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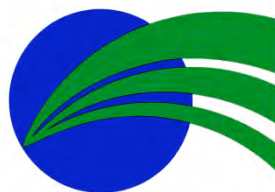


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Qualitative assessment of direct fiscal measures

Study of the Portuguese case Interviews with consumers

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C E E E T A

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I. Context and Methodology

1. Context

The fiscal measure towards RES-Heat in the residential sector was launched¹ in 1991 with the objective to promote renewable energy use. This is the main incentive implemented towards individual households and the current characteristics of the measure (for 2007) are:

Measure	income tax deduction		
Focus	individual households (with main residence or secondary habitation), excluding persons with professional or entrepreneur incomes		
Renewable energy sources	direct and diffuse solar radiation, energy retained in forest or agricultural residues and wind energy		
Eligible appliances	Technology	Water heating	Surface heating
	<i>New equipment² for heat generation using renewable energy sources (since 1991):</i> <ul style="list-style-type: none"> individual solar thermal installations using flat or concentrated solar collectors heat pumps heating systems using biomass (fireplace insert, stove, woodboiler, etc.) 		
	<i>New equipment for electricity generation using renewable energy sources (since 1991):</i> <ul style="list-style-type: none"> solar photovoltaic panels and respective control and storage of energy system supplying electric energy for houses wind power generation units below 5 kW of installed capacity and respective control and storage of energy system, supplying electrical energy for houses 		
	<i>New Equipments for the production of electric and thermal energy (cogeneration) by microturbines with a capacity up to 100 kW using natural gas (since 2002)</i>		
Technical requirements	Any specific technical requirement is mentioned regarding minimal efficiency of the equipment (for their eligibility) neither technical competences for installers.		
Fiscal deduction	30% of the expenses with the equipment and installation (reported by an invoice or equivalent document) can be deducted from annual taxation of families' income with a fixed ceiling (€761 in 2007). Between 2001 and 2007, this fiscal deduction couldn't be cumulated with deduction regarding house loans' payments. This is no more the case since 2008.		

For 2008, some important modifications have been adopted in the framework of the new state budget. For now on, the fiscal deduction is separated from other measures which makes possible from now on to cumulate deductions from a RES-heat

¹ Portaria n° 725/91 (29/07/1991).

² Including complementary equipment indispensable for their use.

investment and from house loan payments. Furthermore, the maximum fiscal deduction has increased to €777.

2. Methodology

2.1. Fieldwork: Data collection

Fieldwork was conducted between late December 2007 and April 2008.

Fifteen face-to-face qualitative interviews were conducted, each with approximately 60-90 minutes duration. To thank interviewees for their participation in this study, a gift voucher was offered.

Generally, the guidelines that were given by the coordinator (Observ'ER) were followed. However, it must be noted that some of the issues were condensed, particularly those related with financial calculations made on this purchase/investment; since in most interviews, it made no sense entering in too much detail, such as whether it had taken into account the possible change in the annual income tax (IRS) that the use of the measure could provide.

Moreover, the section of the interview related to the "pedagogy of the measure" was subject to some changes in order to correspond to the specific context of our country. We have opted to reduce either the quantity of issues/questions or the direction of questioning. For example, as individuals only had knowledge of the measure upon recruitment for the interview, the answers clearly reflect that lack of knowledge. Therefore, individuals were questioned about the omission/absence of information dissemination from several sources and about the several moments in the process of purchase in which they could have received such information.

2.2. Fieldwork: The recruitment process and targeted population

Some difficulties arose during the recruitment process. The main difficulty resided not in finding people who had installed a RES-heat system in their residence in the last 3 years but to find people who had benefited from the measure. Two types of situations were frequently encountered:

- (a) Individuals who have been contacted because there was a clear indication that they had acquired a type of equipment which can be deducted on IRS. However these individuals revealed to have no knowledge of the existence of the measure and thus had lost the opportunity to benefit from it (8 cases).
- (b) Individuals who previously knew about the existence of the measure and have invested in a RES-heat system but who could not benefit from the measure due to their house loan deduction which could not be cumulated with the RES measure during the 2001-2007 period (5 cases).

Due to the difficulties in recruitment as above mentioned, we also interviewed individuals who invested in such equipments during 2007 and, therefore will benefit from the measure by declaring this investment in their IRS during the present year (2008).

In fact, what happened in some of these cases was that the recruitment process for the interview functioned as a source of information for the consumer.

After some methodological reflection about our national reality, we have chosen to consider that these interviewees were valid and representative of the national reality.

These cases make very explicit, on one hand, a great lack of knowledge by consumers and, on the other hand, a deficit in public dissemination in this area.

Moreover, this is also an indicator that whoever invests in renewable energy equipments for heating don't do it because of the fiscal measure – the majority of people seems to ignore its existence – but does such investment for other reasons that lead to this choice.

It is worth mentioning that this methodological justification about the difficulties faced during recruitment for the interviews is in itself an important conclusion of this research.

The recruitment of the interviewees was made through contacts provided by APIsolar (Portuguese Association of Industry Solar), local energy agencies (Sintra and Oeiras), also through sellers and installers who gave indication of some customers, and via a network of personal contacts.

Among interviewed people, 2 have installed geothermal heat pumps, 7 have a thermal solar system and 6 have a biomass heating system. Most interviewees live in the Lisbon Metropolitan Area (LMA).

3. Population sample

Interviewed people	Familial situation in the habitation	Professional activity	Renewable energy solution	Town
Female, 56 years old	Couple	Administrative (retired)	solar thermal	Queluz
Male, 42 years old	Couple + 1 child	Engineer	solar thermal	Magoito
Male, 70 years old	Couple	Military (retired)	solar thermal	Palmela
Male, 48 years old	Couple + 3 children	University professor	solar thermal	Lisboa
Female, 67 years old	Couple	Domestic	solar thermal	Carnaxide
Male, 45 years old	Couple + 2 children	Engineer	solar thermal	Costa da Caparica
Male, 46 years old	Couple	Engineer	solar thermal	Cascais
Female, 42 years old	Couple + 2 children	Administrative	biomass heating appliances	Mem Martins
Female, 46 years old	Couple + 2 children	Childhood educator	biomass heating appliances	Caldas da Rainha
Male, 65 years old	Couple	Carpenter (retired)	biomass heating appliances	Almoçageme
Female, 71 years old	Single	Economist (retired)	biomass heating appliances	Sintra
Male, 39 years old	Couple	Seller	biomass heating appliances	Praia das Maças
Female, 60 years old	Couple	Teacher (retired)	solar thermal	Queijas
Male, 44 years old	Couple + 2 children	Manager	geothermic heat pumps	Évora
Male, 42 years old	Couple + 1 children	Entrepreneur	geothermic heat pumps	Caxias

Biomass Heating Appliances	Solar Thermal	Geothermal Heat Pumps
males - 2 females - 4	males - 5 females - 2	males - 2 females - 0
39-50 years old - 3 51-65 years old - 1 + 65 years old - 2	40-50 years old - 4 51-65 years old - 1 + 65 years old - 2	40-50 years old - 2 51-65 years old - 0 + 65 years old - 0
Single - 1 Couple - 3 Couple + children - 2	Single - 0 Couple - 4 Couple + children - 3	Single - 0 Couple - 0 Couple + children - 2
Active - 3 Retired - 3	Active - 5 Retired - 2	Active - 2 Retired - 0

II. The Purchasing process

1. Profiles and their motivations for RES

1.1. Profiles

The profiles were built from a set of indicators, which were collected through interviews, related to lifestyles, stage of life, values and practices of everyday life of the interviewees and their families.

We have identified 4 groups of profiles:

- (a) The group of retired people
- (b) The group of comfort
- (c) The group of technoDIY (Do it yourself)
- (d) The group of engaged people

Following, we present the main characteristics of each group/profile.

(a) "The group of retired people" (4 persons)

This group encompasses recently retired people who built a house or made improvements in their house and for whom renewable energies are a choice for heating (especially for water heating) their house in a more efficient way – heating at a lower price.

This corresponds to a stage of life in which the transition to retirement and without children in the house gives them opportunity to invest in a house for the rest of their life.

"Since we were going to make improvements in the house, we decided to install the solar panels to save on gas (...) also, we don't have to carry the gas bottles (...) we have to think that we are getting older." (ST)

(b) "The group of comfort" (3 persons)

This group comprises people between 35-50 years old who decide to use renewable energies when they built their house or move out to a new house and take the decision to invest in a comfortable home at low running costs. These are often families with children.

"My house has a feature - is very cool in summer and is completely cold in winter. So it is unthinkable to live there without heating. There was always the appeal of central heating to make it comfortable. (...) I now spend 150 euros on electricity for heating up my home, but I can heat the house efficiently. The indoors temperature is not 30 degrees, it is around 21-22 degrees, it is heated perfectly and the whole family is happy." (GHP)

"In my case, I put a unit of 80 cm, which is enough to heat the whole house, to walk in short sleeves at home" (BHA)

(c) "The group of technoDIY" (4 persons)

People who expressed a personal interest for technical innovations (often men with a technical or engineering background). They are likely to involve themselves in the process of installation and make their own suggestions to the installer. They also want to become more independent from an energy point of view.

"We also have solar energy to heat the water associated with the geothermal system (...). I have worked out this system by myself. (...). I have coursed aircraft mechanics in the Air Force, so this has no secrets for me (...). The insulation instead of being built inside the walls is built outside. (...). The windows are with frames in PVC and UV-reflective glass. It is a class A++ house. I can have it warm or cold with the minimum consumption of energy. (...). I thought it was silly to pay for the diesel to heat the house when there is a system which is better and cheaper." (GHP)

"I chose this system because it was the solution that provided more information and also had the ease of my friend installer to provide the materials and assembled the solution. We discussed a bit what we would be installing (...) it has a very important peculiarity at the level of the installation link to the washing machine, that means, it does not use the electrical resistance. Savings on electricity are fabulous; we save up to 25% on the bill." (ST)

"I put it working out of my curiosity. (...) The assembly was my idea." (BHA)

(d) "The group of engaged people" (4 persons)

This group embraces people who are engaged in associations or trade unions and have a high level of great environmental consciousness. They want to have an active contribution in society and try to adopt a way of lifestyle in accordance with their convictions. They are likely to have environmentally friendly behaviours in their everyday life.

"The idea and feeling of being active in building a better world attracts me." (BHA)

"We are highly attached and concerned about the environment due perhaps to the people we socialize with or due to the fact my parents were from the countryside, we value pure air. I recall my mother telling us: those who do not save water and firewood can save anything." (ST)

"When we first did the maintenance works in the house, we put double glazing (...) we save up water, minimize the use of [plastic] bags, reuse the bags for garbage or shopping. All we can do, we do. We have started separating household trash a long time ago. All lamps are energy saving lamps. We try to do the best possible." (BHA)

Nationwide studies on the Portuguese and the Environment (e.g. Observa, 2000³ and 2004⁴) indicate that energy is perceived mainly as electricity produced in national dams. This social representation points to a dominant perception that does not articulate energy and environment. It is important for the present analysis to understand that there is a national context of environmental illiteracy and a low citizenship and public participation.

Of course there aren't pure profiles. For e.g., we find that the environmental concern is present in all profiles but it does not correspond to a particular lifestyle that underlies the consumer's decision towards a certain RES-heat solution.

In any case, different types of technologies are more likely to be associated to different profiles of people. Data analysis point out to some trends.

Individuals with higher environmental concerns who do not raise the issue of comfort at the top of their scale of values are more likely to choose solar thermal or biomass heating appliances.

Biomass Heating Appliances (BHA), namely stoves, are the cross-cutting technologies, since they are suitable for heating older or traditional houses.

As for Geothermal Heat Pumps (GHP), an emergent sector in Portugal, is likely to be associated to individuals who are interested in technological developments and seek to increase standards of comfort in their homes with the installation of a central heating system (such systems have no tradition in Portugal). This technology satisfies their wish at much lower costs when compared with gas or diesel systems.

The following table summarises the repartition of interviewed people per profile and RES-heat investment.

	ST	BHA	GHP
The group of retired people	2	2	
The group of comfort		2	1
The group of technoDIY	2	1	1
The group of engaged people	3	1	

1.2. Motivations

The motivations that underlie the choices for a certain type of RES-heat system are multilayered and across consumer profiles.

³ Almeida, J.F. (org.) (2000), Os Portugueses e o Ambiente. I Inquérito Nacional às Representações e Práticas dos Portugueses sobre o Ambiente, Celta, Oeiras.

⁴ Almeida, J.F. (org.) (2004), Os Portugueses e o Ambiente. II Inquérito Nacional às Representações e Práticas dos Portugueses sobre o Ambiente, Celta, Oeiras.

We can identify 4 main reasons why people have decided to invest in renewable energies:

- Technological interests.
- Environmental concerns.
- Home comfort.
- Financial concerns (associated to the increase in fossil fuel prices and energy savings with RES-heat system).

Financial concern is a dominant motivation, an underlying motivation across all profile.

"Regarding water heating I chose the solar thermal and with this system I am able to save a lot of money in energy bills." (ST)

"The top motivation is to heat the house at an acceptable price." (BHA)

The financial factor is often associated with one of the following factors: comfort, environment or technology.

The increase in fossil fuel prices had a major impact in household's economy due to the strong raise of electricity, gas and diesel bills. This fact makes people look forward to alternatives for heating their homes. People want to have home comfort at affordable prices; they wish to leave behind cold and expensive winters.

"Essentially economic and quality of life because I needed to improve the heating of the house. (...) Since the beginning this system has demonstrated to be extremely expensive. (...) very high consumption that I could not afford therefore I use to turn it on only for a couple of hours, say from 6 pm to midnight (...) It was impossible to maintain the house at a comfortable temperature because the bills were expensive.. This situation has worsened in recent years due to the rise in the price of gas. As gas bills steadily increase, I have started to think seriously about an alternative." (GHP)

Comfort itself is an important factor of motivation for some people:

"You can walk inside the house in underwear, which is a very pleasant experience when you go to the toilet; also, I like to walk barefoot at home, you don't feel the cold coming from the ground. It is comfortable." (GHP)

In the case of BHA, saving money is related to another common factor: most people have access to firewood at no cost (usually pine trees belonging to the family). Regarding this issue, several interviewees refer to the fact that they are also helping to clear the forest thus contributing to fire protection.

"I had everything prepared for gas, but I refused it due to fuel prices and also because I can get firewood for free." (BHA)

Environmental concerns also emerge as a motivation to invest in RES-heat systems, especially among those who show a more environmentally engaged profile.

"The option has to do with the cost and also with non-pollution. I don't want to be a heavy polluter." (BHA)

"It was mainly for environmental concerns, environmental values, but of course I am keen to reduce my gas bill." (ST)

The technological interest of some people, especially among the technoDIY profile, has led to a RES-heat choice, but again, the financial concern is strongly present in their speech.

"Many years ago I have read about geothermal (...) later when I was building my house I searched for the most modern system and I install it for economic reasons, to heat a house of this size with diesel or electricity were not appropriate solutions. (...) I always was very ingenious I always had a big interested for these things and I thought that one day when I build my own house I would do it properly " (GHP)

"My major concern was trying to optimize the system as much as possible and to save the most possible energy and money" (ST)

Sometimes technology concerns arise from a technological problem in the old heating system, like a fireplace that did not work well – too much smoke in the living room and low heating level. As a consequence, people search for a solution that keeps the “romantic” fire without its disadvantages.

"The fireplace in the living room wasn't working well and was always losing heat. With the heat recovering system we are able to regulate the heat, save firewood and avoid odours and smoke. " (BHA)

Another factor linked to the issue of technology is expressed mainly in the case of solar thermal which took a pioneering step in the 80's. Then there were several situations of bad installations that gave a negative public image to this technology. Currently, it appears that there is a greater confidence in these systems corroborated by several cases in which installations are functioning in good conditions.

Moreover, the solar panels in a case of one of the interviewees benefit from another (unexpected) motivation: the climate changes.

"One important thing for me was to realize that there were plenty of sunny days here and we should take the most of it. If the weather remained as it was before, with many foggy days and bad weather, I guess there was no justification to install such a system, because when there is fog it produced absolutely no warmth, zero. Nowadays, I am absolutely sure that it is profitable! (ST)

In an impressionist and qualitative analysis we can point out some trends of association between technology and motivations of consumers (see table hereafter).

	ST	BHA	GHP
Technological interests	√	√	√
Environmental concerns	√	√	
Home comfort		√	√
Financial concerns	√	√	√

It became clear from the study that the financial concerns cross all the technologies. References to the impact on energy savings are numerous and therefore in the costs associated to fuel and electricity. People perceive these systems as a good investment considering that they are able to be payback in a short period of time by the important energy savings. In biomass cases, most consumers have access to firewood (of their own or collected in the surrounding forests) which in this case reinforces the notion of being a good investment.

The comfort motivation seems to be strongly attached to GHP and BHA.

The environmental motivation is more present in the discourse of solar thermal consumers.

Finally, technological motivations are present across all types of technologies, whether due to a fireplace that does not smoke or heat well, whether due to some individuals' interest and knowledge about mechanics.

2. Context of the purchase

In addition to the motivations that lead people to choose RES-heat systems, we sought to explore whether some contexts of purchase are more frequent than others.

The installation of such systems always requires some level of work – either more or less intrusive works in the structure of the house.

Moving into a new house, house renovation or construction are likely to be regarded as ideal occasions to install any of these heating systems in order to minimize the inconvenience of undertaking works at home and minimize the costs of the works. In general, it is rather cheaper to install a system from scratch than perform conversion works replacing existing systems.

In this context, we emphasise that all interviewees but one, live in houses, many built by the interviews themselves (6 cases), which allow to create a strong bond with the house – a lifetime project -, which encourages their willing to invest in the quality and the comfort of the home at a more infrastructural level.

We were able to identify 4 contexts of purchase:

- Building a new house.
- Invest in the quality of the newly built / renovated house.
- Changing from an apartment to a house.
- Replacing a conventional system or an old RES system.

Taking into account the different technologies and the contexts of purchase, some differences were observed.

GHP	Building a new house Replacing a conventional system of central heating (gas)
BHA	Replacing an old RES system Replacing a conventional system of central heating (gas) Investing in the quality of the newly built /renovated house
ST	Changing from an apartment to a house Changing from an apartment to a housing with ST pre- installation Investing in the quality of the newly built /renovated house

In particular, the moving out from an apartment into a house occurs in the case of solar thermal, which is connected to the environmentalist profile of these consumers. The fact of being difficult to install an individual solar collector in the context of a multifamily building means that the solar solution can only occur alongside the changing to a single-family home.

As regards to BHA, there are several situations due to diversity of supply and the possibility of installing such systems with few works. This solution is often observed in new homes which indoors are cold and expensive to heat with electricity. Consumers choose for the installation of a stove or a fireplace insert to substitute the old fireplace. However, it is also frequent to choose for the replacement of a fireplace insert or the replacement of a conventional system of central heating (with gas) for another one (with firewood).

3. Time and steps of the purchasing process

3.1. Buying process length

Usually, the length of time between the decision-making that will seek to purchase an alternative form of heating and effective implementation of the system, is approximately 3-6 months.

Longer purchasing processes are those which normally coincide with the building of a new house.

Sometimes individuals mention a rather long pre-decision period (sometimes longer than one year), in which they become aware of the need to make some changes

regarding the heating systems in their homes – either because they spend too much or they cannot solve their problem of a cold house. At this stage, people are aware that something must be done but not yet passed into an active purchasing process.

3.2. Important researches on renewable energies before investing in appliances

When individuals decide to acquire a RES-heat system, while some of them previously know which technology to choose, others investigate several options before choosing.

In order to make this decision they invest some time searching for information on the options and solutions available in the market, however many consumers report that this process is not an easy task.

"I had to solve the problem of cold in this house, because I could not keep living like this. I began to study the heating solutions (...) I first consider the solar heating solution (...) but it produces low levels of heating and I had to search for an alternative. Then, someone came to me speaking about geothermal energy and then I further explored this solution (...) nobody told me anything else. "(BHA)

One of the reasons why this difficulty is felt by most consumers is the lack of knowing where to turn to when they want to purchase. And in the case of solar thermal, the need for more accessible demonstration sites or “solar shops” is often mentioned.

"There is not a single place where I can go to choose a panel" (ST)

Consumers themselves become a source of information, dissemination and demonstration of the performance of these systems to their friends and relatives, since they are pioneers in terms of adhesion to such heating systems.

"Later, one of my colleagues built a house and also installed it. She had already seen why it worked here "(ST)

Throughout the process of searching for solutions and its constraints in terms of access to information, consumers are still faced with the financial constraints for investment. Several consumers who have considered installing solar energy eventually end up opting for a biomass heating appliance at a more affordable price and a less intrusive installation.

"It requires works in the home. (...) I am not sure if I would have had courage to make a new installation, in case I had no previous installation. "(ST)

The choice for solar thermal is postponed to an uncertain future.

"Solar panels, we have already considered this option, however we gave up due to its high initial investment. I am not entirely sure; I still consider that I should not abandon completely this option." (BHA)

"For now, solar panels cost are too expensive, above what we can afford. But it doesn't mean that it would not pay the initial investment over time." (BHA)

It should be noted that people do not question the capabilities and effectiveness of solar energy nowadays, even if they often mention those "negative experiences" of the 80's and 90's. The blocking factor for the majority of consumers interviewed in opting for this system is the question of price.

Internet was a source of information often used by most consumers irrespective of their technology choices, even if for some searching for related info available on the internet was more successful and easier than for others.

"I searched for technical information available on the Internet, and all my doubts were answered." (GHP)

The Internet search was frequently followed up with visits to several installers to compare prices, in the case of biomass heating appliances.

"I first searched on the Internet to check existing supply in my residence area. Then I spent 2 weekends visiting those locations and asking for budgets. Afterwards I compared the available options and chose the cheapest one. The fireplace inserts were all identical (...) so we chose to buy where we could get the cheapest installation cost. We wanted it to be small to fit inside the fireplace and no major installation requirements" (BHA)

In the case of GHP, the Internet search was usually followed by a visit to the local installer to assess the conditions of installation.

"It was through the Internet that I found out about this company, I spoke with him by telephone and he came to install the system here" (GHP)

For the solar thermal, it is more likely that the information is provided through personal contacts, either by some acquaintance who has already installed a solar system or by the installer they first contacted.

"One day when this man who had installed the panels on my neighbour's roof was back there to provide technical assistance, I spoke to him." (ST)

"I talked to my neighbour who is an engineer and he promptly offered to show me and explain me about the system he installed; he was very pleased to have a follower." (ST)

"We thought about installing a solar collector but we knew nobody that already had one. We searched on the Internet but it was not easy (...) after some time an installer answered saying he already installed one and then he shown it to us. After that we

searched for further information on the Internet. We also visited fairs and looked for other solution, we browsed through catalogues and installation plans. But, at the end, we turn back to the installer, he seemed honest." (ST)

For this type of purchase, prior knowledge is a decisive factor in the purchasing process itself, whether in the form of knowing the supplier / installer, having any previous experience and / or information about the technology. This factor is synonymous with confidence.

"I chose the ST solution because I had more information about it and also because I have a friend working in this business who could sell and install the ST system, so we discuss a bit what we were going to install (...) I have a lack of information about the other solutions. (ST)

"Even in terms of other stoves, we made some comparisons between their quality and prices and we reached to the conclusion that it was worth investing in one solution we were sure it was better so we end up going to a supplier that we previously knew." (BHA)

Regarding the active search for prior information from consumers, it is possible to distinguish 4 types of researches:

1. Search on the Internet
2. Visit to sellers / manufacturers
3. Visit the dedicated fairs to look for new equipments and alternative solutions.
4. Those who do not actively seek for information and take their decision based on the positive experience of a neighbour, friends or relatives.

3.3. Comparison of prices

The comparison of prices between traditional heating system and RES-heat appliances is calculated on 2 levels:

1. The cost of the initial investment
2. The running cost and the payback time

In this context of purchase, consumers are performing a series of calculations in advance. On one hand, seeking to evaluate their ability to invest at that time, and whether they have cash or whether they need further savings.

"I had to tackle the problem of cold during winters and I had no money to solve it, neither with electricity nor with gas every month." (BHA)

On the other hand, seeking to evaluate (even if they only "*make rough calculations*" (ST)) how long is needed to get the payback on investment through savings on costs of energy consumption.

Almost all interviewees have performed these calculations and point to a payback period between 4 and 7 years, depending not only on the initial cost of the system but also on the number of people living in the house.

"I believe that my system will payback in 7 years approximately. I save in gas consumption, I used to consume 4 large gas bottles per year and now I consume only one per year. My savings in electricity are about 25%, before I spent around 100 euros bimonthly and now I am spending 70 euros." (ST)

Interviewees who have free access to firewood also put it into the equation when considering their option for biomass heating appliances.

"I am a privileged, I have firewood for free. (...) If I had to buy firewood, I probably would spend 100 euros per month for firewood." (BHA)

In sum, despite considering the high initial cost of the RES-heat appliances, which is higher than conventional heating systems in most cases (e.g. instantaneous water heater is cheaper than a solar thermal system), it is the comparison between the running costs (fuel price, etc.) which is the cross-cutting motivation expressed by interviewees regardless of their technological option / choice.

4. When did they hear about the fiscal measure for the first time?

It appears that interviewed consumers knew of the existence of the measure, for which they could benefit by opting to buy RES-heat appliances for their homes, at different step of the purchase process. Based on the interviews' content analysis, it was possible to identify 5 steps with the following repartition between interviewed people.

Process step		Nº of interviews
1.	Before the purchase process	3
2.	During the purchase process	6
3.	At the end of purchase process	1
4.	After the purchase process:	(5)
	a) At the time of filling up their fiscal declaration	2
	b) During the recruitment for this study	3
5.	Heard "too late" and couldn't benefit from the fiscal deduction	N.E.

N.E.: not estimated

- Consumer who had already heard about the measure even before taking the decision to purchase (3 persons).

"I guess it was my sister who told me 'now that you are buying a house you have the opportunity to deduct it in IRS' (...) She is a very reliable source. She knows everything" (BHA)

"I knew about it because I am an economist and my working area is related with fiscal matters of businesses and individuals and thus I am reasonably knowledgeable about the IRS. (GHP)

- Consumer who hears for the first time about the measure when contacting the installer. In more than one case, the installer and client agree splitting the investment cost into two receipts to benefit from the fiscal measure in two years because of the low ceiling (6 persons).

"The installer was the first who told me about it; he split the cost into 2 years, so I could benefit during two years."(ST)

- Consumer informed that the measure exists when finalizing the buying process. During the payment the seller informs the client that the bill can be used to get a fiscal deduction on its tax declaration (1 person).

"I heard about the measure after purchasing the RES-heat system; at the end the installer told me that I was entitled to place it on my IRS." (BHA)

- Consumer who knows of the measure through his/her accountant at the time of filling up the forms for the annual fiscal declaration (IRS) (2 persons).

"It was my accountant who told me" (BHA)

- Consumer who knows that the measure exists during the recruitment process for the interview of the present study and still has the opportunity to present it for fiscal deduction in 2008 (for 2007 income) (3 persons).

"I didn't know that I could deduct it until I was called for this interview." (BHA)

"I remember perfectly to see information about these incentives for solar energy, however in regards to fireplace insert I didn't see any information (...) I feel a bit cheated." (BHA)

We could add another group of consumers which includes those that knew "too late" (during the recruitment process for the interview of the present study i.e. 2008) that the measure exists and so couldn't benefit from the fiscal deduction (since the investment reports to a purchase made before 2007).

Although not included in the sample, these cases are mentioned because they illustrate Portuguese national reality which was reflected in the difficulties faced during the recruiting process cited above.

The single difference in terms of technology that can be noted is that consumers who heard for the first time about the measure only during the recruitment process had installed biomass heating appliances.

Source of information

Regarding the sources of information about the fiscal measure, there is a total absence of references to the national official sources.

"I have not been aware of such information given by the State." (GHP)

In this section of the interview, interviewed people point out a set of critics towards the State's role, namely the lack of wide information diffusion on the type of measures which could benefit the tax payer, reflecting a widespread feeling that the State seems to 'hid' or 'suppress' good information.

The retailer/installer seems to be the most important and crossing source of information, for the 3 technologies.

"It was the retailer who told me about this issue.(...) Later, I confirmed such information with experts in business management". (ST)

Also among consumers who heard about the measure prior to the purchase process, all 3 said that retailers informed them about the fiscal deduction.

According to the various types of moments when costumers for the first time heard about the fiscal measure, not only retailers but also accounting people emerges as a source of information on fiscal deduction at the first contact.

Similarly, CEEETA has played a role as information source when doing the recruitment for the interviews. In such cases, the target of the consumer's critics was the retailer who did not inform them about the fiscal measure during the purchasing process.

In all cases, the consumer was informed on the measure through a direct personal interaction - either through the retailer, the accountant, or the recruiter - stressing the importance that interpersonal relationships assume in this context of nonexistent official information.

Adding to this is the fact that interviewed people who previously heard about the measure, always mention someone - family member, friend or co-worker - who spoke on the subject even when they vaguely recall some form of media information on the measure.

"We listen here and there. At the time I was still working, and sometimes I used to talk about issues related with household expenses with my colleagues, family expenses with children, expenses for this and that, and somehow we ended up to know that we could use a solar collector." (ST)

In this scenario, the information source is always trustworthy from the point of view of the consumer, who rarely confirms such information in triangulation with official sources of information. The only reference to a sort of information source triangulation is related to reading and checking the instructions for filling out the appropriate field on IRS form or talking with some co-working about this issue.

Regarding accuracy of the information that the consumer had access to, it is relative even for the consumer himself. Most people know that there is a ceiling but do not know how much it is, so they opt to put the total investment when filling up their own IRS forms and then,

“Let them calculate how much I may benefit from it” (BHA).

According to consumers most of the sellers were a source of information on the measure, but does not give detailed information.

“The first time I heard about the measure was during the purchase when the retailer told me (...) told me that I could put it in the IRS but he did not know further details like the amounts” (BHA)

Consumers themselves admitted that they didn't ask for more information on the issue: they become satisfied and pleased just to know that there is the possibility of declaring it in the IRS.

The fact that some sellers don't inform consumers about the measure raises, for the consumers, the possibility that they don't really know the measure.

In a short way, we present the source of information about the measure recall by the consumers of RES-heating:

- Installers/retailers.
- Accountants.
- Recruiter (CEEETA).
- Family member, friend, co-worker.
- Vaguely recall of media information.

5. Relations with installers

In most of the cases the installer is also the seller.

In most cases of our sample the established relationship is of trust and satisfaction with the work done.

It is very clear that proper installation is the basis for the relationship with the installer to be seen in a positive way by the consumer.

There was only a case of great dissatisfaction with the installation. The consumer ends up correcting and making the installation working correctly, despite the fact that the instructions were only in Italian (BHA). The consumer was amazed that an installer doesn't know anything about the equipment.

The process of choosing the installer is certainly a factor that has influence in the established relationship and the degree of confidence that is created. Confidence may be due to the fact that the installer be someone known or recommended by someone close (family, friend, colleague, neighbour).

When the installer capacity and his work quality are already known, this may bring confidence to the progress of the installation process because the consumer can rely on his "know-how".

"By the end of the 80's there was a big boom in solar energy, however there was no training for people who were performing the installations which resulted in many bad installations, this meant people were not able to realize the real capabilities of it (...) I had the chance to follow the trajectory of a friend who is an installer, to see his factory, how equipments work, how much hot water is produced, all this process gave me confidence."(ST)

In the BHA market, in general, the relationship established with the installer is more fortuitous; the installation of a fireplace insert or a stove (more usual equipments) is relatively fast and often is not associated with any kind of maintenance of the equipment that could provide a continuity of contact. In these cases the relationship is successful only with the proper installation.

Regarding ST and GHP, these installations involve several visits to the house of the client, creating some closeness by the frequency of contacts.

In the specific case of the GHP raising sector, the 2 interviewees of the sample are pioneers in this system and they have established a stronger relationship with the installer. Sometimes the houses become points of reference, monitoring, testing and demonstration of potential new customers who never saw the system working.

"I was a pioneer. The installer had nothing to show.(...) Now he comes to my home and people can see with their own eyes that the system works." (GHP)

As already mentioned above, the relationship between consumer and installer in the RES-heat sector is sometimes of complicity against the State by agreeing to split into two bills for different fiscal years. Since the established ceiling is very low compared to the level of investment, by this approach the consumer can put the investment on the IRS in two different years and receive a larger deduction.

6. Main conclusions

- The high price of fossil energy is the main motivation to seek alternative forms of heating, whatever the life style is.
- The investment in RES-heat appliances is relatively expensive (depending on the technology, it is more or less expensive) and requires savings, despite they recognize that the investment is quickly offset by what is saved on fuel and electricity costs.
- In several interviewees it is notorious some environmental sensitivity associated with the option for renewable energy, but this is not a motivation that in most cases emerge at first.
- The importance of the new comfort that the house had following the investment is highlighted in their discourse.
- The contexts of purchase in RES-heat appliances is often associated with building a new house or investing in the quality of the newly built /renovated house or change from an apartment to a housing or replacing a conventional system or an old RES system.
- The measure, even when known a priori, is never referred as the motivation for the decision to invest.
- From the point of view of the consumers there is no public / institutional dissemination of the measure; absence of references of state official sources.
- The seller is the main source of information about the measure for consumers.
- The relevance of personal relationships is very strong as a source of information and as a guarantee of confidence for the acquired system and the choice of the installer.
- Most of the cases show that the consumer trusts in the installer and recommend him to friends and family.

III. Role of the fiscal measure

1. The arguments for sale

In most cases of the sample (13 out of 15) it was found that sellers and installers coincide. In terms of commercial context the installation is attached to the choice of a particular RES-heat system. Consumers have the assumption that who sells this type of equipment is also able to install it.

Regarding the time of purchase of the equipment, consumers were asked about the main selling arguments evoked by the seller/installer. There is a set of arguments used by retailers/installers that are common across the 3 sectors:

- Energy saving and money savings accordingly.
- Payback/ return / depreciation of investment.
- Comfort provided by temperature control.
- Less polluting, more environmentally friendly.

Regarding ST, the argument focuses on the fact that this is a truly renewable energy with zero cost and without having the annoyance of the transport (such as gas bottles or firewood). In their argumentative discourse, retailers highlight the savings that follow after the installation and the period of depreciation of the system.

“He told us that we would have gas only for the boiler and that we could save much in gas.” (ST)

For BHA, the positive argument of increased comfort levels extends to a functional comfort due to new BHA in comparison to traditional fireplaces, including the fact that they prevent smoke and ash dirt in the house. Some sellers/installers in this business were also supportive of the idea that this heating system contributes to the prevention of forest fires by using forest residues (an issue to which the Portuguese public is very sensitive). Energy saving is given by increasing the efficiency of the BHA (a tonne of woodfuel lasts much longer and heats better the house).

“He told me that it was a bit more expensive but in the medium term I recover the money; also that I was better served because is less polluting, less spending and could use to the woodfuel from the mountain.” (BHA)

Finally, in the case of GHP the argument is based whether on explanations about its technical potential (the notion that the soil temperature is almost constant and can be used for heating and cooling), whether on accounts demonstration showing that despite the high initial investment payback time is relatively short.

“Although it is a high investment, he has demonstrated to me that I would recover the investment in half a dozen years time. (...) It is an economical argument, if I am not paying other fuels I am not paying a bunch of taxes; thus this is an automatic fiscal benefit.”(GHP)

Measure as a sale argument?

“Those who were more professional, explained the characteristics of the equipment, explaining the amount of woodfuel needed, trying to be more careful in all aspects, and also referred to the fact that you can deduct it on IRS. They were willing to provide all information they have even when we have not asked for.” (BHA)

Regarding the use of the tax measure as a selling argument, the previous quote is expressive of the dominant form as consumers felt that the measure was used: as further information in favour to the acquisition.

The measure is not an argument that the installers take as decisive to the consumer's final decision, taking into account the outlines of values involved.

“The installer used the measure as an argument but also has indicated that with an investment of this size the benefit is low.” (GHP)

Overall, there are few consumers who indicate that the installer used the measure as a selling argument.

2. Consumer's opinion about the impact of fiscal measure

From the consumers' point of view, the measure has the potential to be used as a selling argument, given that a deduction on IRS is always welcome. In general, consumers tend to look to the measure with complacency.

“It's a nice thing.”(BHA)

“It is a good measure.” (BHA)

“It is positive.” (ST)

“It was great to know that we could deduct it on IRS.” (BHA)

“It is a good selling argument.” (GHP)

“It is a good reason to buy.”(BHA)

“There is no doubt that it is attractive, but not a determinant factor.” (BHA)

“These are residual values but all that we can get is welcome.” (GHP)

It should be noted, however, that none of interviewed consumers has taken the measure as a factor in its decision making even when considering the measure as a positive argument.

Consumers stated that they would have taken the same decision even if it did not exist any such measure. In fact, many only knew about the measure at the end or even after the purchase process.

“I must say that if I have not had any fiscal benefit, I would have chosen exactly the same investment.” (GHP)

"It was not due to the 30% reduction, the profitability is in the level of heat [higher efficiency of the device]." (BHA)

"It is money, not much in relation to the total amount spent but it is something. It is not a decisive factor, but it helps." (ST)

Even among those who know of its existence, they are not likely to know in detail all the characteristics of the measure. Most consumers only know they can deduct their investment on the income tax to pay because the installer gave them such information. Some (few) have a vague notion that there is a ceiling and some incompatibilities with the deduction for house loans' payment.

"When I knew about the measure I thought to myself – it is another deduction on IRS. However, I don't know neither how much I can deduct nor what percentage they will give on this." (BHA)

Rough calculations on the impact on IRS are made by a small group only (3 out of 15). Rigorous calculations are not made due to lack of knowledge on fiscal matters and IRS among consumers.

"We don't know how much we are going to benefit." (ST)

"Of course I'm pleased with the idea of a deduction on IRS, but I did not make any specify calculation (...). We look at this as looking at a black box." (ST)

The most common attitude among consumers is to put all the expenses and let "them at the Finance bureau" to make the calculations.

"I filled up the IRS form with the total amount and afterwards the tax bureau will make its calculations and adjustments. So, I don't know yet if they are going to consider the overall amount." (ST)

Evidence shows that most consumers did not check the impact of the measure in IRS. Consumers explain this lack of interest due the measure not being a factor in the decision making of a RES-heat appliances, thus it has not been previously taken into account when they first made their investment plan and calculations. In other words, it is perceived as a bonus, not part of the pre-investment calculations thus not part of the purchase equation. Some even forget to check afterwards the impact of the measure since it mediates a year until a person receives the IRS declaration from the tax bureau. In addition, consumers argue that even if they really wanted to know how much exactly was deducted, they were not able to understand the 'mystery' of the official calculations made by the tax bureau.

It is worth mentioning that Portuguese national context is characterized by a widespread low level of financial literacy, which among other financial issues includes the issue of annual income tax (IRS).

"I have never filled up a tax form in my life. I have always someone who does this for me. I don't know how to fill up the IRS form. The only thing I know is that I can deduct medical and health related expenses."(GHP)

The majority of people are not very familiar with the fiscal deductions that are eligible. They only know they can deduct medical expenses, children's educational expenses and some other deductions.

3. Main conclusions

- The main sale arguments of retailers/installers of RES-heat systems are: energy saving and related money savings; return on investment; comfort gain by temperature control; less polluting, more environmentally friendly.
- The fiscal measure is not the main selling argument used by retailers /installers. It is seen more as a useful complementary information they provide to customers.
- The measure is perceived by consumers as a "nice thing" but not as a decisive factor for the purchase decision.
- In general, knowledge about the measure is vague and reduced to the fact that RES-heat investment costs are eligible for fiscal deduction.
- In the short-term, the possibility of a significant positive impact of the measure is quite reduced due to consumers' lack of knowledge on how to make the calculations about fiscal benefits on their annual income tax. There is a widespread financial literacy the average Portuguese citizen is not familiar with fiscal matters and IRS, which has an impact on the implementation of the fiscal measure.

IV. Routes for improvement

1. Critics from the consumers

Consumers are proving to be very satisfied with the performances of heating and profitability of their RES-heat systems.

"I never thought it could be so amazingly efficient! The quality of life in this house has changed 180 degrees." (BHA)

In general, however, consumers show their discontent with the lack of information that exists and which they have encountered. Such lack of information is primarily on two levels:

- Lack of knowledge about the measure.
- Lack of knowledge about RES heating.

In fact, more than criticism of the measure itself, many consumers feel outraged by not making the slightest idea of the existence of the measure before the purchase. In some cases, as previously mentioned, it was only in the context of interview recruitment for this study that some had the first contact with the measure.

"I was surprised by not knowing that the measure exists. Publicity about the information, more public information is needed. Often people do not have access to certain benefits due to lack of information, while news on football and vandalism are at the top of TV news agendas. Benefits for the population are always placed in the last minute somewhere in a little square or behind the scenes. Any information that is useful to the consumer or user is always in small letters - insurance, banking, social security..." (BHA)

"Therefore, I think there are many things that we can deduct on IRS and are often concealed or almost. The information is not disclosed (...). As a citizen of this country, I feel sometimes deceived due to lack of information which should reach me but often does not reach me at all." (BHA)

A common feeling often expressed by consumers is to be "deceived" by the State itself, which refers to a context of chronic mistrust in the political system and public finances. The lack of information reflects in a scenario where the information is not given, and that even if some information is being sought, the information delivered by the tax bureau is sometimes contradictory one depending on people giving the answer.

These facts are neither encouraging for the consumer nor provide a positive contextual ground in favour of the implementation of a system of incentives to RES-heat technologies based on a model that consumers themselves do not understand how it works nor inspires their confidence (see Section III).

2. Improvements

Many improvements are suggested by the interviewees for the development of the RES-heat sector. Hereafter we are going to present the suggestions for the following levels:

- Improvements of the measure.
- Improvements at financial level.
- Improvements at State level.
- Improvements at RES sector level.
- Improvements at consumers' level.

2.1 Improvements of the measure

Although many consumers have a very limited knowledge on the measure, they point out several generic aspects that can be improved, taking into account the critics previously presented.

- To separate the RES tax deduction from other fiscal abatement (e.g. house loans' payments)
- To define a higher fiscal ceiling and higher % deduction.

"To become a real incentive to investment it has to be a higher percentage, a figure that we can see." (GHP)

- Measure "fitting" with the amount of investment and/or type of technology.

"The ceiling should be higher in line with the actual costs of equipment" (BHA)

- To deduct 100% of the investment over several years.
- To deduct according to the income /size of the household.

"The incentive perhaps should be calculated according to the income of the household or the size of the household." (ST)

- Enforce a mechanism of positive discrimination upon 'made in Portugal' materials and equipments

"In my opinion it is important to differentiate incentives according to each person's choices, if one person installs a system manufactured in Portugal it should have a higher incentive than another person who chooses to install a system manufactured in other country. The benefits are two-folded: one is the country energy savings, and the other is to stimulate this business area in Portugal, create jobs and exports, and so forth. The tax incentive should take all these aspects into consideration" (ST)

In addition to this first set of suggestions more specific about the measure, a second set of suggestions has been identified. In this second set of suggestions there is a common underlying feature which is the consumers' willingness for more public information.

- More public information about the measure.

"I only knew about it because I bought it, otherwise I would have never known about it." (BHA)

- More information about the measure for installers.
- Transparency in the fiscal account regarding the values of the measure that people can benefit from. The installers / sellers could themselves deliver such information to their customers including it in the budget, e.g. through a simulation model provided by the Ministry of Finance or other public body.

"Calculations should be based on a transparent framework. For instance, simulation tables, for an investment of x the benefit is y, an investment w corresponds to a benefit z. (...). A simple simulation model." (ST)

2.2. Improvements at financial level

Apart from improvements of the measure itself, consumers indicate a range of other measures and suggestions at financial level that, according to their opinion are important for the development of the RES-heat sectors in Portugal.

From a consumer perspective, the most important financial improvement is the reduction of the financial effort associated to the installation cost. Some suggestions were put forward to encourage consumers to overcome the initial high cost barrier, as following:

- A loan with a low interest rate in order to support the initial investment

"The problem is mainly at the beginning, for those who live from their salaries with tight budgets, save almost nothing to give for investment (...) loans at low interest rates are welcome, or anything of that kind. " (BHA)

"People will not invest until they have enough money, until they have economic power and such economic power should be provided by the government. (...) They have to figure out how to support people who have no savings to invest (...) set up a governmental enterprise or agency or organisation that would support the initial investment. The starting up is very expensive. "(ST)

- Support financially in the act of purchase, with allowance for acquisition

"For me, it seems more transparent to set aside the tax incentive and directly support the act of investment like in Spain (...) In Portugal, we wait a year to feel the impact of

tax deduction, therefore a direct allowance can be more stimulating, figure by figure is much more stimulant for a person to get the allowance in the start, rather than wait a year. Sometimes people don't even feel the return because they still have to pay tax, like in my case." (GHP)

- Create an investment fund for renewable energy to attract the financial application and further development of national industry

"For systems that are of obvious environmental interest but possibly not economically viable there is a need to create supporting mechanisms. (...) to create the appropriate financial products, for example an investment fund for renewable energies." (ST)

- Create tax incentives for equipments 'made in Portugal'.

Under financial issue emerge in the discourse of some consumer the "punishment" attitude to other systems:

- Establish penalties for house heating systems using fossil energy sources

"They have to be more radical (...). In Portugal solar panels should be compulsory for water heating in the houses (...) or, instead of giving tax incentives, define and establish penalties for the other systems." (GHP)

Finally, the issue regarding information lack is also here.

- Public disclosure of the measures to ensure the democratization of its knowledge.

"Information disclosure is vital (...) not only those who are very well informed should have access to benefits." (BHA)

2.3. Improvements at State level

In addition to financial measures, consumers have suggested other improvements at State level that, from a consumer perspective, are essential for the development of the RES-heat sectors.

There is a need to increase efforts funded by government to relay credible information. The major emphasis is on the perceived lack of information, not only at the level of measures as we have noted before, but also in relation to RES-heat systems. Consumers often feel that such information is only made available to experts.

"There must be credible information but I don't know where to look for it (...) asking a sister, searching on the net, or chatting with a neighbour, we end up to know where to find it but it is not an easy task." (BHA)

"We should have the right to be well informed about all that is going on in the field of alternative energies. To provide information is an obligation." (BHA)

Consumers have specifically suggested the development of campaigns on public television (RTP) which should be broadcasted regularly (on a daily basis) over a long time period (e.g during 2 years). Campaign contents should focus on showing real daily life situations - implementation of RES-heat systems in several types of households, showing the "before" and "after" in terms of comfort and energy savings impacts on daily living.

Linked to this, there is another idea that evokes the need to see the systems at work a live/ directly. This is a technology sector where it is important that disclosure allow the "trial" by consumers. It is more a suggestion to disclosure information.

The relevance of these formats of disclosure is that an informed consumer can choose and decide on the system more convenient for him when he has knowledge of the various alternatives available.

Such demonstration could be led and implemented by the Municipal Energy Agencies. Consumers believe that these agencies could develop projects with a local scope, which promote RES technologies in a credible manner and free of commercial interests. Local authorities and organizations have a key role to play in consumers' opinions. Thus, suggestions can be summarised as follows:

- Create instruments for the dissemination of information to consumers:
 - through media campaigns,
 - through demonstration sites featuring RES-heat systems locally (local demonstration sites).

Yet, another group of suggestions at state level that could strengthen the RES-heat sector in Portugal is related to the standards for the construction of buildings. Such systems should be integrated into the construction of the house/building as a requirement of construction quality. The same should be applicable to other standards of energy efficiency.

- Enforce the implementation of construction standards in the building sector (compulsory for new buildings).

"What really annoys me is the fact that there are no clear construction standards at the level of building/architecture projects. Any new building should become prepared/equipped for using these systems (...) solar panels, double glazing, doors blocked, and a number of other things that help people not spending so much energy to heat or cool the house." (ST)

Finally, many consumers relate to the responsibility of the state as model of energy good practice, going beyond the responsibility that consumers complain to the level of disclosure of information:

- State responsibility to set the example, moving beyond the politically correct speech to best practices in promoting the use of energy efficient solutions (e.g. RES in public buildings).

"People like to follow examples (...) It makes a difference in changing our habits if the example comes from the top." (ST)

"In my opinion public buildings should have been already equipped with RES systems instead of being energy wasters and polluters with all those thousands of air-conditioning equipments working 24 hours per day 7 days per week." (ST)

2.4. Improvements at RES sector level

The professionals who work in this sector are also subject to a wide range of suggestions from consumers. A first set of suggestions points towards the improvement of accessibility conditions for consumers. Namely:

- Making products more accessible in terms of price and payment timeframe.

"Cheaper products so they become more accessible to people." (ST)

"If I was a business man I would examine how to place a product in the market at affordable prices for most people (...) they can make benefits but they can't put high interest rates." (ST)

- Making products more accessible/visible to the public, both through commercial sites and advertising strategies.

"If we want to increase people's adhesion there must be an improvement in the supply side; I am not going to buy just because someone tells me so or a seller tells me it is a good product (...). If it becomes visible, people will adhere at a faster pace." (ST)

"Must enter the market and spend on advertising (...), advertising in outdoors, leaflets in the letterbox, ask for the collaboration of Goucha or Teresa Guilherme⁵" (GHP)

A second set of suggestions points towards the quality of services provided by professionals of RES sector.

- To provide training to installers, calls for training and technical skills' development among installers.

"They have a lack of training to inform customers and even to perform their job (...) Today I am waiting for a technician who comes to provide me with further detailed information and explanations. There is almost none customer support. That is what my experience tells." (BHA)

⁵ TV show hosts with high audience rates.

- To improve training to architects, builders and designers of RES-heat systems (integrate related subjects in academic curricula).

"Change should begin at the universities, during the training of future engineers and architects; the awareness must start from there" (GHP)

"This week I had a great builder in my house to see the system and he was delighted. He never had seen it before, only had heard about but had never noticed how it works (...) For a person who is going to build a house, and usually builds up a home for life, the decisions that are taken must be well balanced and sometimes leave it in the hands of the builder that is not yet aware of all possibilities that may exist." (GHP)

- To bet in quality certification of equipments and installers, and thereby contributing to increase the level of confidence/trust and safety perceived by consumers.

"There must be an accreditation of technical staff (...) There must be some guarantee, an insurance of professional quality which covers damage, that holds someone responsible for. People have to feel confident." (BHA)

In the interview's analysis we found another group of suggestions associated with the training issue and it is based on the need for installers to have an available and "patient" attitude for a consumer who knows little about what he wants to install. This handy approach is implemented by giving ideas adapted to each consumer profile and needs.

"They have to improve in terms of their selling approach. (...) In my opinion there is a lack of training among people who make the installations. They install solar systems without caring about the type of energy sources people already have at home. (...) they have to undertake further training." (ST)

The social responsibility of installers should emerge in this context because, often, they are the main source of information on RES-heat systems that the consumer has access to. So fitting its language and providing credible information, not taking advantage of the consumer's ignorance, are points in favour to create an image of confidence in the RES sector.

- To use plain language and provide credible information.

"It is essential, plain and appropriate language must be used (...) when talking with an informed person the retailer is more careful, but when this is not the case, retailers must not neglect his informative role." (ST)

"A law that regulates information about efficiency of systems for people not to be deceived (...) we are easy to deceive" (ST)

"Treat everyone equally. It shouldn't be because they park a Mercedes at the door that they put the red carpet." (BHA)

They also suggested that the installers / sellers seek to create forms that show clearly and specifically the energy savings that RES-heat systems provide and payback time of investments in each case, taking into account several variables as the number of people in the household, the size and type of house, etc.

- To demonstrate the calculations of energy savings and depreciation of investment timeframe, through the use of a simple and credible system of simulation.

"Often they make a technical discourse instead of a financial discourse. There is the need to explain how much gas can a family save by using a certain system; customers need to understand how long does it take to recover the investment made (...) I know people that count every centime in this things who could be easily influenced if financial issues were clearly put and explained (...) It could be a decisive sale argument that would influence their decision to purchase." (ST)

2.5. Improvements at consumers' level

Finally, consumers who have already joined to one or more RES-heat systems provide a range of advice to potential consumers, advising them to take more care over their investment decision.

- To get as much information as they can (internet, events, etc.).

"[Customers] should not just install the first thing someone tells them; we should not take a decision that we would regret afterwards." (ST)

- To study the alternatives, compare and choose the most appropriate solution for their lifestyle.

"The fireplace insert is a good choice for me but not for other people; for a couple who leaves early in the morning and come back home in the evening and who has no place to store the wood, this is not practical, they just need a system to turn on the button." (BHA)

- To encourage a medium/long term vision about the investment and energy savings

"Make the calculation to see what is most advantageous" (BHA)

- To resist to the "temptation" of saving money in a non professional installation.

“Check the quality of materials, not just buy the cheapest. Also check how the installation is done, whether it is well or poorly installed.” (BHA)

“Only pay after the installation being completed and operational.” (BHA)

- To find an available professional to think with the consumer the best solution for his case.

“The secret to have a good installation depends on how to best combine the several types of energy and imagination, because there are many possible combinations. (...). The right combination associated with the economic factor is the key for success. Consumers should be aware and have a very clear idea of what they want to obtain from the RES-heat system.”(ST)

3. Main conclusions

- Consumers are satisfied with the performance of RES-heat systems.
- The main consumers’ critic is the lack of information about the measure and about RES heat systems.
- Improvements for the development of the RES-heat sectors are suggested by interviewees at different levels: improvements at measure level, at financial level, at State level, at RES sector level and consumer’s level.
- Cross level improvement: more and better public information.
- At measure level, consumers suggested that measure must fit better with the amount of investment and/or type of technology and/or size of the household.
- At financial level the main improvement is to stand up for the initial investment.
- At State level the suggestions point to (1) create a credible source of information and instruments for the dissemination of that source; (2) enforce the implementation of RES-heat systems in the building sector; (3) set the example of energy good practice in the public building sector.
- At RES sector level consumers suggested more training and quality certification to increase confidence and trust in the market; and also suggested improvements regarding RES-heat financing and public exhibitions (e.g. RES-heat shops, solar shops, etc.).
- At consumers’ level, they encourage the medium/long term vision about

the investment and also encourage choosing the most appropriate solution for their lifestyle, studying the alternatives and finding a real professional.

V. Conclusions and recommendations

1. Summary of findings

- The high price of fossil energy is the main motivation to seek alternative forms of heating the house, whatever the life style is.
- Beyond financial concerns, we find environmental awareness, comfort concerns and technological interests as motivations to choose for RES-heat systems.
- The fiscal measure is a “nice thing”, but even when known a priori, is never a decision factor for the purchase decision.
- The seller/installer is the main consumer’s source of information about the measure.
- People don’t understand how fiscal calculations are made, so they never know the impact of the measure on the investment.
- From the point of view of the consumers there is no public/institutional dissemination of the measure neither of the RES-heat technologies. This lack of information reflects the lack of confidence in the market.

2. Recommendations

The suggested improvements made by consumers can be seen as recommendations. The major axes of action are:

- More, better and credible information about the measure, about other financial measures and about the RES-heat systems.
- The importance of a State support for the initial investment in RES-heat systems.
- More training and quality in the RES-heat sector.
- Encourage installers and consumers to study the RES-heat alternatives for each lifestyle and household case.
- It is important for people that the State set the example of energy good practice in public buildings and in standards of the building sector.

List of acronyms

BHA	Biomass heating appliance
GHP	Geothermal heat pump
DIY	Do-it-yourself
IRS	Imposto sobre o Rendimento das Pessoas Singulares (Personal Income Tax)
LMA	Lisbon Metropolitan Area
RES	Renewable energy source
ST	Solar thermal