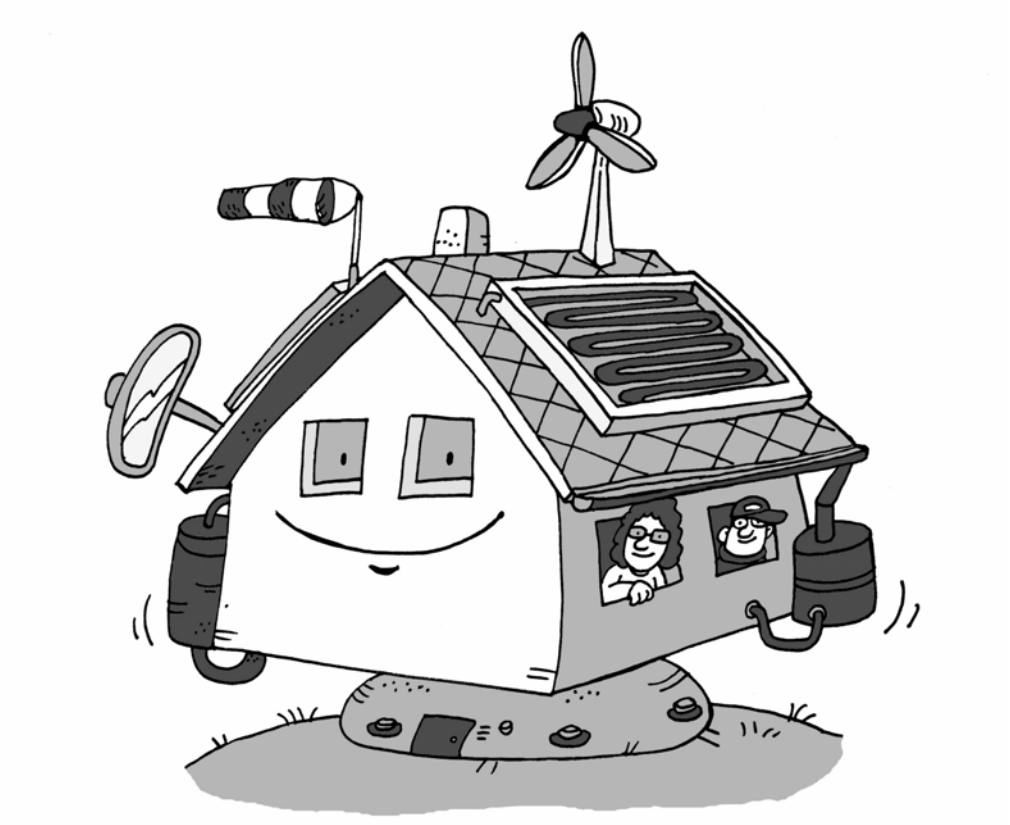

KYOTO IN THE HOME

Deliverable 9: Realising the potential for energy and environmental savings through involvement of the all relevant stakeholders

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Executive summary

This report wants to make awareness of the importance of realising the potential for energy and environmental savings through involvement of different actors on the basis and the experience of Kyoto in the Home Project. It is addressed to those families interested in being informed about the possibilities for saving energy in the home and reducing its dependency from fossil fuels. It is important to be informed about specific behaviour or investments to reduce energy consumption but it is also important to be informed about the local social net who can help families who are aware of the energy challenge. This document provides information of both aspects with a common aim: **motivate families to reduce energy dependency from fossil fuels in the home.**

Target

This report is for those families interested in being informed about the possibilities for saving energy in the home and reducing its dependency from fossil fuels. It is important to be informed about specific behaviour or investments to reduce energy consumption but it is also important to be informed about the local social net who can help families who are aware of the energy challenge. This document provides information of both aspects with a common aim: motivate families to reduce energy dependency from fossil fuels in the home

Introduction

Climate Change is a global challenge that can only be addressed effectively through a global effort. That means international agreements and global policies but also a generalized change of behaviour in energy use as energy consumption represents the major contributor to greenhouse gas emissions in the EU (78%). There are two ways to respond to this challenge: reducing energy demand and increasing the share of renewable energies. Families preferences play a key role in all this process and their change of behaviour in energy use is indispensable for a sustainable change in the energy system. Imagine if the 250 million European households turned off the standby from television... All this changing in consumer behaviour has to be driven by increasing awareness of the benefits of energy saving for the individual and also for the society.

Although theorizing about the best methodologies to rise awareness is necessary at a political and administrative level, families need practical information to be convinced that improving energy efficiency does not mean that they have to give up doing activities to save energy or that they can do a lot without reducing their comfort. Kyoto in the Home project aim is to educate and inform people about all the existent possibilities to reduce energy dependence on fossil fuels and classifies its resources in three groups: schools, families and local stakeholders.

As a head of a family you might ask how do you know if your house can reduce energy demand or how do you know if you can install renewable energy sources and produce your own energy. Do you know who can help you? The answer to all these qüestions represents part of our task of educating not only families but also children and local stakeholders.

As a family you may ask why you should involve children when these actions are adult responsibilities but the answer is easy: energy education is indispensable to raise awareness in this field and not only because children of today will be the adults of tomorrow but also because children can have a great influence on their families and their behaviour concerning energy use.

This report aim is to explain families an easy way of realising the potential of renewables in the home without forgetting the importance of energy education. This is why the document analyses and reflects how Kyoto in the Home project has influenced in many European families in ten different European countries and shows how different methodologies can reach the same objective: convince families to change their behaviour and reduce energy consumption.

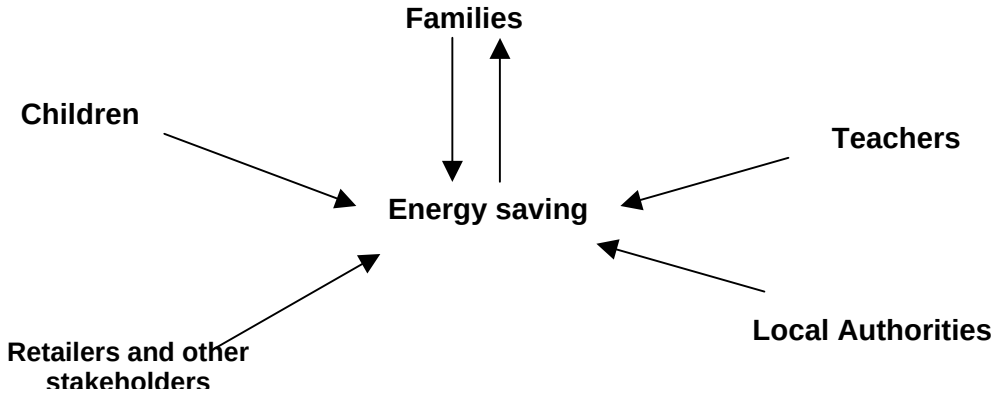
The first part of this document thinks over the importance of involving different local stakeholders. As the famous motto says, it is necessary to think globally but to act locally. It also summarizes how Kyoto in the Home (KITH) project has educated in energy through different methodologies. Energy education affects different players such as students, teachers, families, retailers, etc. However, each player has a different role in the energy education arena and needs different education and information strategy to reach a common goal: **to reduce energy demand in the domestic sector.**

The central part of this document is a guide for realising easily the potential of renewables and reducing energy usage in the home. Local renewable energy generation is a very good solution for reducing greenhouse gases emissions. It is important to let families know about such a solution and give them a boost to use renewable technologies at domestic level.

1 The importance of reducing energy consumptions through involvement of different local stakeholders

In January 2008 the European Commission put forth an integrated proposal for Climate Action which includes a directive that sets a target for the EU of 20% renewable energy by 2020 and 20% of reduction in greenhouse gases emissions. As energy represents nearly an 80% of greenhouse emissions in Europe, reducing energy consumptions becomes one of the main objectives in this period.
The achievement of this target depends on Member States policies but also depends on the impact of the energy sensibilisation on people. After all, efficient technologies and new policies will have little effect if users are not convinced to use them.

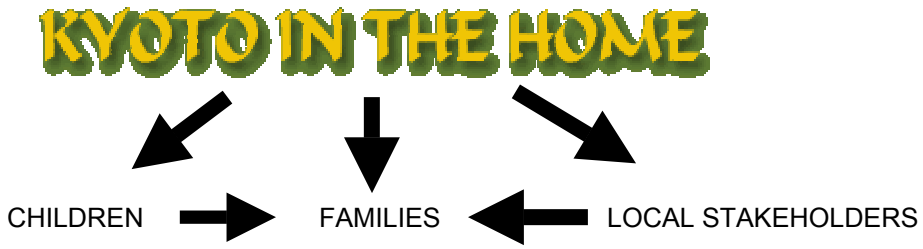
Reducing energy consumptions at domestic level becomes a priority that needs the involvement of different actors.



The aim is to reduce emissions in the home which is strongly related to a reduction of energy consumption and use of renewable energies. Families are responsible of that but they need a strong support from different stakeholders as it implies a change of behaviour.

Kyoto in the Home project has developed different activities assigned to different stakeholders. To reach children from different age ranges we have developed educational resources that have been trialled in more than 150 schools in Europe using formal and informal modes of learning. At the same time, teachers were also trained as, in fact, they are catalizators of the project. At the end they will decide if these resources will be used again.
The first part of this project was focused on informing and educating teachers and children

The next step was to inform and educate families which can be done using different methodologies. Obviously it is more interesting if children, that have already been informed, have a key role in training their families. This is why this project has involved children in the process of educating families. In the process of encouraging families to realise the potential of saving energy and use renewable energy sources in their homes, local stakeholders such as local authorities, retailers or energy agencies are also key players as they become important when families are convinced about changing behaviour but they don't know how to start.



There are many actors involved in the energy education arena but each one influence in a part of the "education niche". That means that all the stakeholders are indispensable in the process of educating and informing families and that to reach common goals, we have to work together.

2. Energy education: a cost effective manner to save energy and promote energy efficiency

Energy is commonly incorporated in engineering studies. However, there is a need to incorporate energy education at all levels because is the basis for sustained changes in the behaviour of current and future energy. Kyoto in the Home project has covered the three main objectives for energy education:
-.identifying what society and individuals can do;
- raising awareness of the issues and their background
- explaining the benefits of that action.

During 3 years, KITH partners have developed different methodologies for training children but also teachers and families. Let's see some examples!

2.1 Realising the potential of saving energy in schools

It is a primary concern to raise awareness in schools of all ages of the importance of energy in our lives and the consequences of being dependent on fossil fuels.
Through ten different modules KITH handbook provides a good program on energy education for students from 6 to 12 years old. Learning process is different in age range; this is why KITH resources classifies activities depending on the age range.

2.1.1 Trials with children

One way of informing children about realising the potential of saving energy is doing some activities related to this topic. This can be done in class as part of the national curriculum or can be used in specific theme days in schools or summer schools.

Formal education

As part of the national curriculum, it is important to plan the sessions with a common thread to ensure a good understanding of children. This has been the main methodology used during KITH trials as it is important to start introducing energy education as part of the formal learning process. The experience has been very positive and many teachers are interested in trial KITH resources in te following years.

Informal education

However, there are some other methodologies to educate and inform children such as organising theme day activities in school or through exhibitions. Some partners have organised a KITH day in schools or summer schools with different activities from KITH resources which has resulted in a brilliant experience.

Imagine if you wake up and you can not make any use of energy. You have neither gas or electricity and you have to manage your daily activities. These kind of activities are part of KITH resources and children have enjoyed a lot thinking them over.

Children imagining a day without energy

2.1.2 Teacher training

Children should be encouraged to use less and more efficient energy and teachers should provide them the basis for understanding energy concepts. It is essential to motivate teachers to include energy education as part of school year activities. There are many interesting methodologies to train teachers and KITH project has tested three of them:

- *Workshops*: In a half day meeting format, teachers met themselves and learnt some aspects of energy education. During KITH project, partners from ten different countries have organised teacher workshops involving more than 500 teachers around Europe.
- *Face to face*: Sometimes it is more effectively to inform teachers in a more direct way organising private meetings. This methodology is very effective because teachers express their fears about teaching energy.
- *Distance training*: Taking into account that not all teachers live in an active area, it is interesting to give them the change of being trained. An online course is a good option as they can learn in an asynchronic way.

Today's children are tomorrow world so it is fundamental to raise awareness in school students of all ages of the central role of energy in our lives.

2.2 Realising the potential in families

Families are, as a last resort, who decide whether to reduce energy consumption at home or not, so it is necessary to involve them in the information process. However, responsibility is not only of them but of all stakeholders who should motivate them to change their behaviours. KITH project has brought families closer via schools and via other local stakeholders.

2.2.1 Inform families via schools

Children can bring home all knowledge and influence their families to make a better use of energy. KITH partners have developed different methodologies that can be used as ideas for those interested in involving schools in family education.

- *School homework:* Giving children some activities as homework could be very useful to inform families. For example an activity could be "analysing the energy bill". Parents will help their children with this task and the whole family would be involved in the energy education process
-*Special sessions for parents:* Organizing a special meeting with parents could be very successful as they can learn practical things that can't easily be introduced to children as for example some technical aspects.
-*Parallel sessions for parents and children:* This pedagogical experience consisted in trialling at the same time but at different level, parents and children. Both targets learn the same thing but with different methodology and they can comment on the activity after doing it.
- *Information letters:* It is also useful to send information letters to families whose children are being educated on energy as it can also be used to raise awareness.

2.2.2 Inform families via stakeholders

Another interesting way of reaching families is to create a net with local stakeholders such as municipalities, retailers, NGOs, etc.
KITH partners have developed the following methodologies:

- *Individual Audits:* Some partners have made audits to some families trying to motivate them to use efficient technologies and renewable energies in the home. This is normally a successful methodology because when you spend some time with the family it is easier to convince them about the advantages of changing behaviour in energy use.
- *Sending letters:* It is an easy and effective manner to inform stakeholders about the objectives of the project and ways to help families.
- *Surveys:* This methodology consists in evaluating individual housing conditions through a

simple questionnaire. After answering it families realize about the possibilities of reducing energy and use renewables at domestic level.

After all this introduction about energy education which is essential in this new culture of energy, you have realised that there are many actors involved who can help you to reduce your energy dependence on fossil fuels.

It's your time to act!

3 Realising the potential for saving energy and reducing dependence from fossil fuels in the home: practical guide

The objective of this guide is to analyse your house from the perspective of energy and evaluate possibilities to reduce your energy consumption and dependence from fossil fuels.
If you want to participate in this energy revolution, the first thing you need to do is to evaluate your individual case and to decide your level of involvement.

3.1 STEP 1: House diagnosis

Energy needs are very different in Polish houses than in Spanish houses but there are many other reasons such as the orientation or the age of the building that should be taken into account. Each family should analyse its own situation. The following commented questionnaire will help you with the diagnosis.

1) Where do you live?_____
As said before it is not the same if you live in the South of Spain than if you live in Norway.

2) Do you live in a detached or semi-detached house?_____
If you live in an apartment it would be more difficult to consider installing renewable energies

3) Is your house oriented approximately to the south? _____Does your house have any shadow element such another building or a tree for example?____
If your house is well-oriented and it does not have many shadow elements such as trees or dwellings, it would be interesting to considering installing solar panels in your house.

4) Which is the age of the building?_____
This parameter is important for two different aspects: energy efficiency and renewables. Considering the first one, depending on the year of construction the quality of building concerning efficiency would be different. Related to renewable energies this parameter could help to evaluate the resistance of the building in case of installing a new technology such as solar panels

5) Are you the owner of your house?_____
If you are the owner of your house it would be more probable that you consider to invest money in the house.

6) Do you think your house is built with good and resistant materials?_____
This question is related with question 4 and it will help energy technicians to decide whether to install renewable energies or not.

7) Which is the area of your house in m^2?_____
This is an interesting information to define your energy consumption.

8)Do you consider that you can keep a comfortable temperature at home all year?____
If you can't, it is important to analyse which are the causes. Is it because you can't afford energy

bills? Is it because your house in not well-insulated?

9) Do you have an electric heating system or a gas heating system?
It is more energy- friendly to heat your house with gas than with electricity.

After answering all these questions you have a simple but effective diagnosis of the house. The second step is to analyse your energy consumption, which means your gas and electricity bills.

3.2 STEP 2: Energy bills analysis

Do you know how much do you pay for your energy bills per year? Do you know how many kWh in total did your house consumed last year? Let's try to guess this information.
The first thing is to collect data from your last year energy bills, both gas and electricity.

10) How much do you pay for your fuel bills in one year? _____
How many kWh does your household consume in one year?_____
This number will vary depending where you live. For example the average of electricity consumption in Europe is 5.000kWh/year.cap but it is obvious that it will depend on many factors

11) Divide the total amount in 10 by the area of your house. Is it less than 10€/m^2?_____
If you need a big amount per m^2 it means that you have to consider improving energy efficiency.

At this point of the procedure, you already know what the energy situation in your household is. When talking about reducing energy dependence on fossil fuels it is necessary to distinguish between cost zero measures, low-cost measures and measures that represent an important investment.

Before asking for a professional assessment there are some measures that any family in Europe can take with any economic cost.

3.3 STEP 3: Cost zero measures

If you want to reduce your energy consumption and your dependence of fossil fuels you can act immediately changing your behaviour referring to energy usage. This would be very effective and it has no economic cost.

- ***Turn off all electronic devices after using them.*** It has no sense to keep computer on or the TV standby after using them.

- ***Switch to a green energy supplier*** Almost in all European countries energy is liberalised which means that families can choose supplier. There are green suppliers that only offer energy from renewable energies. Maybe you can not install renewables in your house but you can buy "green energy" which eliminates your dependence on fossil fuel. Switching has no cost but it is important to compare prices of energy suppliers before taking this decision.

- ***Make a correct use of windows, closers,etc.***

- ***Adjust thermostats to 20-23ºC in winter as a maximum and 25ºC in summer.***

At this point it is advisable to visit an energy adviser in your area. This person will analyse your information and will evaluate some other aspects to give you a good report and a better advise. Your energy adviser would probably suggest low cost measures and high-cost measures which are synthesised in step 4 and step 5

3.4 STEP 4: Low-cost measures

After changing your family energy behaviour it is time to invest a little bit of money now to have a big gain in the future. All the following measures will have an impact on your energy bills so although it is necessary to spend money at the beginning, it will represent an important saving in a short time.
Here you have some examples:

- ***Change your incandescent bulbs to efficient bulbs*** They are five times more effective than the incandescent bulbs. Although efficient bulbs are more expensive you will pay 5 times less in your electricity consumption referring to bulbs

- ***Efficient appliances.*** If you are panning to change your fridge or your washing machine, it is important to take into account the energy label. Although A class are more expensive they will reduce electricity bills which, at a long term, it is also the most economic option.

- ***Make revisions to the boiler.*** Heating water represents an important part of the energy consumption in a house and it is very important to have it in good conditions.

3.5 STEP 5: High cost measures

Although these measures need an important initial investment, they represent an important saving for the future. Improving your house conditions or installing renewables means reducing your dependence on fossil fuels. It is important to state that although these measures have a considerable cost at the beginning they represent an important energy saving which is good both for domestic economy and the environment.
Some actions included in this category are:

- ***Solar passive structures such as Trombe wall***
- ***Insulate your house***
- ***Install renewable energy sources***

After reading all this steps and consulting an energy advise centre in your area you may have your “Saving energy project” which will orient you during the process. Even if you have decided to implement low cost or high cost energy measures it is essential to implement cost zero measures first. Although this process entails a change of behaviour it will benefit both your domestic economy and the environment.

Energy Advice Centres around Europe:

There is a list of European energy advice centres where you can ask for advice

. United Kingdom
-National Energy Foundation http://www.nef.org.uk/
-Energy Saving Trust http://www.energysavingtrust.org.uk/

. France
- Agence de l’Environnement et de la Maîtrise de l’Energie (ADEME) http://www.ademe.fr
- HESPUL énergies renouvelables & efficacité énergétique http://www.hespul.org

. Italy
- ENEA, Ente per le Nuove tecnologie, l’Energia e l’Ambiente http://www.enea.it
- Agenzia Energia e ambiente di Torino http://www.torinoenergiambiente.com

. Hungary

- Regional Environmental Centre http://www.rec.org

. **Polland**
- The polish national enery conservation agency http://www.kape.gov.pl

. Spain
- Ente Vasco de la Energia http://www.eve.es
- Agencia Andaluza de la Energía http://www.agenciaandaluzadelaenergia.es

. Catalonia
- Institut Català d'Energia http://www.icaen.net
- Agència d'Energia de Barcelona http://www.barcelonaenergia.cat

. **Czech Republic**
- Státní Fond Zivotniho prostredí http://www.sfzp.cz
- Zmena Klimatu http://www.zmenaklimatu.cz/

. **Slovakia**
- Státní Fond Zivotniho prostredí http://www.sfzp.cz
- Zmena Klimatu http://www.zmenaklimatu.cz/

. Romania
-Agentia Romana pentru Conservarea Energiei - www.arce.ro
-Centrul pentru promovarea energiei curate si eficiente in Romania- www.enero.ro
-Agentia Nationala (Romana) de Energie Solara si Regenerabila (ANESR)- www.renerg.pub.ro

. Estonia
- Energiasäästu portaal pakub infot ning nõuandeid energiasäästuks kodus, tööl ja tööstuses. http://www.kokkuhoid.energia.ee
- Energiasäästubüroo pakub informatsiooni eraisikutele ja korteriühistutele, kohalikele omavalitsustele, teenindus- ja tööstusettevõtetele. Kodulehelt leiab energiasäästu kalkulaatori. http://www.energiaaudit.ee

KITH project has worked with many families and the next section details how families from different countries have responded to a common RES survey as well as the link with local stakeholders

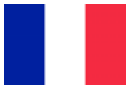
4 The experience of RES survey

KITH project has developed a survey to realise the potential for reducing energy consumption from fossil fuels during 2007 and 2008. Although each country has produced its own version of RES survey, the basis and general questions were the same. You can find the English version at the end of this report.
.
This section summarizes data from different countries in EU and subsequent activities which involved local stakeholders.

4.1 Romania

. 200 hundred families, living in detached houses, answered the RES survey
. 4% of families have to consider now the potential for installing a renewable energy source;
. For 54% of families it is worth considering the potential for renewable energy at some future time.
. For 58% of families the possible renewable source is: roof solar water heater or photovoltaic system;
. For 39% of families the possible renewable source is: small wind turbine
. For 58% of families the possible renewable source is: biomass boiler to replace existing boiler.
. 30 individual audits to Romanian families

The way of introducing the RES survey was to organize meetings for parents in schools or to send them the link by mail. These meetings were very successful and some individual advice was given. During a meeting with 15 parents from Brusturoasa village, a presentation of the advantages of using solar energy in homes for producing hot water during 7 months/year was presented. It was an interesting discussion about energy prices, local wood resource, the cost of gas heaters, electricity, wood processing plants, wood waste, forest biomass and solar.
The local council manifested interest on proposals coming from a foreign investor who intend to build several wind turbines of high capacity on the highest mountains around the village.



4.2 France

. They organised a general public conference either in the school or in another municipal building. Conference given by Hespul energy advisers. Title of conference “Small scale renewable energies in homes” or “Homes in the face of climate change”. Content of conference: precise practical quantitative information on (1) how to save energy and (2) installation of small-scale renewable energy systems.

. Exploitation of the Energy Use Questionnaire (Activity 1, KITH Module 1)
Energy use questionnaires were completed by students with the help of teachers and Hespul energy educators for (1) the student’s homes and (2) the school.

4.3 United Kingdom

The RES survey was distributed to students in five schools, and approximately 120 students, after they had one or more lessons on global warming and reducing the energy demand from the home. There was a good response from parents to the questionnaires sent home with the pupils following KITH workshops and after analyse each one a technician have contacted the families back to give some specific advice.
Concerning local stakeholders, British partners have worked with local installers, the schools, governors, communities and landlords of the properties etc. throughout the process, assisting with grant applications, public consultations, planning approval etc, to great success.

4.4 Italy

The RES survey came out that most part of the families are owners of their apartments and half of them are older than 30 years. All of them use gas a heating system and the average of energy expenditure is 780€ for gas and 490€ for electricity. Interviewed families were interested in windows refurbishments and photovoltaic plants.
A part from the survey some face-to face meetings were organized to fill more specific questionnaire to do the thermal and electric audit of their home and assess them to apply renewable energy sources and energy saving in their apartment

4.5 Catalonia

The survey was answered by 150 families, most of them from Barcelona and suburbs.

Average diagnosis of the families who answered:
. Type of dwelling: apartment
. Tenancy regime: owner
. Heating system: none or gas
. Age of the building: More than 30 years (before thermal regulations)
. Possibilities for installing solar panels both thermal and photovoltaic.

These results coincide with the Spanish statistics except from the heating system which depends from the region. 50% of the Spanish population don't have heating system.
Some individual cases were selected to develop a face-to-face meeting where some advice were given. By the time of writing this report, at least 5 families have introduced RES in their houses mainly solar thermal and biomass.
Many local stakeholders such as municipalities and neighbourhood associations have helped promoting the project and promoting energy efficiency and potential of renewables in the home. However other stakeholders such as local retailers have not been interested in participating in this project.

4.6 Czech Republic

An adapted version of the survey was elaborated and used a basic tool to identify the main field of interest and to guide the respondents towards further activities. For example the survey came out that 49% were interested in thermal insulation, 33% in energy savings and 18% in renewable energies. After the survey, some individual assessment was offered and during this period 43 households and individuals have received specific assessment in collaboration with

local and regional energy advice centres.

4.7 Hungary

The survey was presented during RES day organised in the Danube curve sub-region during spring 2008. Approximately 40 questionnaires were collected and the attendees could learnt about the potential of RES use in their houses, specially on solar energy and heat pump and it was stated that the major gap is the financial mechanism in Hungary related to the RES use in a small scale.

5.Conclusion

Climate Change is a global challenge that can only be addressed effectively through a global effort. It is essential that families like you lead a change of behaviour in the energy use at home. There are many stakeholders at all levels willing to help you in this process. During three years Kyoto in the Home project has influenced in many European families in ten different European countries and has tested different methodologies to reach the same objective: convince families to change their behaviour and reduce energy consumption. This report has presented an easy way of realising the potential of renewables in the home taking into account not only technical aspects but also energy education based in KITH experience.

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