UNIVERSITY OF SURREY

Centre for Environmental Strategy Working Paper 01/14

THE ROLE OF SOCIAL NORMS IN INCENTIVISING ENERGY REDUCTION IN ORGANISATIONS.

Peter Bradley, Matthew Leach and Shane Fudge

CENTRE FOR ENVIRONMENTAL STRATEGY University of Surrey

Research Councils UK Digital Economy Transforming Business and Society

Research Councils UK Energy For a Low Carbon Future

CO2 REDUCE

ISSN: 1464-8083

The role of social norms in incentivising energy reduction in organisations.

Dr Peter Bradley, Professor Matthew Leach and Dr Shane Fudge

CES Working Paper 01/14

This paper is the result of The Reshaping Energy Demand of Users by Communication Technology and Economic Incentives (REDUCE) Project @ http://info.ee.surrey.ac.uk/CCSR/REDUCE/index.htm. The project is funded by Research Councils UK Energy Programme.

ISSN: 1464-8083

Published by:
Centre for Environmental Strategy, University of Surrey, Guildford GU2 7XH, United Kingdom

http://www.surrey.ac.uk/ces/activity/publications/index.htm

Publication date: January 2014 – Version1

CONTENTS

ACKNOWLEDGMENTS

This report has resulted from the REDUCE project for which the Centre for Environmental Strategy is a partner and collaborator. We thank the support from REDUCE project grant (no: EP/I000232/1) under the Digital Economy Programme run by Research Councils UK - a cross council initiative led by EPSRC and contributed to by AHRC, ESRC and MRC. We also wish to thank participants with the study.

ABOUT THE AUTHORS

Dr Peter Bradley *is lecturer in Economics at the University of the West of England (UWE). He was previously at Surrey University and* joined the Centre for Environmental Strategy (CES) in 2006 as an EPSRC research fellow looking at the industrial and social ecology of urban resource flows. Peter has a BSc degree in Environmental Science specialising in environmental chemistry (University of Plymouth), an MSc in Economic Management and Policy (University of Strathclyde) and a PhD in Ecological Economics (University of Surrey). Peter is a member of the British Institute of Energy Economics and the International Society for Ecological Economics.

Professor Matthew Leach is a Professor of Energy & Environmental Systems. Matthew Leach joined the Centre for Environmental Strategy in 2007 and became Director of CES in 2008. An engineer by training, Matthew holds a bachelors degree in Mechanical Engineering from the University of Southampton, an MSc in Environmental Technology from Imperial College London and a PhD in Energy Policy also from Imperial. Matthew is Vice President of the Energy Institute and past Chair of Council of the British Institute of Energy Economics.

Dr Shane Fudge is a Lecturer in Energy Policy at the University of Exeter. Projects that Shane has been involved in since beginning work in the area of sustainability include: RESOLVE (research group on lifestyles, values and environment; BARENERGY (barriers and opportunities to changing consumer behaviour at EU level); UNLOC (understanding local and community governance of energy); CRISP (creating innovative sustainability pathways); and REDUCE (reshaping energy demand of users by communication). He has also been involved in consultancy work, the latest one commissioned by AMDEA into the relationship between technology and behavioural practices around household energy use.

ABSTRACT

This study was part of a collaborative trial for an energy feedback intervention, providing detailed individual desk based energy feedback information to help individuals reduce energy in an office environment. Although the intervention was individually based, this paper explores the social context in which the intervention took place, and in particular attempted to measure changes in normative influence (descriptive and injunctive norms) around specific energy services, before and after the intervention. Results from the study identified that social norms around certain energy services changed as a result of the intervention, and the level of descriptive norms was found to have an effect on the energy efficiency of participants. Additionally interviews which were carried out during the study are insightful in helping understand how norms emerge and spread with the influence of social context and related factors. Interviews indicate strong interactions between technologies/technology policy and social context. The finding are highly relevant in the current age of fast paced technology change where businesses and governments often make decisions on what ICT technologies shall be introduced and used (such as smart metering), without fully considering the two way relationship between these technologies and on social context.

1. INTRODUCTION

The scientific evidence is now overwhelming: climate change presents very serious global risks, and urgent global action is required now (Stern 2006). Stabilizing and then reducing GHGs, is required to avoid the worst effects of climate change (UN 2013).

The energy sector is the single largest source of climate-changing greenhouse-gas emissions and limiting these is an essential focus for action (IEA 2013). Changes are required in supply but also in demand. Around the world there is now strong interest in the use of energy feedback via smart metering technology as a mitigation option for householders and businesses to reduce their energy use and mitigate the environmental problems resulting from GHGs. The UK government in conjunction with stakeholder's plans to ensure that smart meters and feedback are implemented in UK homes and small and medium businesses, to help address climate change (environmental), energy security and affordability (economic).

There are currently a limited number of studies that investigate energy feedback in an organizational setting[1]. A number of the studies that do exist point to the potential for normative influence from one's peers, such as Carrico and Riemer (2011), Goldstein et al (2008) and Siero et al (1996). In the home, energy users pay their own bills, so in this situation there can be financial motive in reducing energy use and its cost (a financial incentive) from reducing energy. No such financial payoff generally exists for employees in the workplace; therefore engaging people to reduce energy invariably requires other motivations. In the economics literature, Gächter and Fehr (1999) identify potential for social incentives as a motivation (although rare in the economics literature). From reading, Gächter and Fehr see social incentives as possibly existing in the form either approval incentives or from opportunities to improve social ties between members of a group. Approval incentives (in the form of social norms) have been systematically examined in the environmental psychology literature by those such as Cialdini et al (1991). Gächter and Fehr (1999) do not pick up on such work, and they only look at one type of social norm (related to social approval). Another form is related to observing and following group actions. Both forms of normative influence from one's peers can be

[1]This finding is consistent with Carrico and Riemer (2011). Relevant studies looking at feedback in an organizational setting and of interest to the current project are those of Carrico and Riemer (2011), Schwartz et al (2010), Siero et al (1996), Lehrer and Vasudev (2011), Scherbaum et al (2008), Gustafson and Longland (2008).

particularly strong in incentivising a given response and action. In the environmental psychology literature however, analysis tends to focus on examining the effect of social norms on behaviour. There is little work that quantitatively and qualitatively examines the emergence of social norms. If social norms around energy are to play a key role in bringing us towards more sustainable economies, such considerations are necessarily. The aim of the current study is to investigate and provide empirical evidence on the emergence and diffusion of social norms in relation to energy services within an organisation.

Before presenting the main study we develop a framework that identifies potential factors effecting the emergence and diffusion of social norms, and their translation into behaviour. The framework is used to help guide the work and capture the range of factors that should be examined. In the current study we use the 'focus theory of normative conduct' (Cialdini et al 1991) as the starting point to guide our investigation of social norms. The study however, is not specific to organisations and the theory is primarily about how social norms are activated (to bring about translation in behaviour) and not primarily about how norms emerge and diffuse. The same can be said of Rimal and Real's (2005) theory of normative social behaviour. Still, these studies were used to inform our approach.

This study used three main data collection/research techniques: smart metering; surveys and interviews. Smart metering identified changes in energy behaviours; surveys provided quantitative data on change in social norms (and factors effecting); interviews provided a view of participants experience and data on the factors that shaped the emergence of norms.

Section 2 now provides background literature on the emergence, diffusion and transmission of social norms into behaviour and present the framework used to help explore the emergence and diffusion of social norms. Section 3 presents the study design for the empirical investigation. Section 4 reports results and section 5 provides discussion and conclusions.

2 Background on social norms

2.1 Definition and description of social norms

The starting point here is to identify key understandings of social norms, based primarily on the work of Cialdini et al (1991), who argued that social norms can be defined as either injunctive (characterised by perception of what most people approve or disapprove) or descriptive (characterised by what most people do). According to this argument, injunctive norms incentivise action by promising social rewards and punishments (informal sanctions) for it (and therefore enjoin behaviour). These are said to constitute the moral rules of a group. Descriptive norms on the other hand, inform behaviour, and incentivise action, by providing evidence of what is likely to be effective and adaptive steps to take (Cialdini et al 1991) based on what others do. The 'focus theory' of Cialdini et al (1991) stipulates that this differentiation of social norms is critical to a full understanding of their influence on human behaviour. They identify three types of norm, the third type are personal norms.

2.2 Theory and empirical evidence in relation to norm emergence within organisations

From the literature, there are a number of processes that lead to the development of social norms and changes in behaviour, these are as follows: 1.) norm emergence2.) norm diffusion and 3.) translation into behaviour.

Usually descriptive norms emerge and then the development of injunctive norms sometimes follows this (Brooklyndhurst 2009). Rimal and Real (2005) identify that the effect of descriptive norms on behaviour can be influenced by injunctive norms. Norm diffusion involves the spread of social norms (injunctive and descriptive). The emergence process and the diffusion processes involve social construction (Boorklyndhurst 2009) and social comparison (Vishwanath 2006). In the latter case, individuals compare with what others do/how they respond to a given situation. Social construction is the theory that norms, beliefs and attitudes are constructed through a process of social interaction (Brooklyndhurst 2009). The social comparison and social

construction process occurs for both descriptive and injunctive norms and are informed from other referent individuals[2].

2.3 Translating social norms into actions and behaviour

A refinement that needs to be applied (rigorously) before the use of normative explanations can be confidently established is whether people's attention is focused on that particular norm. This is an important consideration, as whether the norm will influence behaviour, will depend on whether attention is focused on it. This is important as norms motivate and direct action primarily when they are activated (said to be made more salient or otherwise focused upon). People who temporarily or disproportionately focus on normative considerations are more likely to behave in norm consistent ways (Berkowitz 1972 and Berkowitz and Daniels 1964 and others as seen in Cialdini et al 1991). Norms have to be activated to influence behaviour.

Cialdini et al (1991), suggest that the key to effective activation of injunctive social norms is a focus on the applicability of interpersonal sanctions to the behaviour in question. However they state that it is not their assertion that injunctive social norms only function when evaluating whether others are physically present to provide social sanctions, the authors provide relevant references and theory that relates to this. They further state that individuals are likely to conform to the behaviour even when alone, as long as they are focused on the norm.

Some studies show that personal norms can be stronger than social norms (as evidenced by Cialdini et al 1991. Cialdini et al 1991, believe that the one that has more strength depends on whether the actor is focused on internal or external standards and also sanctions for that action.

In conclusion they found evidence to suggest that norms can be demonstrated to effect action systematically and powerfully and that individual behaviour is likely to conform to the type of norm that is the present point of focus - even when alternative norms dictate different conduct.

[2] Goodman and Haisley (2007) identify that there are a number of ways to classify social comparison processes. They identify: initiation, selection of referents and an evaluation process as important.

Cialdini et al state that, due to the possible influences of the three different types of norm, one must be careful in specifying the particular type of norm that is being made salient by a given technique or mechanism.

Rimal and real (2005) extend Cialdini et al and others work to present a theory of normative social behaviour. The theory/model has three variables/parameters that effect the translation of social norms into behaviour. They state that social identity, norm interaction (injunctive norms in their model), and outcome expectations moderate the influence of descriptive norms on behaviour. This is a useful extension of the work of Cialdini et al (1991) and as these authors start to incorporate influencing factors in their model of translating norms into behaviour. A picture of the model by Rimal and Real (2005) is provided below:

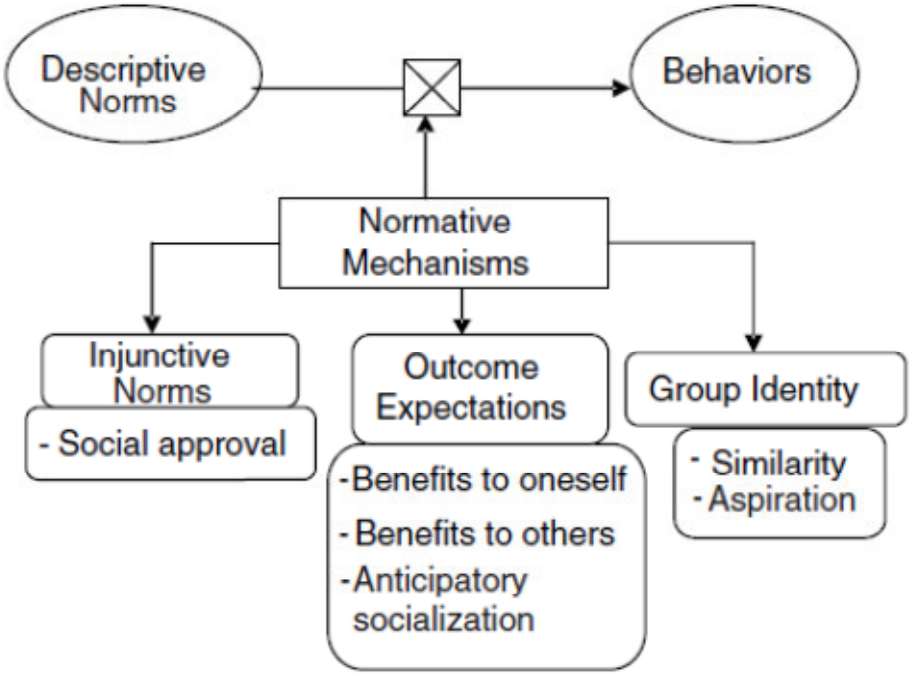


Figure 1: Components of the theory of normative social behaviour (Rimal and Real 2005)

2.4 Questions and gaps

While useful, the focus theory of Cialdini et al only really looks at norm activation and translation into behaviour, it does not look at the emergence and diffusion of social

norms. The same can be said of Rimal and Real (2005). In their theory, Cialdini et al (1991) do not actively factor in the range of factors that affect the translation of norms into behaviour. Such considerations are highly relevant when attempting to motivate large numbers of individuals within an organisation in energy conservation. The current study is therefore focused on this subject. Rimal and Real (2005) start the process of analysis of influential factors, but the model was found to be too simplistic to cover the range of factors at work in developing norms in an organisation and purely focuses on the impact of norms on behaviour and not norm emergence. This does however make sense, Jackson (2006) state that to be usable models must focus quite closely on a (relatively) limited number of specific relationships between key variables. He further states that beyond a certain degree of complexity, it is virtually impossible to prove meaningful correlations between variables. Jackson however clarifies that simpler models run the risk of missing out key causal influences on a decision.

Another observation is clear from the work of Cialdini et al (1991) and Rimal and Real (2005), both focus on the translation of norms into behaviour, for example the work of Cialdini typically attempts to invoke a particular norm and then measure behaviour change. Although very useful and a perfectly good and informative approach, such research provides no information on the two pre steps which are the development and the diffusion of social norms. This is a critical aspect of analysis however for scholars investigating the scope of social norms in bringing about more sustainable economies. The current study builds on the excellent work of Cialdini et al and Rimal and Real (2005), the paper investigates the factors that affect the pre-stage: norm emergence and diffusion for social norms around energy.

3 METHODS

The main approach adopted by the study was to apply and measure the change in social norms and efficient energy use via a longitudinal study[3]. Smart metering technology measured energy use and energy use while present (providing a measure of efficient energy use). To pick up on the factors that affect the emergence and diffusion of social

[3] Social norms in relation to certain energy services were measured in surveys using likert scale questions.

norms, the study primarily made use of interview data, but also data from surveys that collect data on variables consistent with Rimal and Real's model.

Figure 2 provides a framework of factors that affect the emergence and diffusion of social norms and their translation into behaviour, the framework was drawn together from literature review. See Appendix 1 for background and review and papers relevant to each of these factors.

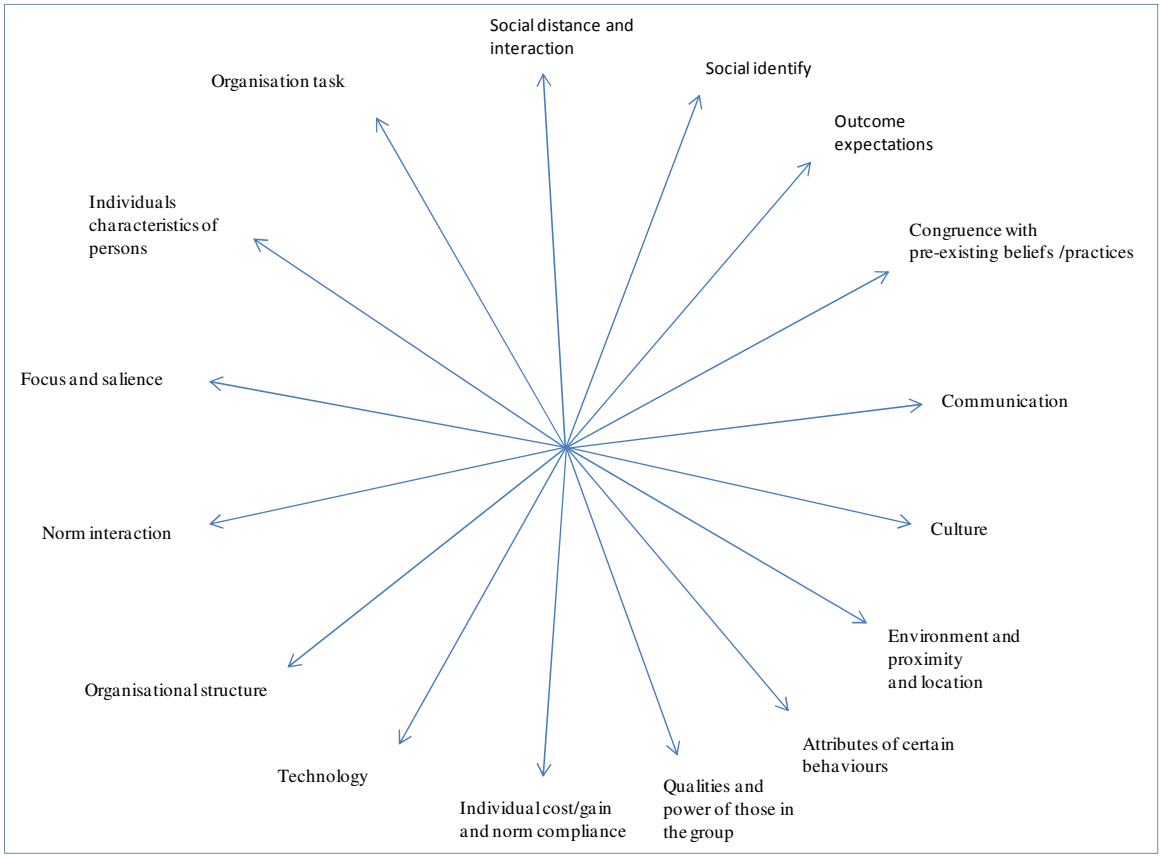


Figure 2: Factors that can affect social norm emergence, diffusion and translation into behaviour

In regard to focus and salience, this is heavily discussed by Cialdini et al , where norm interaction and individual characteristics such as self-monitoring are also covered, so we shall not go into further detail. The other 14 factors are: social distance and interaction; communication; social identity; outcome expectations; culture; environment proximity and location; technology; organisational structures; attributes of certain behaviours; congruence with pre-existing beliefs/practices; qualities and power of those in the group;

individual cost and gain; norm interaction; and organisational task. The factors that are picked up on in the current study are used to help structure the results section and discussion when presenting findings from interviews.

3.1 Methods overview

The study was an longitudinal intervention study. The intervention that was applied in the study was an energy footprint tool called MyEcoFootprint (MEF) that measures desk based energy use and provides feedback to users (via an electronic interface).

As part of the study, three surveys were deployed as well as interviews. A flow chart for benchmark and intervention periods is provided in Figure 3, it identifies at what stages surveys and interviews were conducted as well as key timings.

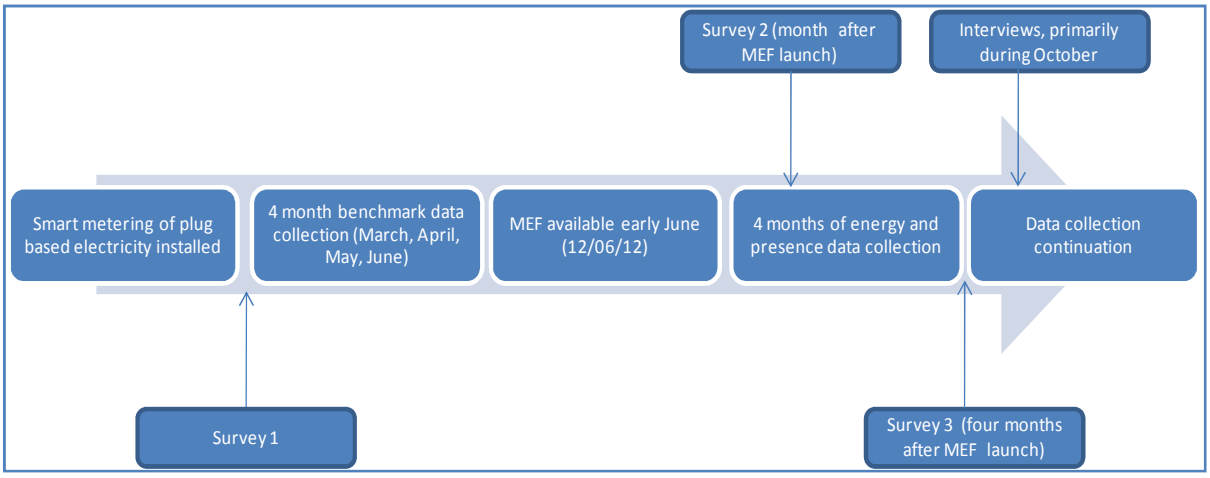


Figure 3: A timeline of activities for the study

An academic department was selected for the study, desk based electricity (plug based) and presence data was collected for four months for each person that participated in the study (second central box moving from left to right). Survey 1 was conducted at the start of this benchmark period. After the four months of benchmark data collection, the MyEcofootprint tool was provided to each participant to provide them with energy feedback information, both in relation to their own personal energy use as well as a comparison average for the type of office that they were in (third central box, left to right). To see more detail on the feedback tool (MEF), please see Appendix 2. The energy feedback information from MEF was available from the start of the intervention period for four months, energy and presence data was again collected during this time. Two

surveys were also undertaken during this time with participants. Figure 4 shows how information was collated for the various factors that influence social norms.

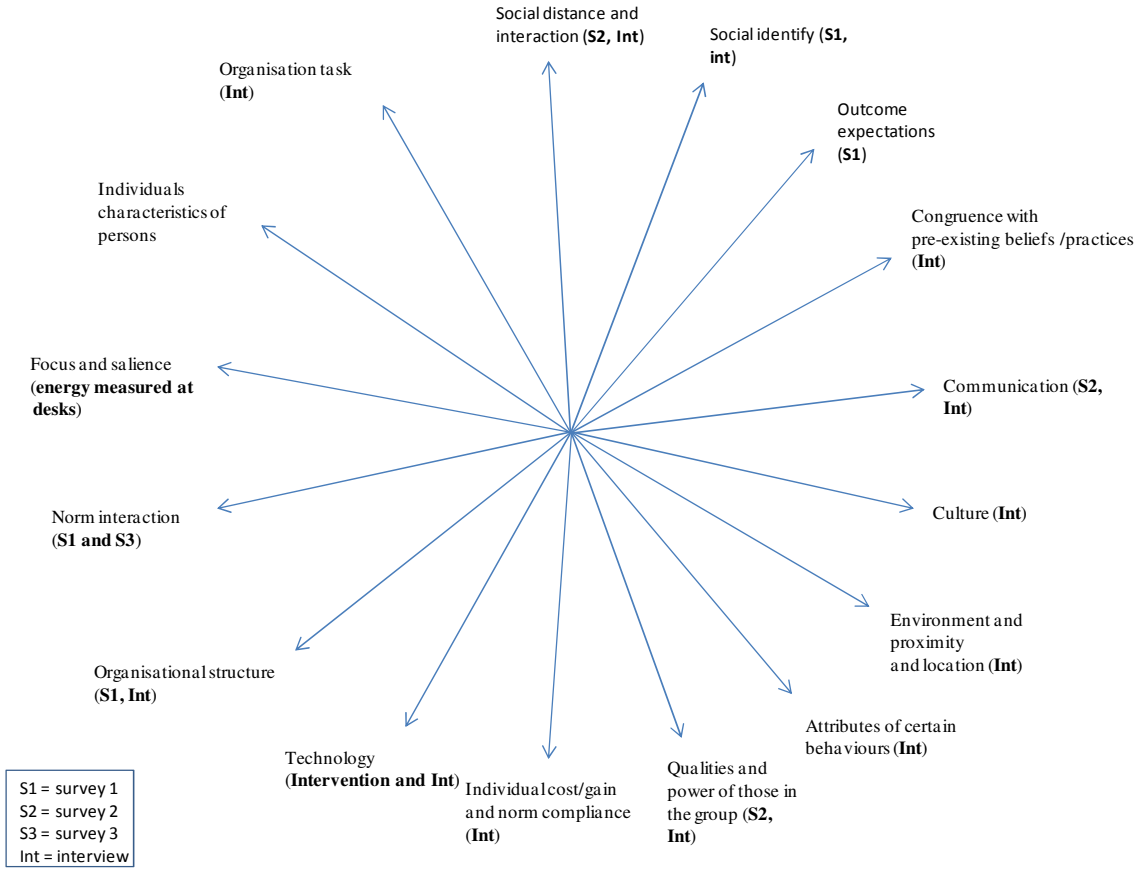


Figure 4: Methods used to explore factors for social norms

The surveys were primarily applied to measure changes in descriptive and injunctive norms around energy use, and to measure some of the important factors that were ultimately presented in the results section: Social identify; Outcomes expectations; norm interaction; social distance and interaction. The approach taken by the current study is that quantitative work is used to look at these small number of key relationships. Qualitative data is then used to provide evidence and explore how a range of other factors influence the development of social norms. This approach allows the study to keep rigour, and transferability in measuring changes in social norms and some key relations, whilst exploring how other factors shape the development of social norms. This moves us towards a more holistic but robust study of the emergence and diffusion of social norms in relation to energy but in a structured way.

Surveys

Survey 1 was carried out during the benchmark period and provided background information on: social distance, interaction and communication within the department; group identify, outcome expectations and injunctive and descriptive norms around energy use. The most important measurement was the benchmark of injunctive and descriptive norms around energy use. Specific questions are provided in Table 1 these were adapted from Carrico (2009) as well as those for group identity and collective outcome expectations.

Factor	Questions	Answer
Group identity	I am very interested in what others think about the department	7 point likert scale from strongly disagree to strongly agree
	When I talk about the department, I usually say 'we' rather than 'they'	
	When someone praises the department, it feels like a personal compliment	
Collective outcome utcome expectations	By changing our behaviour, employees and students like me can reduce the department's energy use	
	The department should do more to save energy	
	I am concerned about the amount of energy that the department uses	
	Energy conservation should **not** be a priority for the department now	
Descriptive norms	How many people in your department: turn off office or lab equipment when they are finished using it?	Five point scale: very few; 25%, 50%. 75%, Nearly everyone
	" " turn off their computers before leaving work for the day?	
	" " turn off their monitors before leaving work for the day?	
	" " turn off the lights at their desk/office before leaving work?	
Injunctive norms	If the other people in your department saw that a computer was left on when the user was not at work, they would:	Five point scale: Stongly disapprove; disapprove somewhat; Neither approve nor disapprove; Approve somewhat; Strongly approve
	" " that a monitor was left on when the user was not at work, they would:	
	" " that an individual's lights were left on when he/she was not at work, they would:	
	" " that office or lab equipment had been left on when it was not in use, they would:	

Table 1: Survey 1 questions

Survey 2 was designed to measure: the extent of discussion, socialising and communication around MEF and energy use, individual cost and gain and effort required in relation to using MEF and reducing electricity. Feelings of 'duty' and also 'pressure' in relation to using MEF were also measured. Specific questions that provide information on measuring the factors in Figure 4 are provided in Table 2.

Factor	Questions	Answer
Communication and social interaction	I duscussed energy use with colleagues	7 point likert scale from strongly disagree to strongly agree
	I duscussed MyEcoFootprint with colleagues	
	Such opportunities for discussion encouraged my use of MyEcoFootprint	
	Discussion with colleagues about MyEcoFootprint helped me reduce my energy use	
	I encouraged my colleagues to use MyEcoFootprint	
	I use MyEcoFootprint because my colleagues use it	
	Because I used MyEcoFootprint I now know more colleagues	
	Because I used MyEcoFootprint I now talk to more colleagues	
	Because I used MyEcoFootprint I now know my colleagues better	
Duty	I felt a duty to department managers to use MyEcoFootprint	7 point likert scale from strongly disagree to strongly agree
	I felt a duty to my colleagues to use MyEcoFootprint	
	I felt a duty to the team who developed MyEcoFootprint	
Pressure	I felt pressure from my managers in the department to use MyEcoFootprint	
	I felt pressure from my colleagues to use MyEcoFootprint	
	I felt pressure from the team who developed MyEcoFootprint	

Table 2: Survey 2 questions

Survey 3 was carried out four months after the intervention period when MEF was launched and measures changes in injunctive and descriptive norms. Specific questions are provided in Table 3.

Factor	Questions	Answer
Descriptive norms	How many people in your department: turn off office or lab equipment when they are finished using it?	Five point scale: very few; 25%, 50%. 75%, Nearly everyone
	" " turn off their computers before leaving work for the day?	
	" " turn off their monitors before leaving work for the day?	
	" " turn off the lights at their desk/office before leaving work?	
Injunctive norms	If the other people in your department saw that a computer was left on when the user was not at work, they would:	Five point scale: Stongly disapprove; disapprove somewhat; Neither approve nor disapprove; Approve somewhat; Strongly approve
	" " that a monitor was left on when the user was not at work, they would:	
	" " that an individual's lights were left on when he/she was not at work, they would:	
	" " that office or lab equipment had been left on when it was not in use, they would:	

Table 3: Survey 3 questions

Interviews

Subsequent to survey 3, interviews were conducted to understand and explore participants' experience of the intervention, and the role of social context and other factors (identified in Figure 4) in shaping the norms that emerge and arise and their diffusion. In particular, information was collected in relation to culture; social distance and interaction and communication; social identity of referents; culture and environment, proximity and location. The interview schedule is provided in Appendix 3.

3.2 Format of Surveys

Surveys were disseminated as online surveys. E-mail reminders were provided and paper versions were disseminated to those that did not respond online.

3.3 Format of interviews

Each interview was designed to be firstly unstructured, in order to capture the essentially qualitative nature of this part of the study (Kleining 1998). This form of interview is broadly designed to be a one-way communication from the respondent to the researcher in order to collect relevant information as it arises. The second part of the interview was more semi-structured and focused, to ensure that relevant information was collected. Overall, the discussion was meant to be free and open, with the interviewer guiding rather than leading and restricting the respondent (Sarantakos 2002).

3.4 Response to surveys and interviews

Survey 1 was sent to the 83 intervention participants and received a response of 40 (31 that were in the intervention group and that had energy data), survey 2 received a response of 37 (19 that used MEF and had filled out the survey) and survey 3 received a response of 29 (19 of which had filled out surveys 1 and 3, of these 17 that provided data for all relevant variable tested). The latter surveys were also sent to all the intervention participants. Eight people took part in interviews.

4. 1 Results survey and energy data;

4.1.2 Descriptive and injunctive norms for energy services; benchmark period

This section presents results for social norms around energy services in the benchmark period. We firstly look at differences observed for descriptive (des) and injunctive (inj) norms for different energy services.

Differences in the mean values for injunctive and descriptive norms around different energy services are provided in Table 4, key values are highlighted in yellow.

	N	Index (mean)	Std. Deviation	Minimum	Maximum
Des_norm_computers	31	2.5	1.03	1	4
Des_norm_office_or_lab	31	3.2	1.04	1	5
Des_norm_monitors	31	2.5	1.31	1	5
Des_norm lights	31	4.1	1.22	1	5
Inj_norm_computer	31	2.9	0.67	1	4
Inj_norm_office_or_lab	31	2.5	0.96	1	5
Inj_norm_monitor	31	2.9	0.65	1	4
Inj_nrom_lights	31	2.5	0.93	1	5

Table 4: Descriptive statistics for descriptive and injunctive norms for different energy services

It is interesting to note the differences in the level of norms around different energy services. Significant difference was found for injunctive and descriptive norms for office and lab equipment and lights compared to computers (computers were broadly the same as monitors) as seen below in Table 5.

	Des_norm_office_or_lab_equipment - Des_norm_computers	Des_norm_monitors - Des_norm_computers	Des_norm_lights - Des_norm_computers
Z Asymp. Sig. (2-tailed)	0.004	0.902	0.00
	Inj_norm_office_or_lab_equipment - Inj_norm_computers	Inj_norm_monitors - Inj_norm_computers	Inj_norm_lights - Inj_norm_computers
Z Asymp. Sig. (2-tailed)	0.04	1.00	0.01
Wilcoxen signed rank test			

Table 5: Test of significance of difference in level of norms for different energy services

The reason for differences in norms between lights and computers was explored in interviews. See Table 6.

In terms of descriptive norms, a common reason for the difference (as perceived by interviewees) was that with uses and practices around computers, descriptive norms were lower (switching off when leaving work) as people may be running simulations. This is an attribute mentioned for this specific energy service, but actually most of the most of the people are not running such simulations. Previous practices required to keep the network working (by leaving computers on) were also mentioned but identified as a relic from the past (by one participant) and not relevant today. This suggests the potential role of history and path dependence in shaping the kinds of norms around these practices today.

Three participants mentioned that avoiding turning the computer off, saves time (convenience and effort). Two participants mentioned that it is more obvious if you have left lights on (as monitors etc. go on standby). There is two sense here: obviousness to the individual but also obviousness to other colleagues. This is an attribute of this energy based behaviour and relates to privacy of the behaviour, but also bounded rationality (a second attribute).

For injunctive norm differences, the main reasons for differences as perceived by interviewees, due to visibility as well as information. It was argued that people are generally more aware that leaving lights on wastes energy.

The role of culture was also identified, as one participant put it:

"turn the lights off", "keep off the grass" – you see signs like this everywhere. Yeah, but "turn off your monitor", "turn off your computer"....this is very recent. People are not used to that, eh, culture. There is a culture of turning off the light. There is no culture for turning off the computer."

It is also interesting to note participant 5's comments. He believed that the difference may be down to leadership from the top (qualities and power of those in the group), which is driven by the need to meet organisational energy targets (organisational structure).

Questions	1. In survey 1 it was found that on average (or using the median) CCSR colleagues believed that 75% or nearly everyone turn off the light before leaving work, but only 50% turn off their monitor or computer. In your view, why do you think this might be?	13. Survey 1 identified that on average (or using the median) if other people in your department saw that a computer was left on when the user was not at work, colleagues would neither approve, nor disapprove. The same question was asked in relation to lights being left on whilst not at work and disapprove somewhat was the (median) answer. In your view why do you think this might be (i.e. the difference in response between computers and lighting)?
Participant 1	"I think this goes back to the older days of computing. So, a few years' back, you know, you had, say, one central computer, and lots of terminals around, connected to that main computer, and people have been told to not turn the terminals off, you know, that they should stay connected to the main machine, so to, you know, just keep the network alive, and I think they just keep to this habit.**(habbits/beliefs)** "Or some guys, I think they have experiments running on their computer overnight (**Simulations**)	Specific response not provided.
Participant 2	"Yeah, I think, eh, most of the people don't even turn off – I know there's some people that don't even turn off their screen, so… I mean, in my opinion, if I need to use the computer, or I think I might need to use the computer at night, to access it, I might turn off the screen and I use it remotely, with, you know, only the remote tower on – the screen can be turned off because I'm not using the screen because I'm not physically there. But I might use the computer, so when I am home, I might need it to be on." (**remote access**). **Simulations** are also mentioned.	Yeah, because the light is something that, if you are there, you use it, but the computer, you can use it in a remote way, so… (**practical related**)
Participant 3	"Yes, yes, yes, I don't know. I know of a few other people who don't turn their computers off and they just sort of put it on lock. But I don't know why people don't do that then… Maybe it's from some old…you know, if they're older generation, perhaps it's they don't think it…it takes longer to boot up the next day or something/ lose data , I don't know." (**practical related/conguence with pre-existing practice**). **Simulations** were also mentioned.	"I suppose the lighting is more visible, isn't it? . That's something that you can actually see is on and…whereas you might not notice so much computers…. And I think you get a bit more…a bit more knowledge about leaving lights on. You know, that's an obvious way of saving energy. " (Visibility and pre-existing knowledge) Okay. Why is there more knowledge about that? "I don't know really. I suppose that's from…just being aware that em…would save energy if you turned lights off. That's something that you perhaps…you have a bit more…in your own home, you would…" (**awareness from home**) "I suppose the lighting is more visible, isn't it? And I think you get a bit more…a bit more knowledge about leaving lights on. You know, that's an obvious way of saving energy." (**Visibility and pre-exisitng knowledge from the home**). Okay. Why is there more knowledge about that? "I guess that's probably just from...yeah, history, or it's a cultural thing. I don't know, yeah, yeah, yeah" **(culture/history)**
Participant 4	"I would say that's the general behaviour of any person, I think, because when you leave a room, you turn off the light. That's just about like what you're used to doing – also at home you do that, But, for computers, people are usually lazy to go to the start button." (**Congruence with pre-exisitng practices, practical**). So where do you think that kind of logic comes from? "I think its habbit. I think it's been around for a long while, so, you know, "turn off the lights", "keep off the grass" – you see signs like this everywhere." Yeah, but "turn off your monitor", "turn off your computer"…this is very recent [laughing]. People are not used to that, eh, culture. There's a culture for turning off the light. There's no culture for turning off the computer." **(culture) Simulations were also mentioned, as well as outsiders** noticing if you don't turn lights off.	Participant felt he had answered in earlier question.
Participant 5	"Yeah, because they can just leave it and go home rather than…and because they know it's locking itself, so they don't…it's almost like they don't care actually, you know – why waste time shutting it down and then go home, you know?" (**practical)**	"The Vice-Chancellor for example often does say, in his, comments about, you know, we've got to meet energy targets as a University, em, and you know, complaining about how, sometimes, when he gets home at night or pops in at night, it's like, you know, Blackpool Illuminations [laughing]! Yeah. So…and I think those sort of…influences from above do sink in" (**organisational policy and top down leadership**) "Mm, and they're much more obvious as well. I mean, it's sometimes hard to tell if a computer is on or not." **(visibility)**
Participant 6	"The monitor, if you leave it about five minutes or less, depending on your [?], it turns black, so you might not consider turning it off because you see it sleeps" (**technology and perception**). **Simulations** were also mentioned. "But, eh, for the lights, eh, you know, when you leave, you usually close the lights so that's…especially if you have one on your desk."	"For the lights, it's, again, something visual. You see he left and he left the office and he has left the lights on, eh, but you can't tell the same for the computer" (**visibility**)
Participant 7	"Probably light is easier, and you're used to doing it, and it's more obvious." (c**onguence with pre-existing practices/habbit, visibility**)	"It could be two things. It could be people do or they don't know how much energy a computer uses." Some discussion was then made with regards to how this could be communicated in the project. (related to **information available)**
Participant 8	"As computers need some time to start, I think they don't want to turn off their computers every day" (**practical**).	"We might think that the user executes some application" (e.g. downloading, **simulation**).

Table 6: Explanations for differences in descriptive and injunctive norms

4.1.3 Change in descriptive and injunctive norms between the benchmark and intervention period

Using the same survey questions as (survey 1), survey 3 again measured descriptive and injunctive norms, but after the intervention. Eighteen participants completed both surveys 1 and 3. For these participants it was possible to measure changes in injunctive and descriptive norms.

	N	Mean (Index)	Minimum	Maximum
Des_computer_(Bench)	17	2.3	1	4
Des_monitor_(Bench)	17	2.4	1	5
Des_computer_(Int)	17	2.8	1	5
Des_monitor_(Int)	17	3.1	2	5
Inj_computer_(Bench)	17	3.1	2	4
Inj_monitor_(Bench)	17	2.9	2	4
Inj_computer_(Int)	17	2.6	1	4
Inj_monitor_(Int)	17	2.8	1	4

Table 7: Descriptive statistics comparison for the benchmark and intervention period

For lights and office and lab equipment, mean values changed little between the benchmark and intervention. Changes for computers and monitors however, were somewhat more apparent for both injunctive and descriptive norms. Due to being related samples the observation number (17[4]) is enough to test for significance in changes.

	Significance Des_office_lab_(Int) - Des_office_lab_(Bench)	Significance Des_computer_(Int) - Des_computer_(Bench)	Significance Des_monitor_(Int) - Des_monitor_(Bench)	Significance Des_lights_(Int) - Des_lights_(Bench)
The median difference between the benchmark and intervention	0.688	0.048	0.04	0.417
	Significance Inj_office_lab_(Int) - Inj_office_lab_(Bench)	Significance Inj_computer_(Int) - Inj_computer_(Bench)	Significance Inj_monitor_(Int) - Inj_monitor_(Bench)	Significance Inj_lights_(Int) - Inj_lights_(Bench)
The median difference between the benchmark and intervention	0.346	0.07	0.45	0.717
Related-Samples Wilcoxon Signed Ranks Test				

Table 8: Significance of changes in injunctive and descriptive norms

Significance of changes was observed for descriptive norms for computers and monitors (highlighted in yellow). The result aligns with the intervention feedback which was focused on desk based energy feedback (computers and monitors and other desk based items). Significant change was not observed for injunctive norms.

[4] We did not have data for the particular variable for one of the 18 participants.

The literature identifies that where a behaviour is new or ambiguity or uncertainty exist, people are particularly likely to gauge normative information from others around them (Lapinski and Rimal 2005). Participant 4 identified that the message of turning off computers/monitor is a new message, this would align with relative changes seen in descriptive norms for this energy service.

4.1.4 Link between descriptive norms and energy efficiency

Given that a significant change in descriptive norms was observed going from the benchmark to intervention period, a cross tabulation and chi-squared test was run to observe whether there was a significant relationship between descriptive norms for computers and energy efficiency. In order to test this, the descriptive norms category data was put into one of two groups group 1.00 (low descriptive norms – score 1 to 2.9) and group 2.00 (moderate to high descriptive norms - score 3 to 5)). Results from cross tabulation with energy efficiency are provided in Table 9 below. This was possible to conduct this for the 25 participants that had both filled out survey 3 and that had energy data.

Des_norm_computers * Ene_eff Crosstabulation

			Ene_eff					Total
			.00	.10	.20	.30	.40	
Des_norm_computers	1.00	Count	7	4	0	0	1	12
		Expected Count	3.4	4.8	1.0	1.0	1.9	12.0
		Std. Residual	2.0	-.4	-1.0	-1.0	-.7	
	2.00	Count	0	6	2	2	3	13
		Expected Count	3.6	5.2	1.0	1.0	2.1	13.0
		Std. Residual	-1.9	.4	.9	.9	.6	
Total		Count	7	10	2	2	4	25
		Expected Count	7.0	10.0	2.0	2.0	4.0	25.0

Table 9: Results from cross tabulation of descriptive norms for computers and energy efficiency

It can be seen that those with moderate to high scores for descriptive norms for computers (at which the intervention primarily targeted), tended to have higher values for energy efficiency (meaning they are more energy efficient). The significance of this finding is identified in Table 10 below with the fisher's exact test.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	[a]	4	.015	.005		
Likelihood Ratio	16.658	4	.002	.004		
Fisher's Exact Test	11.860			.005		
Linear-by-Linear Association	[b]	1	.009	.005	.002	.000
N of Valid Cases	25					

9 cells (90.0%) have expected count less than 5. The minimum expected count is .96.

The standardized statistic is 2.623.

Table 10: Significance of cross tabulations of descriptive norms and energy efficiency

The fisher's exact test is an appropriate test statistic to use when the sample size is lower as it is here (but still high enough to robustly test significance). It can be seen that the fisher's exact test provides a value for exact significance (2 sided) at 0.005 which is highly significant.

Norm interaction

Although the significance of changes in injunctive norms could not be proven, the mean index scores indicate a strengthening of these norms (lower score) from the benchmark to the intervention. It is however not perhaps surprising that changes were not significant as the emergence and diffusion of injunctive norms tends to follow some time after the emergence of descriptive norms.

4.1.5 Group identity, group outcome expectations and descriptive norm changes

As identified in section 2, Rimal and Real (2005) identify group identity and outcome expectations as being important in determining the translation of social norms into behaviour. However, there is little testing of whether group identity and outcome expectations actually effect the emergence of group norms in the first place, this is the focus of the current study. From testing with a chi^2 test, the following results emerged.

Group_identity * Des_norm_computers_bench Crosstabulation

			Des_norm_computers_bench		
			1.00	2.00	Total
Group_identity	1.00	Count	a	b	5
		Expected Count	2.9	2.1	5.0
		Std. Residual	1.2	-1.4	
	2.00	Count	a	b	12
		Expected Count	7.1	4.9	12.0
		Std. Residual	-.8	.9	
Total		Count	10	7	17
		Expected Count	10.0	7.0	17.0

Each subscript letter denotes a subset of Des_norm_computers_bench categories whose column proportions do not differ significantly from each other at the .05 level.

Table 11: Results from cross tabulation of group identity and descriptive norms for computers from the benchmark

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	a	1	.026	.044	.041	
b	2.842	1	.092			
Likelihood Ratio	6.734	1	.009	.044	.041	
Fisher's Exact Test				.044	.041	
Linear-by-Linear Association	c	1	.031	.044	.041	.041
N of Valid Cases	17					

3 cells (75.0%) have expected count less than 5. The minimum expected count is 2.06.

Computed only for a 2x2 table

The standardized statistic is 2.160.

Table 12: Significance of cross tabulation of group identity and descriptive norms for computers from the benchmark

During the benchmark, group identity was found to have a significant relationship with descriptive norms for computers (those with higher group identity tended to have higher descriptive norms around computers). For monitors a significant link was not found. This result can only be said to be indicative and not a conclusive result however, as although the fisher exact test is designed for small sample sizes, further results from sensitivity testing revealed that the result is somewhat unstable due at this sample size. The same applies for the result in the next table with the same number of observations.

Group_identity * Des_norm_computers_int Crosstabulation

			Des_norm_computers_int		
			1.00	2.00	Total
Group_identity	1.00	Count	a	a	5
		Expected Count	1.8	3.2	5.0
		Std. Residual	.2	-.1	
	2.00	Count	a	a	12
		Expected Count	4.2	7.8	12.0
		Std. Residual	-.1	.1	
Total		Count	6	11	17
		Expected Count	6.0	11.0	17.0

Each subscript letter denotes a subset of Des_norm_computers_int categories whose column proportions do not differ significantly from each other at the .05 level.

Table 13: Results from cross tabulation of group identity and descriptive norms for computers from the intervention

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	[a]	1	.793	1.000	.605	
[b]	.000	1	1.000			
Likelihood Ratio	.068	1	.794	1.000	.605	
Fisher's Exact Test				1.000	.605	
Linear-by-Linear Association	[c]	1	.799	1.000	.605	.400
N of Valid Cases	17					

3 cells (75.0%) have expected count less than 5. The minimum expected count is 1.76.

Computed only for a 2x2 table

The standardized statistic is .254.

Table 14: Significance of cross tabulation of group identity and descriptive norms for computers from the intervention

During the intervention period, group identity was not found to be significantly related to descriptive norms.

Although significance was not proved for the relationship between group identity and descriptive norms in the intervention period. In the intervention period, some patters were emergent from the data and are worth briefly noting. For the majority of participants for which completed both surveys 1 and 3, the relevant descriptive norms increased during the intervention period for both computers (9 out of 17) and monitors (12 out of

17). For those that increased for energy practices around computers, those with strong (score of five and above) versus weak (score of 4 or below) group identity were fairly roughly evenly split. During the intervention period often people with high group identity saw no increase or a even decrease in descriptive norms. This indicative finding may provide some explanation as to why the strength of the relationship between social identity and descriptive norms may have diminished in the intervention period, is also shows how such interventions can bring about changes in descriptive norms for those without strong group identity.

Collective outcome expectancy

The relationship between collective outcome expectancy and descriptive norms was also investigated. Significance of a relationship was not proven in the benchmark or the intervention period, however the value for the fishers exact test was 0.228 in the benchmark and 1 in the intervention period, so closer to being significant in the benchmark period.

4.1.6 Social context around MEF and energy use

Appendix 4 provides results relating to communication and social interaction around MEF. In the appendix, it can be seen that there was significant discussion of MEF and energy use by some participants during the intervention, even though feedback was provided at the individual level. This highlights the relevance of social context, even for individual based interventions. Results showed that for some, these discussions had a positive impact in encouraging the use of MEF, but for some it did not. This result would indicate a third form of incentive beyond descriptive and injunctive norms that could motivate use and engagement with energy feedback. It is also interesting to note that the participation with MEF energy feedback was also influenced by the extent to which participants felt duty, particularly towards the research team, but generally not as a result of pressure.

4.2 Findings from the interviews

The interviews were conducted with two academics, three researchers, two PhD students and one administrator. Of those, six of the 8 used the MEF tool. All participated in the intervention group.

What was most striking when looking at discussion and answers across different interview participants, was the differences in attitudes and views which were expressed on the same subject. From our interview evidence, we explore the variation in views and attitudes. Attitudes and views are developed from experiences with the project, but also from the social context which each person is within. Attitudes and social context also affect the emergence and development of social norms. It is informative to look at how descriptive and injunctive norms (as measured in surveys 1 and 2) changed for interview participants interviewed (benchmark to after intervention), before we look in detail at interview findings.

Interview participant	Change in descriptive norms	Change in injunctive norms
Interview participant 1 (researcher)	Increase (appart from office and lab equipment)	Increase (all categories)
Interview participant 2 (PhD student)	*No data (but view informed from interview)*	
Interview participant 3 (Admin)	All increased by 1	No change in injunctive norms (Neutral)
Interview participant 4 (researcher)	Increase for lights, others remain the same	Decrease for lab equipment and lights
Interview participant 5 (academic)	Increase all categories	Increase all categories
Interview participant 6 (PhD student)	Increase for 2 of the 4 decrease for 1 of 4	Increase for 1 of the 4, decrease for 1 of the 4
Interview participant 7 (acadmic)	*No data - but did not use MEF*	
Interview participant 8 (researcher)	Increase for 3 of the 4 categories	Decrease for 2 increase for 1

Table 15: Change in descriptive and injunctive norms (benchmark to intervention) for participants 1 to 8.

Changes in Table 15 show that participant 1 and 5 primarily experienced increases in descriptive and injunctive norms. Participants 3 and 8 also experienced (primarily) increases for descriptive norms, but decreases or no change in injunctive norms. Results for descriptive norms for other participants were mixed, participant 6 experienced increases for two of the four descriptive norms, participant 4 saw increases for descriptive norms around lights, but others remained stable. For injunctive norms, participants 4 and 6 saw decreases in injunctive norms, with some remaining the same.

Table 16 below provides a summary table of the main findings of relevance to this paper. In general attitudes, and experience were somewhat more similar for participants 1,4, 5 and 8 (and generally positive); participants 2, 3, 6 and 7 seemed to share more similar (somewhat less positive) experience.

QUESTION	1 (researcher)	Participant 2 (PhD student)	Participant 3 (admin)	Participant 4 (researcher)	5 (academic)	Participant 6 (PhD student)	Participant 7 (academic)	Participant 8 (researcher) - emailing answers
1. What were your experiences of the beginning of the project?	Technology implementation went smoothly	Concern - I don't see any gain from turning off my computer etc.	A negative perception of how the project was introduced and early experience of being told off. Problem with acessing MEF.	Not very clear experiences as I used MEF from time to time, sometimes I would click and look. Forgot/ignored from time to time, becomes part of the screen.	Good, but was not aware of a comparison with the average	Having these devices next to you at the beginning might be abit uncomfortable, we don't know exactly what they are there for. But afterwards, once we understand that they are not recording discussion, you don't care about it.	I have not installed MEF or used MEF, so have not experienced much.	*I wanted know the project and the technology used in it.*
2. What kinds of things encouraged you to use MEF?	Good to see facts and compare.	At the beginning, curious to see my energy behaviour.	I did look at a couple of times, but it did not tell me how I could do anything about it.	I liked monitoring my usage	When my computer brings up the screen and the emails.	Did not use MEF	na	I was interested in the project and I wanted to consider my next research referring to this project.
3. Were you aware of the feelings and opinions of others in the department of the project?		I don't know, but my guess is that they are thinking the same	The academics thought it was very important.	No - can say that he was more interested than office mates.	Noticed some discussion, more the reaction when people were getting access to their online information. Interpretation from some was that I have to turn my computer off all the time. And i think that was the feeling that came out.	In the office that we were like...five or six students having these devices, some were more concerned about privacy and what's that for, eh, but I haven't talked to them to learn more about that	Have not heard much, but think it has just become a part of things. I don't think people were very enthusiastic about it, and I have not seen much concern about it. Later discussion signals there may have been some concern at the start - privacy concerns.	No, I wasn't. Because I hadn't had a discussion about it. Second answer provided: As I hadn't heard any complaint about it, I don't think they felt bad.
4. How did people feel about participating?	There was a postive attitude.	I don't think there are people resentful to participate	Some early discussion arround lack of choice in participating.	Yea, some people might have some privacy concerns.	not asked.	States that there wasn't any self motivation about doing something with participating, he indicates that it was mainly department led.	Initially, there was not much enthusiasm. After some time, people were willing.	It was not bad.
5. Were there any reasons why you might have felt uncomfortable by not participating in the MEF project?	Felt comfortable with.	No, I don't think	Yes. You would have felt like you were not really helping.	Would have felt bad for environmental reasons.	Could not see a problem as was not dealing with personal information.	If there was surveillance, i.e. When you come to the office and leave and reducing pay/salary. This was not the case. If I would have perhaps, had to annaounce in public. But if I had to just sign, perhaps I might not be that uncomfortable.	No	No, there weren't
6. Were you aware of others viewpoints on taking part/not taking part in using MEF?	Common agreement at least in my office, taking part.	Yes some, but just from a general point of view. They simply don't care in my opinion.	Did not directly answer	Just a feeling, that some had privacy concerns. I think some people just said..."okay just install it I don't mind" but they were not really interested.	Did not know of anyone refusing to take part, or joking/procrastinating, but it may happen.	Yes some.	No	No
7. What was your view about taking part in using MEF?	Positive	Could not see any gain from.	Early discussion signals that they wanted to take	Positive	Positive	He did not use MEF, but was a participant in the project.	Did not take part	I was interested in the project
8. Were there situations or circumstances where you were able to discuss the project with others?	No (yes for the other project)	Yes	Not really	Might have been, maybe lunch breaks	yes	The specific project, I don't think so.	No	No
9. Did you have such discussions often? What did you discuss?	na	rarely	n.a.	Now and again. Perhaps about the reason the project is run. Perhaps about confidentiality, privacy, are we being tracked or not? How successfull it will be in reducing energy use. Speculated about how it may effect wellbeing of the centre.	Often enough	Quite irrregular. Discussion was about potential applications and how we can use sensors to get information and smart-cities, smart offices etc.	na	No
10. Were such discussions before or after	na	After	n.a.	After	After, once you start seing	not asked.	na	na
11. Did such discussions encourage/discourage your MEF use	na	I don't think they changed my ideas	n.a.	No	Yeah, it certainly did'nt discourage me.	na	na	
12. In what ways was the project a shared experience do you think?	Because I know some colleagues also using - common interest from a technical	Individual	I suppose the department involvment, if there is some sort of campus wide, or national interest, then you could feel you are participating. Yes, I	Maybe. On a scale of 1 -100, I would say 20/25	Shared in the sense of other research projects that im linked too.	It could be a shared experience, if when results are published, whether people in the same office have similar results, something like that.	Maybe, everyone working to reduce energy, could be seen as shared.	I don't think the project was shared with participants
13. Was this experience positive or negative?	positive		Fairly positive, I guess.	Can't say positive or negative.	Positive	Neutral	Did not directly answer	It was positive. To reduce our electricity is very important for the environment
14. In what ways was this not a shared experience?	You can see a comparison performer, but you don't know whos in your group.		Early discussions identified some issues.	Some discussion but not long lasting	I don't think so really, as I'm some one who gets out and about and talks to alot of people.	It was not, because each individual has his own information and they did not interact with each other.	Not a shared exepreience in that not enough face to face meetings, only emails which people delete.	I hadn't had any discussion about it with other people
15. Do other people in CCSR use MEF that you are aware of? Do they tend to be	Definately everybody in	No	I don't know.	I just know about my room mates. Researchers.	Aware of one or two others that actively use it. Probably	I am not aware, but I guess there will be.		Yes, researchers
16. What about your office colleagues use?	" "	na	na	" "	I have my own office.	No I don't know. Probably, they don't.		They seemed to check their electricity usage on their computer screens
17. Of those using MEF, why do you think they used MEF?	I'm not aware, we have not discussed.	na	I don't know why they would, I suppose its because their interested in ecology/saving energy/ the reseach aspect.	Probabaly because it is being installed, rather than them choosing to use it.	I think its because they are keen to know how the project is working and what exactly it's doing.	They would use if it was related to their research.		I think they were asked to use MEF
18. Who do you tend to 'hang out' with within your department when you have time to catch up?	My corridor (and a few on the ground	Mainly researchers (particularly	Admin	Researchers	Academics	Office mates and a couple of others from CCSR	All of them.	Persons in the same room
19. Do such colleagues feel a strong connection with CCSR?	did not ask	I don't know.	Not necessarily, no.	Yes, at least the ones I know.	Yes	Yeas, some of them. Students, not so much, because they are hear just a few years and see as a way to a job. Others like fellows and lecturers, feel more close.	CHECK Friendlier in a previous department.	I think so
20. How do you feel about your role in CCSR?	Positive		Okay, don't get much input or influence into anything thats going on.	Does not directly address, but later states he feels comfortable and likes.	See's his role as important	My role as a student is to produce a research programme and papers. I find it an interesting place to also make friends and work and a community.	CHECK	As a visitor, I had'nt felt that I had some role in CCSR
21. How would you best describe the culture in CCSR?		Sociable place	Can be abit isolating. Pressure from the REF and focus on income	Work orientated, people are tolerant of each other and respect. People are reasonable. Well organised.	VeRy international, fragmented, because of how we are positioned and size, and pressure. Very focused with what we have got to do.	International, e.g. Asia etc. and the culture is abit different from European and the western world. There is a different approach in cultures about things, for like privacy.	It works like an enterprise	There are many projects and people work hard
22. Is there a team atmosphere in the group?		Not really, with the people you	Not really	Within individual projects, yes - who you are working with.	Not entirely, a bit short on, because were large probably.	Yes, but whether its a happy team or not, Im not sure.		Yes

4.2.1. Views and attitudes

Views towards the project at the start and participation

From the top 2 questions of table 1 it can be seen that participants 1 (researcher), 5 (academic), 8 (researcher) and 4 (researcher) had fairly positive attitudes towards the project and the MEF tool from the start. With regards to their own participation, all four participants were positive and signalled that they felt comfortable/could not see any problem with taking part/were interested in the project (questions 7 and 5).

Participant 2 (PhD student), had a less positive attitude towards experiences of the project and the MEF tool, stating: *"I don't see any gain from turning off my computer etc".* Participants 2 and 3 did use MEF but were not that positive about participating. Participant 7 (academic) did not use MEF and had not experienced much. Participant 6 and 7 did not use MEF. Participant 6 (a PhD student) had an initial experience at the beginning of the project that was somewhat negative, he stated:

"Having these devices next to you at the beginning might be a bit uncomfortable, we don't know exactly what they are there for. But afterwards, once we understand that they are not recording discussion, you don't care about it"

Participant 3, also recalled a negative perception of the start of the project and how it was introduced. This person also experienced problems with accessing MEF. However, discussion signalled a real keenness to be part of the project, and a want and enjoyment for contributing.

With regards to concerns about not participating (question 5), participant 3 stated: "*You would have felt like you were not really helping."* participant 6 stated as follows: "*I would feel uncomfortable if I would have to say that in public, let's say, because of, you know, somebody said we will install it if, and if I had to say I feel uncomfortable in front of people, perhaps, and no one else said it, that might make me uncomfortable. But if I had to sign it perhaps, then perhaps I might not be that uncomfortable."*

Participant 1, 5 and 8 could not see any problems. Participant 4 stated they would have felt bad for environmental reasons.

Others views and feelings

With regards to how others felt about participating (question 4), participants 3, and 6 were fairly negative. Participant 3,2,4, 5, 7 and 8 were rather more neutral[5]. Participant 1 was positive.

In terms of feelings and opinions of others in the department towards the project participant 8 identified (question 3) that: "*he had not heard any complaint about it, I don't think they felt bad*". Interestingly, participant 5 (lecturer) identified that they had noticed some discussion/reaction when people were getting access to online information, and that the general feeling that came out was that they would have to turn off their computers all the time (response to question 3). This observation would link with results section 4.1.5, that showed that during the intervention period often people with high group identity saw no increase or even decrease in descriptive norms for computers.

Participants 3, 4, and 6 were somewhat different. Participant 4 (researcher) stated (response to question 3): *"Compared to my office mates, I was more interested in it, I think. Because I was taking a look at it and they were not very interested at all, so really, yeah."* Question 17 provided additional information, he stated:

> "*So they had a positive attitude towards it, but using it was entirely the choice of the Department, as they feel it, I think."* For question 4, he identified that some people might have some privacy concerns.
>
> *"I just felt it. People never talked about that. I just thought that, well...I was thinking like what privacy issues could it be, possibly, but eh... perhaps like they might think there is... I don't know, a microphone inside listening to them or... So they are not present there when they are supposed to be and then..."*

Participants 6 (PhD student) expressed similar views. When asked whether aware of the feelings and opinions of others in the department of the project (question 3):

[5] participant 1 identified that there was a positive attitude. Participant 1 further identified common agreement on taking part in his office (question 6). Participant 5 identified that he did not know of anyone refusing to take part, or joking/procrastinating, but identified that it may happen (question 6). The response from participant 8 to question 4 was: *"It was not bad*".

"In the office that we were like...five or six students having these devices, some were more concerned about privacy and what's that for, eh, but I haven't talked to them to learn more about that"

Question 6, and further discussion is quite revealing about perception on how the project was introduced, and views on participating:

"There wasn't any em...like...eh...self em...motivation about doing something with that, so, eh, these were told to us, okay, we will install these device in your office, if you have any problem, then...any concerns talk with us, otherwise they will be there. That's how they introduced it to us" (Participant 6).

When further asked if the introduction was appropriate or could it have been done better, participant 6 stated:

"It could have been done on a voluntary basis. If they didn't have enough volunteers, then they could [employ] non-volunteers"

Somewhat similar views were reflected by participant 3 (before direct questions), about how the project was introduced and the opt-out policy. This is interesting as it shows how making a policy decision on opt-out versus opt-in can affect, social context and attitudes towards the project. Further interview data from participant 3 (non academic) identified that the management's announcement and introduction about the project did not feel particularly friendly. This highlights the unknown influential factor of how well management will implement such technologies in organisations and industry[6] and the effect that this can have on the development of social, the social context can affect the emergence of particular norms within groups. Participants 3 and 7 had fairly neutral responses to question 3[7].

[6] The introduction made by the management was an unplanned impromptu face to face introduction to the project to participants (beyond that made by electronic communication).

[7] When asked question 3, participant 3 responded: *"The academics thought it was very important."* Question 6 was not answered directly by participant 3.

Participant 7 gave the following account for question 3: "*Have not heard much, but think it has just become a part of things. I don't think people were very enthusiastic about it, and I have not seen much concern about it."*

And question 4: "Initially, there was not much enthusiasm. After some time, people were willing."

View on shared experience

Interviewees were asked in what ways the project was a shared experience (question 12), this is interesting to look at as the extent of shared experience has potential to effect social interaction relating to MEF and energy behaviours. Participant 1 believed it was shared in the sense that he knew some colleagues were also using MEF and because there is a common interest from a technical point of view. Participant 5 believed it was a shared experience in the sense of other research projects he was linked to. Participant 5 identified that it was not a shared experience in the sense that you can see a comparison performer, but you don't know if he is in your group. Participant 8 stated:

"*I don't think the project was shared with participants*. He pointed out*: "I hadn't had any discussion about it with other people*".

Participant 4 stated on a scale of 1 – 100, 20/25. Participant 2 identified it as individual. Participant 6[8] stated that it could be a shared experience, if when results are published, people in the same office have similar results. Participant 7 identified that maybe everyone working to reduce energy, could be seen as shared. Participant 3 stated:

> "*I suppose the department involvement, if there is some sort of campus wide, or national interest, then you could feel you are participating. Yes, I suppose you could feel shared ownership but..."*

4.2.2 Social distance and interaction

It was clear from question 3 earlier, that participant 5 gleaned information (intentionally or non-intentionally) about others participation via discussions on such things as technical issues. Participant 5 was also asked the 'situations or circumstances where he was able to discuss the project with others? (question8)' where he gave the following response:

> *"you know, corridor chats when you're getting a coffee or doing a fire drill (laughing)"*

[8] The latter point identifies the importance (for some participants) of bringing about shared ownership in such energy interventions. On the subject of the ways in which this was not a shared experience (question 14), Participant 6 stated: "*It was not, because each individual has his own information and they did not interact with each other"* and participant 7 stated: "*Not a shared experience in that not enough face to face meetings, only emails which people delete".* The latter point flags up the role of the form of communication in developing a shared experience.

This is important as it signals the ability for discussion to provide information on referents outside of one's immediate office environment. In terms of the people that participant 5 interacts with in such discussion, the following is informative:

> "*people passing do catch me for a quick chat, so I sort of do interact with....usually the academics and senior researchers"*

This reflects organisational structure, as participant 5 is also an academic.

Participants 2 and 4 also discussed the project (although participant 2 rarely)[9]. With regards to what was discussed, participant 4 provided the following:

> *"Perhaps about the reasons the project is run. Perhaps about confidentiality, privacy, are we being tracked or not? How successful it will be in reducing energy use. Speculated about how it may affect wellbeing of the centre."*

From this, although participant 4 was generally positive about the project, it can be seen that they encountered differing views and concerns relating to confidentiality, privacy and the project, which informed a particular perception of others views. Neither participant 2 or 4 identified that their discussion encouraged their use of MEF (unlike participant 5). So from this, it is clear that discussion and social context amongst participants and sub groups on a project like this can have a positive, neutral (even perhaps negative) effect in encouraging engagement and motivation to use the MEF tool, this is in line with findings from the survey reported earlier, but provides more depth on the types of discussion and differing effects of discussion on MEF use.

4.2.3 Discussion, referents, proximity and location

From the above section, it would seem that the information that participant 5 gained from discussion was mainly the views of other academics. Given that participant 5 is in a single office, their main referents for verbal information are therefore other outside academics.

For participant 1 the situation is quite different, environment, proximity and location play the main role in shaping his perception of others participation with and use of MEF. When asked question 15, they stated that definitely everybody in his office used MEF. It

[9] Participant 2 (PhD student) and 4 (researcher) tend to 'hang out' with other researchers within their department.

is further identified that they are researchers (equivalent in terms of organisational structure). Importantly, information was not communicated verbally (identified from findings for questions 8 and 17), therefore it must have been based on observation. Such observations about others engagement with energy reduction (via MEF) would not be as readily available in a single office. Therefore this highlights a role for environment and proximity and location in determining referents available and observational information (which informs social norms). It is also clear that this was the case for participant 8, when asked about his office colleague's use of MEF (question 16) he states: "*they seemed to check their electricity usage on their computer screens."* This participant tended to 'hang out' with his office colleagues, so they will have been his main referents, researchers. Participant 4 also only knew of his roommates use of MEF, again indicating the role of proximity and location in determining referents and observational information.

Continuing on this theme, when asked do people in the department use MEF that you are aware of? It is interesting to note that for participants 1, 4, 5, and 8 all identified awareness of participants. All of these participants show increases in descriptive norms as identified in Table 12. For participants 2, 3, 6 and 7 none of the participants identified knowledge of others using MEF. Following this the norm in these latter participants surroundings (their 'social context') was to not use MEF, either this, or these participants were generally not interested to know of their referents use of MEF (but this would go against the strong evidence that there was a general shift in social norms from the benchmark to the intervention)[10].

4.2.4 Social identity of referents and team atmosphere

Relating to social identity of colleagues (their potential referents), participant 5 identified colleagues as having a strong connection with the department (question 19). He states:

> "*Eh...yes, I would say so, very much part of it, yeah.*" No data was collected for participant 1, participant 8, thought that his colleagues do have a strong connection with the department. Participant 4 identified: *"Yes, at least the ones I know".*

[10] Of the data that we have for these latter participants, descriptive norms only increase for two of the four energy services (participant...), participant 3 saw a small increase in all norms. The latter participant did use MEF, the former did not.

It is interesting to note that those with generally more positive views and perceptions for the project (participants 1,5, 8 and 4) identified their colleagues as having a strong connection to the department.

Participants 2, 6, 3 and 7 had somewhat different views. *Participant 2 stated: 'I don't know' (PhD student).* Participant 6 (PhD student stated: *"students, not so much, because they are hear just a few years and see as a way to a job. Others like fellows and lecturers feel more close".* Participant 3 (admin) identified: "*Not necessarily, no*." Participant 7 (lecturer) identified variance, identifying that people have different views.

In terms of question 22: 'is there a team atmosphere in the group?' Most participants had mixed feeling about this[11]. It was sometimes identified that participants do, but within individual work teams.

Culture

With regards to culture in the department, question 21 asked: 'how would you best describe the culture in the department?'

Participant 4 (researcher) identified the culture as work orientated and that people are tolerant and respectful of others and reasonable, also that the department is well organised. Participant 5 described the culture as very international, but quite fragmented and very focused with what it's got to do. Participant 8 stated: "*There are many projects and people in* the department *work hard*" He further identified that the department works like an enterprise.

Participant 2 (PhD student) identified the department as a sociable place. Participant 3 (admin) identified that the she felt the department could be a bit isolating, and with

[11] Participant 8 stated yes to this question. Participant 5 however stated: "*Eh, not entirely, I would say, because we're large probably, and because we aren't small enough to meet weekly, in a way, and I think that's…that's one thing, because certainly, compared to other places I have worked, that is one thing we are probably, eh, a bit short on*" No data was collected for participant 1.

Responses from participants 4, 2, 3 and 6 were likewise, not so positive:

> *"Not really"* (participant 2 and 3);
>
> *"Within projects yes.."* (Participant 4);
>
> *"Yes, but whether it's a happy team or not, I'm not sure"* (Participant 7).

pressure from the REF and a focus on income. Participant 7 (academic) identified that the department works like an enterprise.

Participant 6 (PhD student) identified the following:

> *"*the department *has researchers from all around the world, eh, mainly, eh, Asia, eh... The culture is a bit different from Europeans and the Western world. So, there is a ...a different approach in... cultures about things, for like privacy."*

Interviewer: Okay.

Participant 6:

> *"So, eh, their…the use of the tool and this project raised more concerns from that…from those guys than average."*

The interviewee was later asked if they had any idea as to why this is? The interviewee answered as follows:

> *"I think it's their culture and I don't know if…it's rights perhaps."*

The interviewer then asked about specific countries as opposed to Asia and participant 6 identified China, Iran and Pakistan and such areas.

In summary, this latter dialogue from participant 6 is interesting and relevant as it identifies the impact that an international culture may have in determining people's attitudes to technologies such as smart metering and this can influence the social context and norms (as the literature suggests) in participation and energy behaviours that transpire within groups.

4.2.5 Communication:

In terms of communication; from question 2 it can be observed that the MEF feedback as well as emails encouraged the use of MEF. It is clear from question 10 that communications in the form of discussions occurred after the online MEF feedback was provided and therefore identifies a link between online information and discussion and the development of social context which can influence the development of norms. The results in section 4.1.6 suggested that for a number of participants, such discussion

encouraged participation, but it was also clear for some that discussion did not encourage participation.

Question 11 suggests that MEF feedback information was useful to participant 5 in encouraging use of MEF. This participant was in a single office and had an awareness of others use of MEF. Given that participant 5 was in a single occupancy office, it seems likely that his awareness of others use of MEF (question 15) was heavily reliant and informed from his own discussion or observation of discussion. As noted earlier, this differs somewhat from the experience of participant 1 and 8 (in multi-occupancy offices), where the communication of information about others use of MEF was purely observational, as they did not discuss the tool.

For participants 2, 3, 6 and 7, there are also some valuable insights on communication. Participant 3 and 6 refer particularly to the initial face to face introduction to the project. Experience of participants from the interviews indicates a perception that the introduction could have been conducted in a more friendly way. As discussed earlier this introduction communication shaped some of the attitudes and discussions that developed within certain groups. This illustrates the importance of tone and delivery in organised face to face communications in shaping the social context and norms that emerge. Participant 7 believed that there should have been more face to face communications in preference to e-mails. This again highlights a diversity in views when compared to participant 5 who was encouraged by the emails.

It is clear from discussions of participant 4 that concerns and negative perceptions about an intervention can be shared through discussion as well as more positive discussion topics. In this way attitudes and perceptions as well as norms can be socially constructed within groups. Technology, environment, proximity, location and social interaction through discussion all play a role in shaping the social context for participants and providing referent information about others attitudes, experience, practices and social norms. This is apparent, even though the main intervention and focus was primarily communicated through individual feedback.

5 Discussion and conclusions

This study set out to explore the role of social norms in energy reduction in organisations. Social norms around specific office based energy services were measure before and after an energy intervention. Changes in energy for each participant were also captured. In order to make for an interesting and insightful study, theory from Cialdini et al (1991) and Rimal and Real (2005) was drawn on to inform the study. Rimal and Real's Theory of Normative Social Behaviour identifies key factors effecting the translation of social norms into behaviour. Factors identified in Rimal and Real's model for determining whether social norms effect behaviour were explored in the current study, but with regards to norm emergence as opposed to translation into behaviour. This path was taken as it was identified as a gap in the literature and a useful exploration.

The review also identified that Rimal and Real's model though highly useful and tractable, is fairly simple. From review it was clear that beyond the factors that Rimal and Real apply: group identity, collective outcome expectancy and norm interaction, there are actually many other factors affecting the emergence and diffusion of social norms and translation into behaviour. The current study explored these factors in relation to energy services whilst also measuring changes in injunctive and descriptive norms as a result of the introduction of energy feedback. The following findings emerged from the study.

Descriptive and injunctive norms measured in survey 1, were much stronger for lighting and office and lab equipment than for computers and monitors. Some of the reasons for differences between computers and lighting were explored in the interviews, often it emerged that participants could see differences in the attributes of behaviour around particular energy services that would affect norms. A range of factors however, including culture were mentioned.

Change in descriptive and injunctive norms between the benchmark and intervention period were then looked at. There was a significant change (increase) in descriptive norms for computers and monitors going from the benchmark to the intervention period (but not for lighting and office and lab equipment). This is an interesting finding, as these are the very energy services that the energy intervention was focused on. What is also interesting is that a significant relationship was found between descriptive norms and energy efficiency ratios for participants, after the intervention, those with higher descriptive norms tended to be more efficient in their energy use.

Chi^2 tests were then applied to explore the relationship between group identity and descriptive norms and collective outcome expectations and descriptive norms. A significant relationship was found to exist for group identity and descriptive norms for computers during the benchmark period; further testing is however advised to confirm this as sensitivity testing suggested instability due to low number of observations in the case of this particular result. A significant relationship between collective outcome expectancy and descriptive norms was not found during the

benchmark. In the intervention period no significant relationships to social identity or collective outcome expectancy were found for either computers or monitors. The approach applied here in this study can be further applied in future and extended.

Survey data also presented evidence on the social context around MEF and energy use from survey results. Interestingly this showed roughly an even split between participants that discussed MEF and those that did not. For discussion around energy use there was a slight majority for those that did not discuss, over those that did. It is clear that for at least 6 of the participants, such discussion encouraged their use of MEF. In this way, social context played a role in incentivising and motivating people to use the feedback tool, for some it did not of course. Interviews suggest that in some situations, discussion may even have discouraged use of MEF. The survey also showed that participants in the project often felt a duty (to use the MEF tool) towards the 'in house' team that developed the tool . This is an interesting finding and indicates that if such tools are developed/led by influential employees from 'within house' this could increase participation with the feedback from the MEF feedback tool.

The role of physical environment, proximity and location in shaping the emergence and diffusion of norms

The interviews in this research showed very clearly how the physical environment, proximity and location can affect the referents available and accessibility of observational data as well as the social context within which participants find themselves and therefore the normative information available. This will shape the social norms around energy that emergence and their diffusion. For participants interviewed, available referents (those for which people tended to hang out with or shared a room with) often reflected the position held by the participant (organisational structure) e.g. whether a lecturer, researcher or PhD student etc and or location. The literature shows that people on the same level (in terms of organisation) provide attractive referents for attaining normative information.

The role of management, policy and culture in shaping social context and norms

From the interviews it was clear that both the introduction to the REDUCE intervention as well as policy decisions taken to make the project opt-out as opposed to opt-in influenced the development of attitudes and views for most of those interview participants that had a less positive view/experience of the project. It is interesting to note that of those that had a less positive view/experience (participants 2, 3, 6 and 7), none were aware of their office mates/colleagues' use of MEF. For those that had a more positive view/experience however (participants1,4,5, and 8), all were aware of at least some colleagues use of MEF. This is an interesting observation and when taken in conjunction with findings of the impact that managements' implementation and opt-out policy has on the experience of participants, would

indicate that with respect to the development of descriptive norms, policy as well as communication are important factors due to influencing social context of participants and it would seem social observation/comparison. Research should explore this further to confirm these indicative findings. This has real relevance as it is clear from our study that there is a significant link between the development of descriptive norms around energy services and actual energy behaviours.

Some of the interview data also indicated that cultural background of participants can affect their experience, perception and views and attitudes around privacy and acceptability of the technologies applied and the intervention. Attitudes and views do affect the social context and discussion that develop and therefore the norms that emerge. Given such findings and the need for energy interventions to have a positive as opposed to negative impact on organisations, the design and implementation of interventions and technologies used should take account of how a particular technology and intervention design may be acceptable/unacceptable as a result of cultural background or mix of participants. Such considerations are highly relevant in the UK which is culturally quite mixed. One participant identified discussions about how such interventions affect wellbeing within the department, it is important to note this as well as the number of concerns around privacy, as this indicates that such technology interventions do generate anxieties. This is an important issue that needs to be addressed by those implementing new technologies such as smart metering. It is also important to note that if participants are unhappy or unsure about smart meter implementation, this has the potential to effect costs of the implementation (see Bradley et al 2013).

Overall, such findings highlight the deep interaction between technology, social context, norms and policy, and that this interaction has the potential to affect the success of energy reduction from smart metering as well as costs.

References

Ang, S., Van Dyne, L. And Begley T.M (2003). The employment relationships of foreign workers versus local employees: a field study of organizational justice, job satisfaction, performance, and OCB. Journal of Organisational Behaviour, Vol. 24 Issue 5, pp. 561-583.

Aggleton, P., & Parker, R. (2002). HIV/AIDS stigma and discrimination: A conceptual framework and basis for action. The Population Council Inc.

Bagozzi, R. P., Wong, N., Abe, S., & Bergami, M. (2000). Cultural and situational contingencies and the theory of reasoned action: Application to fast food restaurant consumption. Journal of Consumer Psychology, Vol. 9, Issue 2, pp. 97–106.

Bell, S. J., & Menguc, B. (2002). The employee-organization relationship, organizational citizenship behaviors, and superior quality. Journal of Retailing, Vol. 78, Issue 2, pp. 131–146.

Berkowitz, A. D. (2004). The social norms approach: Theory, research and annotated bibliography. Accessed: 22.08.13 Available at: http://www.alanberkowitz.com/articles/social_norms.pdf

Berger, C. R., & Calabrese, R. (1975). Some explorations in initial interactions and beyond: Toward a development theory of interpersonal communication. Human Communication Research, 1, 99–112.

Brooklyndhurst (2009). The diffusion of environmental behaviours; the role of influential individuals in social networks. Report 2: The evidence. A research report completed for the Department for Environment, Food and Rural Affairs by Brook Lyndhurst.

Borsari, B., & Carey, K. B. (2001). Peer influences on college drinking: A review of the research. Journal of Substance Abuse, Vol. 13, Issue 4, pp. 391–424.

Borsari, B., & Carey, K. B. (2003). Descriptive and injunctive norms in college drinking: A meta-analytic integration. Journal of Studies on Alcohol, Vol. 64, Issue 3, 331–341.

Capitanio, J. P., & Herek, G. M. (1999). AIDS-related stigma and attitudes toward injecting drug users among Black and White Americans. American Behavioral Scientist, Vol. 42, No. 7, pp. 1148-1161.

Carrico A.R. Motivating Pro-environmental behaviour: The use of feedback and peer education to promote energy conservation in an organisation setting. Dissertation submitted to the Faculty of the Graduate School of Vanderbilt University in partial fulfilment of the requirements for the degree of Doctor in Philosophy in Psychology 2009. Available at: http://etd.library.vanderbilt.edu/available/etd-07202009-180058/unrestricted/Carrico20May09.pdf Accessed: 04.01.14

Carrico A.R. and M. Riemer (2011). "Motivating energy conservation in the workplace: An evaluation of the use of group-level feedback and peer education". Journal of Environmental Psychology. Vol. 31, Issue 1, pp. 1-13.

Christensen, P. N., Rothgerber, H., Wood, W., & Matz, D. C. (2004). Social norms and identity relevance: A motivational approach to normative behavior. Personality and Social Psychology Bulletin, Vol. 30, No. 10, 1295–1309.

Cialdini R.B., Kallgren, C. A. Reno, R. R. (1991). A focus theory of normative conduct: A theoretical refinement and reevaluation of the role of norms in human behavior. Advances in experimental social psychology. Vol. 24, Issue 20, pp. 1–243.

Cialdini, R. B. (2001). Influence: Science and practice (4th ed.). New York: HarperCollins.

Christopher (1989). Social Loafing and Collectivism: A Comparison of the United States and the People's Republic of China. Administrative Science Quarterly, Vol. 34, No. 4, pp. 565-581.

Clapp, J. D., & McDonnell, A. L. (2000). The Relationship of Perceptions of Alcohol Promotion and Peer Drinking Norms to Alcohol Problems Reported by College Students. Journal of College Student Development, Vol. 41, No. pp. 19–26.

Delerga, V. J., Lovejoy, D., & Winstead, B. A. (1998). Personal accounts on disclosing and concealing

Dukerich, J. M., Golden, B. R., & Shortell, S. M. (2002). Beauty is in the eye of the beholder: The impact of organizational identification, identity, and image on the cooperative behaviors of physicians. Administrative Science Quarterly, 47, 507–533.

Field (2002). Hechter M., and Opp K.D. (2002). On the Emergence of Social Norms. Contemporary Sociology, Vol. 31, No. 6, pp. 638-640.

Gächter S. and E. Fehr (1999). "Collective action as a social exchange". Journal of Economic Behaviour and Organisation. Vol. 39, pp.341-369.

Gartrell (1982). On the Visibility of Wage Referents. The Canadian Journal of Sociology, Vol. 7, No. 2, 1982, pp. 117-143.

Goodman and Haisley (2007). "Social comparison processes in an organizational context: New directions". Organizational Behavior and Human Decision Processes, Vol. 102, Issue 1, pp. 109–125.

Goldstein N.J., Cialdini R.B., V. Griskevicius (2008). "A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels". Journal of Consumer Research, Vol. 35, Issue 3, pp.472-482.

Greenberg J, C E. Ashton-James, N M. Ashkanasy (2007). Social comparison processes in organizations. Organizational Behavior and Human Decision Processes, Vol. 102, Issue 1, pp. 22–41.

Hofstede, G. (1980). Culture's Consequences: International Differences in Work Related Values, Beverly Hills, Sage.

International Energy Agency (2013). World Energy Outlook Special Report 2013. Available at: http://www.worldenergyoutlook.org/publications/weo-2013/ Accessed: 07.01.14

Jackson T (2006). Motivating Sustainable Consumption. A review of evidence on consumer behaviour and behavioural change. A report for the Sustainable Development Research Network. http://hiveideas.com/attachments/044_motivatingscfinal_000.pdf

Kane, A. A., Argote, L., & Levine, J. M. (2005). Knowledge transfer between groups viapersonnel rotation: Effects of social identity and knowledge quality. Organizational Behavior and Human Decision Processes Vol. 96, Issue 1, pp. 56–71.

Kelman, H. C. (1961). Processes of opinion change. Public Opinion Quarterly, Vol. 25, 57–78.

Kleining (1998), Das Rezeptive Interview, Bielefeld: University of Bielefeld.

Kraus et al (2012). "Toward a contingency framework of interpersonal influence in organizational identification diffusion." Organizational Behaviour and Human Decision Processes, Vol. 118, Issue 2, pp. 162–178.

Lapinski and Rimal (2005). "An Explication of Social Norms". Communication Theory, Vol. 15, Issue 2, pp. 127–147.

Markus H.R. and S.Kitayama (1991). Culture and the Self: Implications for Cognition, Emotion, and Motivation. Psychological Review, Vol. 98, No. 2., pp. 224-253.

Morrison, E. W. (1993). Information Seeking: Exploring Types, Modes, Sources, and Outcomes. The Academy of Management Journal, Vol. 36, No. 3, pp. 557-589.

Oyserman D., Coon, H.M., Kemmelmeier, M (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. Psychological Bulletin, Vol. 128 (1), Issue 1, pp. 3-72.

Park and Levine (1999). Park, H. S., & Levine, T. R. (1999). The theory of reasoned action and self-construal: Evidence from three cultures. Communication Monographs, Vol. 66, Issue 3, p. 199-218.

Perkins, H. W., & Berkowitz, A. D. (1986). Perceiving the community norms of alcohol use among students: some research implications for campus alcohol education programming. International Journal of the Addictions, Vol. 21, No. 9-10, 961–976.

Perkins, H. W., & Wechsler, H. (1996). Variation in perceived college drinking norms and its impact on alcohol abuse: A nationwide study. Journal of Drug Issues, Vol. 26, Issue 4, 961–974.

Prentice, D. A., & Miller, D. T. (1996). Pluralistic ignorance and the perpetuation of social norms by unwitting actors. In M. P. Zanna (Ed.), Advances in Experimental Social Psychology: Vol. 28 (pp. 161–209).

Van Knippenberg, D., & Van Schie, E. C. M. (2000). Foci and correlates of organizational identification. Journal of Occupational and Organizational Psychology, Vol. 73, Issue 2, pp. 137–147.

Vishwanath (2006). "The Effect of the Number of Opinion Seekers and Leaders on Technology Attitudes and Choices". Human Communication Research, Vol. 32, Issue 3, pp. 322–350.

Ross, L., Greene, D., & House, P. (1977). The “false consensus effect”: An egocentric bias in social perception and attribution processes. Journal of Experimental Social Psychology, Vol. 13, Issue 3, pp. 279–301.

Richter, A. W., West, M. A., van Dick, R., & Dawson, J. F. (2006). Boundary spanners’ identification, intergroup contact, and effective intergroup relations. Academy of Management Journal, vol. 49, No. 6, pp. 1252-1269.

Riketta, M. (2005). Organizational identification: A meta-analysis. Journal of Vocational Behavior, Vol. 66, Issue 2, pp. 358–384.

Sarantakos S (2002). Social Research. Published by Palgrave, Basingstoke, Hampshire.

Salancik G.R. and J. Pfeffer (1978). A Social Information Processing Approach to Job Attitudes and Task Design. Administrative Science Quarterly, Vol. 23, No. 2, pp. 224-253.

Sherif, M. (1935). The psychology of social norms. New York: Harper & Row.

Siero F.W. A.B. Bakker, G.B. Dekker and M.T.C. VandenBurg (1996). “Changing organizational energy consumption behaviour through comparative feedback”. Journal of Environmental Psychology vol. 16 issue 3, pp. 235–246.Rimal and Real’s (2005)

Stern, N. (2006). Executive summary (long). Stern Review on the Economics of Climate Change. HM Treasury. Available at: http://webarchive.nationalarchives.gov.uk/+/http:/www.hm-treasury.gov.uk/sternreview_index.htm Accessed: 14.04.2013

Suls, J., & Wan, C. K. (1987). In search of the false-uniqueness phenomenon: Fear and estimates of social consensus. Journal of Personality and Social Psychology, Vol 52 (1), 211-217.

Trafimow, D., & Finlay, K. A. (2001). The relationship between normatively versus attitudinally controlled people and normatively versus attitudinally controlled behaviors. Social Science Journal, Vol. 38, No. 2, pp. 203–216.

Trafimow, D., & Fishbein, M. (1994). The moderating effect of behavior type on the subjective norm-behavior relationship. Journal of Social Psychology, Vol. 134, Issue 6, pp. 755–763.

Woods, W. J., Dilley, J. W., Lihatsh, T., Sabatino, J., Adler, B., & Rinaldi, J. (1999). Name based reporting of HIV-positive test results as a deterrent to testing. American Journal of Public Health, vol. 89, issue 7, pp. 1097–1100.

United Nations (2013). Climate Change Mitigation. Available at: http://www.un.org/wcm/content/site/climatechange/pages/gateway/mitigation Accessed: 23.11.13

Appendix 1: Review of factors affecting social norms

In this appendix we provide some background on each of the 14 factors: Social distance and interaction; Communication; Social identity; Outcome expectations; Culture; Environment proximity and location; Technology; Organisational structures and institutional arrangements; Attributes of certain behaviours; Congruence with pre-existing beliefs/practices; Qualities and power of those in the group; Individual cost and gain; Norm interaction; and Organisational task.

Social distance and interaction

Gächter and Fehr (1999) suggest that approval incentives (as occur with injunctive norms) are greater when there is a greater density of social interaction. This will effect norm emergence, diffusion and potentially transmission. They state that social distance (taken to be frequency and intensity of social interaction, given their discussion) and familiarity are important to approval incentives, repeated interaction is positively correlated with the importance of approval incentives. Repeated interaction is likely to increase costs from non-compliance.

Social distance and interaction can also effect the emergence and diffusion of descriptive norms as it increases the amount of information available about what others are doing. For these reason, the work place could be a fruitful place for investigation given social interaction and exchange often occurs on a daily basis.

Importantly, social interaction can result in misperception of norms. Lapinski and Rimal (2005) identify that:

"Individuals often misperceive the prevalence of a behaviour (i.e., descriptive norms) in their social midst (e.g., Clapp & McDonnell, 2000; Perkins and Wechsler, 1996; see Berkowitz, 2004, and Borsari& Carey, 2003, for reviews), and the magnitude of this misperception is positively related to interpersonal discussion about the topic (Real and Rimal, 2002)."

Importantly, in terms of magnitude of misperception and the influence of norms on behaviours, Lapinski and Rimal (2005) state that the literature shows that the source of information is important (amongst other things). For example, referent group member, typical other, stranger etc., they cite Borsari and Cary (2003). This is because the source of information will shape the social comparisons that occur and social comparison plays a key role in norm emergence and diffusion.

Social identity

Smith and Louis (2008) provide a good brief description of The Social Identity Approach to the Attitude-Behavior Relationship (p.4).

"*The basic premise of the social identity approach is that belonging to a social group, such as a nationality or a sporting team, provides members with a definition of who one is and a description and prescription of what being a group member involves. Social*

identities are associated with distinctive group behaviors – behaviors that are regulated by context-specific group norms (see e.g., Abrams & Hogg, 2001). When individuals see themselves as belonging to a group and feel that being a group member is important to them, they will bring their behavior into line with the perceived norms and standards of the group. People are influenced by perceived group norms because they prescribe the context-specific attitudes and behaviors appropriate for group members."

Lapinski and Rimal (2005) state that when people perceive that they share a group identity with members of their reference group there are two reasons for conformance with a norm is more likely: 1.) members experience a positive effect when they conform (they cite Christensen, Rothgerber, Wood and Matz, 2004); 2.) there is an implicit understanding that norm compliance, or failure to comply with a group behaviour will be recognisable by other group members and that members are able to acquire information about their expression of group solidarity.

From their review Kraus et al (2012) report that organisational identity (social identity within an organisation) is a strong predictor of employee job attitudes (Van Knippenberg and Van Schie 2000), cooperative behaviour (Dukerich, Golden and Shortell 202; Richter, West van Dick and Dawson 2006), in role performance (Riketta 2005), knowledge transfer (Kane, Argote and Levine 2005), organisational citizenship behaviour (Bell and Menguc 2002) amongst other variables. Kraus et al (2012) focus on the influence of peers in organisational/social identity processes. Kraus et al (2012) state that work-group OI diversity operates as an important contextual factor that may inhibit the effect of information sources and in this way the emergence and diffusion of social norms[12].

Lapinski and Rimal (2005) suggest that it is likely that the extent of group identification is culturally determined as culture can indirectly effect susceptibility to normative effects. Qualities of those in the group and organisational structure can also play a role in determining social identity, Kraus et al (2012) found that influence of expert peer's OI on focal employee's OI grows stronger when the focal employee's tenure at the organisation is higher. Such individuals can also have a disproportional effect in determining group identity.

Outcome expectations

Rimal and real (2005) identify in their theory of normative social behaviour that as well as social identity, and norm interaction (injunctive norms in their model), outcome expectations also moderate the influence of descriptive norms on behaviour (these are the three variables/parameters of their model).

[12] They state that (p.174):

"organisational members develop their identification with organisations in a social context in which organisational values and norms are created, interpreted, sanctioned, rewarded, and most importantly, diffused through organisational members such as supervisors and expert peers".

Congruence with pre-existing practices/beliefs

Lapinski and Rimal (2005) identify that the effect of descriptive norms on behaviour is more powerful on individuals whose self-identity is closely aligned with the enactment of the behaviour or for individuals that are highly ego-involved in the given behaviour – makes the norm more salient. The later authors provide examples. Lapinski and Rimal (2005 p.138) state that:

"*When individuals internalize normative information (i.e. via values/ego), the presence of the reference group is not required for sustained normative effects (Sherif, 1935). If however, individuals enact a behaviour in the absence of internalisation – a process that Kelman (1961) termed compliance – then the presence of the reference group is required for normative influence to occur."*

The latter study by Lapinski and Rimal (2005) seems to somewhat contradict work by Cialdini et al (1991) that states that individuals are likely to conform to the behaviour even when alone, as long as the focus remains.

Communication:

Lapinski and Rimal (2005) state that via communication intervention, misperceptions of individual's about the prevalence of a behaviour can be corrected, the later authors identify relevant studies. They however, state that what is often neglected is the question of how these misperceived descriptive norms are formed to begin with. Lapinski and Rimal (2005) state that (p.137):

"It is our premise here that individuals' communication patterns play a key role in the development of normative perceptions. Further, communication influences the extent to which people perceive a discrepancy between their own and others' attitudes or behaviours such that they believe they are in the minority when they are actually in the majority (pluralistic ignorance; Prentice & Miller, 1996), believe their behaviours are more different from others than they actually are (false uniqueness; Ross, Greene, & House, 1977), or think others think and act as they do when they do not (false consensus; Suls & Wan, 1987)."

The current author notes that one has to ask however: how do we know whether a norm is or is not miss perceived? It might be the case that these norms are not misperceived but reflect reality. Lapinski and Rimal (2005) state that they extend the model of the Theory of Normative Social Behaviour (Rimal and Real 2005) to include the role of communication as a variable[13]. It is not however clear how they do this in relation to the

[13] Lapinski and Rimal (2005), p. 143 conclude that: "*The inclusion of communication processes in norms-based theories is likely to enhance scholars understanding about how norms are formed, transmitted, and modified among members of a social group. Furthermore, the expansion of the theoretical models to include the role of various moderators (outcome expectation, group identify, and ego involvement) in the relationship between descriptive norms and behaviours is likely to add significant explanatory power to these models."*

actual model, for example there is no system diagram provided etc, it is more a discussion of potential influence on norms via communication. They discuss the role of social distance, source of information and normative referent group etc, and the internalisation of normative information. Although linked to communication, we see these not as specifically communication itself but factors that shape the availability of normative information, judgments of validity of information.

The importance of communication in identified norms and social identify effects on norms is highlighted in Goldstein et al 2008, they state (p.480):

"*in order to optimize social identity effects, it is wise for communicators to ensure that an important social identity is not only salient but that the norms associated with the identity are known and also salient."*

Norms in communication within an environment also shape social comparison (Goodman and Haisley 2007).

Culture

Culture can effect individualistic and collectivistic characteristics of a community or group and such characteristics affect the development of social norms and translation into behaviour. In cultures where the collective is emphasised (Hofstede 1980 as seen in Lapinski and Rimal 2005) or interdependent views of self predominate (Markus and Kitayama 1991 and Bond 1986), norms appear to provide a more powerful impact on behaviours. Park and Levine (1999) found that normative factors in the theory of reasoned action (TRA) were significantly associated with interdependent (collective orientated) but not independent (self orientated) construal. Oyserman et al (2002) in their study find that Chinese were found to be both less individualistic and more collectivistic than others from different cultures such as European Americans. Similar findings are shown in Christopher (1989). Bond (1991) also refers to examples of interdependent self as being strong in Chinese society.

Beyond affecting individualistic and collectivistic characters of a group, Goodman and Haisley (2007) identify culture as important in actual social comparison processes. The identify that background of workers can be important in determining perception in an organisational environment, perceptions can sometimes differ between workers from the culture in which the organisation exists as compared to those from outside cultures. Therefore the international mix is an organisational variable that can influence perceptions within an organisation, probably in many different ways. The current authors identify that it may effect referent selection and evaluation processes in social comparison. Goodman and Haisley (2007) cite work by Ang, Van Dyne, and Begley (2003).

Field (2002) in his review relating to social norms, expresses surprise that many authors do not explicitly note the importance of culture and history and the current context in restricting the set of norms that are able to arise and that are available to be adopted at any given time.

Proximity and location

Proximity and location of people is important as this can affect the extent to which people interact (*and in this way potentially emergence, diffusion and behaviour translation)* but also where[14] and which people tend to interact with each other and in this way referent selection (and focus and salience). Goodman and Haisley (2007) identify from earlier studies that the perceived relevance of referents determines selection and that relevance and attractiveness of referents is affected by ease of access to the referent and appropriateness of the referent in addressing the person's needs of concern. Individuals will gravitate towards referents that are appropriate and computationally easy to assess.

Gartel (1982) identify the importance of proximity in relation to awareness of others and social comparison processes, Goodman and Haisley (2007) further discuss.

Proximity and location also has an impact on visibility of actions. This can affect knowledge of descriptive norms (*emergence and diffusion*) and the ability to identify non-compliance with injunctive norms (*effects translation into behaviour*). Goldstein et al (2008) identify that:

"*it is typically beneficial to follow the norms that most closely match one's immediate settings, situations, and circumstances*"

Goldstein et al (2008) produce empirical evidence of this from their study.

Technology

Where individuals are in a situation that facilitates face to face working, or alternatively where technological infrastructure facilitates working in more isolation or distributed environments, the availability and specificity of social comparison referents should be different (Greenverg et al., 2007 as seen in Goodman and Haisley). This is similar to the subject of proximity and location, but involves the role of technology in shaping outcomes. Face to face environments are also said to increase socialisation processes which lead to shared understanding of rules. Visibility of actions is also obviously shaped when technological infrastructure facilitates working in isolation as opposed to face to face environments.

In relation to energy use, technology can also provide information to individuals on their own energy practices, as well as those of others via smart metering in conjunction with a user interface. Such technologies can provide information to individuals about their own energy use as well as relevant similar information about the group as a whole.

[14] A key requirement according to Focus Theory of Normative Conduct (Cialdini et al 1991), is to confidently establish whether people's attention is focused on the norms of concern (descriptive or injunctive) – there must be focus and salience for norm activation.

Attributes of certain behaviours

Building on the work of Finlay (2001) and Trafimow and Fishbein (1994), Lapinski and Rimal (2005) advocate that certain attributes of behaviours can make a given behaviour more of less likely to be subject to influence by perceptions about others' beliefs, observations and other behaviours (they cite Bagozzi et al., 2000 and Cialdini, 2001). The extent or magnitude to which normative influence varies due to the attributes of particular behaviours is said to be largely ignored in the norms literature.

Lapinski and Rimal (2005) define behavioural attributes as the defining features that comprise the behaviour as opposed to the contexts in which the behaviour takes place. Lapinski and Rimal (2005) however, note that behavioural attributes and situational/contextual factors may overlap. This is demonstrated in this paper. In terms of behavioural attributes, these are said to include (not an exhaustive list) such things as: confidentiality (Delerga, Lovejoy, and Winstead 1998; Woods et al 199), perceived stigma (Aggleton and Parker, 2002l Capitanio and Herek 1999) amongst others.

Lapinski and Rimal (2005) elaborate on two attributes, ambiguity and behavioural privacy[15]. Lapinski and Rimal (2005), p. 141 state that:

"If a behaviour is solely enacted away from the public eye, then not only is there no opportunity to observe others' behaviour (and thus no information about behavioural prevalence), but one's own behaviours would also not be observable for others' scrutiny."

Individuals are also said to be less likely to interrogate others (Berger and Calabrese 1975, as seen in Lapinski and Rimal 2005)[16].

It is said that ambiguity can arise where a behaviour is new, or in a new culture where mores are not clear. In the cases where the behaviour is not new, ambiguity can arise due to their being no obvious course of action (i.e. contradictory information). In such situations of ambiguity, people are said to be particularly likely to gauge information from others around them (Lapinski and Rimal 2005). If ambiguity is not perceived, individuals are less likely to look for normative information (Berger and Calabrese, 1975 as seen in Lapinski and Rimal (2005)).

Character, qualities and power of those in a group that display norms

Feld (2002) p. 639, state that:

"*Some authors suggest the importance of power and others that consensus may facilitate the formation of norms, but there is need for greater clarification of the*

[15] In relation to behavioural privacy, in moderating normative influence, Lapinski and Rimal (2005) cite Bagozzi et al 2000 and Cialdini et al 1990.

[16] It is said that the implication of knowing ones behaviour, is that social sanctions can be exercised for going against an injunctive norm, it is said that this can result in substantial pressure to conform (Lapinski and Rimal 2005). Pressure to conform is higher when referent others are present (Bagozzi et al 2000 as seen in Lapinski and Rimal (2005)).

processes that determine whether and when particular interests are likely to lead to the emergence of norms"

It is clear that there does seem to be certain individuals within social networks that can have disproportional influence on norm emergence and development through an ability to 'set the tone' of their social network. Booklyndhurst (2009) identify that such individuals exert normative influence on others and their attitudes and behaviours are perceived as the benchmark by other members of the group. They further state that the reason that such individuals are so influential is that their attitudes and behaviours have a quantitatively larger effect on what others around them perceive to be the most appropriate or acceptable behaviour, both at the descriptive and injunctive level.

Individual cost and gain and norm compliance

Field (2002) states that being in the interest of many members is not a sufficient criteria for the emergence of a norm – but it is important the norm does not directly conflict the interests of many members of a group. From their review Field (2002) find that many behavioural regularities do not turn into or remain as norms, and many norms are not in the immediate self-interests of most individuals. Field therefore states that there needs to be clarification of the conditions and processes to enable behavioural regularities to become norms.

Organisational structure

Building on Goodman and Haisley (2007) this can include authority, decision making, reward systems etc. The latter authors cite that job level, size of job category, tenure (Oldham et al., 1986), can effect social comparison processes. In the current study we give communication as its own independent variable/factor and closely aligned with social distance, Goodman and Haisley (2007) classify as part of the organisational structure.

Shah (1998) as seen in Goodman and Haisley (2007) produce evidence that employees rely on structurally equivalent individuals for information about their jobs (e.g. technique and performance), for information relating to organisational practices (such as behavioural norms) employees rely on cohesive ties (i.e. individuals within the organisation with which they have some relationship with). They also found that job characteristics influence the quantity of social comparisons made. Social comparison was higher where jobs entailed more uncertainty and that demand high performance. Kraus et al (2012) note that, work-group peers are important social influencers because of their accessibility and familiarity to employees than other actors (Morrison 1993 and Salancik and Pfeffer 1978). Kulik and Ambrose 1992 similarly identify that as referents, co-workers are more than just convenient, they are compelling sources of social information (as seen in Greenberg et al 2007). Leaders also represent important social referent information.

Goodman and Haisley (2007) identify that the more institutionalised and visible mechanisms are (for example formal mechanisms for rewards), the more they should stimulate social comparison processes.

Organisational task

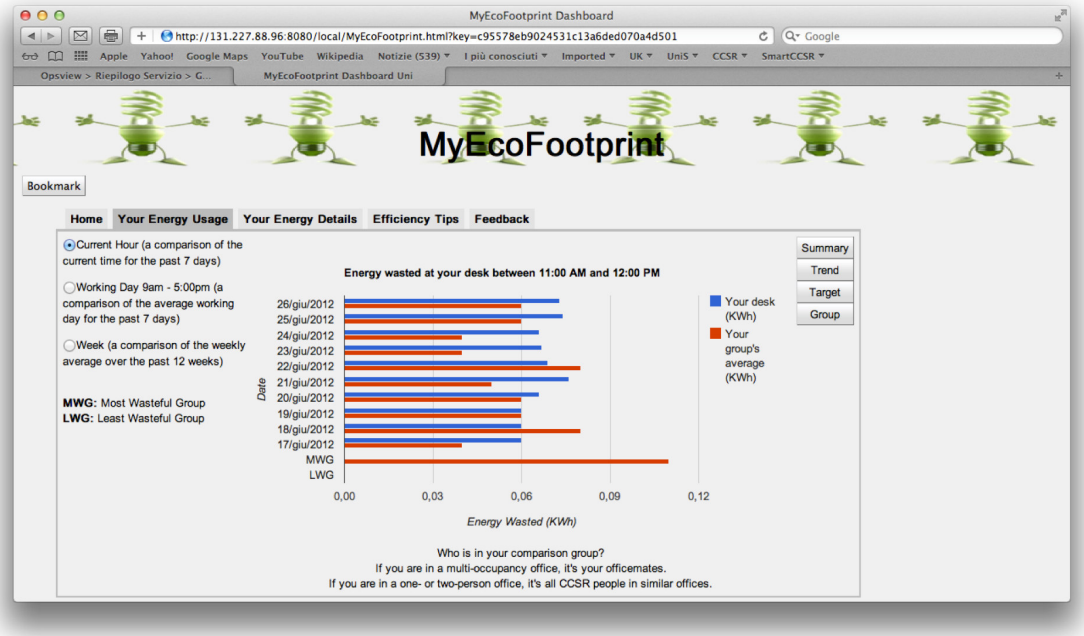
Organisations task is also identified as relevant in determining the attractiveness of referents via shaping the motivational goals of social comparison (Goodman and Haisley 2007)[17].

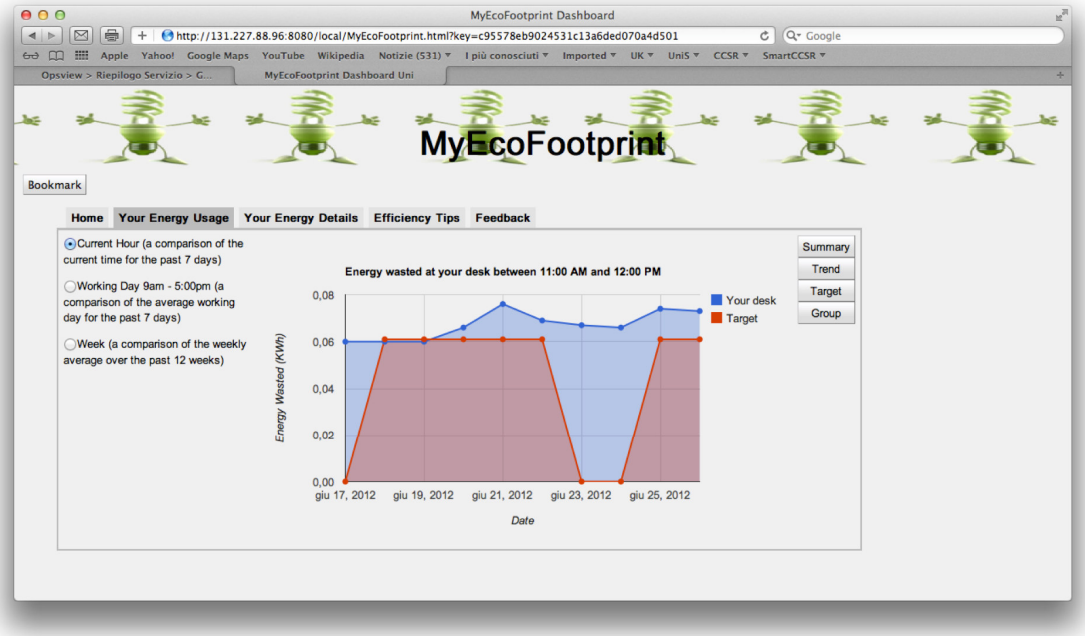
Factors affecting the emergence, diffusion and translation of social norms into behaviour have now been discussed. Such factors were explored and investigated in the current study to inform findings on changes in relation to social norms and energy in an organisational setting as a result of deploying a technology based intervention to help people use energy more efficiently.

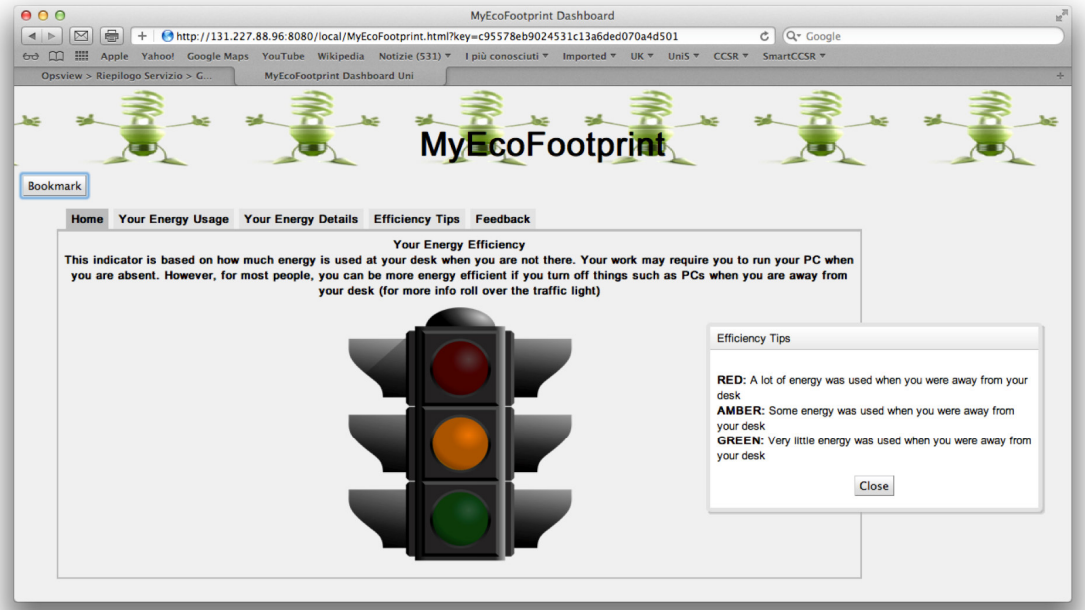
.

[17] This is the case in the REDUCE trial.

Appendix 2: Detail on MEF feedback tool






MyEcoFootprint Dashboard
http://131.227.88.96:8080/local/MyEcoFootprint.html?key=c95578eb9024531c13a6ded070a4d501
Google
Apple
Yahoo!
Google Maps
YouTube
Wikipedia
Notizie (531)
I più conosciuti
Imported
UK
UniS
CCSR
SmartCCSR
Opsview > Riepilogo Servizio > G...
MyEcoFootprint Dashboard Uni
MyEcoFootprint
Bookmark
Home
Your Energy Usage
Your Energy Details
Efficiency Tips
Feedback
Your Energy Efficiency
This indicator is based on how much energy is used at your desk when you are not there. Your work may require you to run your PC when you are absent. However, for most people, you can be more energy efficient if you turn off things such as PCs when you are away from your desk (for more info roll over the traffic light)
Efficiency Tips
RED: A lot of energy was used when you were away from your desk
AMBER: Some energy was used when you were away from your desk
GREEN: Very little energy was used when you were away from your desk
Close

Appendix 3: Interview schedule

1. **What were your expectations at the beginning of the project? (opener -10 to15 minutes)**
   "……(Experiences)……"

   What could have been done better by the organisers?

2. **What kinds of things encouraged you to use MEF?**

3. **Were you aware of the feelings and opinions of others in the department of the project?** What do you consider were the general feelings in the department towards the MEF tool and REDUCE project? *How did people feel about participating?*

4. **Were there any reasons why you might have felt uncomfortable by not participating in the MEF project?** Were there any reasons why you might have felt uncomfortable by participating in the project?

5. **Were you aware of others viewpoints on taking part/not taking part in using MEF? What was your view about taking part in using MEF?**

6. **Were there situations or circumstances where you were able to discuss the project with others?** *Did you have such discussions often? What did you discuss? Were such discussions before or after you started using MEF or both? Was there a willingness for people to discuss the project?*

7. **Did such discussions encourage or discourage your use of MEF?** *Of the people that you spoke to about MEF would you say they are close friends or friends? Did you speak to people outside of close colleagues about the project?*

8. **In what ways was the project a shared experience do you think?** *Was this experience positive or negative? In what ways was this not a shared experience?*

9. **Do other people in the department use MEF that you are aware of? Do they tend to be lecturers, researchers or students?** *What about your office colleagues use? Of those using MEF, why do you think they used MEF?*

10. **Did you discuss the MEF project outside of the workplace, for instance with your partner or significant other?** What kinds of things did you discuss?
11. In survey 1 it was found that on average >...% (check from Qr1) of people turn off the light before leaving work but only.....% (check from Qr 1) turn off their computer. In your view, why do you think this might be?

12. Survey 1 also identified that on average if people in your department saw that an individuals lights were left on when not at work they would ....(check answer from Qr 1), where as for computers and monitors they would ....(check answer from Qr1). In your view, why do you think this might be?

13. **Who do you tend to 'hang out' with within your department when you have time to catch up? Would you say these are friends or work associates?** *Do such colleagues feel a strong connection with the department?*
14. **How do you feel about your role in the department?** *Do you feel that you have a niche within the department?*
15. **Did you encounter any conflict or conflicting views in attempting to reduce your office energy use?**

17. How would you best describe the culture in the department? *How does it feel to be part of? Is there a team atmosphere in the group? Do people pull together to help one another within the group?*

16. **What aspects of the department life do you like most and what aspects do you like least?** *Do you find many organisational rules in the department, how do you feel about such rules, do such rules help or hinder you?*

Appendix 4

4.1.6 Social context around MEF and energy use

It is apparent from Figure 6 that there was discussions in relation to MEF and energy reduction after MEF was released.

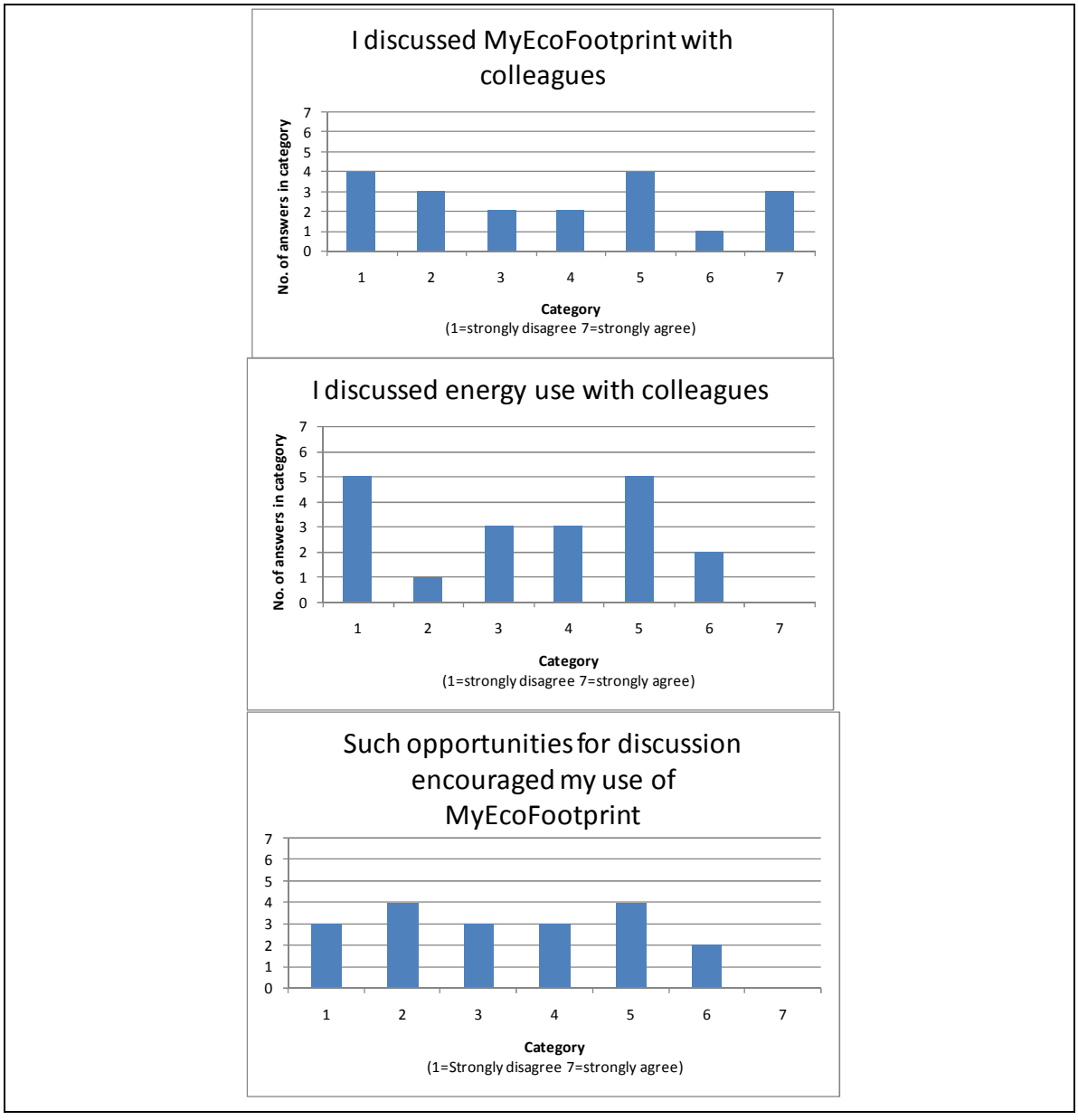


Figure 6: Survey findings on social context around MEF and energy use

It is clear from Figure 6 above that there was significant discussion of MEF and energy use by some participants during the intervention, even though feedback was provided at the individual level. This shows the relevance of social context, even for individual

based interventions. For some, discussion has a positive impact in encouraging the use of MEF, but for some however it did not.

It is also interesting to note that the use of MEF was also influenced by the extent to which participants felt duty, but generally not as a result of pressure. See results below:

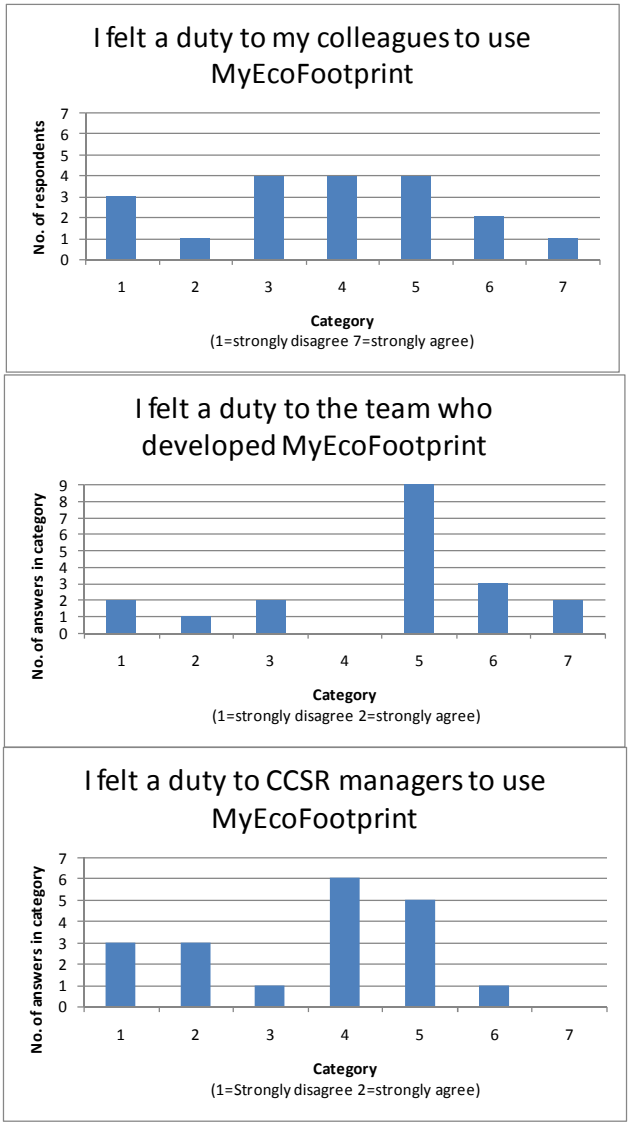


Figure 7: Duty and MEF use

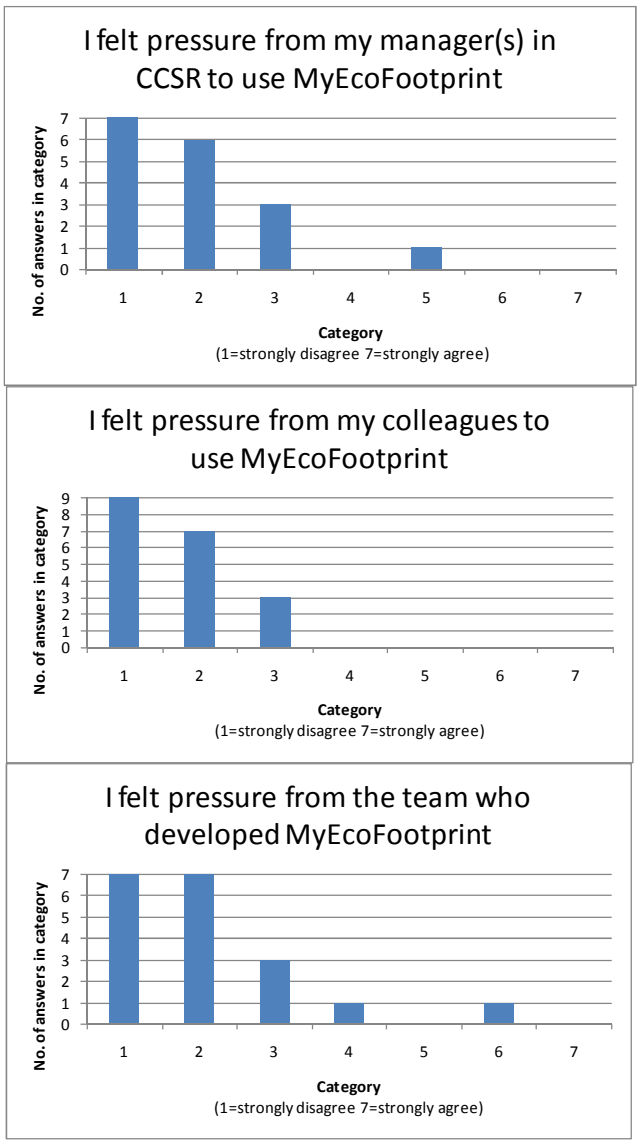


Figure 8: Pressure and MEF use