EC Project 610829

A Decarbonisation Platform for Citizen Empowerment and Translating

Collective Awareness into Behavioural Change

D1.2: Social Requirements Specification

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Version history

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0.2	04/04/2014	Harith Alani	Restructuring, fitting into D1.2 theme and template. Edits.
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Executive Summary

In order to attain the ambitious aims of the DecaboNet project, it is essential to have in-depth insight into the profiles, life-styles, needs, and motivations of the stakeholders with regards to energy awareness. To this end, co-creation workshops were designed and organized in Amsterdam, Utrecht and Zurich. This report documents in detail:

- **Aims of the stakeholder requirements elicitation process**

  Through the design and use of highly targeted co-creation workshops with selected user groups, the stakeholder requirements definition process set out to identify and address the factors which define social behaviour with regards to energy usage and awareness
- **Social/Demographic background of the stakeholder groups**

  Families were selected as the primary target group. These families were educated and "sensitized" to the energy issue.
- **Methodology adopted to shape the co-creation workshops**

  "Cultural Mapping" and "Users as Designers" were adoped as the methodological basis for the design and running of the co-creation workshops. The paper describes the rationale behind this selection, and the fundamentals of these methologies.
- **Process, feedback, and observations from the workshops**

  The goals, process and content of the workshops are described in detail. Obervations on the workshop process indicate such as aspects as increasing interaction as personal involvement in the topic intensifies. Finally extensive space is given to the feedback of the users, their reflections on personal and family awareness, engagement, involvement and responsibility in energy issues, their behavioural change as a result of the workshop process, their need for informational support, and their thoughts on "exporting" their new awareness and behaviour to a wider society.
- **Results and recommendations from the co-creation workshops**

  Based on the results of the co-creation workshops, this paper recommends creating awareness and change with respect to energy usage through direct personal, emotional, ethical and physical involvement of the user in his or her immediate community and space, starting with the family unit. This approach should be supported and sustained through the provision of targeted digital information. This approach should also be extended to encourage direct contact across further communities and cultures to inspire and motivate change on a wider social level.

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1. Introduction

The DecarboNet project aims to create a "decarbonisation platform for citizen empowerment and for translating collective awareness into behavioural change". In order to achieve such social impact, it is essential to have in-depth insight into the profiles, life-styles, needs, concerns, and motivations of the targeted stakeholders with regards to energy awareness. To this end, co-creation workshops were designed and organized in Amsterdam, Utrecht and Zurich to elicit the essential stakeholder requirements.

This report documents in detail:

- Aims of the stakeholder requirements elicitation process
- Social/ Demographic background of the targeted stakeholder groups
- Methodology adopted to shape the co-creation sessions held with selected stakeholders in order to capture and evaluate their requirements,
- Process of the co-creation workshops, with feedback from the "users" and observations from experts
- Results of the co-creation workshops and consequent practical recommendations for engaging individual citizens and communities.

1.1. Aims of the Stakeholder Requirements Specification

The availability of well-researched and reliable data with regard to user behaviour and requirements on an individual, group and community level is critical, if a platform is to be created, which is truly in a position to bring about meaningful and sustainable behavioural change in the daily lives of the stakeholders.

Through the design and use of highly targeted co-creation workshops with selected user groups, the stakeholder requirements definition process set out to identify and address the factors which define social behaviour with regards to energy usage and awareness. These include personal and family values and responsibility, and social and economic pressure. In addition, they address those aspects which impact and support behavioural change, such as information availability and format, personal motivation and empowerment, feedback mechanisms, and usability.

Such defining individual and social factors, which influence energy awareness and change, form the basis of the user and technical requirements, which the DecarboNet platform aims to address. These requirements are then reflected in the recommendations and guidelines, produced as a result of the elicitation

process, and ultimately "fed into" the further platform creation, testing and dissemination process.

1.2. Social / Demographic Background of the Test Groups

The provision of in-depth social and demographic data for the user groups, which were selected to participate in the stakeholder specification process, is beyond the scope of this study. Further research is necessary to refine the data to accommodate specific social groups.

For the purpose of this requirements specification, families were selected as the primary target group. This selection was made on the following basis:

- The family and the home are very often at the centre of social behaviour and identity.
- The family unit represents an ideal model for the observation of interactive group dynamics.
- Such families are generally composed of both adult professionals and children, providing an easier basis for rollout to further target groups in the professional and classroom space.

In addition, these families were generally digitally literate, educated and already somewhat "sensitized" with regards to the energy issue. Again, this selection was made for very specific reasons:

- Such "sensitized" early adaptors are ideally suited to the limited time frame available for the requirements elicitation process
- Project partner WWF has already been working with "sensitized" families
- Project partner GEO is targeting the provision of SMART energy appliances for family households, who are considered early adopters of this technology

Following is an overall presentation of the demographic profile relating to the workshop participants in Amsterdam, Utrecht and Amsterdam:

Total number of participants:	**28**
Total number of parents:	**13** (7 female + 6 male)
Parent age span:	**37 – 52**
Occupation. Employed, skilled professionals	

Total number of children:	**15** (7 female + 8 male)
Children age span:	**6 – 18**
All still engaged in formal education	

2. Approach and Methodology

2.1. Overall Approach

The starting point to this investigation into stakeholder requirements is the daily life-style and behaviour of citizens and groups with regards to energy usage. The challenge is then:

- To capture the factors with the potential to *instigate* awareness, engagement and consequently changed behaviour towards the energy issue
- At the same time, to define the related factors, which are required to *motivate, consolidate and sustain* this changed awareness and behaviour.

This approach might be represented in the following simple value chain (Figure 1):

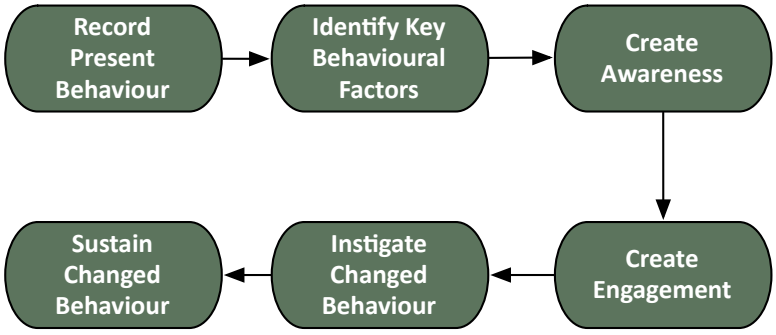

Figure 1: Process for instigating and changing behaviour

This definition of the key factors within this process lies at the heart of the stakeholder requirements elicitation.

2.2. Methodology

The path of creating citizen energy awareness is littered with the wrecks of past, failed attempts to create and implement change "from above"; a top-down model which is too impersonal to reach "under the skin" of the average citizen [1].

The rationale behind the design and implementation of the co-creation workshops, which were used for the present requirements elicitation process represents a rejection of the top-down model. As the following paragraphs explain, co-creation methodology is based on the affirmation that, if the process of behavioural change is to succeed, the user needs to feel personally addressed, involved, empowered and active in issue solving [2].

To this end, two related methodologies were used for the co-creation workshops: *Cultural Mapping* and *Users as Designers*.

2.2.1. Cultural Mapping

Cultural Mapping is about discovering and recording identity, with consequent emotional, cultural and social needs and aspirations. The methodology integrates strong principles of User-Centred design to capture, identity and examine the relationships between individuals, groups and communities and how they inter-operate within selected environments and spaces. A framework is thus created which informs and enhances planning, and public engagement.

At the centre of the Cultural Mapping Methodology is the availability of easy to use, creative media tools in combination with specifically designed workshop methodologies and formats, which enable citizens to participate actively in the sustainable planning and regeneration process.

Cultural Mapping is an empirically based and iterative process, driven by User-Centred Design principles, the Cultural Mapping Tool Kit, originally created by Janine Huizenga in 2008-2010, and a combination of workshop formats, creative and participative processes and methodologies. The following aspects have proved to be essential components of an effective Cultural Mapping process:

The narrative technique

The narrative is the most direct and appropriate means to enable people to express their own emotional and cultural relationship to a physical or geographical location in their environment. If asked about a space, room,

street, square, people generally do not respond with a physical, “objective” description of the place. Rather, they “tell a story” – about a relative or friend who lived there, a memorable incident which once took place, a building which they particularly like – which relates their own very personal and subjective relationship to the location. In this sense the narrative is the essential expression of personal experience, emotion, memory and cultural identity with regard to the surrounding, physical environment.

As opposed to giving responses in a “traditional” semi-structured interview, Cultural Mapping participants are able to present their own frame of reference with their own “narrative response” to a situation, location or environment.

Engagement and empowerment

The focus on small personal experiences within the workshops has also significantly enhanced the engagement of the participants and indeed lowered the threshold of level of entry into the workshop. The participants are now more enthusiastic and engaged, because they do not merely “feed in” data without any clear immediate benefit for themselves, but rather have an immediate sense of strengthening their identity and their relationship to their environment and their peers within their environment. They feel empowered by expressing their feelings to others.

"Pre-reflective expression” versus “categorisation” in articulation

If one of the strengths of the intuitive approach is to allow participants to create their own frame of reference, and react to a location or environment with a pre-reflective experience that hasn’t yet been put into words (and hence closer to the complexities of intimate experience), why immediately try to limit this expression of emotional complexity with the imposition of simple simplified semiotic representation in the form of symbols and icons? The use of icons, however, is not intended to limit, but rather lies in the differentiated nature of the mapping process itself. Visual symbols have a powerful effect in evoking strong feelings. In this sense, visual icons are used to “trigger” initial reaction rather than to articulate emotional complexity

In the co-creation workshops, the mapping exercise was particularly used to focus participants from a very physical perspective on energy usage in individual rooms and spaces within the shared household.

2.2.2. Users as Designers

The Users as Designers methodology, developed by Waag Society, implies that real users should be the ones to define design requirements. When the user and designer work together according to this design philosophy, they both take on multiple roles throughout the design process.

The 'Users as Designers' philosophy relies strongly on empathy, subjectivity of interpretation, personal intuition, human interaction and trust, with research integrated in the development process and development being the focus of its research.

By involving prospective users in the design process, the results are likely to bring meaningful perspectives and options into the hands of people. This leads to better systems that are designed with the user in mind. Adoption and appropriation of the results become far more likely than by using traditional methods of development.

3. The Co-creation workshops

3.1. Co-creation workshop format

In order to achieve the maximum impact, co-creation workshops were developed in two related but autonomous formats:

- **Moderated sessions**: Initially the workshops were conducted as moderated sessions, with the participation of an experienced or specifically trained moderator to accompany the users throughout the co-creation process.
- **Instructables**: In the course of the requirement elicitation process, "Instructables" were created which enabled users to download and implement the workshop instructions from a remote location, thus considerably broadening the scope of potential participants and consequent impact.

3.2. Co-creation workshop process

Description of the workshop course: During the course of three workshop sessions, a variety of families playfully experiment with their own use of

energy in their house and, in their direct environment. The families work together and learn from each other, and try to analyse and alter their habits.

General goal of the workshops: The workshops aim to create awareness about, and behavioural change in, the use of energy in ordinary households in a playful and non-invasive way, without any undue pressure.

- **Goal of first workshop**: This first workshop is designed to map the current situation, and the related emotions and values, in households in relation to energy use.

- **Goal of second workshop**: The second workshop is designed to reflect on the first experience and changes, which might have been made in the households, following the first workshop and the use of the toolkit.

- **Goal of third workshop**: During the third workshop the families test various existing tools (WWF Carbon Footprint meter, Earth Hour, Geo tools, etc.) that might assist in the behavioural change. Following the previous workshops and testing of these tools, the families work on a concrete solution for their own situation; a tool for specific use in their households that will generate an active and motivated attitude towards decarbonisation/sustainability, and can subsequently be shared with others in their community.

Target groups:

- ***Primary****:* families with a minimum of two children living at home (above the age of 6).

- ***Secondary****:* other households (1 or 2 person households, student houses, community households, divorcees with part-time children, shelters, etc.), businesses, schools and government.

Materials: The type of materials used in the workshops are listed below:

- Value visualisation tools
- Energy usage map tokens
- Family Energy Home Toolkit
- Mapping materials
- Crafting materials
- Pens

- Markers
- Paper

Duration of each workshop: Each workshop was limited to a maximum of 120 minutes. The length was specifically dictated by the attention span of the families, particularly as these families included children, and the workshops took place at the end of the working day. The series of workshops, usually with gaps of several days, was seen as an iterative process, where participants reflected and acted upon the results of previous workshops and experience at home.

Number of participants: Ideally one to four families need to participate in the workshops.

Special attention: The following are a few consideration and preferences related to the workshops:

- All family members actively participate in the workshops and in the activities following the workshops.
- Preferably, the families are available for all the sessions, but at least present for the first session.
- If convenient, the workshop leader(s) may visit one of the households for more specific observations.

Alternative course / "Instructables": A set of downloadable instructions and files are provided for families and organisations which want to participate, but are not able to join in the workshops.

Utility Toolkit: All participating families receive a *Utility Toolkit*, which they can take home. This contains a value tree, mood tokens, an energy diary, utility labels and personal utility stickers (Figure 2).

Figure 2: utility toolkit used in the workshops

Tips and guidelines for workshop leaders: The below were the guidelines and recommendation we followed with these workshops, drawn from Waag's long experience with social engagement and running participatory design. Later in the project, such recommendation could form pat of the decarbonisation methodology.

1. In an ideal situation, two people lead the workshop: one in the lead, and one assisting, who should also keep an eye on the time schedule and the active involvement of children.
2. Always start with an exercise to let everybody "get comfortable" with speaking in public. For example, let participants bring an object that makes them happy. Every family member should be able to explain why he or she feels happy with this object.

3. Start the workshop with an introduction about the project, the reason for these workshops and good examples of simple behavioural changes regarding energy use that could inspire.
4. Try to avoid a negative family dynamic. There are no wrong answers and nobody should be held responsible for behaviour in the family. The sessions are about working together, not against each other.
5. Try to keep every participant involved. When someone is passive or shy, try to actively engage that person by asking questions or by giving this person a specific role to fulfil.
6. Every participant within the families should have a specific role.
7. When participants are in doubt or confused, don't ask 'closed-ended'[1] questions but ask 'open-ended' questions[2] that will slowly lead the participants to the answer themselves. Keep asking questions until they get to the concrete solution.
8. Create an active environment as soon as possible; doing not talking.
9. Facilitate a discussion among the families - can the families inspire each other?
10. The act of creating, together with the information, which is discussed and visualized, are more important than the accuracy of the drawn maps, etc.
11. When "stuck" during the discussion sessions, use the reflective questions, shown at the end of this document.

Activity prior to the first workshop: The members of the families are asked to describe a typical day in their life, focusing on their behavioural pattern (in the house).

Each family member will describe and visualize this activity and take into account what the energy use might be during these activities. Lego, paper, magazines, scissors, can be used to visualize, especially for families with small children. In this case the families 'build' all their routes through the house.

[1] A 'closed-ended' question can be answered with a simple 'yes' or 'no', or a one word answer. It doesn't require reflection and deeper thought. Example: 'Are you happy?'

[2] An 'open-ended' question requires more depth and a lengthier response, and will keep the conversation going. Example: 'What are some of the things that bring you the most joy?"

3.3. Workshop 1

The following sections 3.3 and 3.4 present detailed, practical descriptions of the workshops themselves. For details of the goals of the workshops, differences between workshops within the whole iterative process, and observations made during the actual running of the workshop sessions, readers should consult sections 3.2 and 3.5 respectively.

Time (min.)	Part	Explanation
10 min.	Introduction	The workshop leader(s) introduces the families to the general activities of the workshop and the motivation for the sessions. A timeline is provided. All families introduce themselves to each other and to the workshop leaders. The workshop leader(s) provides some inspiring examples of small behavioural changes that can influence energy use in a private house.
30 min.	Value tree	The families are asked to come up with (at least) five personal ***values*** regarding the environment and energy usage. The workshop leader provides a few examples of values you can use (e.g. health, "connectedness", nature, family, etc.). First the family members define five individual ***values***. Then, within the family, members discuss and 'negotiate' five values that are accepted by the entire family. This exercise immediately links personal emotions and commitment to the subject of the environment and energy usage and at the same time creates a shared 'language' and understanding concerning this topic within the family. In this context, the Value Tree serves a "touchstone" for the families, with which to check their progress and behaviour against their defined values. If necessary, the Value Tree can be changed in the course of time, particularly as

		regards prioritization of values. The entire family visualizes these values by using a ***Value Tree***. Materials are provided.
15 min.	Presenting values	All families present their final values to each other and explain their choices where necessary.
20 min.	Mapping rooms	The individual family members are invited to draw a map of the layout of their house. Each family member starts with the room they feel most comfortable in (everybody should draw a different room). In every room the energy, water and gas points need to be visualized. The maps don't have to 'beautiful' - they need to functional. Once they have drawn their rooms, the family members combine their maps and add the rooms that have been omitted (For instance: washing room, pantry, corridor, etc.). The end result is a floor plan of the entire house. (Again, the real scale of the rooms is not important!)
20 min.	Value maps	Now the family members are asked to map their feelings about their energy usage and connected behaviour in the house on top of their drawn map/floor plan with ***Mood Tokens*** representing these feelings: Very good / Good / Unsure / Bad / Very bad. For example: they now realize that leaving the television on 'stand-by' wastes a lot of energy and they therefore apply a 'Very bad' sticker to the living room map where the television is located.
10 min.	Presenting mapped houses	All families present their maps and receive feedback from their peer families.
15 min.	Introduction toolkit	The workshop leader(s) introduce the ***Utility Toolkit*** to the participants. The families take the ***Utility Toolkit*** home and use it to tag and monitor their behaviour in order to improve energy usage in those rooms, in which

		usage was found to be unsatisfactory. Suggestion: Every family member can claim responsibility for a specific area of energy use. For example: one person can be in charge of all the plugs, one can claim warm water, one person is responsible for the waste disposal and one person wants to be in charge of the thermostat. Individual members of the family can make proposals or individually take action in improving energy usage in each of the rooms. When the whole family is together, for instance during evening dinner, they discuss all actions they have undertaken for that particular day around energy usage behaviour in the house. If an individual family member has proposed an action which the family considers to be successful,[3] a sticker in the colour of the "active" family member and with the symbol of the specific energy source, is placed on the label connected to the place or apparatus where the positive action took place. At regular intervals of time (suggestion: end of the week), the number of points gained by each member of the family is added up and the 'Energy Champion' is rewarded*. Of course, after some time the whole family will enjoy the benefits of lower energy usage bills.

How to use the Utility Toolkit

There are two versions of the toolkit: *the "take-home" version* for participants of the workshops and *the downloadable version* for people who perform their own sessions. In the latter case every part of the toolkit is printable on A4 or A3 paper or cardboard. You can find *the downloadable version* here {insert link}.

[3] The families themselves determine whether a proposal proved to be a successful one, and what the reward for the overall 'Energy Champion' will be.

Step 1 - Obtaining the Utility Toolkit

Take-home version: All families take home the Utility Toolkit containing a value tree, mood tokens, an energy journal, utility labels and personal utility stickers.

Downloadable version: The family working at home downloads all components of the Utility Toolkit. These components are PDF-files and consist of graphics, which they can print and cut out, and a step-by-step manual, explaining how to follow the workshop format and how to use the toolkit at home. The format is on A4, but can easily be printed out on A3.

Step 2 - Value Tree

The families need to decide what their five main values are in relation to energy usage and their direct environment. They need to rate these values in order of importance (

Figure 3).

Take-home version: During the workshop, the families already put these values on their value tree, provided during the workshop session.

Downloadable version: The families that are not participating in the workshop can decide on these values at home and place them either on a printed version of the tree or they design a tree out of cardboard, using the file provided.

Key to these values is that they are the communal values for the family. In order to come to a consensus every family member will first decide on five values for themselves (varying from ‘comfort’ to ‘health’ to ‘play’ and ‘culture’, etc.). Once they have defined these values, the family members form groups of two, which in turn define five values shared by both people. In the case of a large family, all values need to be refined, step-by-step, until there are five values left on which all family members can agree.[4] These values should always be used as a "touchstone" during the course of the use of the toolkit.

[4] This exercise is designed for families with children above the age of 12. Families with smaller children will follow an alternative route, in which children visualize their ideal household by drawing or building with Lego blocks, and the parents then translate these to values.

Figure 3: Energy value tree

Step 3 - Mapping the house

The families map their own house. The goal of this exercise is that the families gain insight into where and how energy is used in their own home. Each family member starts mapping the room, which they like best in their house. If several family members 'fancy' the same room, they will have to decide amongst themselves who will draw a map of this room, because it is important that all rooms are covered. After this task has been completed, they combine the rooms and possibly add any missing rooms to gain a complete view of their house. During this exercise they try to think of all their appliances, energy points (sockets) and their varying use of energy.

Take-home version: The families do this exercise in the workshop using the mapping tools provided (Figure 4).

Downloadable version: The families at home can download the mapping materials or use just simple paper and pencils to draw up their map (Figure 5).

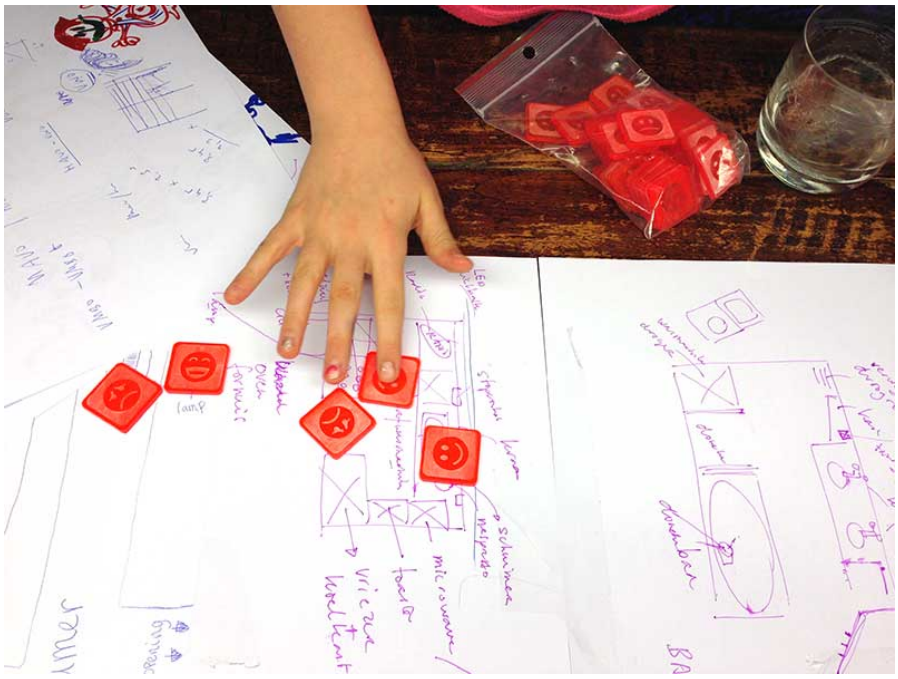

Figure 4: mapping exercise for energy consumption in the house

Figure 5: Downloadable version of the toolkit

Step 4 - Energy and emotions

After the mapping exercise, the families define their energy use by using ***Mood Tokens*** (Figure 6). These tokens represent their feeling about the specific uses of energy in their house. There are five different ***Mood Tokens*** and they range from very happy to very unhappy. A question mark is also provided in case feelings towards usage of a specific utility are unsure, or if usage is shared by different family members, in different ways, so that they cannot reach consensus. .

Figure 6: Mood Tokens

The families 'walk through' all the rooms in their house and decide together where the ***Mood Tokens*** need to be placed. Once the entire house is mapped and fitted with ***Mood Tokens*** a photo captures the state of the house at that moment. This is the so-called "zero-measurement" state, on which all future changed behaviour is based.

Take-home version: The families do this exercise in the workshop using the plastic ***Mood Tokens*** provided.

Downloadable version: The families at home can download the ***Mood Tokens,*** print them and cut them out.

Step 5 - Take over the home!

Once the 'unhappy spots' are defined in the house by the ***Mood Tokens***, the participants can start their behavioural changes in their home. Every 'weak spot' is marked with a ***Utility Label*** (Figure 7). There is one for energy, water, gas and food.

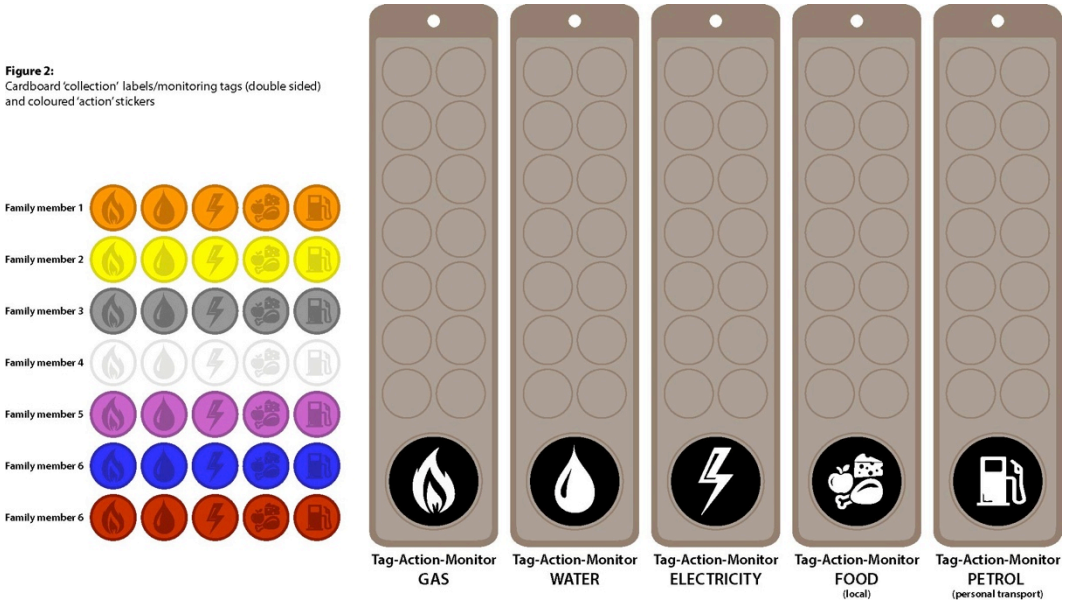

Figure 7: Utility labels

Every family member is given his or her own ***Utility Stickers*** and can claim responsibility for a specific area of energy use.

For example: one person can be in charge of all the electricity sockets, to check if there are no unnecessary phone or other chargers left in it and one can claim hot water usage. One family member takes responsibility for the waste disposal and another is 'in charge' of the thermostat.

Individual members of the family can make proposals to improve use of energy in each of the rooms. The family discusses together, during a daily meeting, which changes have been made and who was responsible for these changes. If a change is deemed successful, the responsible person is rewarded and allowed to place his or her sticker on the ***Utility Label*** in question.

In the journal, the family records all the changes, which have been made. These can be descriptions of the proposed changes, but also the effect the changes have on the dynamic of the household and in which way the changes affect the ***Family's Values.***

At regular intervals of time, the number of points and the stickers and gained by each member of the family are added up and the 'Energy Champion' is rewarded. Of course, after some time the whole family will enjoy the benefits of lower energy usage bills.

The families themselves determine a suitable reward for the 'Energy Champion'.

Take-home version: The families are given the ***Utility Labels*** and the ***Utility Stickers*** during the last part of the workshop, to take home.

Downloadable version: The families at home download the ***Utility Labels*** and the ***Utility Stickers.***

3.4. Workshop 2

Time (min.)	Part	Explanation
5 min.	Introduction	The workshop leader introduces the families to the general activities of the workshop. A timeline is provided.
20 min.	Value tree & revaluation	In the first session the families have made their value tree. This tree remains visible, to help them keep the values in mind while doing the exercises. It is possible that the effect of using the Utility Toolkit at home has changed either the order, or the values themselves. These changes will be discussed and presented later on. Then the original maps, made by the families in the previous session, are provided. The families start to revaluate their maps. Was it actually a valid representation of their house? Did they miss something essential? If changes need to be made, the families can now make them. The families also discuss, in the light of the revaluation of their maps, and their consequently changed behaviour, whether it is also necessary to reprioritize the order of their values.
10 min.	Presenting 'new' values tree and house maps	The families present their altered/improved maps to each other. The other families can respond to the changes and make suggestions to improve their household even more. When a family struggles with a balance between value and energy use, the other families may come up with

		suggestions.
30 min.	Reflection on using the toolkit	The families have all taken photos of their houses, and the positioning of their tags. Every family member had a different role. During this reflective session the family members will evaluate their past week, how they made changes, and what influence these changes had on the household. The workshop leader moderates these reflective talks, which are held with all the families at once. The ***Reflection Questions*** at the end of this document below can be used to give direction to the conversation.
40 min.	Energy tool	The families work on a design sketch for a specific energy solution in their home. This small invention can either be an actual physical tool using electronics, a personalized charting system to monitor the energy usage responsibilities of each family member, or even a small visualization of each utility in the house, and its energy usage.
10 min.	Presenting plans Energy tool	The families present their plans to each other and receive feedback on their ideas.
5 min.	Next week	The families are instructed to follow up their activities by using the Utility Toolkit. To make things more interesting or motivational, new (game) mechanics can be introduced such as a daily "tombola" with a ‘sustainable solution’ to implement in their household, or the introduction of a challenge such as ‘sweater-week’ (when the heating is turned down, and people need to wear an extra sweater).

3.4.1. Reflection Questions

For Workshop 1:

1. What core values does your family unit embrace?
2. How do these core values relate to the issue of energy?
3. Can you identify in detail the actual usage of energy in your family home.
4. How do you feel about the actual energy usage in your family home. Good? Bad? Satisfactory?
5. Can you reconcile this usage with your family values?
6. How can you change this behaviour in practical terms?
7. Can you allot personal responsibility to practical change?

For Workshop 2:

1. What strategies and behaviour have you put in place in order to make the energy usage changes that were made durable?
2. Which tools can you think of, that would support you more effectively in the implementation and monitoring of the changes in energy usage?
3. Could you describe your role in this energy experiment
4. Could you describe the role of the children in this experiment?
5. Could you think of ways to motivate friends and family to do the same?
6. Could you give some examples of things that will motivate you to make the changes?

3.5. Co-creation session observations

With regards to format, environment, and process, several observations can be made around the co-creation workshops:

- Generally families were interested in the exercises, motivated, and increasingly interactive as personal involvement in the topic intensified, also with the introduction of 'hands-on" work.
- The fact the groups were able to do all the exercises, - particularly those of a "hands-on" nature, around a table - was particularly important in creating a relaxed and productive "family" atmosphere

- In this sense, the "playfulness" of the family setting was positive, interactive, and motivating
- If young children are participating, they must be kept "involved", otherwise they can be easily distracted. In this context, it is preferable not to involve very young children in the workshops, as too much focus can be drawn towards maintaining the participation of the youngest.
- On the other hand, the input of the older children was particularly important. Through school and the media, this age group was more aware of energy issues, and they were keen to play an active role in discussions and consequent action.
- It is preferable to involve all participating families in the whole process over several workshops. Such participation is necessary to maintain interest and commitment

3.6. Co-creation session feedback

3.6.1. Creating awareness and engagement, instigating changed behaviour

Embedding awareness and change in family values and responsibilities

The general feedback from the families was that the workshop participation and exercises were instrumental in raising their awareness around energy usage and instigating change in their behaviour. It was also essential that they carried out the workshop process together, as a physical family unit. Two main exercises were cited as essential factors:

- The value ladder - definition and prioritization of the family's core values - was seen as crucial in creating an emotional and ethical base, against which their ensuing behaviour could be compared. The values were consequently often discussed, not only in the workshops, but also on a daily basis at home. Five out of the seven participant families decided to display the "Value Tree" as a constant reminder of their defined values, and value prioritization was even changed by certain families in the course of the workshop period.
- Directly after value definition, the "house mapping" exercise was perceived as decisive in creating the "Aha" effect with regard to creating awareness of the energy usage of the family, and each individual member of the family. There was general consensus among the families of the feeling of individual and group responsibility and engagement to change their behaviour. ("What was your own motivation to save energy"? "Our presentation of the house mapping at

our family table". Mother, Zurich). This drive to change behaviour "at home" was then extended to energy usage outside the home.

3.6.2. Motivating and Reinforcing Changed Behaviour and Commitment

Raising awareness, engagement, and commitment

The feedback indicated strong family consensus around key driving factors in developing awareness, engagement and commitment:

- The workshop discussions around values, energy awareness and need for action and change were often reported to have created a new, "open" level of discussion and bonding within the family. ("I now like to think and share what is good for the family. It would be good to do this in other aspects of family life". Mother, Zurich, "Most important thing was for me to discuss about values with our teenaged son. We never do this normally". Father, Zurich, "We have never spoken to each other before like this, about this..." Mother Amsterdam)
- This new, open environment for discussion around energy is reported to be very positive in building and reinforcing common action ("We've made the energy theme a topic of regular conversation. We've created some standards together that we can address together when somebody is being negligent. In that respect, energy has now become something that we can talk about without conflict". Father, Amsterdam)
- In this respect, the "ritualization" of discussion around energy is reported as being a key factor in sustaining awareness and action ("We have made it a tradition and ritual to sit together every evening to discuss the subject. In this way, we motivate each other's good behaviour. And particularly to stay active. We discuss our day, our energy behaviour, and what we still can do. This motivates us". Daughter, Amsterdam)
- The families reported the motivating and sustaining effect of accepting individual and joint responsibilities within the family. All now have ownership of the issue and all are equally responsible. Thus, self-imposed peer pressure, through daily discussions and using the journal, maintains engagement and checks responsibility. ("The family sets its own goals and dates. This motivates us". Father, Zurich)
- The "play" element within the family actions - finding the "weak" spots in the house, using the stickers, gaining points - is reported as being a strong motivator for change. As can be expected, children particularly appreciate this aspect of "playfulness", and are generally seen to be

more active in the house, for example, in turning off lights and saving water.

3.6.3. Self-Monitoring

- The availability of self-monitoring tools was widely identified as being necessary to maintain self-awareness and commitment.

3.6.4. Need for quick and easy access to relevant information

There was general agreement among the workshop participants that the provision of easily accessible, relevant and accurate digital information was essential in maintaining their engagement and commitment.

- The participants indicated that it would be very motivating to receive ongoing comparative information on their progress as regards to energy usage. Not only would such data foster engagement, but if would also provide context and confirmation for their efforts. ("We talk about changes in our behaviour without really knowing what the actual effect is. We think we are doing better than before, but we have no objective standards or measurements to know exactly how much we did better or worse than (A) before (in our own household) (B) our neighbours (who have the same type of home) (C) the national average. Basically, we want to know what we are achieving." Father, Amsterdam)
- In this context, there is also a strong demand for ongoing tips and tricks, particularly from others engaged in such an awareness process. ("I'd like to read other people's journals for behavioural stimulation, for comparison and new ideas." Mother, Amsterdam. "I also like to be updated with tips and tricks to save energy. I guess this project will result in new kinds of behaviour that should be shared with the rest of the participants - and the world!" Father, Amsterdam)
- With respect to the kind of information described above, there was strong emphasis on the need for the provision of good, visually clear data ("The results of our energy saving activities should be should be easily accessible and visible". Mother, Amsterdam)
- The provision of accurate, targeted data was also seen as very valuable in maintaining energy efficiency, particularly at home. With the support of such data, the home environment was perceived to be the "starting point" for energy control. ("Generally, it’s easier to control the energy environment at home than it is at work or in a recreational environment". Father, Zurich)

3.6.5. Exporting awareness to wider society

In addition to heightening and maintaining their own awareness and changed behaviour, the co-creation workshop participants were all made aware of the need to change and improve the behaviour of their friends, neighbours, schools and work colleagues.

Enlighten and inspire others to change: friends and neighbours

- The families' own experience following the workshops was seen as a great opportunity to tell about what they have achieved, and to inspire change in friends and neighbours, for example, when they are mixing socially ("I'd like to strike up a discussion about this project with friends during a meal, or some other opportunity, and tell them what kind of changes we've achieved at home". Daughter, Amsterdam). In this context, it is important to note that the participants did not want to "preach" but rather inspire those close to them through their own commitment, and feeling of responsibility. ("I'm very much in favour of independent responsibilities. I would like to tell them (friends) about it, in the hope my enthusiasm catches on. I won't go out "canvassing" though". Father, Amsterdam)
- In the same way, several families proposed trying to influence their neighbours through friendly tips and advice and through the example of their own life-style. ("We could offer friendly advice in casual discussions, for instance, suggesting going solar"." Mother, Zurich, "Invite neighbours for a beer and discuss trash issue casually". Father, Zurich)
- In any case, extending and promoting awareness among neighbours is seen as strongly collaborative, friendly affair, with close and direct combined action ("I'll address this idea in the next meeting of our house owners' organization to see who wants to join me in the challenge to make the house completely self-sustainable in terms of energy use". Mother, Amsterdam).

Enlighten and inspire others to change: school and work

- Particularly the children were keen to introduce the energy topic to their classmates and teachers. For example, they proposed presenting the topic at school, talking to headmaster, and suggesting other sustainability topics and activities.
- Several families proposed linking the co-creation workshop format directly into school activities, for example by introducing the "sticker game" to their teachers and classmates.

- Also in the workplace, the participants emphasized the importance of offering advice from their own experience and asking friendly questions, rather than "preaching" or direct confrontation. ("We could organize a sustainability workshop or a competition, involve children, encourage co-workers to use bikes to commute, emphasize the positive effects, share but don't proselytize". Mother, Zurich)

Enlighten and inspire others to change: clubs, leisure, wider society

- The participants also recommended extending the range of personal advice to their sports and leisure clubs. Again, this was seen as an environment when they could achieve direct personal impact. Initial feedback indicates that this form of change is "transferable" to a wider social community.
- In any case, the family experience was often seen as a "starting point" for wider social action on the basis of their own example (e.g organizing plastic bottle collection in the community, or starting to generate 'own' energy and thus being able to go off the energy grid. Mother, Amsterdam).

4. Results and Recommendations

For the purposes of the Decarbonet project, a series of co-creation workshops have been held with families in Amsterdam, Utrecht and Zurich, in order to elicit essential user requirements and subsequently generate practical recommendations for engaging individual citizens and communities. In general, user reaction has been very positive, with enthusiastic participation and interaction.

4.1. Results

Observations and feedback from the participants have delivered the following clear results:

- Direct personal, emotional, ethical and physical involvement within the family unit in energy usage in their immediate environment (in the relationship to their family values and the efficiency of energy usage in their own homes) was the most effective means to create awareness and instigate behavioural change in energy issues.
- Creating a new, trusted platform for "open" discussion around energy usage within the family community was very positive in building and reinforcing common action without conflict.
- On the basis of open discussion and shared values, family "Rituals" and "Narratives" around energy usage can be quickly established, and can act as key factor in sustaining awareness and action on a day-to-day basis.
- The acceptance of "joint ownership" of energy usage, with consequent individual and joint responsibilities, within the family community, reinforced by self-imposed peer pressure and "self-regulation" constitute a strong force in maintaining engagement.
- The "play" element within the family actions is a strong force in maintaining awareness and engagement, particularly among the children.
- The availability of self-monitoring tools is widely seen as being necessary to maintain self-awareness and commitment.
- There is a clear indication that the provision of easily accessible, relevant and accurate digital information is essential in maintaining engagement and commitment. This need particularly refers to comparative information with (1) individual and community achievement with regard to past behaviour (2) comparison with other neighbourhoods (3) comparison with the national average. In this

context, there is also a strong demand for ongoing tips, tricks and reminders.

- The positive experience of awareness and change through direct personal, emotional, ethical and physical involvement within the family unit is an excellent basis from which to enlighten and inspire others in the same way in the wider social community, whether friends, neighbours work colleagues or school-mates. In this context, it is important not to "preach" but rather inspire and engage directly and emotionally through commitment, lifestyle and feeling of responsibility
- This direct and personal approach can also be extended further to wider social groupings and communities.

4.2. Recommendations

We recommend an approach to creating awareness and change as regards energy usage through direct personal, emotional, ethical and physical involvement of the user in his or her immediate community and space. This means creating shared awareness, values, responsibility, and commitment towards better energy usage within a strong physical community, particularly within a shared environment. As generally the strongest physical and emotional community unit, the family is the preferable starting point for this process of awareness and behavioural change.

This direct, personal approach is seen to achieve far greater initial impact than the provision of impersonal information regarding, for example, the damaging effect of energy wastage on the environment, or the intellectual debating of ideas and opinions around energy usage. The provision of more impersonal information on the wider effects of energy wastage on a national or global scale tends to leave users with a feeling of "powerlessness" as an individual. In this context, they will quickly lose interest. The ability to change their direct energy environment, and the ensuing feeling of achievement, provides users with a powerful sense of "empowerment". This feeling is vital in sustaining the behavioural change process.

This direct approach means defining values within the community, and allocating direct responsibilities for achieving and maintaining better energy usage. This also implies designing "open" co-creation sessions for different types of end-users and communities (e.g. workplace, schools, residential homes, clubs, and associations).

It is vital to encourage discussion, narrative building, daily rituals and debate to inform, motivate and sustain awareness and changed behaviour. Although this practice is most effective within a physical community setting, online

debates and discussion could also be very useful in complementing the direct approach. We recommend further examination and development of this "complementary" approach in combination with the Open University's research around the Debating Tool.

A "playful" approach to questions of energy usage, when suitable, should be encouraged, particularly within the physical family / community. This can be more effective than an overtly "serious" approach, particularly among children. In this context, the "competitive spirit" can be a powerful force in motivating and sustaining change, from within the family or wide community perspective.

Awareness and changed individual, family and community behaviour should also be motivated and sustained through the provision of targeted and tailored digital information. This should take the form of:

- Ongoing comparative information about (1) individual and family/ community achievement and progress with regard to past behaviour (2) comparison with energy usage data from neighbourhoods (3) comparison with the national average. In this area, there is an urgent need for ongoing, accurate, and well visualized digital monitoring and reporting feedback regarding individual and group energy usage behaviour.
- Further research is needed into the practical use of energy usage monitoring devices. We recommend further examination of this question in combination with the Open University's researchand GEO's expertise around the use of such devices
- There is a clear need for a web platform for "tips and tricks" to share solutions and advice for ongoing tips and tricks, particularly from others engaged in such an awareness process

These recommendations are based on direct personal, emotional, ethical and physical involvement of the user in his or her immediate community and space. This approach should be extended to encourage direct contact across further communities and cultures to inspire and motivate change on a wider social level. This means, for example, training workshop leaders and key members of communities to "transfer" the approach from one community to another. Such a direct personal approach and transfer across wider social communities should be supported by the provision of targeted individual and comparative data, as previously described, to create a complementary personal/digital social progression of awareness and change (Figure 8).

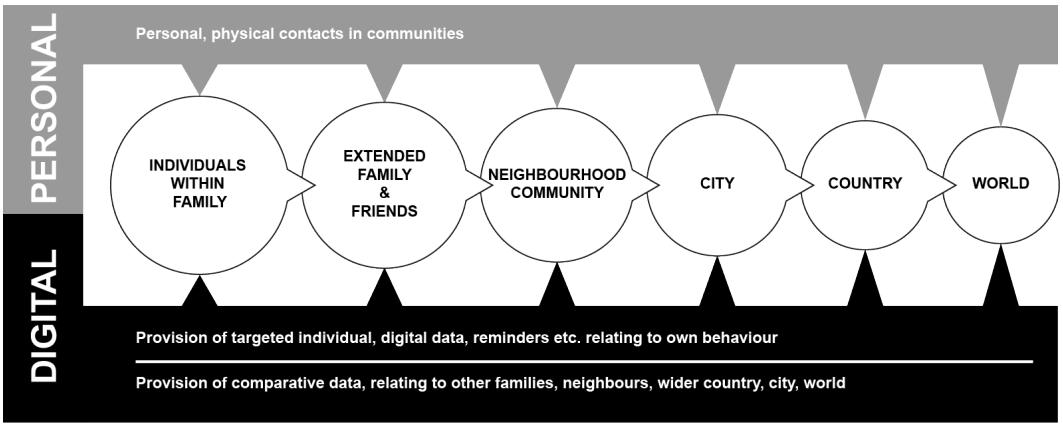

Figure 8: Extension of 'family unit' approach through social communities

We recommend also other measures to foster this approach. For example, energy suppliers could create "pop-up" shops in urban centres in which they conduct such co-creation workshop with their users. In the same spirit, individual and group empowerment could be fostered through the availability and accessibility of such tools as the Fablabs, or self-manufacturing facilities, to allow users to create their own energy saving and monitoring solutions.

We recommend that the participants in the workshops are "revisited" after several months to determine whether they have continued their changed behaviour after the initial impact of the co-creation workshops has diminished. Particularly with regard to their own level of "comfort", it is essential for this study to check whether their new good practices have been maintained.

5. Conclusions

This report is based on the observations, feedback, and integrated results of a series of co-creation workshops, which were designed and carried out from a specific methodological perspective, Cultural Mapping and Users as Designers, and with a specific target group, the family unit.

We believe that the subsequent recommendations can serve as a sound basis, from which to extend the approach to a wider social spectrum, with the complementary development of tools and support systems.

In this process, it is also necessary to integrate further research by consortium partners into the "living" report. For example, research covered in D1.1.1 and conducted from a different methodological basis, provides excellent insight into awareness and behaviour as regards energy consumption in the workplace. Such complementary perspectives will be further developed and integrated over the coming months.

Next we plan to study how the recommendation that came out of these workshops can be fed into the DecarboNet platform, in terms of design decisions, services, fuctionailities, and intervention strategies.

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A. List of Figures

B. List of Tables

Not applicable.

C. List of Abbreviations

Abbreviation	Explanation
CA	Consortium agreement
DoW	Decription of work, i.e. GA - Annex I
EC	European commission
GA	Grant agreement
IP	Intellectual property
IPR	Intellectual property rights
PC	Project coordinator
PMB	Project management board
SC	Scientific Coordinator
PO	Project officer
PSB	Project steering board
DM	Data Manager
AB	Advisory board
WP	Work package

D. References

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[2] Waag Society. 2001. Users as Designers.http://waag.org/en/project/users-designers

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