FROnT
FAIR RHC OPTIONS AND TRADE

European report on end user decision making factors for Heating and Cooling systems

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CONTENT

EUROPEAN REPORT

EXECUTIVE SUMMARY

The main objective of this report is to identify end-users' decision making factors when making choices about heating and cooling (H&C) systems in five of the participating European countries covered by the FROnT project. These countries are: the Netherlands, Poland, Portugal, Spain and the United Kingdom.

The surveys, conducted in three different sub-sectors: residential, non-residential and industrial, allow us to identify key purchasing criteria (KPC) across the whole sector. These surveys have addressed the heating and cooling sector as whole, not only renewable energy solutions (RES).

A national survey was carried out in each country (national reports are available) under the coordination of the respective energy agency. The number of interviews conducted at European level was: 4,195 in the residential sector, 896 in the non-residential sector and 585 in the industrial sector.

According to the results of surveys, the main energy source employed in all sectors is natural gas followed by electricity. There is also a considerable variability in the industrial sector.

In general, the main information source is professionals' opinions. However its influence is more relevant in the non-residential and industrial sectors than in the residential sector, where there are other important information sources such as the Internet or relatives.

Regarding key purchasing criteria, total economic savings is the most important criterion for the residential sector while for the non-residential sector it is reliability, followed by total economic savings. The industrial sector presents the same pattern as the non-residential sector.

The non-residential sector presents the greatest level of RES technology awareness followed by the industrial sector, making the residential sector the least aware. Overall, the most supported RHC technology is solar thermal energy, particularly in the residential sector. The perception of RHC technologies is very similar in all sectors. It is considered to require high investment costs and to deliver high economic savings.

The main rejection reason for RES technologies in the residential sector is the high investment required, followed by structural changes involved and the need of approval by neighbours or superiors. In the non-residential sector, the latter has less weight than the two former. The main rejection factor in the industrial sector is, by far, the high investment required.

The industrial sector is most willing to pay for RHC, compared to residential and non-residential sectors.

1. OBJECTIVE

The objective of this report is to identify end-users' decision making factors for heating and cooling (H&C) systems in the five participating European countries covered by the FROnT project. These countries are: the Netherlands, Poland, Portugal, Spain and the United Kingdom. This will be the first step in building a model of the decision making process when deciding on installing a heating and cooling system. It will also enable tools that can facilitate stakeholders at European and national level to provide better and transparent information to consumers.

The surveys, conducted in three different sectors: residential, non-residential and industry, allow us to identify key purchasing criteria (KPC) across the whole sector. They also provide information about *"Willingness to pay"*, including environmental and social parameters. These surveys have addressed the heating and cooling sector as whole, not only renewable energy solutions (RES).

2. SURVEYS IN THE PARTICIPATING COUNTRIES

To achieve these objectives a national survey has been carried out in each country (national reports are available) under the coordination of the respective energy agency.

Questionnaires for each analysed sector (residential, non-residential and industrial) were developed by all the partners in order to use a homogenous tool and get comparable results.

The execution time for this activity, excluding subcontracting launch period, was around 2 months.

The number of interviews conducted at European level was: 4,195 in the residential sector, 896 in the non-residential sector and 585 in the industrial sector.

The number of queries classified by country and by sector is shown in the following table. It is also includes the related representativeness of each group.

SECTOR	COUNTRY	NUMBER OF QUERIES	CONFIDENCE LEVEL	SAMPLE ERROR
RESIDENTIAL	NETHERLANDS (NL)	560	95%	4.14%
	POLAND (PL)	960	95%	3.16%
	PORTUGAL (PT)	900	95%	3.27%
	SPAIN (ES)	1,250	95%	2.77%
	UNITED KINGDOM (UK)	525	95%	4.28%
NON-RESIDENTIAL	NETHERLANDS (NL)	15	95%	25.29%
	POLAND (PL)	150	95%	7.97%
	PORTUGAL (PT)	250	95%	6.16%
	SPAIN (ES)	300	95%	5.62%
	UNITED KINGDOM (UK)	181	95%	7.25%
INDUSTRY	NETHERLANDS (NL)	35	95%	16.55%
	POLAND (PL)	100	95%	9.78%
	PORTUGAL (PT)	100	95%	9.78%
	SPAIN (ES)	250	95%	5.62%
	UNITED KINGDOM (UK)	100	95%	9.78%

3. SURVEY ON RESIDENTIAL SECTOR

The survey execution flow diagram is shown in Figures 1 and 2. Question Q5 was not asked in all countries.

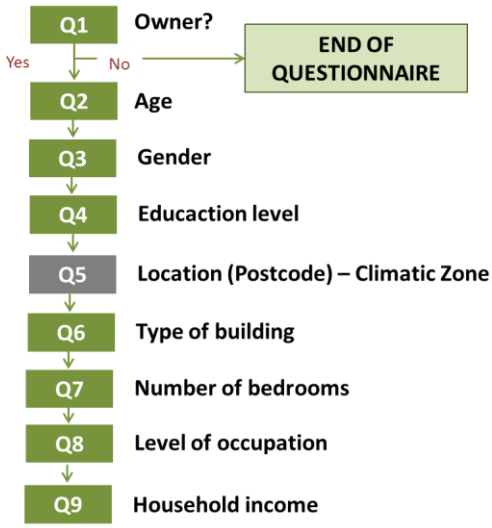


Figure 1 *Characterisation of the sample. Residential sector.*

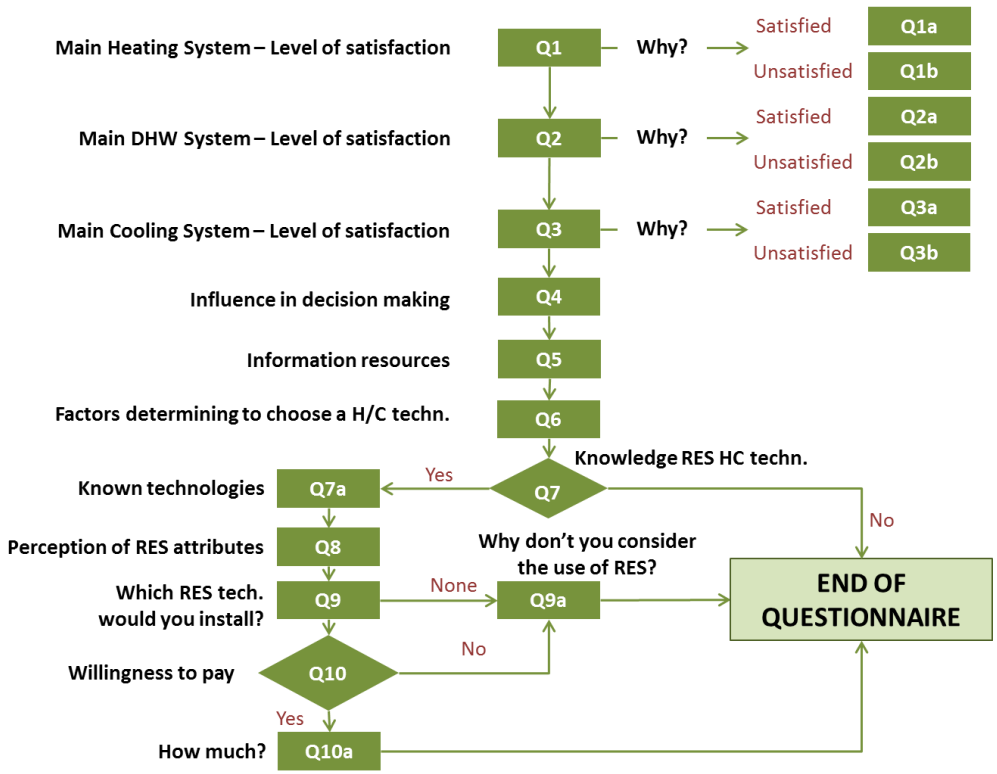
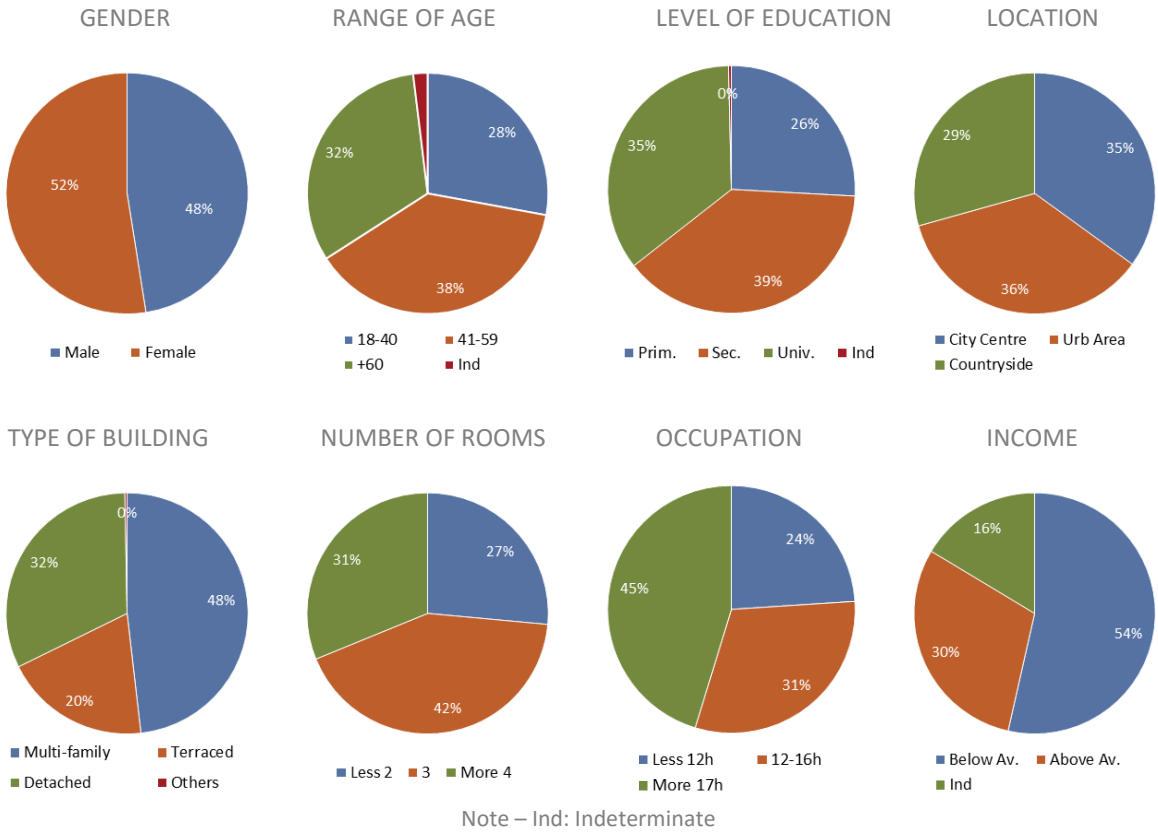


Figure 2 *Flow diagram to follow in questionnaires. Residential sector.*

3.1 MAIN FEATURES OF THE SAMPLE

In the five participating countries, 4,195 interviews were conducted for the residential sector. The main features of the sample interviewed are shown in Figure 3. This sample is balanced compared with the relative figures of the participating countries (in terms of age, gender, level of education, etc.). Additionally, the sample is balanced in each Member State as is described in each national report.



Note – Ind: Indeterminate

Figure 3 *Sample characterisation in the participating European countries.*

3.2 CURRENT HEATING AND COOLING SYSTEMS

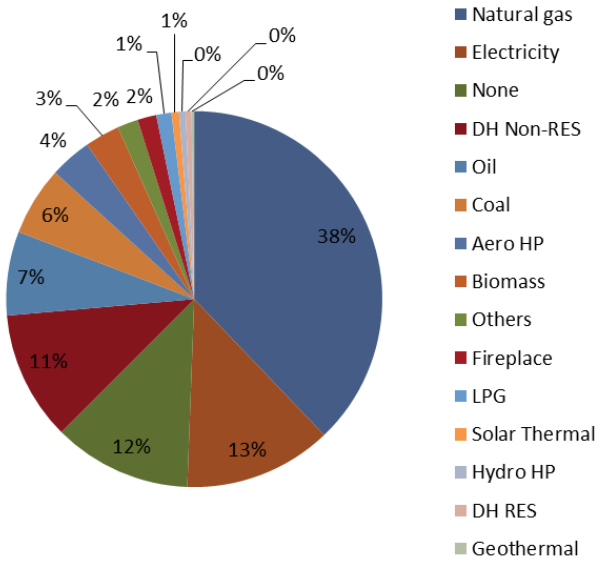


Figure 4 *Heating systems in the participating countries. Residential sector.*

The main heating systems used in the five participating countries are natural gas boilers (38%) and electric devices (13%). Natural gas is the main fuel in the Netherlands, Spain and the United Kingdom. Electricity is mainly used in warm countries (Portugal and Spain). Non-RES district heating is the main option for heating in Poland and it represents 11% of total answers. Coal (6%) is mainly used in Poland, in individual boilers and district heating systems. The contribution of the rest of sources is negligible. There are some biomass installations and fireplaces (3% and 2%, respectively. Portugal is the country with most installations), but the development of other renewable energies is practically inexistent (less than 1%).

There are more decentralised systems (57%) than centralised ones (43%), although the United Kingdom does not have a specific classification for this category. 12% of respondents do not use any heating system, mainly in Spain and Portugal due to the mild climatic conditions.

Heating system satisfaction is very high and it is not really dependant on the sample features, such as age, education, etc. (satisfied – 88%; no answer – 2%; dissatisfied: 10%). Those who use natural gas and biomass are more satisfied than the average, while those who use electric and oil systems are more dissatisfied. For those respondents satisfied with their heating systems, the main satisfaction reasons are: comfort levels (56%) and easy use, reliability and safety (39%). On the other hand, the main dissatisfaction reason is the fuel price (54%).

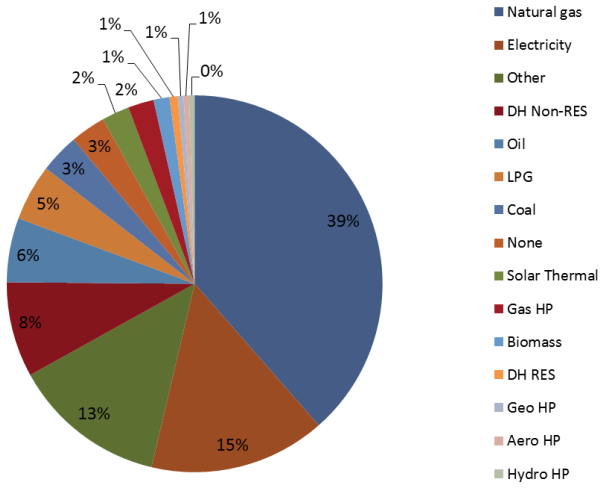


Figure 5 *DHW systems in the participating countries. Residential sector.*

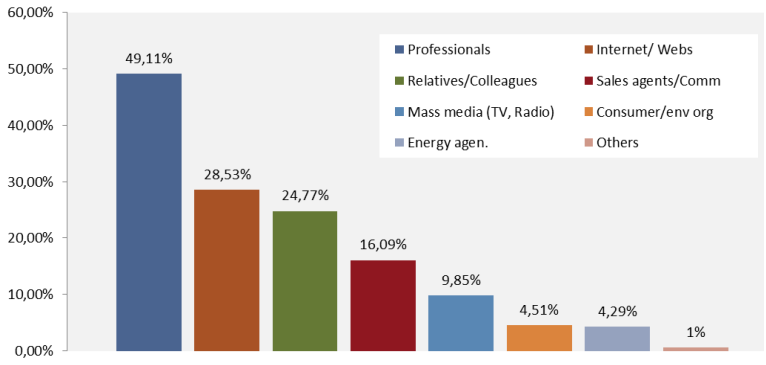
Regarding Domestic Hot Water (DHW), the main systems used in the five participating countries are natural gas boilers (39%) and electricity (15%). Natural gas is the main fuel in the Netherlands, Spain and the United Kingdom. Non-RES district heating (8%) is the main option in Poland. In Portugal, other individual and small-scale technologies, are mainly used.. There are few biomass installations (3%) (Portugal is the country with most installations) and solar thermal installations (2%) (the United Kingdom is the country with most of them).

The satisfaction level is high (satisfied – 90%; no answer – 9%; dissatisfied: 1%) and the main satisfaction reasons are: comfort levels (54%) and easy use, reliability and safety (39%). The different features of the sample (age, gender, etc.) are not really influential. On the other hand, the dissatisfaction is higher for electric system users.

The vast majority of dwellings in the participating countries do not have any cooling system (85%). Obviously, the countries with the largest number of cooling systems are Spain and Portugal (28% and 20% of dwellings have cooling systems respectively). Existing cooling systems are mainly electric air conditioning systems (8% of respondents have them) and heat pumps (4%). In general, the satisfaction about these systems is very high (satisfied – 89%; no answer – 9%; dissatisfied: 2%). The main satisfaction reasons are the easy use (51%) and the high comfort level (48%).

The main reason to use current heating and DHW systems in dwellings is because they already exist there (52% and 50%, respectively). Other reasons given by respondents are: access and fuel costs (18% – 15% in the case of DHW systems) and equipment price (11% in both cases). Legal obligation is not a predominant reason to support the installation of heating and DHW systems. Regarding cooling systems, the main reasons for acquiring the current technology were: equipment price (25%), prior conventional system existence in the dwelling (17%) and access and fuel costs (16%).

3.3 INFORMATION RESOURCES



In all the participating countries, the main information source is professionals (49%) followed by the Internet (29%) and relatives and colleagues (25%). Consulting professionals is the preferred source in Spain and the Netherlands, the Internet is the preferred source in the United Kingdom and Poland. Lastly, sales agents are the preferred source in Portugal.

Figure 6 *Information resources in participating countries. Residential sector.*

In relative terms, men use the Internet more than women, while women rely on the opinion of relatives and colleagues. People between 41 and 59 years-old tend to consult professionals while young people and people with a high level of education prefer using the Internet. People from rural areas rely more on professionals and sales agents' opinions rather than the Internet. Those with income above the average prefer professional opinions and the Internet.

3.4 KEY PURCHASING CRITERIA

This is a multi-option question. Respondents could choose more than one answer. According to this survey, the key purchasing criteria (KPC) identified for H&C systems in the five participating countries are:

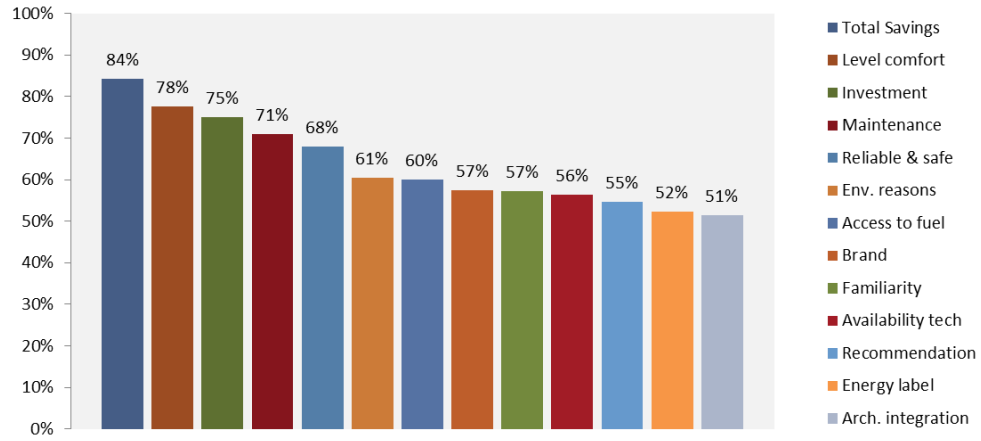


Figure 7 *Key purchasing criteria in the participating countries. Residential sector.*

Total economic savings is the most important criterion to choose H&C systems followed by comfort level (78%). Initial investment is also important (75% of respondents).

Total economic savings is the most important criterion in Poland. Comfort level is the most important factor in Spain, the Netherlands and Portugal (followed in these three countries by total economic savings). Reliability and safety is the major factor in the United Kingdom.

The following tables show the key purchasing factors considering the demographical features analysed. In general, architectural integration and environmental reasons are more relevant for women than for men. Economic savings, investment and maintenance are more important for people between 41 and 59 years-old than for young people. The importance of savings and recommendations from relatives for those who have primary education (higher than the average) is remarkable.

The following tables show the key decision factors in the five participating countries. First column (%) shows the total sample average of answers, while the rest of columns show the average of answers related to each feature. For instance, initial investment is a relevant factor for 75% of the sample. 76% of men chose this option and 75% of women. So, the gender is not influential for this key decision factor.

		Gender		Age				Level Education				Location of the building		
KEY DECISION FACTOR	**%**	*Male*	*Female*	*18-40*	*41-60*	*>60*	*Ind.*	*Prim.*	*Sec.*	*Sup.*	*Ind.*	*City Centre*	*Urban Area*	*Rural Area*
Initial investment	**75%**	75%	76%	71%	80%	76%	43%	86%	72%	71%	75%	80%	71%	74%
Savings along the life expectancy	**84%**	85%	84%	84%	88%	82%	59%	91%	82%	83%	75%	87%	81%	85%
No need of maintenance	**71%**	70%	72%	63%	78%	74%	9%	87%	66%	65%	75%	77%	64%	72%
Guarantee of comfort	**78%**	77%	78%	69%	84%	81%	26%	92%	72%	73%	88%	81%	72%	80%
Environmental reasons	**61%**	59%	62%	54%	66%	63%	21%	75%	54%	57%	75%	67%	55%	60%
Familiarity with the technology	**57%**	55%	60%	51%	63%	59%	6%	75%	54%	48%	56%	66%	51%	54%
Recommendation from others	**55%**	52%	57%	50%	58%	58%	4%	75%	50%	45%	69%	62%	49%	53%
Reliability and safety	**68%**	68%	68%	58%	76%	72%	2%	79%	64%	65%	81%	73%	61%	71%
Existence of energy labelling	**52%**	49%	55%	46%	59%	53%	2%	62%	49%	49%	56%	60%	45%	52%
Availability	**56%**	56%	57%	47%	64%	58%	2%	69%	52%	52%	56%	64%	49%	57%
Accessibility to the fuel	**60%**	59%	61%	51%	69%	61%	4%	71%	55%	57%	69%	67%	52%	62%
Architectural integration	**51%**	49%	54%	43%	59%	53%	4%	60%	47%	50%	50%	59%	44%	53%
Reliable brand/manufacturer	**57%**	58%	57%	48%	62%	64%	2%	74%	52%	51%	63%	57%	54%	62%

		Type of building				Nº Bedrooms			Level occupation			Income average		
KEY DECISION FACTOR	**%**	*Apartment*	*Row house*	*Detached*	*Other*	*Less 2*	*3*	*More 4*	*<12h*	*12-16h*	*>17h*	*Higher*	*Lower*	*Ind*
Initial investment	**75%**	76%	81%	70%	67%	75%	79%	70%	68%	74%	80%	72%	73%	91%
Savings along the life expectancy	**84%**	85%	85%	83%	75%	84%	87%	82%	80%	84%	87%	82%	84%	93%
No need of maintenance	**71%**	71%	79%	65%	83%	70%	77%	64%	58%	69%	79%	66%	68%	91%
Guarantee of comfort	**78%**	77%	84%	76%	83%	76%	83%	73%	68%	76%	84%	73%	77%	96%
Environmental reasons	**61%**	64%	61%	56%	50%	59%	66%	54%	51%	59%	67%	56%	57%	82%
Familiarity with the technology	**57%**	61%	58%	51%	67%	56%	64%	48%	49%	55%	63%	54%	51%	80%
Recommendation from others	**55%**	56%	55%	53%	42%	57%	59%	46%	49%	54%	59%	52%	48%	76%
Reliability and safety	**68%**	67%	78%	64%	83%	64%	75%	62%	54%	67%	77%	62%	69%	86%
Existence of energy labelling	**52%**	55%	56%	46%	50%	46%	60%	47%	38%	53%	60%	49%	51%	66%
Availability	**56%**	59%	58%	51%	75%	54%	64%	49%	41%	58%	64%	51%	56%	75%
Accessibility to the fuel	**60%**	62%	66%	54%	75%	57%	67%	53%	43%	59%	70%	55%	60%	78%
Architectural integration	**51%**	55%	56%	44%	67%	48%	59%	44%	34%	52%	60%	46%	53%	66%
Reliable brand/manufacturer	**57%**	53%	69%	56%	75%	56%	61%	53%	51%	55%	63%	54%	54%	76%

Table 1. Key decision factors chosen by sample features. Residential sector.

3.5 AWARENESS OF RHC

According to the results, 65% of survey respondents in the five participating countries are aware of the use of RHC (renewable heating and cooling) systems. The following tables show the awareness of RHC technologies, considering the different features of the sample. The deviation of each group compared with the total distribution of the number of answers is shown below. For instance, 65% of the total sample is aware of the use of RES, 73% of the total men sample and 58% of the total women sample, so the conclusion could be that men are more aware of RHC than women.

		Gender		Age				Level Education				Location of the building		
	%	*Male*	*Female*	*18-40*	*41-60*	*>60*	*Ind.*	*Prim.*	*Sec.*	*Sup.*	*Ind.*	*City Centre*	*Urban Area*	*Rural Area*
Yes	65%	73%	58%	67%	69%	59%	73%	53%	64%	76%	63%	65%	69%	62%
No	35%	27%	46%	33%	31%	41%	27%	47%	36%	24%	38%	35%	31%	38%

		Type of building				Nº Bedrooms			Level occupation			Income average		
	%	*Apartment*	*Row house*	*Detached*	*Other*	*Less 2*	*3*	*More 4*	*<12h*	*12-16h*	*>17h*	*Higher*	*Lower*	*Ind*
Yes	65%	64%	59%	72%	67%	61%	64%	72%	69%	69%	61%	62%	76%	57%
No	35%	36%	41%	28%	33%	39%	36%	28%	31%	31%	39%	38%	24%	43%

		Country				
	%	*ES*	*NL*	*PL*	*PT*	*UK*
Yes	65%	63%	47%	73%	63%	79%
No	35%	37%	53%	27%	27%	21%

Note - Ind: Indeterminate

Table 2. Awareness of RHC by sample features. Residential sector.

The most well-known technologies for those who are familiarised with RHC (65%) are represented in the following table. Solar thermal energy is the most well-known RHC technology, followed by biomass:

TECHNOLOGY/SOURCE	HEATING/DHW	COOLING
Solar thermal	96%	37%
Biomass	49%	18%
Air-source heat pumps	40%	19%
Geothermal heat pumps	42%	19%
RES-based District Heating/Cooling	21%	11%

Table 3. List of the known RHC technologies. Residential sector.

Data should be interpreted as the 96% of the respondents familiarised with RHC (65%) would be familiarised with solar thermal energy for heating uses. It means that 62% (0.65 x 0.96) of the total sample would be familiarised with solar thermal energy.

3.6 PERCEPTION OF RHC ATTRIBUTES

The perception of RHC attributes of those survey respondents familiarised with RES (65%) is shown in the following table:

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

Table 4. Perception of RHC attributes by respondents. Residential sector.

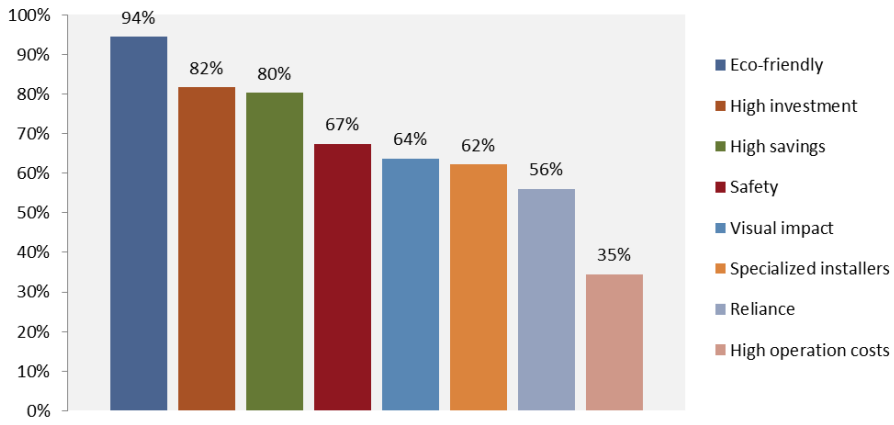


Figure 8 *RHC perception in all participating countries. Residential sector.*

Most of the respondents think that RHC is more respectful of the environment and more expensive than non-renewable technologies. However, they are aware that RHC imply more economic savings, lower operation costs and higher safety compared with fossil fuel technologies. In addition, respondents think that RHC system installers are more specialised. Regarding reliance, the survey shows that the perception is almost equal for RHC and non-renewable technologies.

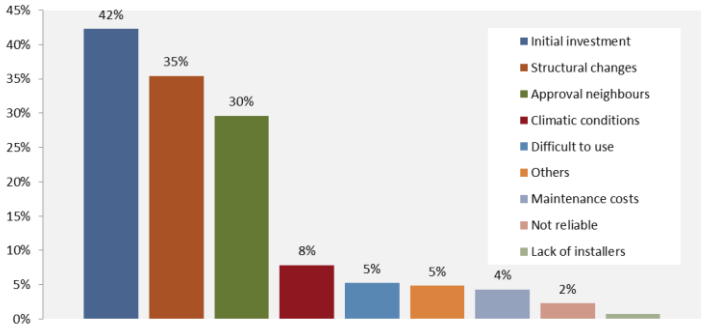
Features of the sample such as age and gender do not have a strong influence on the answers to this question, although men are slightly more likely than women to think that RHC technologies are slightly more expensive. Those with primary education think that RHC technologies are more reliable although they involve more operating costs.

Analysing the results by country, in Spain and the Netherlands respondents think that the installers are much less specialised in RHC facilities than in other non-renewable technologies. In the rest of countries the results are aligned.

3.7 ADEQUACY OF RHC

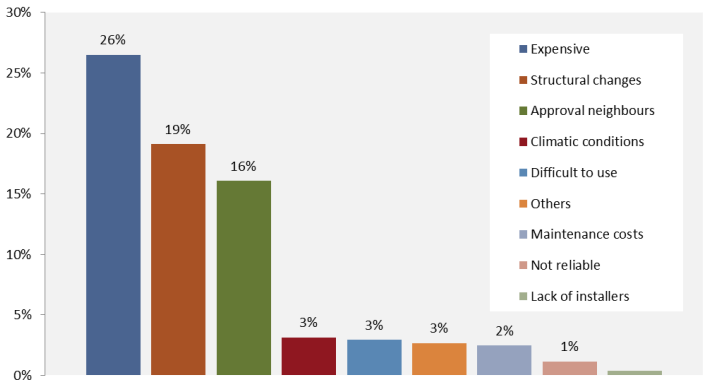
With regards to the question about the most suitable renewable energy technology to be incorporated in their dwellings, 27% of respondents who are familiarised with RHC (65%) believe that no renewable energy technology is suitable for their heating and DHW systems. Women and those who live in city centres and in multi-family dwellings are more reluctant to install RHC than the rest of the sample groups. Income does not seem to be a factor that influences the decision of installing a RHC system. The income influence percentage is above the average in Spain and Poland (34% and 36% of respondents, respectively).

On the other hand, 39% of respondents who are familiarised with RHC (65%) do not consider any incorporation of renewable energies in cooling systems. In this case, women, people below 40 years-old, people over 60 years-old and those whose income is below the average are also more reluctant to install any cooling system. Reluctance percentage is above the average in Poland (63%), the Netherlands (51%) and Portugal (47%).



The main rejection reasons for using RES in heating or DHW systems are: initial investment (42%) and structural changes required in dwelling (35%). Figure 9 shows the answers distribution for the rest of reasons.

Figure 9 *Rejection reasons for using RES in heating and DHW systems in participating countries. Residential sector.*



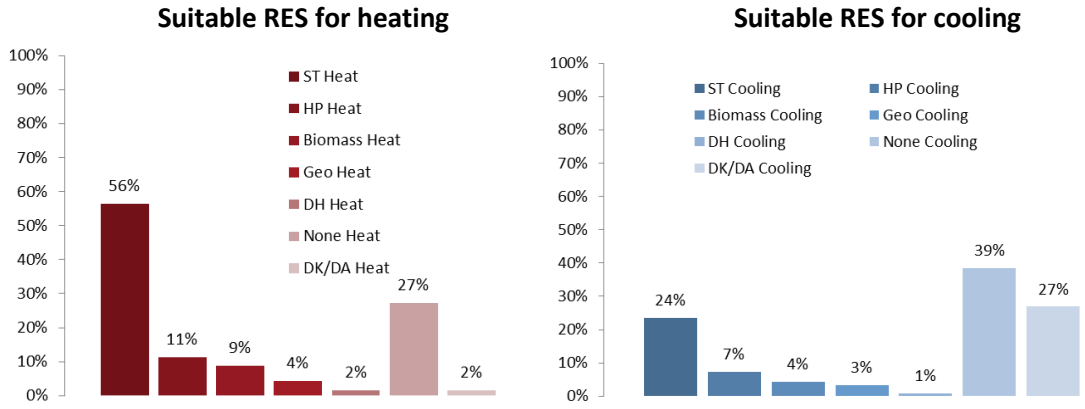
The main rejection reasons for using RES in cooling systems are also initial investment (26%) and structural changes required (19%). Figure 10 shows the distribution of the rest of reasons. The lack of installers is not a significant RES rejection reason in Europe, its result is negligible.

Figure 10 *Rejection reasons for using RES in cooling systems in participating countries. Residential sector.*

71% of respondents who are familiarised with RHC (65%) consider the installation of some RES technologies for heating or DWH systems (2% of respondents do not answer this question). According to the results, the preferred technology to be used is solar thermal energy (56%).

Figure 11 shows the RES technologies most considered for heating and DHW systems in Europe. Solar thermal energy is preferred in detached and big dwellings (more than 4 bedrooms). Biomass and geothermal energy are preferred by people from rural areas. People who live in city centres and those with low incomes are more reluctant to install any RHC.

35% of respondents who are familiarised with RHC (65%) support the installation of RES technologies for cooling systems. Solar thermal energy is the most common response (24%). Again, people with low incomes are more reluctant to install any RHC technology.

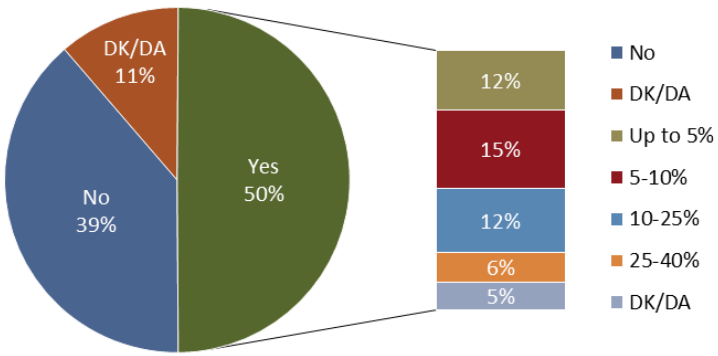


Note - DK/DA: Do not know/do not answer

Figure 11 *Suitable RHC technologies in participating countries. Residential sector.*

3.8 WILLINGNESS TO PAY

Considering the total sample of the respondents who are familiarised with RHC (65%), 50% of them would be willing to make a higher initial investment, 39% would not, and 11% did not answer this question. Figure 12 shows the percentage of respondents familiarised with RHC (65%) that are willing to pay for a RHC system. According to the results, 12% of respondents would pay up to 5% more for an RHC system, 15% would pay between 5 and 10%, 12% would pay between 10-25%, 6% would pay between 25-40% and 5% did not answer this question.



Note - DK/DA: Do not know/do not answer

Figure 12 *Willingness to pay for RHC technologies. Residential sector.*

In general, men, young people and those with university a university level education are more willing to pay more for a RHC system than the rest. This is also the case for people who live in the countryside. The willingness to pay is lower in Portugal than in the rest of countries (28%).

4. SURVEY ON NON-RESIDENTIAL SECTOR

The survey execution flow diagram is shown in Figures 13 and 14. Question Q5 was not asked in all countries.

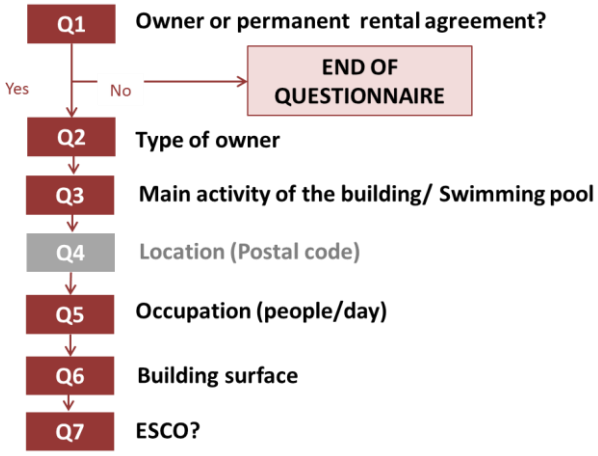


Figure 13 *Sample characterisation in non-residential sector*

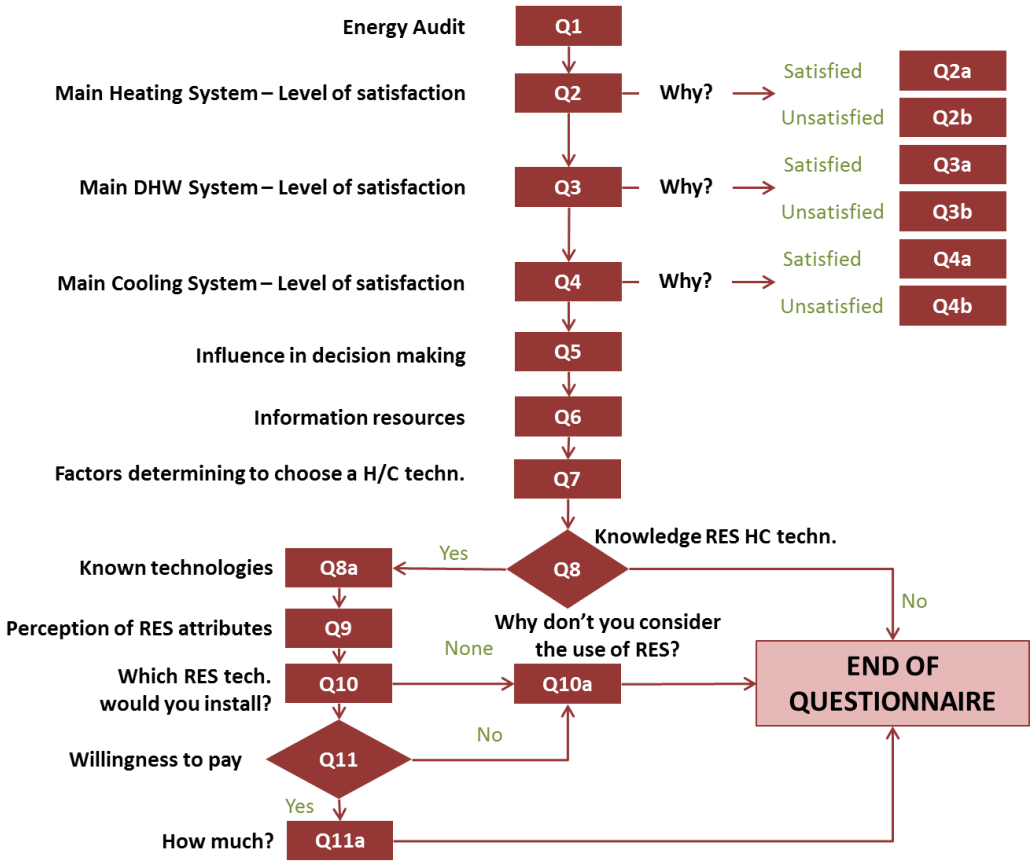
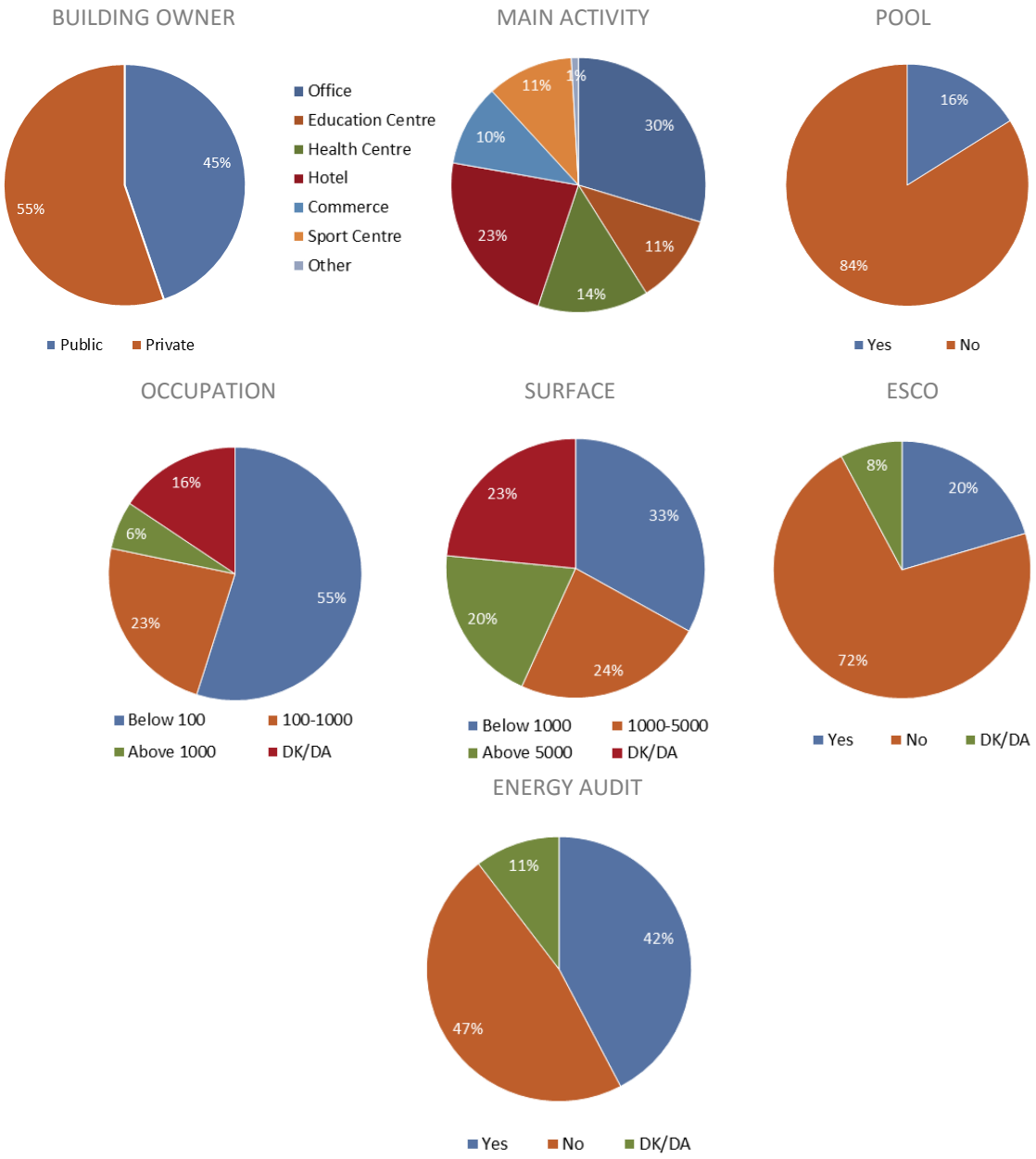


Figure 14 *Flow diagram to follow in questionnaires. Non-residential sector.*

4.1 MAIN FEATURES OF THE SAMPLE

In total, 896 interviews were conducted in the non-residential sector in the five participating countries. The main features of the sample interviewed are shown in Figure 15. This sample is balanced (in terms of building owner, main activity, etc.) compared with the total data of the countries.



Note - DK/DA: Do not know/do not answer

Figure 15 *Sample characterisation in the participating European countries. Non-residential sector.*

4.2 CURRENT HEATING AND COOLING SYSTEMS

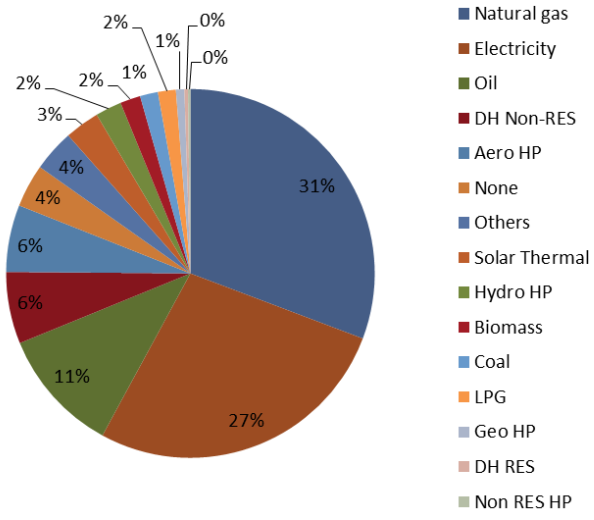


Figure 16 *Heating systems in the non-residential buildings in the participating countries*

The main heating systems used in the five participating countries are natural gas boilers (31%) and electric devices (27%). Natural gas is the main energy source in the Netherlands, Spain, Poland and the United Kingdom. Electricity is the main source in Portugal. Oil is the second fuel option for Spanish non-residential buildings and it represents 11% of the total sample. Non-RES district heating is the second technology in Poland and it represents 6% of the total.
4% of respondents do not have any heating system; this is mainly in Portugal and Spain.

In general, RHC contribution is low. There are few solar thermal installations (3%), biomass installations (2%) and heat pumps: –aero (6%) and hydro-thermal (2%). Also, there are more centralised systems (67%) than decentralised (23%).

The heating system satisfaction is high and it is not really dependant on any feature sample, such as age, education, etc. (satisfied: 85%; no answer: 2%; dissatisfied: 13%). Those who use natural gas and biomass are more satisfied than the average, while those who use electric and oil systems are more dissatisfied. The main satisfaction reasons are: comfort levels (70%) and the easy use, reliability and safety (23%). In contrast, the most common dissatisfaction reason is fuel price (38%).

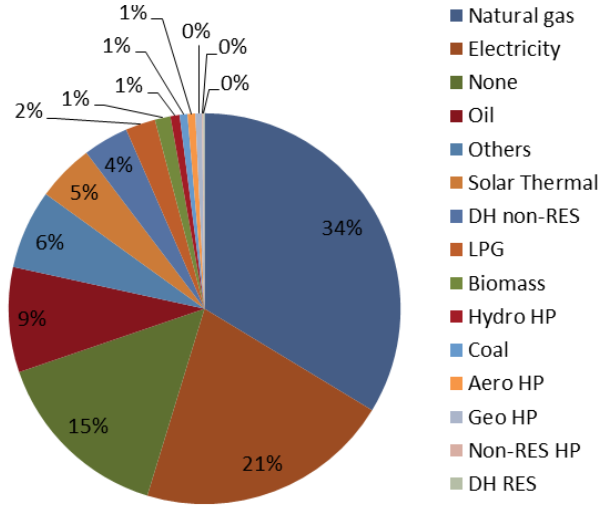


Figure 17 *DHW systems in the non-residential buildings in the participating countries*

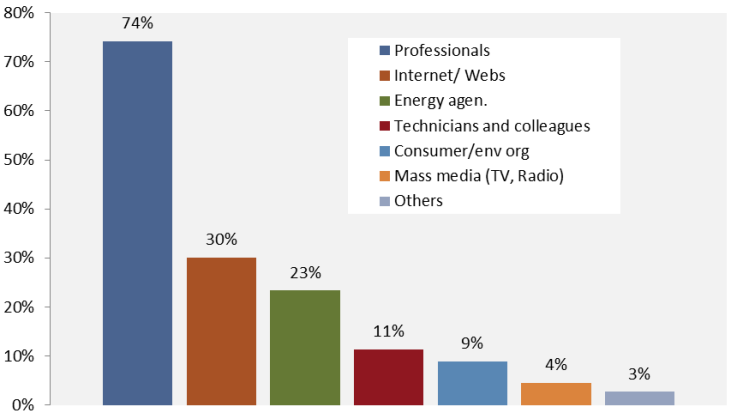
Regarding Domestic Hot Water (DHW), the main systems used in non-residential buildings in the five participating countries are natural gas boilers (34%) and electric heaters (21%). Natural gas is the main fuel used in the Netherlands, Spain, Portugal and the United Kingdom, while electric devices are more used in Poland. Of the buildings in the sample 15% do not have any DHW systems (mainly in Spain and Portugal). Regarding RHC, solar thermal energy is quite common in all these countries (5%) although the rest of RES do not even reach 1% (e.g. biomass, heat pumps, geothermal, etc.)

The satisfaction level is high (satisfied: 86%; no answer: 2%; dissatisfied: 12%) and the main satisfaction reasons are: good comfort levels (62%) and ease of use, reliability and safety (26%). Satisfaction is higher for natural gas users and lower for oil users. The main dissatisfaction reason is fuel price (28%).

Of non-residential buildings, 37% do not have any cooling system but 43% have air conditioning systems. Heat pumps (aero- and hydro- thermal) are quite common in Spain and the Netherlands and they represent together 14% of the total sample. The rest of systems are not very used in the participating countries so their percentage is negligible. In general, cooling system satisfaction is very high (satisfied: 87%; no answer: 2%; dissatisfied: 11%) because of their high comfort levels (61%) and their easy use (23%).

The main reason for the use of current systems in non-residential buildings for heating and DHW applications is that they are already installed (24% for heating systems and 21% for DHW systems) and the imposition from superiors (23% and 17% respectively). Legal obligation is not a predominant reason for heating and DHW systems installation (4% and 3%, respectively). The main reason for the use of current cooling systems is the same, namely prior existence in the building (19%).

4.3 INFORMATION RESOURCES



In all the participating countries, the main information sources are the professionals (74%) followed by the Internet (30%) and energy agencies (23%).

Figure 18 *Information resources in participating countries. Non-residential sector.*

In relative terms, managers of public buildings prefer mainly energy agencies and the Internet as information sources, while managers of private buildings prefer professionals' advice. The Internet is more used by office buildings. Finally, energy agencies are preferred by health-care sector.

4.4 KEY PURCHASING CRITERIA

According to this survey the key purchasing criteria (KPC) for H&C systems in non-residential buildings for the five participating countries are:

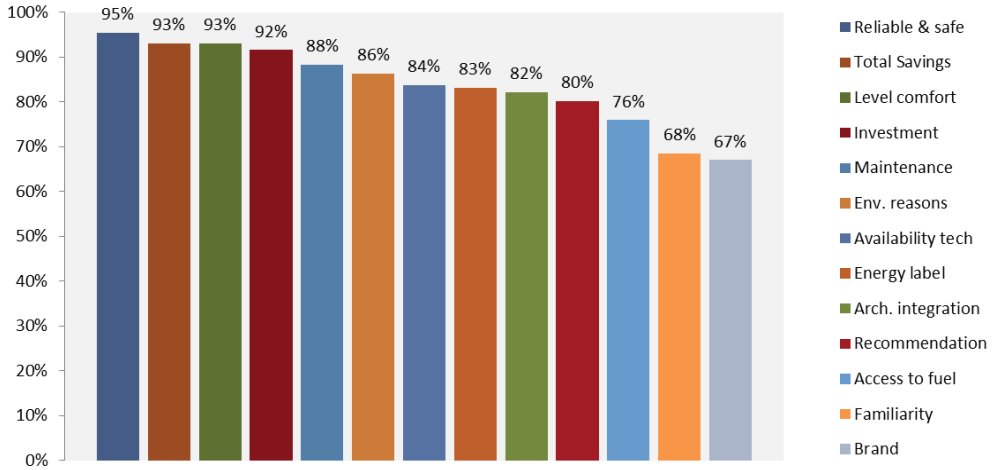


Figure 19 *Key purchasing criteria in the participating countries. Non-residential sector.*

It is a multi-option question; the percentage corresponds to the number of answers compared with the total sample. Reliability and safety is most common criterion to choose heating and cooling (H&C) systems, followed by total economic savings and comfort levels (93%). Initial investment is also important (92% of respondents). Total savings and initial investment are the most relevant criteria in Poland. Reliability and safety is the most common factor in Spain and the United Kingdom. Finally, maintenance, comfort levels and environmental reasons are the most relevant criteria in the Netherlands while in Portugal it is the initial investment.

Table 5 shows the key purchasing factors considering the criteria analysed. The first column (%) shows the answer average in the total sample, while the rest of columns show the average of answers related to each feature. For instance, investment is a relevant factor for 92% of the sample. 95% of office buildings chose this option and 85% of educational centres. So, the activity of the building is influential for this key decision factor.

KEY DECISION FACTOR	%	Building owner		Main of activity						Pool		Country				
		Public	*Private*	*Offices*	*Commerce*	*Health Centres*	*Hotels*	*Educational Centres*	*Sport Centres*	*Yes*	*No*	*ES*	*NL*	*PL*	*PT*	*UK*
Investment	**92%**	92%	91%	95%	86%	94%	90%	85%	94%	94%	91%	89%	47%	97%	100%	83%
Total economic savings	**93%**	95%	92%	97%	92%	92%	90%	91%	92%	93%	93%	91%	87%	97%	98%	87%
Maintenance	**88%**	89%	88%	88%	90%	90%	87%	88%	85%	90%	88%	88%	93%	89%	94%	79%
Level comfort	**93%**	93%	93%	94%	96%	91%	92%	91%	93%	95%	93%	93%	93%	92%	97%	88%
Environmental reasons	**86%**	92%	82%	93%	90%	83%	82%	80%	84%	92%	85%	86%	93%	93%	95%	69%
Familiarity	**68%**	67%	70%	67%	63%	70%	74%	72%	61%	76%	67%	61%	53%	72%	78%	66%
Recommendation	**80%**	80%	81%	83%	69%	80%	83%	78%	80%	88%	79%	75%	60%	77%	96%	71%
Reliable & safe	**95%**	96%	95%	96%	96%	96%	94%	94%	96%	98%	95%	94%	87%	95%	100%	92%
Energy label	**83%**	82%	84%	85%	82%	83%	84%	82%	79%	90%	82%	80%	47%	84%	98%	69%
Availability tech	**84%**	89%	80%	89%	85%	85%	74%	84%	86%	90%	82%	82%	67%	90%	100%	60%
Access to fuel	**76%**	89%	65%	81%	80%	80%	72%	70%	70%	88%	74%	93%	67%	95%	100%	
Arch. integration	**82%**	85%	80%	85%	84%	90%	77%	75%	80%	90%	81%	87%	53%	79%	98%	57%
Brand	**67%**	63%	71%	75%	61%	68%	64%	69%	56%	72%	66%	40%	60%	70%	96%	70%

KEY DECISION FACTOR	%	Occupation				Surface				ESCO			ENERGY AUDIT		
		Below 100	*100-1000*	*Above 1000*	*DK/DA*	*Below 1000*	*1000-5000*	*Above 5000*	*DK/DA*	*Yes*	*No*	*DK/DA*	*Yes*	*No*	*DK/DA*
Investment	**92%**	94%	92%	71%	89%	91%	98%	87%	90%	92%	92%	84%	89%	94%	89%
Total economic savings	**93%**	95%	94%	89%	86%	93%	96%	93%	90%	93%	94%	84%	92%	96%	88%
Maintenance	**88%**	90%	88%	87%	84%	86%	90%	91%	87%	93%	88%	81%	90%	88%	83%
Level comfort	**93%**	94%	92%	93%	90%	93%	95%	93%	91%	92%	94%	83%	93%	93%	90%
Environmental reasons	**86%**	86%	89%	89%	82%	85%	92%	87%	81%	90%	87%	66%	89%	86%	77%
Familiarity	**68%**	71%	68%	65%	61%	70%	71%	71%	62%	63%	70%	71%	69%	69%	63%
Recommendation	**80%**	85%	73%	80%	74%	85%	85%	77%	71%	80%	82%	67%	80%	82%	71%
Reliable & safe	**95%**	96%	96%	91%	93%	94%	99%	96%	93%	98%	95%	89%	95%	96%	92%
Energy label	**83%**	87%	80%	82%	75%	82%	89%	84%	78%	81%	84%	79%	83%	86%	71%
Availability tech	**84%**	83%	87%	82%	81%	79%	94%	87%	77%	81%	86%	70%	83%	86%	76%
Access to fuel	**76%**	72%	78%	78%	86%	71%	92%	80%	63%	75%	81%	34%	76%	81%	53%
Arch. integration	**82%**	84%	80%	67%	85%	77%	91%	77%	85%	83%	83%	74%	78%	86%	81%
Brand	**67%**	79%	56%	64%	41%	70%	70%	72%	55%	65%	69%	54%	66%	71%	52%

Note - DK/DA: Do not know/do not answer

Table 5. Key decision factors chosen by sample feature. Non-residential buildings.

4.5 AWARENESS OF RHC

Of the survey respondents in all the participating countries, 88% are aware of the use of RHC technologies. The following tables show the consciousness of RHC systems, considering the sample features. The deviation of each group compared with the distribution of the total answers is also shown:

		Building owner		Main of activity							Pool	
	%	*Public*	*Private*	*Offices*	*Comm.*	*Health Centres*	*Hotels*	*Educational Centres*	*Sport Centres*	*Others*	*Yes*	*No*
Yes	88%	92%	84%	94%	88%	81%	86%	82%	85%	100%	92%	87%
No	12%	8%	16%	6%	12%	19%	14%	18%	15%	0%	8%	13%

		Occupation				Surface				ESCO			ENERGY AUDIT		
	%	*Below 100*	*100-1000*	*Above 1000*	*DK/DA*	*Below 1000*	*1000-5000*	*Above 5000*	*DK/DA*	*Yes*	*No*	*DK/DA*	*Yes*	*No*	*DK/DA*
Yes	88%	89%	87%	87%	84%	91%	94%	90%	73%	88%	91%	59%	92%	89%	65%
No	12%	11%	13%	13%	16%	9%	6%	10%	27%	12%	9%	41%	8%	11%	35%

		Country				
	%	*ES*	*NL*	*PL*	*PT*	*UK*
Yes	88%	81%	100%	100%	100%	69%
No	12%	19%	0%	0%	0%	31%

Note - DK/DA: Do not know/do not answer

Table 6. Awareness about RHC by sample feature. Non- residential sector.

Well-known technologies for those who are familiarised with RHC (88%) are represented in the following table. Solar thermal energy is the most well-known technology, followed by biomass and heat pump, but their differences are significant:

TECHNOLOGY/SOURCE	HEATING/DHW	COOLING
Solar thermal	89%	40%
Biomass	57%	6%
Air-source heat pumps	46%	16%
Geothermal heat pumps	42%	7%
RES-based District Heating/Cooling	15%	2%

Table 7. List of the known RHC technologies. Non-residential sector.

The data should be interpreted as meaning that the 89% of the respondents familiarised with RHC (88%) would be familiarised with solar thermal energy for heating uses. This means that 78% (0.89 x 0.88) of the total sample would be familiarised with solar thermal energy.

4.6 PERCEPTION OF RHC ATTRIBUTES

The perception of the attributes of RHC by those survey respondents who are familiarised with it (88%) is shown in the following table:

ATTRIBUTE	RENEWABLES	NON-RENEWABLES
Higher initial investment	87%	13%
Higher operation costs (maintenance and fuel)	29%	71%
Higher savings along the life expectancy of equipment	88%	12%
More eco-friendly	97%	3%
Higher working reliance	59%	41%
Higher visual impact and/or need of space to install/store fuel	63%	37%
Safer	74%	26%
More specialised installers	68%	32%

Table 8. Perception of RHC attributes by respondents. Non-residential sector.

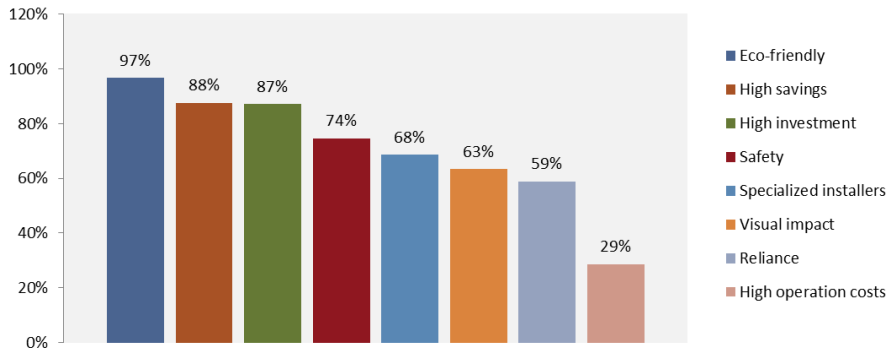


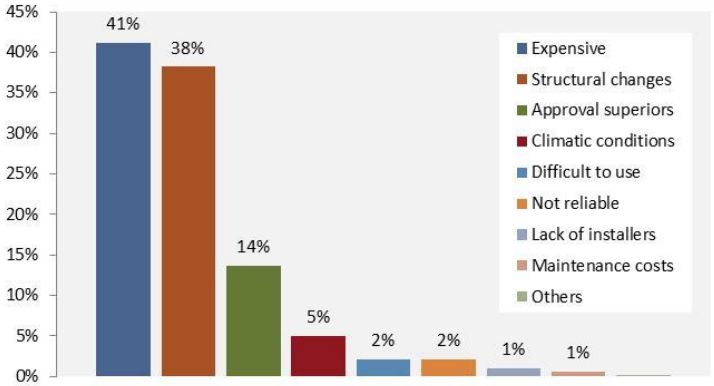
Figure 20 *RHC perception in all participating countries. Non-residential sector.*

Respondents think that RHC is more respectful of the environment and more expensive than non-renewable technologies. They also think that RHC technologies imply more economic savings, lower operational costs, higher levels of safety and greater visual impacts. In addition, respondents say that RHC installers are highly specialised and that the installations are more reliable.

It is not clearly appreciated any influence of the general building features in the RHC attributes perception. Analysing the results by country, initial RHC investment is above average in Portugal and Poland. In Spain and the Netherlands respondents consider RHC installers much less specialised than installers of non-renewable technologies. Respondents in ES and NL are less likely to consider RHC as safe, compared to those in other countries'. The rest of results are quite aligned for all countries.

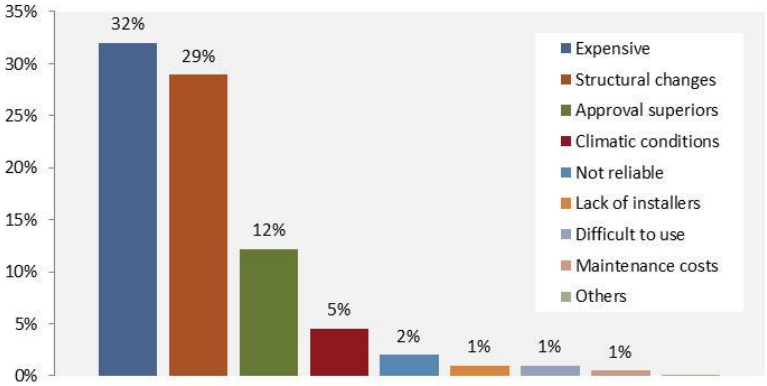
4.7 ADEQUACY OF RHC

Regarding the perception of adequacy of RHC for non-residential buildings 25% of respondents who are familiarised with RHC (88%) do not think that any of them are adequate for heating or DHW systems. In general, managers of public buildings, offices, commerce, those without any energy audit, and those that do not receive any service from an energy service company (ESCO) are more reluctant to install RHC technologies. This percentage is above the average in Poland, Portugal, and the United Kingdom (28%, 32%, and 36% of respondents respectively). Regarding the incorporation of renewable energies in cooling systems, 25% of the total does not support this. Of this group, managers of public buildings are the most reluctant. The rejection percentage is above the average in Poland (26%) and Portugal (42%).



The main reasons for rejecting RES in heating or DHW systems are: initial investment (41%) and structural changes required in buildings (38%). Figure 21 shows the distribution of the rest of the rejection reasons.

Figure 21 *Rejection reasons for RHC heating and DHW systems in participating countries.*

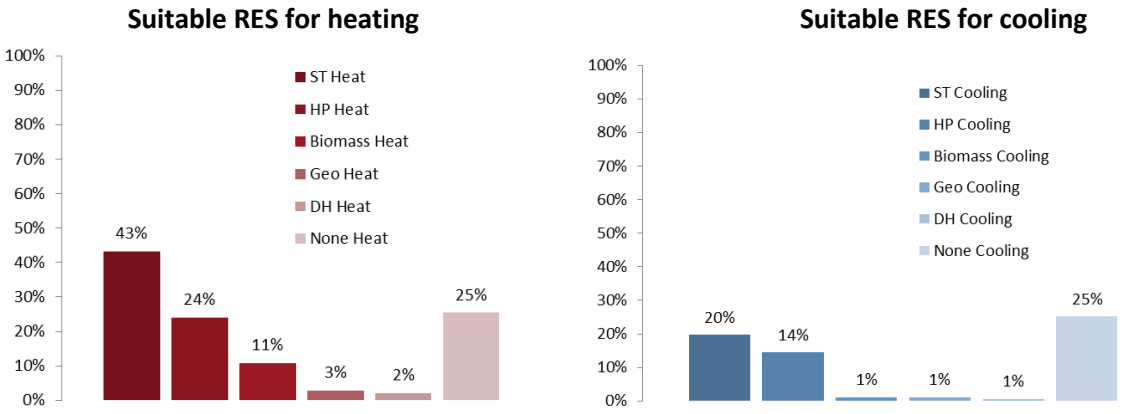


The main rejection reasons for using RES in cooling systems are also initial investment (32%) and the structural changes in buildings (19%). Figure 22 shows the distribution of the rest of these reasons.

Figure 22 *Rejection reasons for RHC cooling systems in participating countries*

83% of respondents familiarised with RHC support the possibility of using these technologies in heating and DWH systems. According to the results obtained, the favourite technology for all countries is solar thermal energy (43%). Figure 23 shows the most suitable RHC technologies for heating and DHW systems in Europe. Solar thermal energy is preferred by managers of educational and sport centres. Regarding biomass, it is preferred by managers of educational centres. The preference of solar thermal energy suitability is above the average in Spain, Portugal and the United Kingdom, whilst and heat pumps are the most preferred in the Netherlands and Poland.

Of the respondents familiarised with RHC, (32%) think about the possibility of installing RES technologies in cooling systems. Solar thermal systems are the preference for respondents (20%). Solar thermal energy is more popular in Portugal, while heat pumps are the most popular in the Netherlands.



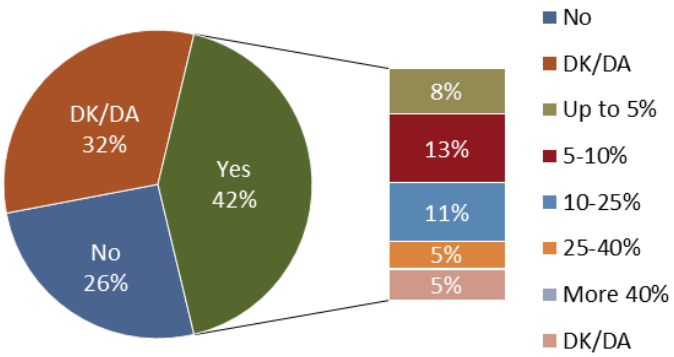
Note - DK/DA: Do not know/do not answer

Figure 23 *Suitable RHC technologies in participating countries. Non-residential buildings.*

4.8 WILLINGNESS TO PAY

Of the respondents familiarised with RHC, (42%) would be willing to pay more money, 26% of them would not make a higher initial investment, and 32% did not answer this question. People are more willing to pay in the Netherlands, Spain, Poland, and the United Kingdom and less in Portugal, where only 18% of respondents would pay more for RHC systems.

Figure 24 shows the percentage of respondents familiarised with RHC (88%) that are willing to pay more for a RHC system in the non-residential sector. According to the results, 8% of respondents familiarised with RHC (88%) would pay up to 5% more, 13% would pay between 5-10%, 11% would pay between 10-25%, 5% would pay between 25-40% and 5% do not answer this question.



Note - DK/DA: Do not know/do not answer

Figure 24 *Willingness to pay for RHC technologies. Non-residential sector.*

5. SURVEY ON INDUSTRIAL SECTOR

The survey execution flow diagram is shown in Figure 25 and 26.

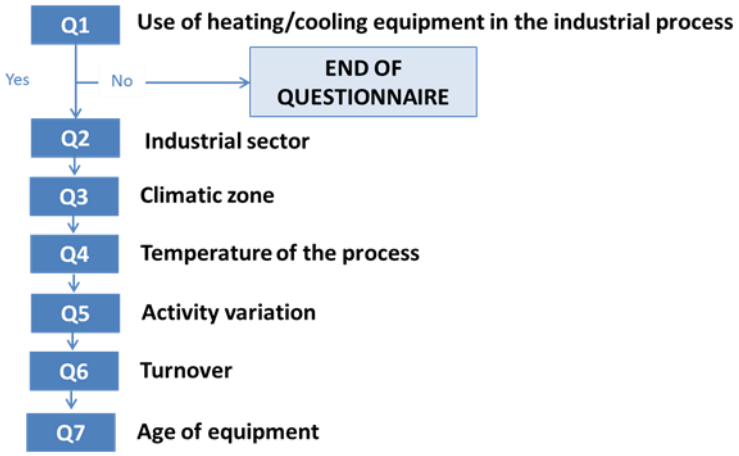


Figure 25 *Sample characterisation in industrial sector*

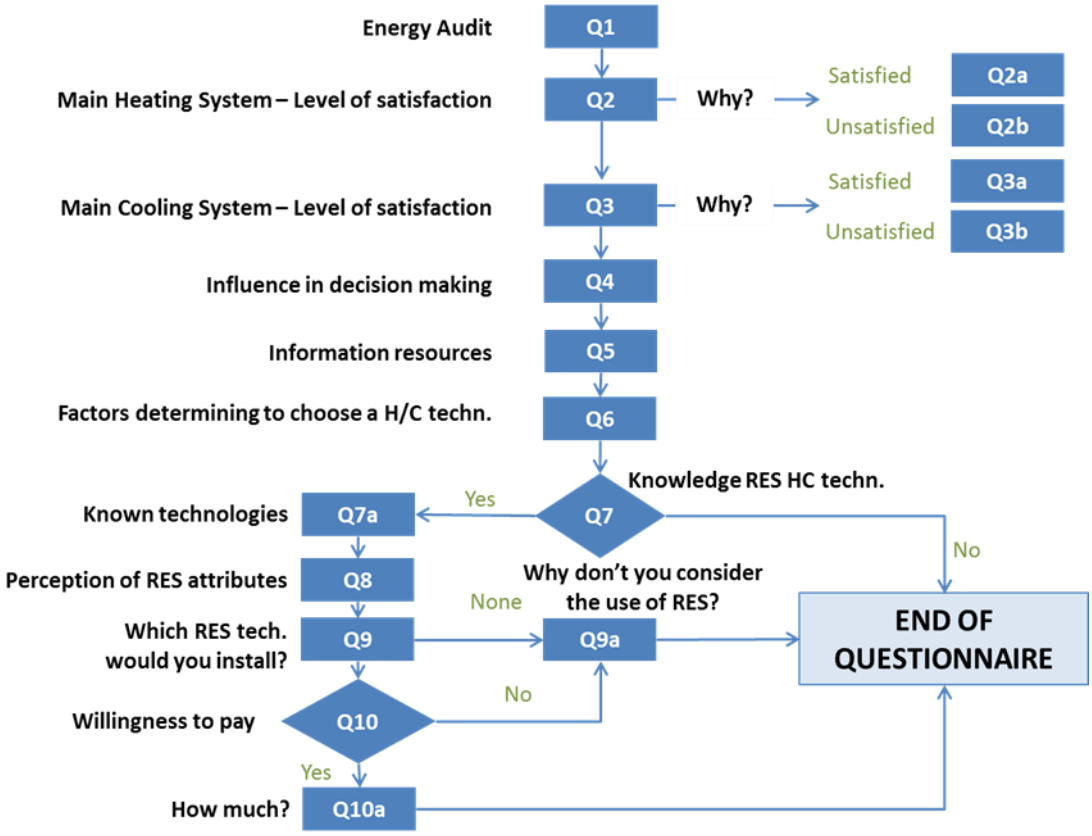
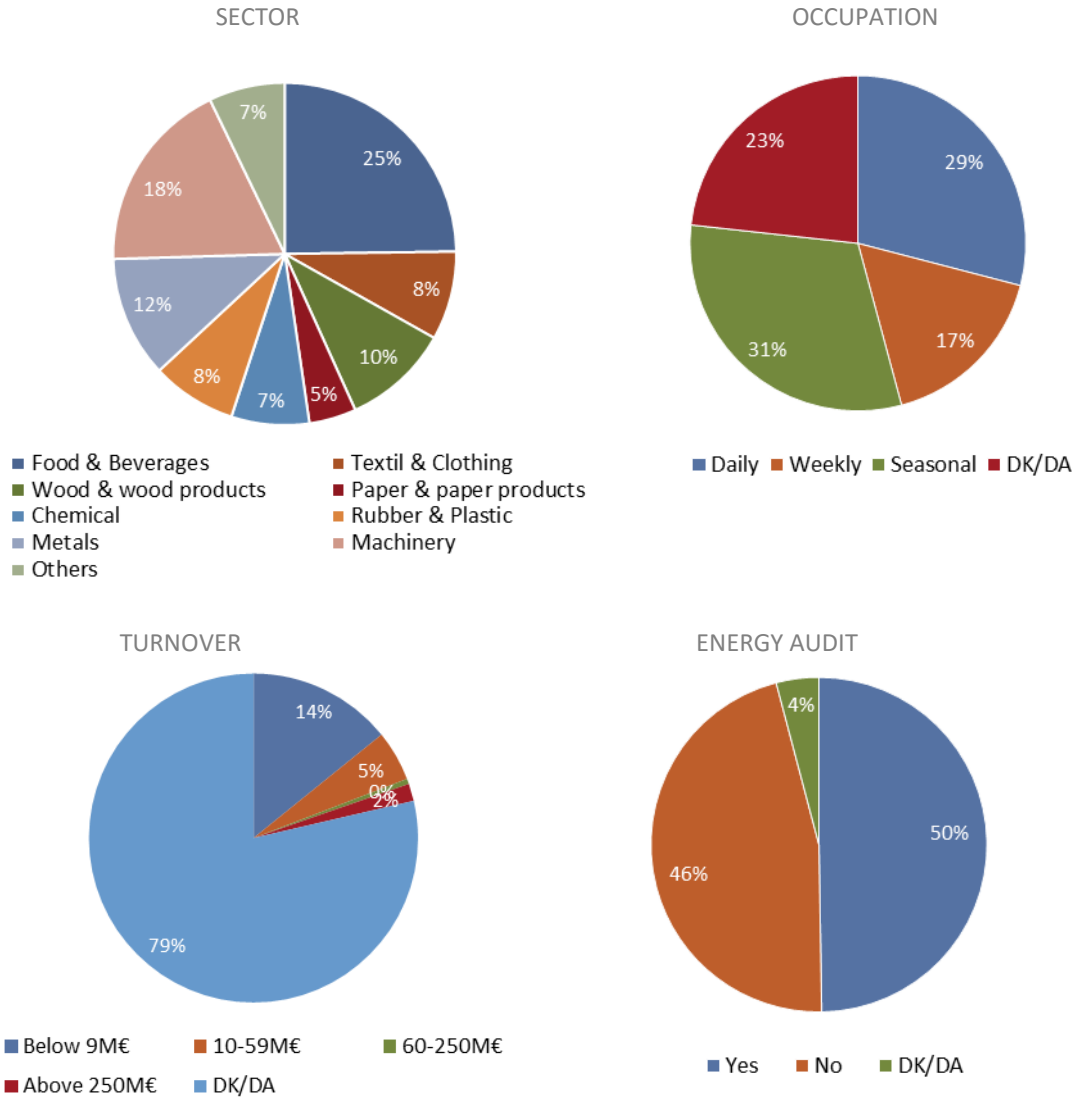


Figure 26 *Flow diagram to follow in questionnaires. Industrial sector.*

5.1 MAIN FEATURES OF THE SAMPLE

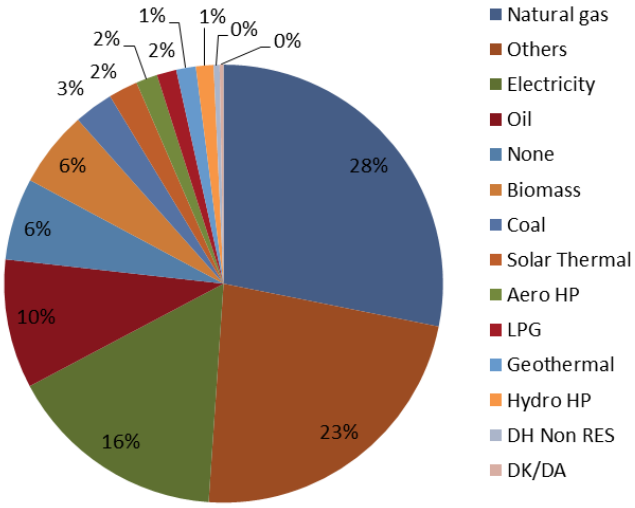
In total, 585 interviews were conducted for the industrial sector in the five participating countries. The main sample features are depicted in Figure 27. The sample is balanced (in terms of sector, occupation, turnover and energy audit) comparing with the total data of all countries.



Note - DK/DA: Do not know/do not answer

Figure 27 *Sample characterisation in the participating European countries. Industrial sector.*

5.2 CURRENT HEATING AND COOLING SYSTEMS

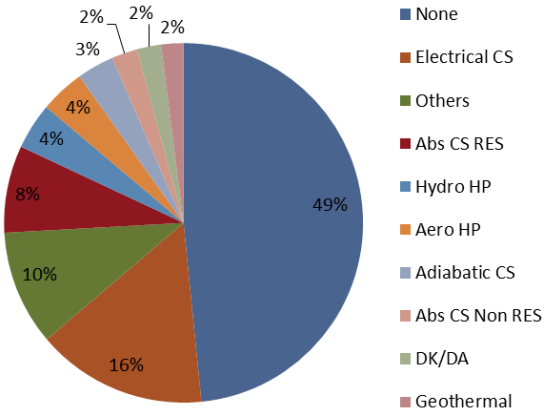


Note - DK/DA: Do not know/do not answer

Figure 28 *Heating systems in the industrial sector in all participating countries*

The main heating systems used in all the participating countries are natural gas boilers (28%) and other systems based on the recovery of heat from industrial processes (23%). Natural gas is the main fuel used in the Netherlands, the United Kingdom, and Poland. Electricity is the main energy source in Portugal and other systems are preferred in Spain. The presence of RES is low in general. 6% of respondents use biomass as energy source (mainly in Spain, Poland, and the United Kingdom). The percentage of other renewable energies percentage is negligible (solar thermal: 2%; geothermal: 1%).

The level of satisfaction with heating systems is high (satisfied: 91%; no answer: 3%; dissatisfied: 6%) and is not really dependant on the industrial sub-sector. Industries with seasonal production are, in general, less satisfied than the others. Satisfaction does not depend on the fuel type. The main satisfaction reasons are: system adaptation to the process conditions (58%), the ease of use, reliability and safety (29%) and the equipment price (24%). On the other hand, main dissatisfaction reasons are equipment price (73%) and fuel price (53%).



Regarding cooling systems, 49% of respondents do not use them, and those who do mainly use electric cooling systems (16%). The second position is occupied by electrical cooling systems (16%). RES are present, mainly, in absorption machines (8%). Other technologies like heat pumps or geothermal energy are less usual (4% and 2% respectively).

Note - DK/DA: Do not know/do not answer

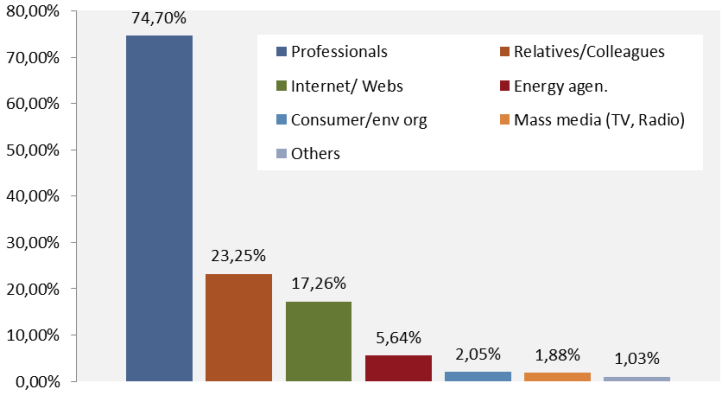
Figure 29 *DHW systems in industrial sector in all participating countries*

Satisfaction level is high (satisfied: 85%; no answer: 5%; dissatisfied: 10%) and its main reasons are: system adaptation to the process conditions (60%) and the ease of use, reliability and safety (29%)

The main reasons for using current systems for heating in industrial sector are the technicians' expertise (24%) and the prior existence of the system (21%). The least valued option is the existence

of incentives (4%). For cooling systems, the main reasons that support the acquisition of current technologies are technicians' expertise (14%) and the prior existence of the system (12%).

5.3 INFORMATION RESOURCES



In all the participating countries, the main source of information is professional opinions (75%) followed by colleagues and the opinions of technicians (25%), and the Internet (17%). Professionals are the preferred information source in all the participating countries.

Figure 30 *Information resources in participating countries. Industrial sector.*

In relative terms, professionals are more consulted by the rubber and plastic sector, while colleagues (other technicians) are preferred by machinery sector. Energy audits and occupation are not influential for the election of any specific information resource.

5.4 KEY PURCHASING CRITERIA

The key purchasing criteria (KPC) for H&C systems for the industrial sector from the five participating countries are shown in Figure 31. It is a multi-option question; which is why the percentages are so high.

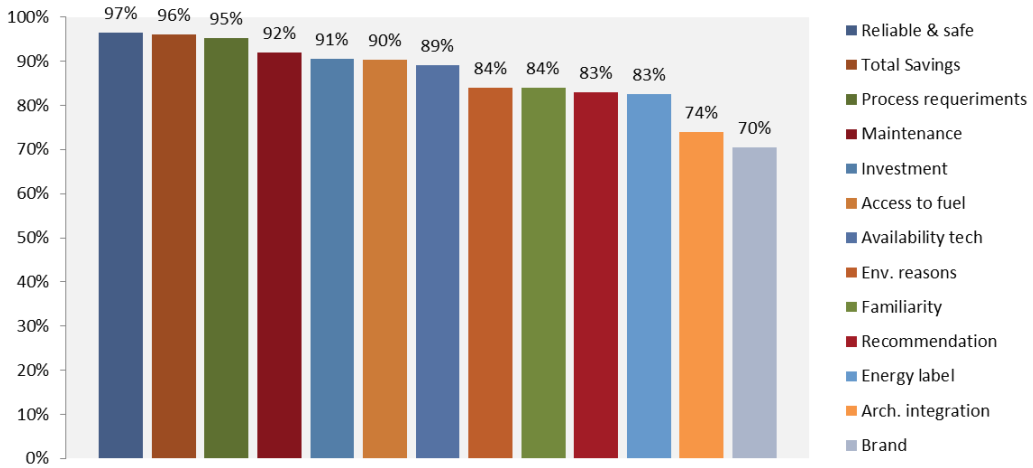


Figure 31 *Key purchasing criteria in the participating countries*

Analysing the responses obtained in all countries, almost all the purchasing criteria are very important for the industrial sector. Reliability and safety is the most relevant criterion (97%), followed by economic savings (96%) and process requirements (95%). Architectural integration and brand are the least important criterion for industrial respondents (74% and 70%, respectively).

The following tables show the key purchasing factors for the sample. The first column (%) shows the answers of the whole sample as an average, while the rest of columns show the answers for each subsample. Initial investment is a relevant factor for 91% of the sample, with the type of industrial subsector having an impact on the level of influence; 100% of textile industries chose this option and 77% of paper industries.

KEY DECISION FACTORS	%	Industrial sector								
		Food & Beverages	*Textil & Clothing*	*Wood & wood products*	*Paper & paper products*	*Chemical*	*Rubber & Plastic*	*Metals*	*Machinery*	*Others*
Investment	**91%**	90%	100%	88%	77%	91%	89%	87%	96%	86%
Total economic savings	**96%**	99%	96%	98%	85%	93%	94%	88%	100%	98%
Maintenance	**92%**	90%	94%	93%	85%	86%	89%	90%	97%	98%
Process requirements	**95%**	95%	90%	98%	88%	100%	91%	96%	96%	98%
Env. reasons	**84%**	85%	92%	88%	54%	81%	81%	67%	93%	95%
Familiarity	**84%**	81%	88%	88%	77%	72%	72%	78%	97%	90%
Recommendation	**83%**	84%	84%	92%	73%	60%	74%	70%	96%	90%
Reliable & safe	**97%**	95%	98%	98%	81%	100%	96%	94%	100%	100%
Energy label	**83%**	85%	84%	83%	58%	77%	79%	70%	93%	93%
Availability tech	**89%**	88%	94%	92%	77%	91%	74%	85%	96%	95%
Access to fuel	**90%**	88%	98%	93%	62%	93%	79%	93%	99%	88%
Arch. integration	**74%**	70%	84%	88%	62%	77%	49%	72%	88%	60%
Brand	**70%**	70%	86%	69%	77%	58%	60%	57%	81%	69%

KEY DECISION FACTOR	%	Occupation				ENERGY AUDIT		
		Daily	*Weekly*	*Seasonal*	*DK/DA*	*Yes*	*No*	*DK/DA*
Investment	**91%**	96%	94%	89%	83%	92%	88%	96%
Total economic savings	**96%**	100%	100%	97%	87%	96%	96%	96%
Maintenance	**92%**	97%	92%	92%	86%	92%	92%	96%
Process requirements	**95%**	94%	98%	97%	92%	95%	96%	96%
Env. reasons	**84%**	94%	82%	84%	74%	88%	79%	88%
Familiarity	**84%**	94%	82%	88%	68%	87%	81%	88%
Recommendation	**83%**	90%	78%	91%	67%	85%	81%	83%
Reliable & safe	**97%**	99%	100%	97%	91%	98%	96%	92%
Energy label	**83%**	93%	82%	85%	68%	84%	81%	92%
Availability tech	**89%**	95%	89%	93%	77%	90%	87%	92%
Access to fuel	**90%**	96%	95%	92%	78%	92%	89%	88%
Arch. integration	**74%**	85%	73%	70%	67%	78%	70%	75%
Brand	**70%**	85%	60%	60%	74%	77%	62%	83%

Note - DK/DA: Do not know/do not answer

Table 9. Key decision factors chosen by sample feature. Industrial sector.

5.5 AWARENESS OF RHC

Of the survey respondents in all the participating countries, 76% are aware of the use of RHC technologies for industrial processes. The following table shows the awareness, considering the sample features:

		Industrial sector								
KNOW	%	*Food & Beverages*	*Textil & Clothing*	*Wood & wood prod*	*Paper & paper prod*	*Chemical*	*Rubber & Plastic*	*Metals*	*Machinery*	*Others*
Yes	**76%**	78%	80%	85%	65%	79%	60%	54%	88%	76%
No	**24%**	22%	20%	15%	35%	21%	40%	36%	12%	24%

		Occupation				ENERGY AUDIT		
KNOW	%	*Daily*	*Weekly*	*Seasonal*	*DK/DA*	*Yes*	*No*	*DK/DA*
Yes	**76%**	84%	78%	77%	63%	86%	66%	58%
No	**24%**	16%	22%	23%	37%	14%	34%	42%

		Country				
	%	*ES*	*NL*	*PL*	*PT*	*UK*
Yes	**76%**	74%	71%	71%	100%	61%
No	**24%**	26%	29%	29%	0%	39%

Note - DK/DA: Do not know/do not answer

Table 10. List of the known RHC technologies. Industrial sector.

Well-known technologies for those familiarised with RHC (76%) are represented in the following table:

TECHNOLOGY/SOURCE	HEATING	COOLING
Solar thermal	*79%*	*19%*
Biomass	*70%*	*20%*
Air-source heat pumps	*57%*	*28%*
Geothermal heat pumps	*47%*	*23%*
RES-based District Heating/Cooling	*22%*	*16%*

Table 11. List of the known RHC technologies. Industrial sector.

The data should be interpreted as meaning that 70% of the respondents familiarised with RHC (76%) would be familiarised with biomass energy for heating uses. It means that 53% (0.70 x 0.76) of the total sample would be familiarised with biomass energy.

5.6 PERCEPTION OF RHC ATTRIBUTES

The perception of RHC attributes by those survey respondents familiarised with RHC (76%) is shown in the following table:

ATTRIBUTE	RENEWABLES	NON-RENEWABLES
Higher initial investment	86%	14%
Higher operation costs (maintenance and fuel)	42%	58%
Higher savings along the life expectancy of equipment	82%	18%
More eco-friendly	95%	5%
Higher working reliance	43%	57%
Higher visual impact and/or need of space to install/store fuel	74%	26%
Safer	58%	42%
More specialised installers	57%	43%

Table 12. Perception of RHC attributes by respondents. Industrial sector.

All respondents familiarised with RHC (76%) think that RHC is more respectful of the environment and more expensive than non-renewable technologies. They also say that RHC implies more economic savings, lower operational costs, higher levels of safety and greater visual impacts. In addition, the respondents think that RHC installers are highly specialised and these installations are more reliable.

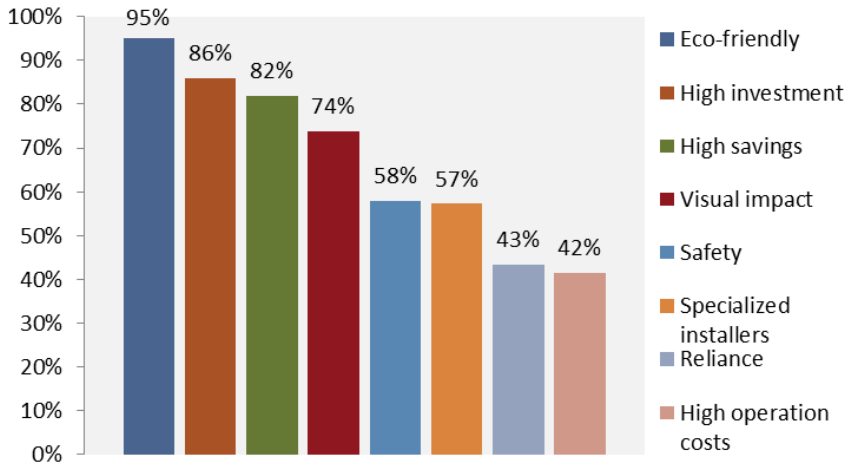


Figure 32 *RHC perception in all participating countries. Industrial sector.*

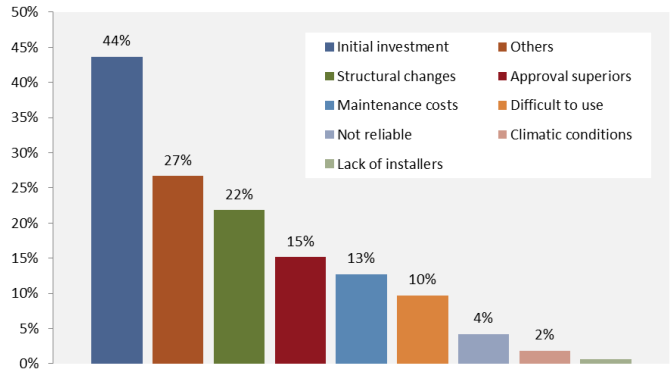
The type of industrial sub-sector has a very large impact on the perceived attributes of RHC. The textile industry shows higher than average levels of perception of RHC as reliable and having high operational costs.

Respondents in Portugal and Poland are more likely than average to perceive RHC as requiring a high initial investment. Respondents in Spain and the Netherlands are less likely than average to perceive RHC as having higher operational costs, being safe, and requiring specialised installers.

5.7 ADEQUACY OF RHC

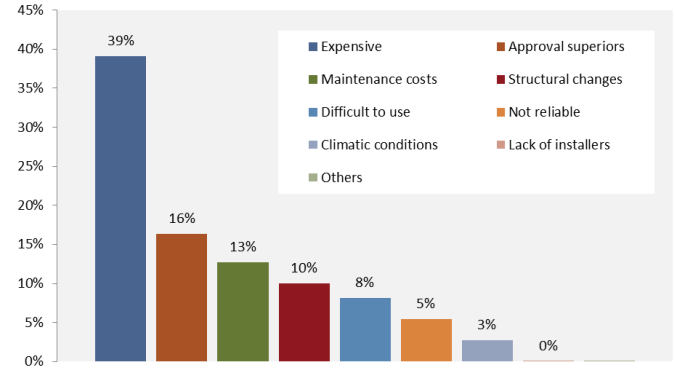
Regarding perception of the adequacy of RHC technologies adequacy in the industrial sector, 37% of respondents familiarised with RHC (76%) do not believe any are suitable for their own heating systems and 8% did not answer this question. In general, respondents from the chemical and metal industry are the most reluctant to install RHC technologies for heating applications. This percentage is above the average in the United Kingdom (67% of respondents who are familiarised with RHC in this country).

With regards to the incorporation of RES in cooling systems, 25% of respondents familiarised with RHC do not believe any are appropriate and 49% did not answer this question. In this case the textile, paper, chemical and metal industries are more reluctant than the average. The rejection percentage is above the average in the Netherlands (36%), Portugal (42%), and the United Kingdom (70%).



The main rejection reasons for using RES for heating in industrial processes are initial investment (44%), and the need for structural changes (22%). Figure 33 shows the distribution of the rest of rejection reasons.

Figure 33 *Rejection reasons for RES for heating in industrial processes in participating countries.*

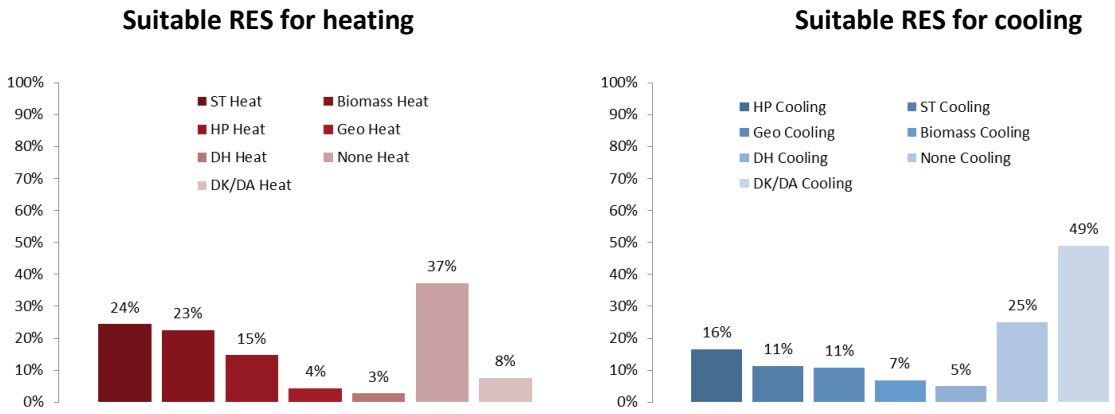


The main rejection reasons for using RES for cooling in industrial processes are initial investment (39%) and the need for approval by superiors (19%). Figure 34 shows the distribution of the rest of rejection reasons.

Figure 34 *Reason for the rejection of RES in cooling for in industrial processes in participating countries*

Of respondents familiarised with RHC, 55% would consider installing RES technologies for heating in their industrial processes. According to the results, the favoured RHC technology to be used is solar thermal energy (24%), followed by biomass (23%). Figure 35 shows the perceived suitability of different RHC technologies in the European industry. The textile industry favours solar thermal energy, while the wood and machinery sectors favour biomass. In Portugal, solar thermal energy shows above average rates of approval, while in Spain biomass is preferred.

Of the respondents familiarised with RHC, 26% would consider installing RES technologies for cooling systems. Overall, heat pumps are the preferred technology (16%), mainly in the Netherlands, Poland and Portugal. Solar thermal and geothermal energies are also popular among all industrial respondents.



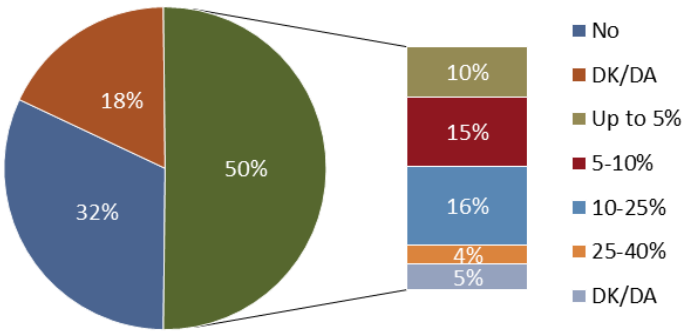
Note - DK/DA: Do not know/do not answer

Figure 35 *Suitable RHC technologies for heating and cooling in industrial processes.*

5.8 WILLINGNESS TO PAY

Of the respondents familiarised with RHC, 50% would be willing to pay more, 32% would not pay more and 18% did not answer this question. The industrial sector is more willing to pay in the Netherlands, Spain, and Portugal. In Poland only 30% of respondents familiarised with RHC would pay more for RES for heating and cooling systems.

Figure 36 shows the percentage of respondents familiarised with RHC (76%) that are willing to pay more for a RHC system in the industrial sector. According to the results, 10% of respondents familiarised with RHCwould pay up to 5% more for a RHC system, 15% would pay between 5-10%, 16% would pay between 10-25%, 4% would pay between 25-40% and 5% do not answer this question.



Note - DK/DA: Do not know/do not answer

Figure 36 *Willingness to pay for RHC technologies. Industrial sector.*

6. CONCLUSIONS

Comparing the results obtained for each of the sector analysed, the following conclusions can be identified:

- The main energy source employed in all sectors is natural gas followed by electricity. There is also a considerable variability in the industry sector.
- In general, the main information source is professionals' opinions. However its influence is more relevant in the non-residential and industrial sectors than in the residential sector where there are other important information sources, such as the Internet or relatives.
- Regarding key purchasing criteria, total economic savings is the most important criterion for the residential sector while for the non-residential sector it is reliability, followed by total economic savings. The industrial sector presents the same pattern as the non-residential sector.
- Non-residential sector presents the greatest level of RES technology awareness followed by the industrial sector. The residential sector is the least aware.
- Overall, the most supported RHC technology is solar thermal energy, particularly, in the residential sector.
- The perception of RHC technologies is very similar in all sectors. It is considered to require high investment costs and to deliver high economic savings.
- The main rejection reason for RES technologies in the residential sector is the high investment required, followed by structural changes involved and the need of approval by neighbours or superiors. In the non-residential sector, the latter has less weight than the two former. The main rejection factor in the industrial sector is, by far, the high investment required.
- The industrial sector is most willing to pay for RHC, compared to residential and non-residential sectors.

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