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Link(s) to article on publisher's website:
http://dx.doi.org/doi:10.2991/ict4s-env-15.2015.13
http://enviroinfo2015.org/

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Perceptions and behaviour towards climate change and energy savings

The role of social media

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Abstract— **Success in promoting changes in behaviour is often dependent on the choice of interventions. This research investigates the use of social technology features as interventions to raise energy awareness and to promote a collective behaviour change towards saving energy. Aiming at understanding this scenario, an online survey was conducted to extract from Internet users their current position towards climate change, energy savings, and social media usage. Main results are reported in this paper indicating, for instance, that social media is not yet a main source of information in this context. Triggering discussions around the consumption of specific appliances, and associating it with energy-saving tips based on personal experiences were pointed out as promising approaches to support behaviour change through social media.**

Keywords—climate change; engagement; energy awareness; collective awareness; social media; sustainability

I. INTRODUCTION

Despite all the investments in technical innovations to reduce carbon emissions, behaviour change is still considered a central strategy for policy markers to mitigate climate change [1][2]. Promoting a behaviour change towards protecting the environment is a complex mission, since individuals do not always respond rationally to favourable economic or more sustainable choices [2]. Different sociocultural forces (or barriers) such as personal values, incentives, formal support, peer pressure, also influence behaviour.

When considered beyond a technical perspective, technology can play different roles in the challenging task of leveraging behaviour change. Generally speaking, Oinas-Kukkonen [3] defined Behaviour Change Support System (BCSS) as a *"sociotechnical information system designed to form, alter or reinforce attitudes, behaviours or an act of complying without using coercion or deception".*

Providing feedback on individual's actions to potentially raise awareness is an initial requirement for a BCSS. In-home displays for energy consumption feedback are examples of that. But the sole provision of information is not enough to guarantee a lasting behaviour change result [4][5]. Ideally, technology should also motivate people to be engaged, for instance, by connecting people through collective savings

actions [5].

Integrating feedback of consumption with social media platforms expands the potential of technology to nudge behaviour change from the individual level to the collective, thus boosting a positive social change. By enabling dialogue and quick information diffusion, social media could help shaping opinions and disseminating patterns of behaviour; a potential catalytic power in engaging people with a social issue such as climate change [6][7].

According to the behaviour change literature, people tend to act in a certain way to be in line with others in similar contexts, following social norms [8]. In terms of energy consumption, for instance, it is believed that creating a social norm around being more energy efficient offers one of the best routes to changing peoples' behaviour, even though energy is an invisible good and less binary than other possible behaviours related to environmental protection.

To actually mediate the way people interact with the environment and eventually engage people, technology must be properly designed for that. Although there are many studies addressing the design and the analysis of impact of BCSSs, many questions keep challenging researchers in terms of establishing a systematic approach [9]. Examples of recent investigations include studying how people's awareness increases (e.g. of their own energy consumption) [10], how they react to environmental messages [11][12], how changes in behaviour could be brought about and maintained [1][13], and how social media behaviour can be associated to pro-environmental behaviour.

This research aims at exploring the potential of technology in raising collective awareness towards climate change and in transforming this awareness into effective behaviour change to conserve energy. Insights from monitoring online participation and behaviour patterns within social technology may also help supporting strategic decisions regarding perception and awareness of environmental issues by policy makers and other environmental stakeholders.

This paper is situated in the initial stage of understanding the potential of such approach and associated scenarios. Results of an online survey with Internet users on their

positions and behaviour towards climate change and energy saving, and also on their perspective of social media as a mean to share experiences are presented. The results are then discussed under a sociotechnical approach. The association of the results with aspects of behaviour change theory leads then to recommendations for the social technology development.

This paper is organised as follows: In section 2, a theoretical overview on behaviour change is presented, followed by the state of the art on studies associating social media and energy conservation as a target behaviour described in Section 3. Research questions are presented in section 4. Results of the online survey conceived to answer these questions are presented in section 5 and discussed in section 6, leading to recommendations for a social technology design in section 7. Section 8 concludes the paper and points out future works.

II. UNDERSTANDING BEHAVIOUR CHANGE

Different scientific domains such as psychology, anthropology, sociology, and philosophy have put effort into understanding the forces that drive people's behaviour and decisions for engagement with protecting the natural environment [14][15]. This "*not emotionally neutral subject*" [16] has been conceptualised as Behaviour Change Theory, a field of study that transcends environmental purposes, being also applied to health, education and dissemination of new products or concepts.

Behavioural change theory is mainly dominated by two complementary approaches: models of behaviour and theories of change. Socio-psychological **models of behaviour** can be applied to understand specific behaviour and identify factors of influence, mainly at the individual level [17]. The majority of behaviour-change oriented research in technology design is based on an individual model and, according to Hekler et al. [19] not considering the context in which a technology will be used.

Theories of changes explain the behaviour change process through social science lenses, being particularly helpful to develop interventions leading to a desired behaviour change. For this reason, they have been applied to policy making aiming at promoting social changes [17]. Theories are generic, not taking into account contexts, perceptions and needs of a particular group of people [18]. Nevertheless, balancing abstraction with contextual relevance is needed [19]. Selecting then the best theory or model from hundreds of different conceptual views to inform the design can be then a challenging task [17].

By integrating a number of formal theories from psychology and social sciences in terms of "*what it takes for new practices or products to be adopted by groups of people*", this research sheds light on the 5 Doors Theory [18]. This generic theory aggregates elements from Diffusion of Innovations [20], the Self-Determination Theory [21] of motivation, among others. Instead of promoting changes to peoples' beliefs or attitudes, the 5 Door focuses more on "*enabling relationships between people and modifying technological and social contexts*". It consists of 5 conditions or factors that must be present in the actors' lives:

1. Desirability: take into account people desire
2. Enabling context: modify the social and technological context to enable action
3. Can do: build actor's self-efficacy
4. Buzz: generate positive buzz, interest
5. Invitation: frame an emotionally compelling invitation

By providing these 5 conditions, the actors may trial the behaviour. If it generates satisfaction, they may adopt it in a sustainable way. Figure 1 [18] illustrates these conditions.
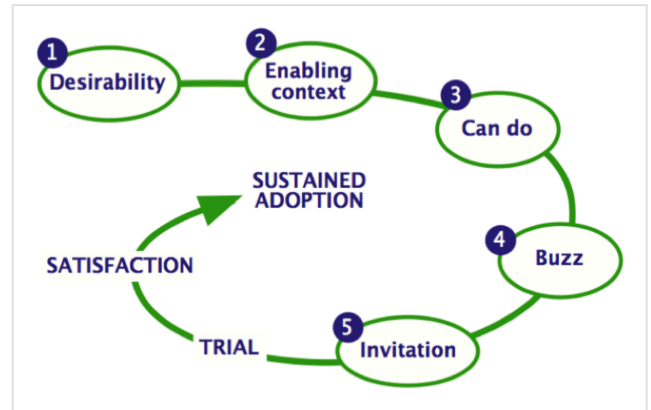

Figure 1 - Five Doors Theory (adapted from [18])

For [17], interventions should be informed by theory and developed on the ground, rather than simply based on the uncritical adoption of a model.

Independently of the theoretical approach, technology design can be inspired or even grounded on behaviour change theory. Next section describes technologies that intend to promote behaviour change focusing on energy saving as the desired behaviour.

III. BEHAVIOUR CHANGE TOWARDS ENERGY CONSERVATION

Assuming that individuals, at different stages of behaviour change, may require different informative support, He et al. [22] relied on the Transtheoretical Model [23], a behaviour model, to design energy consumption feedback.

Although the individual approach is dominant in technology design for promoting [24], some authors [25] argue that environmental issues should not be turned as personal moral choices only. The social context is important to be considered not only to make changes more effective, but also to promote changes in larger scale, influencing policymaking.

Associating social media to technology to leverage behaviour change can actually bring context and social connections to promote behaviour. For the Climate Change Communication Advisory Group [26], "*there are few influences more powerful than an individual's social network*", to promote more environmentally friendly behaviour.

The potential of social media to disseminate and to incite pro-environmental behaviour was explored by [27] among staff members in an education institution, recognising Facebook as

an effective tool in that context. In [28], the authors found that being part of a collective effort was considered more important to the participants than the effectiveness of the action on the environment, reinforcing the importance of connecting people for collective efforts.

In terms of energy savings, engaging people with the issue has been proven to be a complex task [1][17], since energy is out of sight and usually out of mind [29]. In general, people do not wish to be profligate and to waste energy: many *do* have a carbon conscience, however latent. Again, connecting people to find solutions together and disseminate it has been shown to be a promising approach.

This study evaluated an online debate tool as a favourable approach to motivate engagement and to raise energy awareness in a collective way in a workplace [5]. The possibility to interact with other people's ideas (adding arguments or even voting) was considered the main motivational aspect to engage participants.

Initiatives such as [30], [31], [32] and [33] are also based on social network to foster energy savings. EnergyWiz [31] explored social comparison one-on-one and ranking to motivate savings. This project also relies on environmental psychology to design tailored eco-feedback considering different values (altruistic, egoistic, and biospheric) related to environmental concerns [34].

Although the number of new developments targeting has increased in the last years [19], a better understanding of the factors that influence people's behaviour towards energy conservation is still necessary [4]. In the same extent, it is still required to learn how to best explore the potential of technology to create awareness of problems and possible solutions requesting collective efforts [35].

In line with that, this study aims at finding directions to technology design to leverage towards energy saving exploring social media. In the next section, some research questions are defined for further discussion.

IV. UNDERSTANDING THE SCENARIO

Before promoting changes in behaviour, first it is necessary to understand how people make sense of the social issue. The way people perceive climate change and act, coping or not with that, is influenced by a number of sociocultural factors and players. Media (TV, newspapers, magazines, etc.), for instance, has an important role in forming public opinion. Inspirations by friends, eventual actions promoted by local communities or schools may also influence people's perceptions and actions towards the issue. Experiencing recent extreme weather events has also led people to believe more in climate change and be more concerned, as this survey in the UK pointed out [36].

We defined a set of research questions for identifying the way people perceive social media in such complex context, their current position, interest, and patterns of behaviour. Answers to these questions aim at informing and guiding further developments.

Related to current position towards climate change:

- Is the scenario for promoting behaviour change favourable? How concerned are people in general?
- What kind of behaviour people associate to environmental protection? Is energy saving among them?
- What are other aspects of life (or values) that can impact on behaviour change towards protecting the environment?
- How are people distributed over the stages of behaviour? Where do people see themselves in the process?

Sources of information and social media:

- What are the preferred sources of information on climate change? Is social media among them?
- What kind of information related to climate change and energy saving are people more interested in? Does the media influence preferences?
- What kind of information people would be happy to share among their friends?
- What kind of information related to energy saving are people more interested in getting?
- Are people keen to share energy-saving related content? What kind of content would they share?
- What is the boundary between private information and interesting personal experiences to be shared among other people?

To develop a general picture, an online survey was carried out in September and October of 2014, targeting Internet users in communities or workplaces surrounding our project members, people potentially reached by social technologies associated to this study. The survey was promoted through social networks and Intranets. The sample then did not intend to represent geographical areas or specific demographic groups. Results are described in next section.

V. SURVEY RESULTS

A. *Respondents profile*

The survey received answers from 212 participants over Europe (83%), North and South America (7% and 9%, respectively), and Asia (1%).

The large majority of participants (72%) aged between 25-44 years old; 22% from 45-64, 3% from 18 to 24 and other 3% older than 65 years old.

As Figure 2 illustrates, Facebook users that actually create new posts at least every few weeks are 64.6% of the participants, while 28.2% are Twitter users.
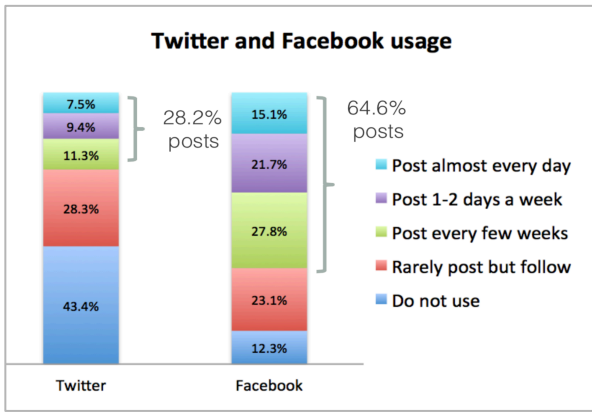
Figure 2 – Twitter and Facebook frenquency of usage

B. Current position towards climate change

Around 80% of participants stated their level of concern above 3 in a 1-5 scale from "I don't really think about it" to "It guides most of my everyday choices". The graph in Figure 3 describes the distribution over the scale, with 36.8% in the concern level 3, other 35.4% in the level 4, and 7.5% in the maximum level of concern.
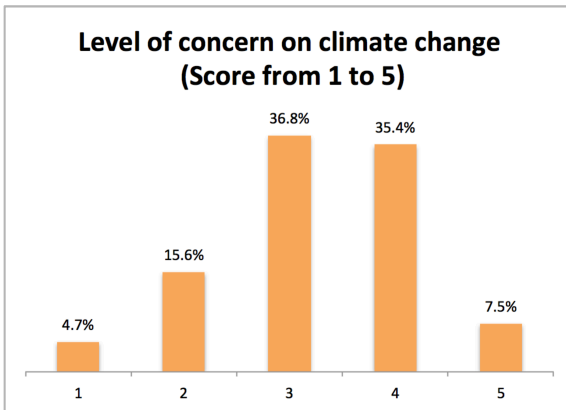

Figure 3 – Participants' level of concern on climate change

The importance of reducing individual energy consumption as part of the battle against climate change was recognised by 78% of the respondents. People that did not recognise the importance are mostly (83%) between the levels of concern 1 to 3.

When asked to describe pro-environmental behaviour people already have or are keen to have, 147 participants mentioned a set of 328 actions. The main topics are synthesised in Figure 4. Considering consuming less electricity (26%) and gas together (9%), 35% of the responses referred to saving energy, followed by 28% mentioning transport, i.e., cycling to work, efficient or hybrid cars, etc.; 14% referred to either plastic bags, recycling or composting; 9% was about water conservation; 8% eating local/seasonal/vegetarian food; and 7% proposed to consume second hand goods or buying less.

Figure 5 illustrates the tag cloud based on the responses to this open question. The size of words in the image refers to how recurrent they were in the responses. Energy and car were

the most important words, followed by recycling, reduce and water. The underlined works *avoid, instead, rather, possible* evidence the negotiation associated to changing behaviour.
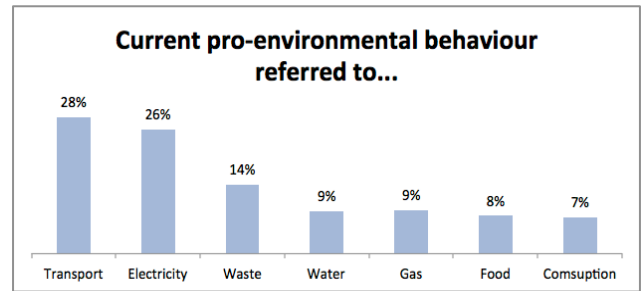

Figure 4 - Current pro-environmental behaviour topics

Figure 5 - Cloud tag with the responses

For building an overview on how people assess different aspects of life and how natural environment is situated in this scenario, participants were asked to select the 3 most valuable things in their life among Money, Comfort, Health, Leisure, Community, Family, and Nature. The chart below (Figure 6) represents the results in terms of respondents' level of concern on climate change. The trade-off between Comfort and Money can be noticed. More concerned people are, more Nature was considered valuable. Money has shown to be not that relevant when compared to other aspects.
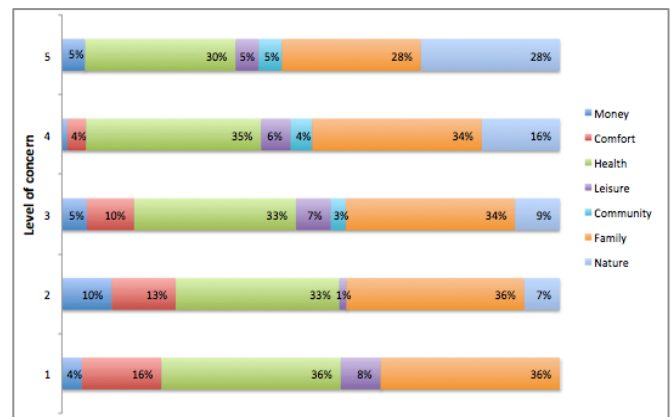

Figure 6 - Values attributed to aspects of life x level of concern

Aiming at mapping aspects of the 5 Doors Theory' of behaviour change [18], participants were asked to select the statement, among 6 options, that best reflect their position in a behaviour change process:

111

Stage 1. "I recognise the need to reduce my consumption";

Stage 2. "I am keen to reduce my consumption. I need to find feasible ways to do that";

Stage 3. "It is a personal commitment: I will start reducing my consumption";

Stage 4. "I am doing my part already using less energy than I used to";

Stage 5. "I am doing my part using less energy, and I would like to encourage more people to do the same".

No stage. "I am not really concerned about it".

The participants distribution over the stages is represented by the chart in Figure 7, pointing out the majority (34.4%) consider they are already saving energy (stage 4), and other 20.8% consider they are ready to start engaging other people (stage 5).
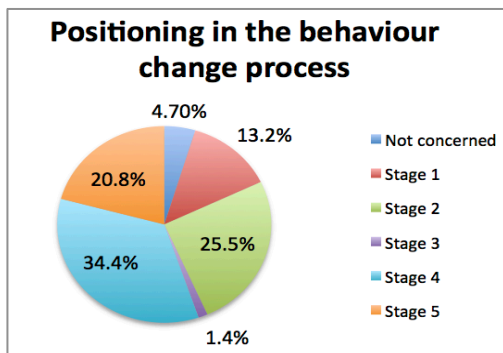

Figure 7 - Participants' position in the behaviour change process

When asked about their potential interest in monitoring their energy consumption, results indicated that the more concerned people are, the higher is their interest in learning the consumption of individual appliances, while the interest for comparing their consumption with other people is higher among less concerned people.
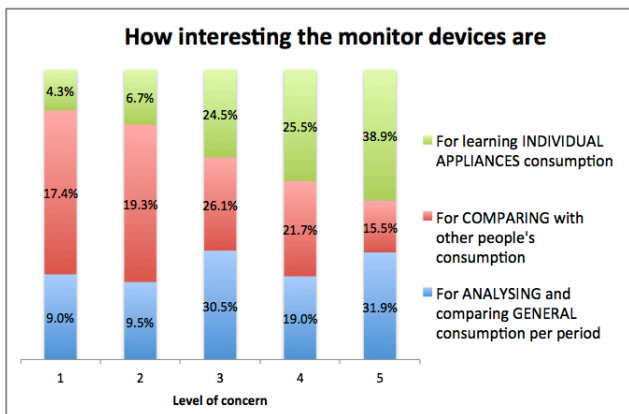

Figure 8 – Level of concern x interest on monitoring energy consumption

A total of 89% of the participants reported above 3 for their level of interest in a 1 to 5 scale for learning the consumption

of individual appliances. The chart in Figure 8 illustrates this result.

C. Source of information and social media

Social media is not yet considered as a strong channel of information on climate change. "Friends on social networks" and "Following non-governmental organisations (NGOs)" or research groups on Twitter or Facebook were only in the 5th and 6th positions in the raking of preferences, chosen by 26,9% and 22.2% of the respondents, as illustrated in the Figure 9 chart. People prefer to be informed on climate change through the News (i.e. TV, newspapers, etc.), followed by "Listening to enthusiastic people (watching it online, at talks, or conversations...)". Dedicated portals or blogs and scientific publications were also more selected than social media.
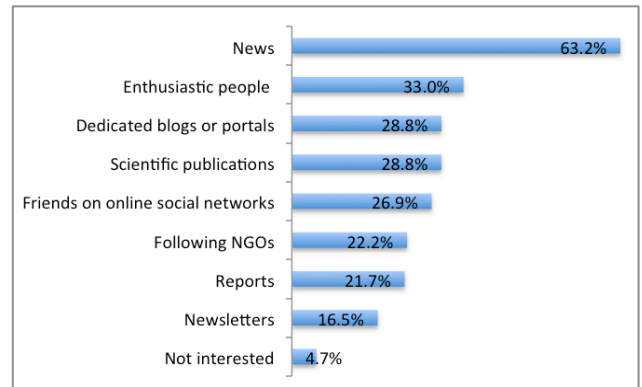

Figure 9 – Preferred channels of information on climate change

Participants were asked to select the topics they are interested in on climate change and energy saving through different channels, i.e. in the news, in conversation with friends, via Facebook and Twitter. The set of tables below presents the results.

Table 1 lists the topics on climate change ranked by general preference (a sum of all the channels selected). Every topic was exemplified with a link for a real article to avoid different interpretations. The columns represent the % of people among the 212 participants that selected News (N), Conversation with friends (C), or Facebook (FB), Twitter (T).

Table 1 – Preferred channels of information on climate change

	Topics on climate change	(N) %	(C) %	(FB) %	(T) %
1	General hints towards pro-environmental behaviour (ex: "*a list of ways that you can help related to energy, food, water, etc.*")	65	50	50	23
2	Successful stories of environmental protection (ex: "*How Brazil has dramatically reduced deforestation*")	71	41	44	20
3	General facts about climate change and environment (ex: "*Ozone layer is healing - but we are now contributing to climate change more than ever*")	71	42	33	18
4	How people have perceived the climate change impact (ex: "*My bees and climate change*")	55	50	33	18

5	Tragedies associated with effects of climate change (ex: *"Climate change to cause more flashing floods"*)	68	37	31	16
6	Personal experiences of pro-environmental behaviour (ex: *"I stopped buying bottled water because I believe..."*)	33	68	37	13
7	Campaigns pro-environment (petitions, challenges, etc) (ex: *"Petition - Replace fossil fuel energy for renewable energy"*)	44	29	42	19

In Table 2 the topics related to energy saving are listed according to the preferred channels.

Table 2 – Preferred channels of information on energy saving

	Topics related to energy saving	(N) %	(C) %	(FB) %	(T) %
1	General energy saving hints	58	58	43	20
2	Campaigns for energy conservation	39	67	38	16
3	Wasting behaviours observed	53	58	30	14
4	Relating energy consumption with CO_2 emission	57	39	28	18
5	Personal experiences of energy saving	53	28	39	18
6	Troubles and dilemmas associated with energy saving	39	56	25	11

And in Table 3, people selected the topics they would be happy to share on Facebook, Twitter and what they would not share. The smaller preference for Twitter when compared to Facebook in Table 3, and also in the previous results, mainly reflects the proportion of Twitter users that filled the survey, nearly half of Facebook users.

Table 3 – Content people would share or not

	Energy related content people would share	(FB) %	(T) %	Not share (%)
1	Advice for other people saving energy	41	17	51
2	News related to climate change or environment protection	40	24	47
3	Pro-environmental campaigns	37	24	51
4	Your personal experience saving energy (or somehow protecting the environment)	35	18	57
5	Details of your energy consumption for people advise you on how to save	21	8	75

To understand what people would actually share and how they would shape the messages, participants were also invited to simulate a post on Twitter regarding energy saving. 154 people created a "post". The answers were manually categorised. In Table 4, the types of contents are summarised and exemplified with a response. The percentage of messages in each topic is also presented.

Table 4 - Type of messages people would post on Twitter

Message type	%
Guiding actions – "do it". Ex: *Please turn off the WiFi router when you are out.*	30
Invitation to engage. Ex: *Has anyone got an energy monitor in the house? How much do you use?*	19
Informing benefits. Ex: *Those who eat meat consume x% more energy than those who don't. Consider going veggie for just one day a week!*	15
Reflections on current reality. Ex: *Nature and the environment is important. We must stop destroying it and look for ways to create sustainable energy that work in harmony with it.*	14
Sharing own experience. Ex: *I just reduced my energy by half. Guess how!*	8
Incentives. Ex: *Don't waste, don't be a loser, save money.*	6
Reflection on own behaviour. Ex: *I agree with (website) and should cycle to work more frenquently*	5
Education "how to". Ex: *list of the household appliances which use the most electricity and a suggestion of how they could be reduced*	1
Comparison with other people. Ex: *Your neighbor is a better climate saver than you are - let's bed!*	1

These results of the survey are then discussed in the next section.

VI. DISCUSSION

A. Current position towards climate change

The scenario has shown to be favourable for engaging people to tackling climate change. Participants of the survey, potential users of a social technology, expressed high levels of concern on climate change and recognised energy saving as an important aspect of the battle.

As pointed out in the literature, promoting behaviour change cannot consider only users' rational choices, mostly driven by money of indirect or intangible benefits to the environment. The scale of values in Figure 6 placing Money in the last position reinforces this assumption. People must feel confortable to evaluate the trade-off between more environmentally friendly choices and individual values, such as comfort or protecting the family. Technology can be designed to support this negotiation process.

Learning the consumption of individual equipment was the most interesting aspect for people when monitoring energy consumption. The knowledge extracted by using specific sensors can generate more valuable discussions than sharing and comparing general consumption data. For instance, a user can evaluate how high or low their appliance consumption is compared to other people, leading to immediate reflections on behaviour patterns and the need to replace the appliance for a more efficient one. Sensors can also be applied for learning how to configure appliances efficiently, quantifying benefits of shutting-down, or unplugging every day use devices, quantifying direct costs of daily actions, i.e. the annual cost of laundry in the house [29] [37], leading to hints to be shared.

B. Social media usage

A worldwide demographics study on social media usage found a comparable proportion on Facebook and Twitter usage [38]. For them, 71% of online adults use Facebook, and 18% are on Twitter. Results suggested Twitter as less personal than Facebook from participants' perspective. For example, 8% only would share consumption details on Twitter, while 21% on Facebook; and "Personal experiences of behaviour" on Twitter was also the least selected item of interest related to the topic climate change.

Results indicated a higher interested for positive messages on social media than negative ones, e.g. successful stories and facts were preferred than tragedies associated with effects of climate change, or troubles or dilemmas to save energy. However, troubles and dilemmas were considered relevant for a conversation.

Participants expressed interest in seeing hints both to guide their behaviour towards protecting the environment and to save energy. Energy saving campaigns were pointed out as more attractive than the general pro-environmental ones. In average, 40% of the participants chose Facebook as interesting media to both environmental and energy saving campaigns, suggesting social media can play a role in disseminating that.

People are happy to share good news and facts. However, to instigate the interest on social media as a source of practical information, user-generated content sharing personal experience on saving energy or protecting the environment must be also encouraged to compete with general media. 38% of participants considered interesting to read about personal experiences on energy savings and somehow protecting the environment on Facebook. And 35% is keen to share such data. Another 40% would also share energy saving advices. The restriction to share personal consumption data though, is clear – 75% would not share details of energy consumption.

The interest for learning and sharing hints identified in the survey is in line with the debate approach by [5], which pointed out that exchanging experiences, ideas and freely expressing opinion about environment protection and energy saving are relevant ways to raise awareness collectively. Dilemmas related to energy saving expressing the trade-off with other values can also be applied to trigger discussions, potentially attracting people in the initial stages of behaviour change to engage with the conversation.

C. Correlating social media and behavior change

The hypothesis that people in different stages in the behaviour change process generates different types of content to be shared among their contacts was evaluated. Based on [18], Table 5 describes how the types of messages described in Table 4 were associated to the stages of behaviour. The correlation between these two variables was calculated, resulting in the coefficient r=0.42. This result does not strongly confirm the hypothesis, but suggests a moderate relationship between the type of user-generated content and behaviour change stage.

This result, though, is preliminary. Performing additional analysis with real social media data by applying accurate and automatic methods is still necessary. It has been addressed by the project as future work.

Table 5 - Correlation between stages and types of messages

Stage	Expected type of messages
1	Reflections on current reality, frustrations
2	Educative, information about benefits
3	Objective actions, incentives
4	Personal experiences
5	Invitation to engage

In the same way people seem to produce content differently according to the stage of behaviour change they are in, they also need different interventions (information and resources) to progress along the behaviour change process, according to the 5 Doors Theory [18]. This assumption is then mapped as design recommendations built upon the survey results, as described in next section.

VII. DESIGNING TO LEVERAGE THE BEHAVIOUR CHANGE PROCESS

Engaging people with climate change in the context of this research means gathering people online and bridging aspects of their daily life with behaviour within their social network, leading to energy conservation.

Following the 5 Door's approach [18], this study assumes the hypothesis that people in a different stage of behaviour change can be influenced by specific incentives (or interventions) in the form of technology features to move to next stages. This approach also certifies that the 5 conditions in the behaviour change process [18] have been considered by the technology to leverage behaviour change.

The features presented here were elaborated based on the survey results, but also consolidate findings from literature on energy saving (i.e.[37][31][30]), climate change communication [26], behaviour change [1][3], and user studies [37][39]. Table 6 presents the association between possible features and the stages of behaviour.

Table 6 - Features x stage of behaviour change

Stage of behaviour change [18]	Functionalities
1. Desirability Dealing with frustrations, wants, showing the need of a change	- Climate change discussions: to evidence the extent of the problem and impact. Ideally, the discussion should be presented in attractive way, as a game (quiz) for instance. - Dilemmas: difficult choice questions confronting pro-environmental behaviour x personal values to generate an online debate. The dilemmas can target specific behaviour, defining then a main theme. They have the purpose of attracting people to discussions.
2. Enabling context Providing conditions, understanding how to change behaviour	- Informing: links to additional informational content from dedicated portals or blogs on the main theme. - Monitoring consumption: energy monitors integrated as learning tools,

	informing on specific appliances' consumption.
3. Can do Improving self-efficacy	- Challenge: users can challenge themselves to change behaviour (pledge), and apply for prizes and public rewards. Results can be self-reported or, ideally, integrated with sensors/monitors. Prizes can be defined in partnership with existing associations or NGOs, for instance, transformed into donations or trees planted. - Petitions: link to related petitions to be signed, empowering the user (association with NGOs).
4. Buzz Encourage spreading successful stories	- Challenge other people: users can challenge people within their social network to change behaviour, evoking social norms and peer pressure. - Stories and Hints: Encourage users to post their sucessful stories of changes in behaviour and hints under the dilemma theme. - Headlines: Visulisation on what other people in their social networks are saying on social media (Facebook and Twitter) related to that.
5. Invitation Engage more people	- Visualising engagment: visual representations of how people are getting engaged with the portal, and their performance in the challenges. Visualisations also in terms of topics of discussions are interesting not only to foster engagement, but to inform policy makers too.

The set of desirable features described here points to directions for further development. The features must be designed and evaluated with the participation of potential users in terms of presentation, adequacy, role in raising awareness, individually and collectively, and impact on promoting behaviour online and in everyday life. Generally speaking, these recommendations contribute to build an understanding of the potential role of social media to promote engagement with energy saving in a collective way.

VIII. CONCLUSION

This paper brought into discussion the challenging tasks of raising energy awareness and promoting energy savings collectively by means of a social technology. To understand the scenario, an online survey collected perceptions from 212 people, Internet users, in terms of climate change related information, current and potential new behaviour, and social media usage.

Results pointed out an encouraging scenario to promote climate change related discussions, associating energy monitoring of specific appliances with hints to guide behaviour change towards energy saving, and promoting campaigns and petitions through social media. Social media is not yet a source of information in climate change/energy saving for most of people. However, there is already a good level of interest for

people sharing personal experience on saving energy or protecting the environment, since it does not involve private consumption data.

These findings from the survey, among others, were mapped according to behaviour change theory, more specifically the 5 Doors Theory, suggesting then functionalities for a new social technology with the purpose to leverage behaviour change.

This is a study current in progress under a user-centric approach. Engaging people with social technologies and promoting user-content generation are the next steps to fulfil the objectives of, beyond providing access points to trigger behaviour change collectively using social media, extract patterns of online and in the physical world behaviour towards protecting the environment.

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