LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Department of Psychological and Behavioural Science

"Green Community project: making UK residents participate to the supply side of the energy market"

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Coursework Submission, Academic Session 2016/17

MSc Programme: **Psychology of Economic Life**

Course for which work submitted: **Psychology of Economic Life (PS465)**

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Date: **12/12/2016**

Assignment:

You are a member of a group of experts [your working group] consulted, on an economic issue currently occurring ["the case"], by one of the major stakeholders (e.g. government, key industry player, consumer association…). Your working group must produce its report by early December in the form of a 5000 words report. 3 intermediary presentations of the progress of your work are planned with the stakeholder. The final report must be 5000 words max.

The final report should include a short background description of the case (1000 words max, not included in the 5000 words], a clear statement of the questions the group addressed in the report, a brief review of relevant literature in the domain of the case, a theory literature review presenting and discussing the theories most relevant to address the case (accounting for what happens) and how they apply. Finally, based on the literature above and justified by it explicitly, some recommendations for the stakeholder. These recommendations should foster sustainability.

The reference list (which must follow APA rules) is not included in the word count. The background description does not count (but must be less than 1000 words). Tables count. You can add supplementary material in appendix but no more than 20 pages.
The intermediary presentations in classes do not count for the final mark: they are part of the work and not intended for evaluation.

NB: This essay is the actual assignment piece produced by the group; before receiving marking and feed-back. It is not a report, does not commit the LSE, and is provided ONLY as an example of what is produced in the group work in PS465 for the benefit of future students. Remember they were written only in a couple of weeks during an already intense term, by students with no previous knowledge of the domain.
The assessment consisted of this group essay, of an individual MCQ and of an individual essay (this year, a reflexive piece on lessons learned in the group work).
This specific essay received a good mark in the (double, blind) marking.

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INTRODUCTION

Background

The issue of climate change is one of the most pressing of the 21st century. The increasing frequency of extreme weather events, the warming of oceans and the melting of polar ice are enough to demonstrate that climate change is real and dangerous. The scientific community has provided undeniable evidence that human activity is the main cause of global warming (Shaftel, 2016), and it is in light of this fact that the international community has come together to address this serious matter, leading to the Kyoto Protocol and the Paris Agreement being signed in order to commit participating countries to reducing their greenhouse gas emissions (United Nations, 1998).

In the United Kingdom, this international commitment led to the adoption of the Climate Change Act of 2008. The long-term target agreed upon was a reduction of the UK's net carbon account by 80% for the year 2050 relative to the 1990 baseline. Carbon budgets were put into place and intermediary net carbon account targets were set ("Climate Change Act 2008", 2008). Although meeting the first and second targets has proven to be achievable, there are significant concerns in light of the challenges yet to come.

Year after year, energy supply remains the largest contributor of greenhouse gas emissions in the UK, due to coal and gas still being used as the main fuels (key figures in Appendix 1). This issue is constantly the target of government policies and regulations. On the supply side, such interventions include the Carbon Price Floor (CFP), the Capacity Market (CM), and the introduction of Renewable Obligations (ROs). All three of these programs have the same goal: to encourage investment in renewable energy sources. Policies addressing the demand side of the energy industry have mainly focused on residential consumers, who represent a third of the market. Current interventions include the large scale installation of smart meters in domestic homes, the Domestic Renewable Heat Incentive (Domestic RHI), and the payment of Feed-In Tariffs (FITs) to micro-generators of renewable energy. The aim of these policies is to encourage consumers to make the switch to renewable energy sources, or to reduce their energy consumption.

While supply-side measures have seen some degree of success, the ones addressing the demand side have shown some unexpected limitations. It is in light of this fact that *[supposedly, in the framework of this assignment!]* the Department of Business, Energy and Industrial Strategy (BEIS) has approached us, a team of societal psychology experts specialized in sustainability.

The BEIS has given us the mandate to examine the limitations of past consumer-oriented policies, and to propose a large-scale sustainability intervention informed by societal psychology insights.

Sustainability Intervention Proposal

Following a brief analysis of past consumer-focused government interventions, we will propose a project challenging the barriers existing among the government, energy suppliers and consumers in the energy industry. The *Green Community* project, as it will be called, will involve the cooperation of the government, energy suppliers, and consumers in an effort to increase the proportion of energy being sourced from renewable sources in the UK.

In short, the aim of the Green Community project is to make UK residents participate to the supply side of the energy market, by encouraging them to become micro-generators of renewable energy and to share surpluses with their community separately from the public grid. The novelty in this approach comes from the fact that we target communities as our unit of intervention, which encompasses our stand on the importance of the societal context in determining behaviour.

The project will be broadly designed at the BEIS level, through a combination of our recommendations and the input of electrical engineers and entrepreneurs. However, district Councils will be responsible for its implementation, and should be given the liberty to adapt the project to the needs of their local communities. This will allow innovations to occur locally and successes to be subsequently shared across districts. Such an approach is supported by Smith and Raven (2012) who argue for the importance of 'protective spaces' in the development of sustainability innovations.

Key aspects of the project design include the following:

- ✓ Each Council will manage the project through a separate business entity, subsequently referred to as 'the Company'. The Company will act as a platform connecting residents with energy surpluses to residents wishing to buy renewable energy.
- ✓ All revenues and costs will go through the Company. Separating the project from the rest of the Council's activities will ensure full transparency.
- ✓ All profits will be reinvested in sustainability initiatives benefiting the community.
- ✓ Financing will come from a combination of BEIS sponsorship, Council budget reallocation, partnership with solar panel and wind turbine manufacturers, and investments from the Big Six energy suppliers.
- ✓ For the project to be formally sponsored by the BEIS, Councils will need to recruit 250 households. As soon as the project is accepted, Councils will commit to recruiting another 600 households over the next 3 years.

The aspects of the project design listed above are mostly economic and will not be further discussed in this report. The focus will be on the rationale behind the intervention proposed, and on the psychological processes making it an effective strategy. Specifically, our analysis will make use of concepts drawn mainly from *Social Exchange Theory*, *Installation Theory*, and *Norm Psychology*. This report is divided into five sections, as per Table 1.

Table 1. Sections of this Report

1	Review of Interventions Directed at Consumers	
2	Inter-Actor Relationships as Social Exchanges	Social Exchange Theory
3	The Green Community Project	Installation Theory Norm Psychology
4	Limitations of the Approach Proposed	
5	Conclusion	

Appendices are summarized in Table 2 below.

We advise the reader to refer to the glossary in Appendix 1 when * are encountered in the text.

Table 2. Appendices

1	Glossary	
2	Key Figures of the UK Energy Industry	
3	Stakeholder Analysis	
4	Participant Financing	Game Theory

SECTION 1 – REVIEW OF INTERVENTIONS DIRECTED AT CONSUMERS

Before designing our own consumer-based intervention, a crucial step was to examine the limitations of past and current policies aimed at addressing the energy consumption behaviours of UK residents. This analysis is summarized in Table 3

As societal psychologists, we take Lahlou's stance that behaviours are determined by the combination of physical, embodied, and social factors. Sustainable behaviours will thus be realised if they are *affordable* (enabled by the physical space), *imaginable* (in reference to knowledge, motivations, etc.) and *socially acceptable* (approved by others) (Lahlou, forthcoming). Consistent with Lahlou's proposition, we argue that while a given intervention might aim only at changing one of these three elements, that is not to say that the other two should be ignored – for they are all involved in determining behaviour.

Our analysis has revealed that so far policy-makers have based their interventions mostly on environmental concern perspectives (people act because they care about the environment) or on rational economic perspectives (people act for economic reasons) (Griskevicius et al., 2010). Speaking in Lahlou's terms, they have focused on the physical and inner spaces, however it isn't clear how they have addressed the social space. This is what we have identified as the main limiting factor to the success of past and current policies aimed at UK consumers.

Following this conclusion, the Green Community project will carefully take into account the physical, inner and social factors that guide sustainable behaviour.

Figure 1. Determinants of Sustainable Behaviours (Lahlou, forthcoming)

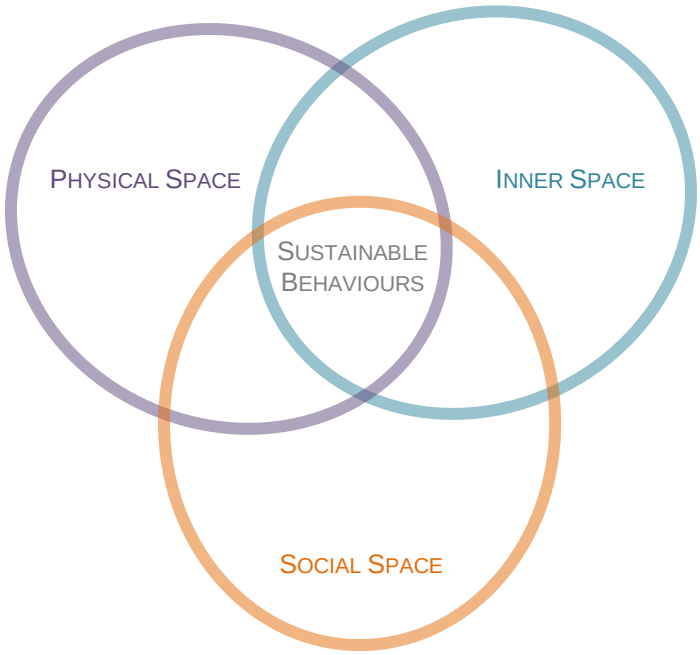


Table 3. Summary of Interventions Directed at Consumers

WHAT IT IS	MAIN ASSUMPTION	PERSPECTIVE	TARGET FOR CHANGE
SMART METERS			
Provides consumers with real-time information on their energy usage expressed in pounds and pence	Energy usage information makes consumers capable and motivated to change their energy consumption behaviours	Environmental concern perspective	Inner Space: Addresses issues of information and motivation
THE GREEN DEAL			
Offers financing to homeowners wishing to make use of environmentally-friendly technologies on their properties	Budget constraints prevent people from making use of green technologies	Rational economic perspective	Physical Space: Makes green technologies *affordable* to consumers
THE DOMESTIC RENEWABLE HEAT INCENTIVE (DOMESTIC RHI)			
Offers quarterly payments for 7 years to homeowners installing renewable heating systems on their properties	Money can act as an incentive for people to install renewable heating systems	Rational economic perspective	Inner Space: Money motivates the adoption of green technologies
FEED-IN TARIFFS			
Offers a fixe rate for energy generated and exported by micro-generators of renewable energy	Financial risks prevent people from adopting green technologies	Rational economic perspective	Physical and Inner Space: Provides financial security to investors

SECTION 2 – INTER-ACTOR RELATIONSHIPS AS SOCIAL EXCHANGES

Introduction

The Green Community project was carefully designed to engage the participation of the government, energy suppliers, and consumers. This decision was based on the interdependency among these three actors that together foster the available set of goods and services, technologies, rules and consumer practices (Tukker et al., 2007). Indeed, we believe the best way to change the status quo in the energy industry is to encourage the cooperation of policy makers, businesses and consumers – thus creating a 'triangle of change' driving all three entities to move in synchrony (ibid., 2007).

To some extent, the energy market could create an incentive for change if it began to reflect the scarcity of resources or the true environmental cost of energy generation (ibid., 2007). Yet, bottom-up and market based actions will only generate long-term change if they are supported by top-down and framework changes, again due to the powerful interdependency of actors in the system (ibid., 2007).

Essential to the success of this approach is the maintenance of positive relationships among all actors involved. The present section will thus examine the dynamics among them through the lens of Social Exchange Theory (Homans, 1961), as an upgraded version of a Stakeholder Analysis. We will then end this section with a recommendation as to how to preserve positive relationships using insights from social identity theories.

Inter-Actor Relationships as Social Exchanges

Figure 2 shows a stakeholder map combining the actors involved in the Green Community Project, and expands it to incorporate other stakeholders involved in the UK energy industry. The three categories of stakeholders illustrated are the government, energy suppliers, and end-users.

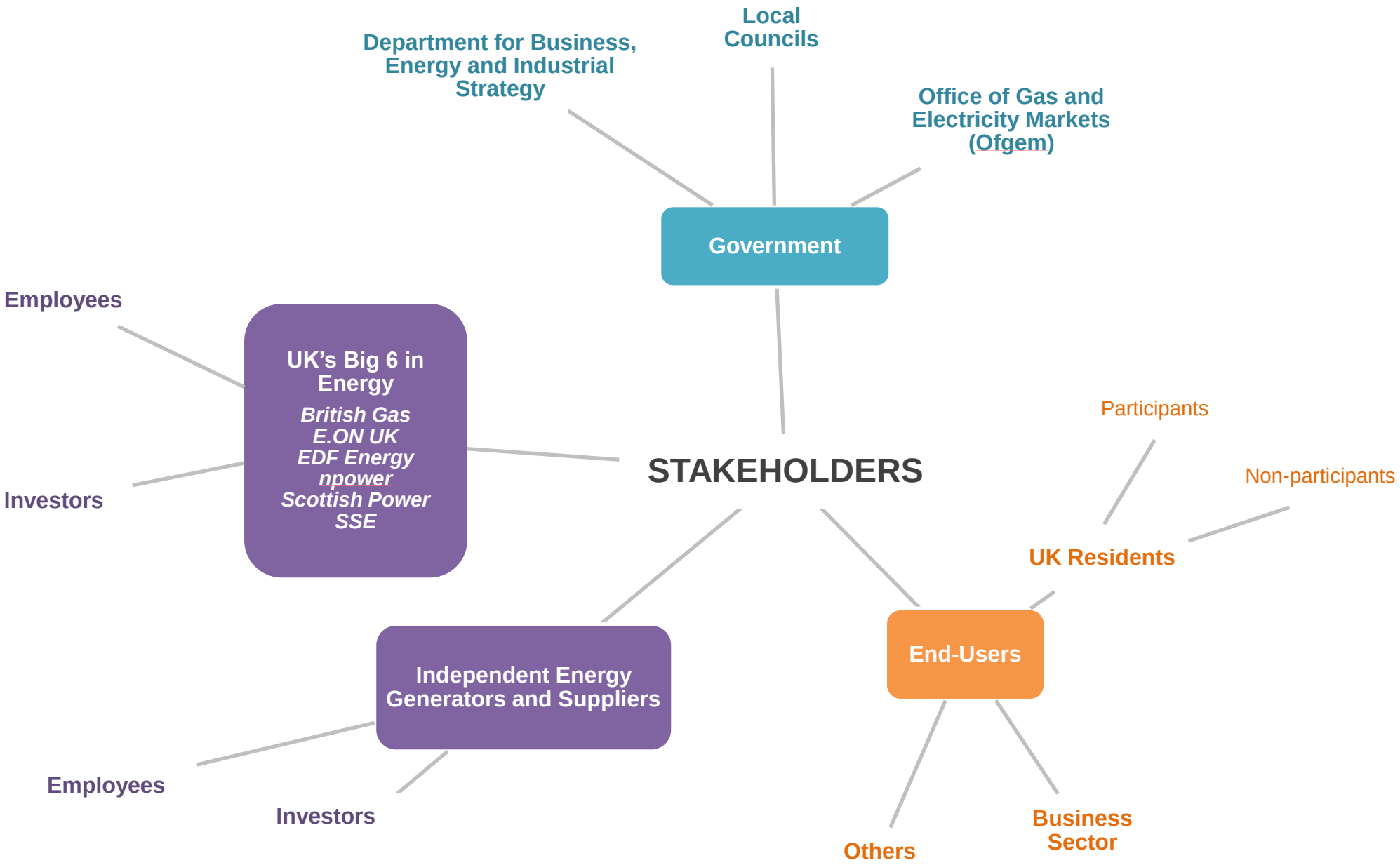


Figure 2. Stakeholder Map

The Government

The three government entities involved are the BEIS, the Office of Gas and Electricity Markets (Ofgem), and district Councils. Together, they hold the power to create and enforce regulations pertaining to the energy industry and to climate change.

The participation of the government in the Green Community project involves:

- ✓ Sponsorship of the project by the BEIS
- ✓ Implementation and management of the project by district Councils
- ✓ Payment of feed-in tariffs by the Ofgem
- ✓ Distribution and collection of Renewables Obligation Certificates (ROCs) by the Ofgem
- ✓ Participation in decision-making related to the project and to the reinvestment of profits into sustainability initiatives benefiting the community

Energy Suppliers

The largest stakeholders in this category are the 'Big Six' energy suppliers who collectively own over 80% of electricity and gas retail markets – the majority of which are also vertically integrated (Ofgem, 2016). Independent energy generators and suppliers form a smaller share of the market, but are often involved in the provision of renewable energy.

The participation of energy suppliers in the Green Community project involves:

- ✓ Investment from the Big Six suppliers in the project, as a way to comply with their Renewable Obligations (RO)
- ✓ Supply of energy to residents, in the case of insufficient renewable energy generation and to ensure that there be no gaps in energy supply
- ✓ Installation of smart meters in homes to measure energy surpluses
- ✓ Participation in decision-making related to the project

End-Users

End-users of energy consist mainly of the business sector and UK citizens. The business sector will not play a major role in the Green Community project. However, UK citizens will play a key role in the strategy proposed, by becoming micro-generators of renewable energy.

Specifically, their roles will involve:

- ✓ Long-term leasing of solar panels and wind turbines from the Company
- ✓ Generation of energy and supply of surpluses to the community grid
- ✓ Participation in decision-making related to the project and to the reinvestment of profits into sustainability initiatives benefiting the community

Unfortunately, not all residents in a given community will have the opportunity to become participants, as participation will likely require owning a home. However, non-participating residents will be able to benefit from the Green Community project by buying renewable energy surpluses from the Company at an advantageous price relative to UK standards. Not only will this model ensure that all benefits be retained by members of the community, but it will also create the essence of a *sharing economy* by enabling non-participants to utilize assets they do not possess (Belk, 2014).

Analysis of Exchanges Between the Actors

The Green Community project involves the creation of long-term relationships among the government, energy suppliers, and participating or non-participating residents. Ensuring that all dynamics remain positive is thus essential to the success of our intervention. In order to predict these dynamics, we take Homans' view that relationships are a form of exchange where economic concepts can be used to understand behaviours (Homans, 1961).

As to what is exchanged, we will be using the vocabulary of **resources*. We will take the stance that resources can only be called as such in relations to other actors who value it (Emerson, 1976), and limit our analysis to the six most relevant resources exchanged. We combined the take of different authors on resources (e.g. Foa & Foa, 1971; Blau, 1964), but adapted their definitions to our problem (Table 4). Table 5 depicts these resources in relation to each actor involved.

Table 4. Resources Exchanged between the Actors Involved

MONEY	Pounds
GOODS	Renewable energy surpluses
INFORMATION	Energy usage information, as monitored by smart meters
SUSTAINABILITY	Reduction of greenhouse gas emissions
POWER	Power to change the energy market
STATUS	Consensual prestige (Henrich & Gil-White, 2001)

Table 5. Net Transactions between the Actors Involved

	Resources Received	Resources Returned
GOVERNMENT	SUSTAINABILITY	MONEY
SUPPLIERS	SUSTAINABILITY INFORMATION	MONEY POWER
PARTICIPANTS	MONEY STATUS POWER	GOODS SUSTAINABILITY INFORMATION
NON-PARTICIPANTS	GOODS SUSTAINABILITY POWER	MONEY STATUS

For the purpose of simplicity, only the *net* transactions between actors were represented in the above table. A few clarifications are, however, needed to understand this analysis.

- ✓ We assumed that the government is willing to offer money in exchange for a reduction of greenhouse gas emissions that will allow it to comply with climate change agreements.
- ✓ Similarly, suppliers have an obligation to source a certain proportion of energy supplied to consumers from renewable energy sources (Ofgem, 2016), which they can comply with by investing in the project.
- ✓ Information on energy usage is highly valuable to energy suppliers, as it allows them to better forecast demand. This information is provided to suppliers through smart meters installed in the homes of participants.
- ✓ Only renewable energy *surpluses* are relevant as a resource in these transactions. These surpluses are transferred among participants and non-participants.
- ✓ We assumed that concerns over the environment motivate non-participants to buy renewable energy surpluses. Combined to the government and suppliers' desire to obtain sustainability, this leaves participants as net 'givers' of sustainability.
- ✓ The strategy we propose will empower consumers to foster change in the energy market. Participants will gain a share of the renewable energy supply,

while non-participants will be empowered by having access to cheaper sustainable energy options. This idea will be further discussed in Section 3.

- ✓ Participants will be offered 'Certified Green' plaques to display on their homes. This will indicate their status, which can only be given to them by other members of their group, in this case the non-participating members of the community (Griskevicius, 2010).

Maintaining Satisfactory Relationships

Following the above analysis, how will actors be satisfied with their relationship to other actors?

From a Social Exchange Theory perspective, Thibaut and Kelly (1959) argue that each party involved in a relationship will use a *minimax strategy*, in that they will try to minimise costs and maximize rewards. Ideally, all actors included in the present discussion will be able to earn a *profit* from the transactions depicted above. This win-win outcome can be understood with the concept of *value*, which is similar to the concept of utility in economics, and in our case, has to do with the subjective usefulness of a given resource to an actor (Homans, 1961). As long as the value of resources received exceeds the value of resources returned, all stakeholders will be satisfied with their involvement in the Green Community project.

The Social Identity Approach (Haslam, 2014) is also a useful tool to address these expected dynamics. It incorporates social identity theories for use in practice (Tajfel & Turner, 1979; Turner et al., 1987), and highlights that **social identities* and **self-categorisations* impact people's perceptions and behaviours. Haslam acknowledges that 'the power of groups is unlocked by working with social identities, not across or against them', and that there is no such thing as an 'apolitical' intervention in that dominant groups will seek to maintain the status quo while minority groups' views are at risk of being overlooked or underrepresented (Haslam, 2014).

While our analysis of relationships as social exchanges examined only large categories of actors, the reality is way more complex. Each actor incorporates multiple subgroups who have varying goals, motives and priorities.

- ✓ The government is made up of multiple agencies both on a national and local level, with varying commitments to the public.
- ✓ Commercial partners include energy suppliers, but also financial and other business sponsors.
- ✓ UK residents are made up of subgroups with differing socio-economic statuses, values and attitudes.

Acknowledging that the people included in these subgroups vary in their identities and self-categorizations is essential to preventing inter-group conflicts. We will thus recommend running several workshops and focus groups throughout the year, where members of each subgroup will come together and engage in dialogue. We will encourage them to identify with each other, to negotiate, and to focus on goals at a higher level.

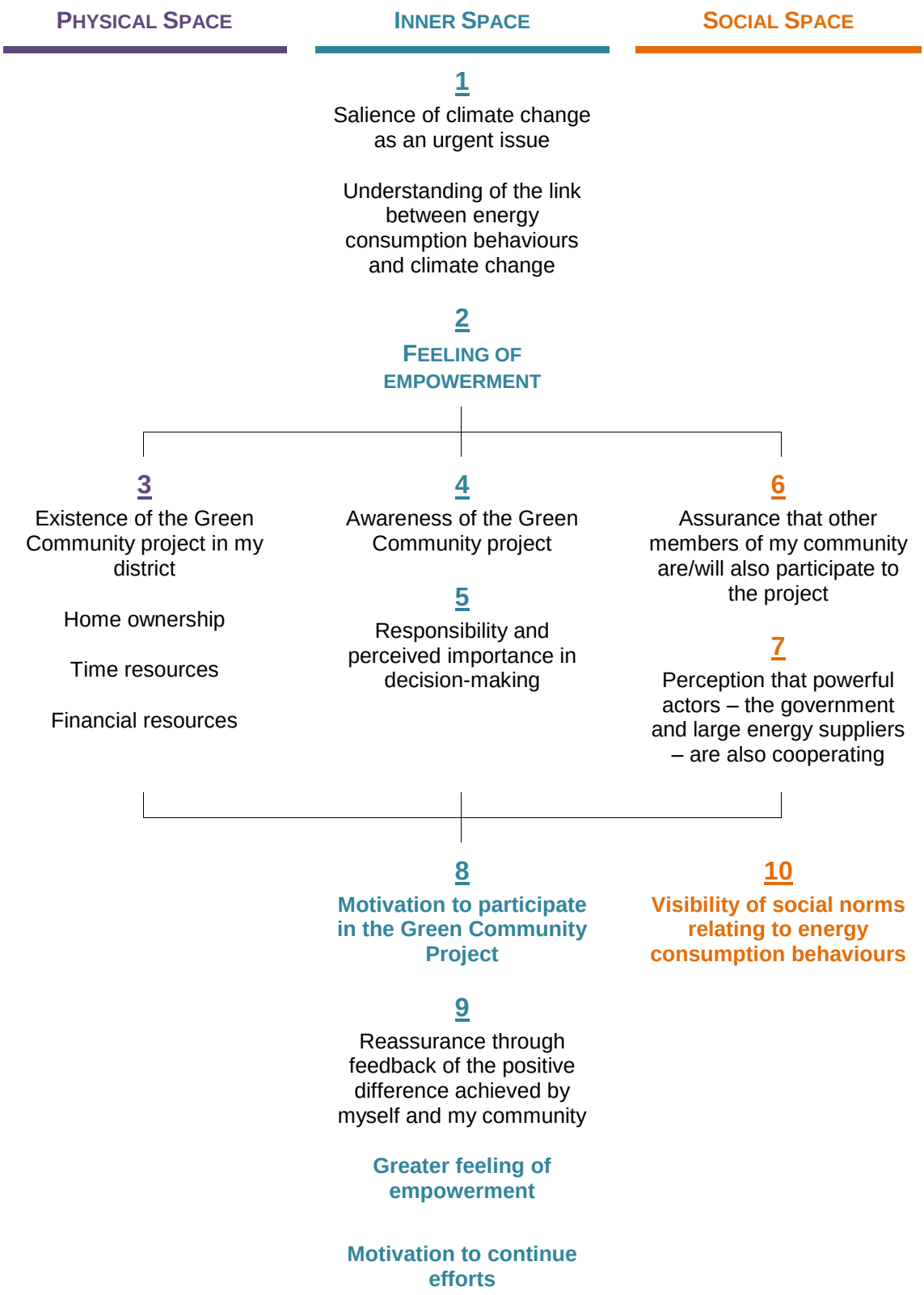
SECTION 3 – THE GREEN COMMUNITY PROJECT

Introduction to the Green Community Framework

Following the conclusion we made in Part 1, we have decided to create a solution framework based on Lahlou's Installation Theory. Installation Theory recognizes that a given installation (behavioural setting) will generate predictable behaviours, which will be the ones made possible after accounting for the **physical*, **embodied* and **social layers* acting as behavioural filters in the installation (Lahlou, forthcoming). Furthermore, Installation Theory was created specifically in order to inform the design of behavioural interventions promoting sustainability.

The Green Community Framework (Figure 3) will ensure that our strategy accounts for each of these three layers. Each of its components is numbered and refers to a specific subsection. This framework should not however be understood as a series of steps to be accomplished – all three layers act simultaneously.

Figure 3. The Green Community Framework



1 Information and Education

The omnipresence of models derived from Ajzen and Fishbein's Theory of Reasoned Action (TRA) and their subsequent Theory of Planned Behaviour (TPB) in the literature on sustainable behaviour demonstrates the importance granted to generating the right attitudes towards the environment (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). Information and education are essential, however our Green Community Framework demonstrates that there is much more to cover if we are serious about changing behaviours – and addressing the attitude-behaviour gap in sustainable behaviour (Terlau & Hirsch, 2015).

2 Empowering Consumers

Empowering consumers is one of our central recommendations. As illustrated in our Green Community Framework, we take Thøgersen's (2005) stance that this requires addressing all external and individual constraints to sustainable behaviour (components 3 to 7 of the framework), and that the resulting feeling of empowerment will motivate consumers to take action (component 8).

3 Physical Space Factors of Empowerment

The government and suppliers play a key role in fostering an external environment allowing consumers to be sustainable. Applied to the Green Community project, this involves the following:

- ✓ The BEIS should ensure that as many Councils as possible implement the project, allowing residents to become participants.
- ✓ Home ownership will likely be necessary for participation in the project. How the government can address this matter is beyond the scope of this report.
- ✓ Consumers will not require significant time resources to gather information about the project, as it will be made available to them through clear and straight-to-the-point communication. Time resources will be needed to take part in stakeholder workshops and community decision-making, but these will be fully optional.

Essential to the success of our strategy is making participation affordable to all residents. This will be achieved by a combination of the following:

- ✓ Participants will be able to enter long-term leasing agreements with the Company for solar panels and wind turbines.
- ✓ Financial security will be achieved by reproducing the existing Feed-In Tariffs (FITs) offered by the government to micro-generators of renewable energy. Participants will benefit from receiving a pre-specified rate for each unit (kWh) of energy generated, and the Company will guarantee a price in return for each unit (kWh) of energy supplied to the community grid.

- ✓ Participants will be offered an additional financial incentive, which they will have a choice to keep or to donate to the Community Fund.

The financing aspect of our solution was carefully thought of to ensure residents be better off by participating to the Green Community project than by generating energy on their own and benefiting from existing FITs. Due to lack of space, complete details of our approach are presented in Appendix 3, including a full discussion based on Game Theory.

4 Awareness of the Green Community Project

People will not feel empowered by the Green Community project if they are not aware of the project being implemented in their district. In addition to traditional means of communication, Councils will elect community leaders responsible for spreading awareness. This approach to leadership is supported by social identity theorists (Turner, 1991), who argue that 'individuals' capacity to influence others and motivate them to contribute to the achievement of groups goals will vary as a function of their capacity to embody the values and meaning of the group in a given context' (Haslam, 2014).

5 Responsibility and Participation in Decision-Making

We were inspired by the strategy of the Woking Borough Council to engage the community in its effort to tackle climate change (Thorp, 2010), and this idea has become central to the Green Community project. We believe this approach is consistent with the point-of-view of Hansen and Schrader (1997) that environmental policy should reflect at least partially the ethical responsibility of consumers. By designing an intervention in which consumers will actively take part, engaging them in decision-making related to the project and to the reinvestment of profits, and finally by inviting them to stakeholder focus groups and workshops, we are hoping that consumers will feel more responsible for addressing climate change, but also that they will feel further empowered to actually do so.

6 The Social Dilemma

The government and the Big Six energy suppliers have significant power to change the energy industry. Any individual consumer's power on the other hand is practically inexistent, because unless other consumers are involved as well, their efforts will not make a difference. This is the essence of the social dilemma in environmental behaviour (Dawes, 1980; Kollock, 1998), which has informed our decision to propose a solution based on communities rather than individuals. Research has demonstrated that this in an effective approach (Heiskanen et al., 2009). Getting consumers to cooperate is empowering them, and bringing back their motivation to act (Geller, 1995).

7 Issues of Credibility and Trust

Equally important to countering the social dilemma is that residents should perceive that the government and suppliers – not just other residents – are committed to environmental issues (Lafferty & Meadowcroft, 2000). On the part of the government, this entails carefully taking into consideration how certain decisions could affect their credibility and the trust they receive. Prime Minister Theresa May's decision to abolish the Department for Energy and Climate Change (DECC) is the most current anti-example of this recommendation, as it what perceived by UK citizens as an 'abandonment' of the fight against climate change (Johnston, 2016).

8 Motivation to participate in the Green Community Project

As the components discussed above are realized, consumers will feel empowered to act and this will in turn positively affect their motivation to actually participate in the project (Thøgersen, 2005).

9 Providing Feedback

Reassuring participants that their efforts are making a difference is essential to countering the effects of the social dilemma and to making them feel further empowered by the project.

While we have depicted feedback as part of the internal layer (in the sense that it has to do with information and increases motivation), we very well could have included it in the social space. This is because this feedback is one the main tools by which we will make the private behaviour of energy consumption are social one – thus allowing us to leverage the power of social norms.

Each participant will receive brief monthly statements by mail or email, including (but not limited to) the information below:

- ✓ Energy generated, consumed and supplied to the grid (by the participant, and by all community participants combined)
- ✓ Greenhouse gas emissions avoided (by the participant, and by all community participants combined)
- ✓ Revenue from the energy generated and sold to the Company
- ✓ Personal donation to the community, if applicable

Twice a year, participants will also receive information regarding the advancements of the Green Community project throughout the UK. This will further empower them by making them feel that they are part of something bigger.

10 The Role of Social Norms

Lahlou describes the social layer of the installation as being the one where *'other stakeholders* regulate our activity' (Lahlou, forthcoming). As the variety of stakeholders and types of norms involved in our problem render the social space extremely complex, we will limit our analysis to members of the community and define norms as the 'rules and standards that are understood by members of a group and that guide and/or constrain social behaviour without the force of laws' (Cialdini & Trost, 1998). As norms develop in groups to specify what is acceptable or unacceptable behaviour, actions become coordinated. This in turn facilitates cooperation among group members and the realization of group goals. In the present subsection, we will demonstrate the essential role of social norms in the success of the Green Community project. Table 6 summarizes our analysis.

Table 6. Groups and Norms Involved in the Green Community Project

MEMBERSHIP / REFERENCE GROUP	DESCRIPTIVE NORMS DESIRED	INJUNCTIVE NORMS DESIRED	INTERVENTION TO MAKE PUBLIC
COMMUNITIES			
District	Participation to the project	Those who can should participate People should care about the environment	'Certified Green' plaques
Neighbourhood			
Street			
SUBGROUP OF GREEN COMMUNITY ORGANIZATION			
Participants	Low energy consumption	Participants should minimize their energy consumption	Monthly feedback by mail or email

Essential Definitions

In Table 5, districts, neighbourhoods and streets were labelled *communities* in that they are groups of individuals sharing a common interest, in this case a territory (Lahlou, forthcoming). The Green Community project, including its participants, Council employees, the infrastructure, etc., is an *organization* in that it has a goal – tackling climate change (ibid.).

Membership groups were defined using objective criteria (Kelley, 1965), i.e. geographical location, and participation/non-participation to the project. We also considered *reference groups*, the groups to which individuals feel some psychological relationship to, and to which they will compare themselves to in order to determine the proper behaviour. In this case, reference groups turned out to be the same as membership groups (ibid.).

We have used the perspective of social identity theorists by tying norms to group membership (e.g. Turner, 1991). As will be revealed by the discussion below, such an approach resulted in *descriptive norms* being closely coordinated with *injunctive norms* (Hogg & Reid, 2006). We will define descriptive norms as patterns and regularities in behaviour, and injunctive norms as those conveying what is approved or disapproved of in a group (Cialdini, Kallgren & Reno, 1991).

Analysis and Recommendations

While social norms can act in the private space, they are much more influential when acting on public behaviour. We thus recommend purposely making certain energy consumption behaviours social in order to leverage the power of norms.

As a first measure to trigger the role of social norms, participants will be offered 'Certified Green' plaques to be displayed on their homes. Residents, by becoming participants, will thus be able to send a strong signal to their community that they are prosocial rather than proself (Griskevicius, 2010). Indeed, participation will demonstrate that they care about the environment, or at least about the success of the community's organization, and are willing to contribute. Research has demonstrated that such altruistic behaviour increases the *status* of the individual within his group (Hardy & Van Vugt, 2006). Referring to our analysis of relationships as social exchanges in Section 1, status will thus be a desirable resource obtainable by becoming a participating member of the community.

Both participating and non-participating members of the community will receive individual benefits from the Green Community project: through money and status for participants, and through having access to cheaper renewable energy for non-participants. However, the more community members participate, the more the community will also benefit as a whole from the enhanced well-being that comes from reducing the effects of climate change. Therefore, we expect participation to the project and the underlying concern for the environment to become the injunctive norms in the community. As participation spreads across streets, neighbourhoods and districts, we also hope to see participation become the descriptive norm.

Providing monthly feedback as detailed in subsection 9 will allow participants to compare their energy consumption and greenhouse gas emissions avoided to other participating members of their community. As they do so, we optimistically expect them to adjust their contribution upwards, but less often downwards. We base this idea on two arguments: the first one being that the benefits described above will increase as a function of their efforts, and the second one being that reducing their efforts would contradict the *social responsibility norm* (Berkowitz & Daniels, 1963), a type of injunctive norm stating that people should in certain situations give without expecting anything in exchange. Needless their name to be known, participants will thus be motivated by their need for social approval, and use feedback to be reassured that they are contributing enough to the goal of the organization. As all participants do the same, we hope low energy consumption to become the descriptive norm.

Clarification of Omission

Monthly feedback will also reveal the amount a given participant donated, if at all, to the Green Community Fund. However, participants will not be provided with information on the percentage of donators. This decision was carefully thought of in order to avoid injunctive norms to develop around donations. Not only have we demonstrated that this won't be necessary for participants to donate (Appendix 3), but we also wanted to avoid participants feeling any social pressure to select the donate option, as that would kill the whole incentive behind the scheme we designed.

Conclusion to the Green Community Framework

The above section proposed a broad framework for the implementation of the Green Community in a given district. However, multiple districts might implement the project simultaneously, and it might take several years before the majority of districts have their own project running.

As Councils modify different aspects of the project to match the needs of their local populations, we expect to see different variations of the Green Community project appear. As a final recommendation, we will encourage bringing together project representatives from each district, once or twice a year, to share and discuss the local adaptations that turned into successes, and those that didn't work as well.

In line with Lahlou's idea that Darwinian principles of evolution can be applied to installations, we expect this last recommendation to result in a Darwinian reproduction of the Green Community Project. This will arise from the fact that only successful adaptations will be kept and replicated, while the other ones will gradually die out.

SECTION 4 – LIMITATIONS OF THE APPROACH PROPOSED

Limitations to Analysing Relationships as Social Exchanges

In Section 2, we depicted the interactions between stakeholders as transactions involving multiple resources of different nature, and we assumed that all stakeholders would be satisfied as long as they obtained more value than they returned. While we do see the merits of this approach, we are also concerned by the simplicity with which it depicts these interactions. Clearly, not all currencies exchanged could be identified or analysed – social acceptance and time are just some of those that were left out. In addition, we could hardly conclude anything about the satisfaction of each actor without taking into account the opportunity costs of these exchanges (Emerson, 1976). Those include purely economic opportunity costs (such as suppliers having to forego other investment opportunities), but also non-economic ones (such as participants not being able to use their time for other activities).

Blau's stance that exchanges are 'voluntary actions of individuals that are motivated by the returns they are expected to bring' (Blau, 1964) contains the idea that actors are rational in their interactions. However, the reality is that social exchanges are guided by social norms, and not all norms imply such rationality. In the previous section, we mentioned the social responsibility norm that would act to ensure participants maintain their efforts without any expectation to receiving in return. Our social exchange analysis would fail to explain such behaviour.

Limitations of the Green Community Framework

In Section 3, we constructed a solution framework based on the three layers of Installation Theory (Lahlou, forthcoming). We do believe this was an interesting approach, especially as it ensured that we took into consideration physical, embodied and social factors that we might not have addressed otherwise. However, we have doubts about the applicability of Installation Theory to an intervention as large as the Green Community project. We believe that the complexity and variety of behaviours involved throughout the implementation of our proposal make it impossible to identify all the different elements acting on each layer. In reality, our intervention might have been best broken down into the multiple installations that it is composed of, and Installation Theory could then have been applied to each with greater accuracy.

Limitations of the Proposed Intervention

While we truly believe in the potential of the Green Community project, we nonetheless have to acknowledge its limitations.

We were careful to design every part of our intervention in a way that wouldn't put significant pressure on individuals, as we were afraid that reactance might occur (Brehm, 1966). However, some components still entail a certain level of risk. When smart meters were introduced in the UK, some strongly resisted to the idea of loosing control over their energy usage information and initiated the 'Stop Smart

Meters' movement (Acquisti et al., 2015). While we are confident that this will not happen with the smart meters installed to measure energy supplied to the community grid (see Appendix 3), we still have to acknowledge the greater risk carried by this aspect of our solution. The same risk could arise if individuals perceived the norms arising to be too prescriptive. For instance, if the participating norm became strong enough to limit the freedom to chose whether or not to participate, community members might react by turning against the project.

Economic and practical limitations will not be further discussed here, as they are of concern to other experts. However, we acknowledge their impact on the proposed approach, which includes the following:

- ✓ Renewable energy is dependent on weather conditions and therefore its supply strongly fluctuates. Large scale energy storage solutions need to be developed to overcome this challenge.
- ✓ The current status quo of British homes influences the applicability of, for example, solar panels (Economidou, 2011).
- ✓ In the case of energy supply, a centralized market could be preferential to a decentralized system (e.g. Chao & Huntington, 1998).

SECTION 5 – CONCLUSION

This report examined limitations of past consumer-oriented policies and proposed a large-scale sustainability intervention informed by societal psychology insights. The Green Community project is constructed from a three-layered framework, and key recommendations include:

- ✓ Maintaining satisfying relationships between all stakeholders;
- ✓ Targeting communities as a way to address the social dilemma;
- ✓ Empowering consumers to motivate action;
- ✓ Electing community leaders to spread awareness of the project;
- ✓ Making consumers feel responsible for addressing climate change;
- ✓ Offering 'Certified Green' plaques activating social norms; and
- ✓ Providing feedback to reassure consumers of their positive impact.

The proposed solution aims to be an effective behavioural intervention addressing climate change. It is an innovative approach to a much-debated topic, and it has the potential to achieve a large-scale positive impact on the environment.

APPENDIX 1 – GLOSSARY

Capacity Market: Provides suppliers with a guaranteed market for the electricity they generate, in exchange for their commitment to deliver sufficient energy at all times. Counters the greater variability and unpredictability of renewable energy generation (Ofgem, 2016).

Carbon Price Floor: Supplements the EU Emissions Trading System (EU ETS) by acting on the price of greenhouse gas emissions to ensure that it remains above a certain level (Ares, 2014).

Community: 'Group of humans with common interest (e.g. sharing a resource, a need, or a territory) who recognize each other as members of the same group, are aware of their common fate and have developed some institutions and organization' (Lahlou, forthcoming).

Department for Energy and Climate Change (DECC): Government organisation which 'works to make sure the UK has clean, affordable energy supplies and promotes international action to mitigate climate change.' The DECC recently became part of the Department for Business, Energy and Industrial Strategy (BEIS) (Government Digital Service, 2016).

Department of Business, Energy and Industrial Strategy (BEIS): 'The department brings together responsibilities for business, industrial strategy, science, innovation, energy, and climate change' (Government Digital Service, 2016).

Descriptive norms: 'Guides the behaviour via the perception of how most others would behave' (Cialdini, Kallgren & Reno, 1991).

Domestic Renewable Heat Incentive (RHI): A governmental financial incentive to promote the use of renewable heat (Ofgem, 2016).

Embodied Layer: In Installation Theory, the mental space in an installation which includes 'internal interpretation structures, usually known as representations, mental models, experience, skills, knowledge, reflexes, habitus, common sense, dispositional properties of the body (drives, reflexes, propensity, inclinaiton, etc.)' (Lahlou, forthcoming).

Feed-In Tariff: Offers payments to micro-generators of energy in order to provide them with financial security in exchange for their investments in renewable technologies. The scheme is composed of two feed-in-tariffs (FITs): a generation tariff, which is a set rate paid for electricity generated, and an export tariff, which is a set rate paid for electricity exported into the grid (Ofgem, 2016).

Game Theory: The application of mathematical theory or 'games of strategy', and the application of these games to economic problems. First developed by John von Neumann and Oskar Morgenstern in the 1940's (Von Neuman & Morgenstern, 1953).

Green Community Framework: The Installation Theory based framework informing the design of the Green Community project.

Green Community Fund: Fund in which participating community members can select to donate 10% of their export tariff. Will be used by the community to further support sustainability initiatives.

Green Community project: The sustainability intervention proposed in this report, where UK residents will participate to the supply side of the energy market by becoming micro-generators of renewable energy and sharing surpluses with their communities through a separate grid.

Injunctive norm: 'Guides the behaviour via the perception of how most others would approve/disapprove of a person's conduct' (Cialdini, Kallgren & Reno, 1991).

Installation Theory: A theory that describes how societies funnel their members into specific, expectable, behaviours through installations: 'specific scaffolding and control systems which assemble, in context, components distributed at physical, mental and social level.' Installations are composed of three layers: the physical space (affordances), the subject (embodied competences) and the social space (institutions) (Lahlou, forthcoming).

Membership group: 'Groups to which we belong (which we are in) by some objective criteria, external designation or social consensus (Hogg & Vaughan, 2014; Hyman, 1942; Kelley, 1965).

Minimax strategy: A decision rule or strategy based on minimizing costs and maximizing benefits or rewards in social exchanges (Thibaut & Kelly, 1959).

Nash Equilibrium: In Game Theory, the Nash Equilibrium is a solution concept of a non-cooperative game involving two or more players in which each player is assumed to know the equilibrium strategies of the other players, and no player has anything to gain by changing only his or her own strategy. This was developed by John Nash in the 1940s (Nash, 1950).

Norms: 'Rules and standards that are understood by members of a group and that guide and/or constrain social behaviour without the force of laws' (Cialdini & Trost, 1998).

Office of Gas and Electricity Markets (Ofgem): A non-ministerial government department, which regulates the electricity and gas markets in the UK. Ofgem's main objectives are to protect consumer interests, ensure fair competition in the market and administer the government's green energy and social schemes (Ofgem, 2016).

Opportunity Cost (In the context of Social Exchange): Rational choice theorists have used the concept of opportunity costs to refer to the cost of forgoing the next-most attractive alternative when choosing a particular action (Hutchison & Charlesworth, 2011).

Organisation: ‘Socio-technical entities combining people in an explicit structure with labour division to reach goal’ (Lahlou, forthcoming).

Physical Layer: In Installation Theory, ‘The objective layer [in an installation] is the physical context, the material environment’ (Lahlou, forthcoming).

Profit: In social relationships, when the rewards exceed the costs (Thibaut & Kelly, 1959).

Reactance Theory: This theory outlines a set of motivational consequences that can be expected to occur whenever freedoms are threatened or lost. It holds that a threat to or loss of a freedom motivates the individual to restore freedom (Brehm & Brehm, 1981).

Reference Group: ‘Groups that are psychologically significant for people’s attitudes and behaviour’ (Hogg & Vaughan, 2014; Hyman, 1942; Kelley, 1965).

Renewable Obligations (RO): Ensures that suppliers source a portion of energy supplied to consumers from renewable energy sources, which they must demonstrate by presenting Renewable Obligations Certificates (ROCs) (Ofgem, 2016).

Renewable Obligations Certificate (ROC): An electronic green certificate for eligible renewable electricity generated within the UK and supplied by licensed suppliers to consumers. ROCs are issued by Ogfem to accredited renewable generators (Ofgem, 2016).

Resource: ‘An ability, possession, or other attribute of an actor giving him the capacity to reward (or punish) another specified actor’ (Emerson, 1976).

Self-categorisation: It is people's self-understandings in a given context that shape their psychology and behaviour. It also provides the basis for psychological group membership and its consequences (Haslam, 2014).

Self-Categorization Theory: Focuses on the processes that lead people to believe they share (or do not share) group membership, and how their group membership affects their understanding of the world and their interactions within it (Turner et al., 1987).

Sharing economy: An economic and cultural model in which consumers are able to use assets owned by someone else and share resources in return (Belk, 2014).

Smart meter: A gas and electricity meter that digitally sends meter readings to energy suppliers. It can come with a monitor that measures energy usage in almost real-time (Smart Energy GB, 2016).

Social dilemma: Each individual receives a higher payoff for a socially defecting choice (e.g. polluting), than for a socially cooperative choice, but all individuals are better off if all cooperate rather than defect (Dawes, 1980).

Social Exchange Theory: Human relationships are based on subjective cost-benefit analyses and the comparison of alternatives; for example, a positive relationship is one in which rewards outweigh costs (Homans, 1961).

Social identity: Social identity is a concept that explains intergroup behaviour and was originally developed by Tajfel and Turner (1979). It is best described as predicting certain intergroup behaviours based on perceived group status differences, perceived legitimacy and stability of those status differences, and perceived ability to move from one group to another (Tajfel & Turner, 1979).

Social Identity Approach: Combines social identity theory & self-categorization theory to use in practice / interventions (Abrams & Hogg, 1990).

Social Identity Theory: How individuals make sense of themselves and other people in the social environment; individuals derive a portion of their identities from their memberships and interactions within and among groups (Tajfel & Turner, 1979).

Social Layer: In Installation Theory, the social control enforced by others to regulate behaviour (Lahlou, forthcoming).

Social responsibility norm: A type of injunctive norm, according to which in certain situations people should make contributions without expecting reciprocity (Berkowitz & Daniels, 1963).

The Company: Business entity each Council will establish to manage the Green Community project.

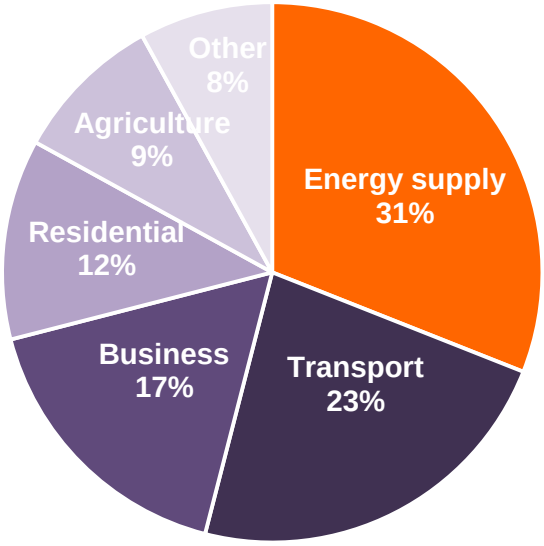
Theory of Planned Behaviour (TRA): A development from the earlier Theory of Reasoned Action. TPB holds the same assumptions as TRA but with an additional nuance: not all behaviours are voluntary. TPB thus contains perceived behavioural control as an added factor (Ajzen, 1991).

Theory of Reasoned Action (TRA): An earlier version of Theory of Planned Behaviour. TRA posits that voluntary behaviours are determined by intentions, and intentions are developed from underlying attitudes and subjective norms (Fishbein & Ajzen, 1975).

Value: 'The subjective psychological value an individual derives from a good or service' (Homans, 1961).

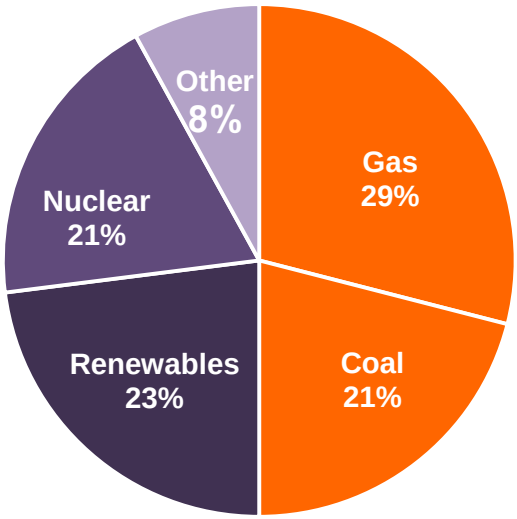
APPENDIX 2 – KEY FIGURES OF THE UK ENERGY INDUSTRY

Sources of UK Greenhouse Gas Emissions



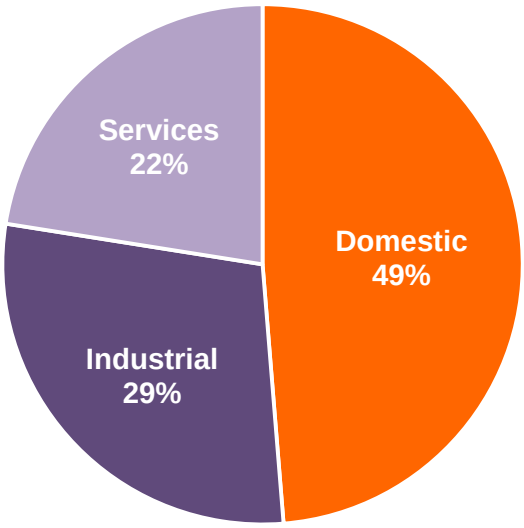
Source: 2014 UK Greenhouse Gas Emissions, Final Figures, DECC, February 2016

Fuels used for UK Electricity Generation



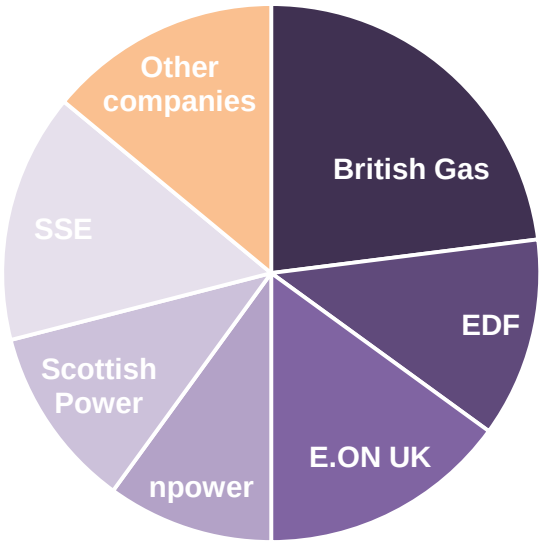
Source : DECC DUKES Energy Statistics, April 2016

2015 Non-Transport Energy Consumption by End-use



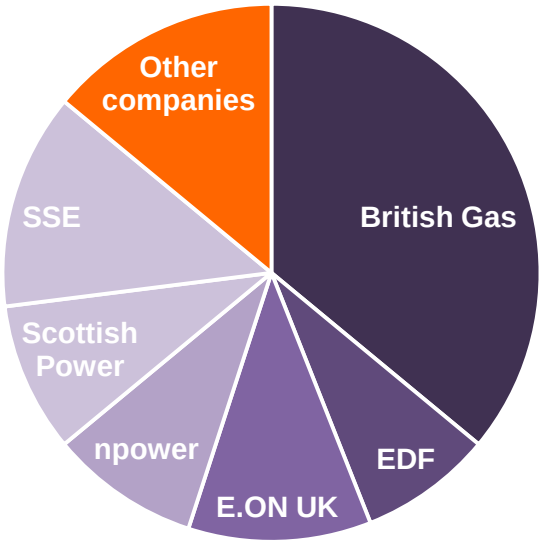
Source : Energy Consumption in the UK (ECUK) 2016 – Data Tables, BEIS, November 2016

UK Retail Elecricity Market Share



Source: Ofgem Retail Energy Markets Report 2016

Retail Gas Market Share



Source: Ofgem Retail Energy Markets Report 2016

APPENDIX 3 – STAKEHOLDER ANALYSIS

STAKEHOLDERS		OBJECTIVES	POWERS
GOVERNMENT	Department for Business, Energy and Industrial Strategy (BEIS)	**Address climate change** Develop industrial strategy Manage the relationship between government & business	Policy in the areas of: **Climate change** Business, export and trade Energy (Governs Ofgem)
	Office of Gas and Electricity Markets (Ofgem)	**Promote sustainability** Protect consumer interests Supervision and development of markets and competition Promote security of supply	**Distribution of ROCs** **Payment of Feed-in Tariffs** Creation of regulations Investigation of company behaviour Imposition of fines and enforcement orders
	Local Government (Councils)	**Protect the interest of communities** **Promote sustainability** Education, transport, housing, waste management, etc.	**Control over local funds** **Decision-making relating to the project** Power through relationship to other government entities
SUPPLIERS	Big 6 Investors	**Comply with Ofgem** Maximize profit and growth Maintain competitiveness Obtain consumer information	**Decision-making relating to the project** Very high market power
	Independent Investors	**Comply with Ofgem** Maximize profit and growth Maintain competitiveness	Low market power
	Employees	Avoid redundancy Maintain salary conditions	Protection through UK Labour Law Power through Trade Unions
END USERS	Business Sector	Obtain energy at low cost Maximize profit and growth Maintain competitiveness	Customer bargaining power (represent 46% of demand)
	Participating Citizens	**Minimize environmental impact** Minimize energy bills Gain status Obtain good quality service	**Decision-making relating to the project** Customer bargaining power (represent 33% of demand)
	Non-Participating Citizens	**Minimize environmental impact** Minimize energy bills Obtain good quality service	Customer bargaining power (represent 33% of demand)

APPENDIX 4 – PARTICIPANT FINANCING

The government currently offers payments to micro-generators of energy in order to provide them with financial security in exchange for their investments in renewable technologies. The scheme is composed of two feed-in-tariffs (FITs), which are index-linked and guaranteed for a period of 20 years.

1. A generation tariff: Set rate paid for each unit (kWh) of electricity generated.
2. An export tariff: Set rate paid per unit (kWh) of electricity exported to the energy grid as calculated by smart meters.[1]

This existing scheme had to be taken into consideration as we designed the economic side of our solution. The challenge was to ensure that households be better off by participating to the Green Community project than by generating energy on their own and benefiting from the FIT scheme.

This problem was resolved through the combination of three financial incentives:

1. Participants will receive a rate indexed to the existing generation tariff for each unit (kWh) of electricity generated.
2. Participants will sell their energy surpluses to the Company at a price per unit (kWh) indexed to the existing export tariff.
3. Participants will be offered a choice between the following:
    a. Receiving an extra 5% per unit (kWh) exported to the community grid
    b. Donating this extra 5% to a Green Community Fund, and seeing their donation tripled by the BEIS.

In regards to (3), the default option will be to donate the 5%, a simple choice architecture manipulation that will take advantage of the default effect (Tversky & Kahneman, 1991). Participants will be fully free to change their decision at any moment, and this will ensure that they do not feel the pressure of a commitment.

The multiplying factor selected is a strategy informed by Game Theory (Von Neumann & Morgenstern, 1944) in order to ensure participants always select the 'donate' option. Indeed, by making a few basic assumptions, we can use Game Theory to predict the outcome of offering the option in (3). These assumptions are:

- ✓ There are only two participants, P1 and P2.
- ✓ The utility of the community fund to a single participant is equal to its total monetary value divided by the number of participants.
- ✓ Participants have the same preference for public goods (the community fund) and private goods (the cash back).
- ✓ Players play simultaneously and repeatedly.

[1] In reality, energy exported is currently estimated as 50% of energy generated. However, it is part of the government's short-term plan to install smart meters measuring this precisely.

If neither P1 or P2 decides to collaborate by donating 5% of their export tariff, each of their payoffs will be equal to 5% of the export tariff.

If P1 collaborates but not P2:

- P1's payoff will be 0 + (5*3)/2 = 7.5
- P2's payoff will be 5 + (5*3)/2) = 12.5

If both participate, each of their payoffs will be ((5 + 5)*3)/2 = 15

The payoff matrix is thus the one below:

		P2	
		KEEP	DONATE
P1	KEEP	5 / 5	12.5 / **7.5**
	DONATE	**7.5** / 12.5	**15** / **15**

The best strategies are indicated in bold. Whether played once or repeatedly, this game will result in a *Nash equilibrium with a pure strategy where all players choose to cooperate. Although what we proposed here was a 5% donation tripled by the government, note that any instance where the government would more than double the donation would result in the same Nash equilibrium.

Limitations to this Approach

While using Game Theory to understand the behaviours of participants in this situation is interesting, the extent to which it will reflect the reality is fairly limited. This is because in reality, participants are not rational and might not always select the option maximizing their payoffs. If P1 were cooperating but P2 weren't, their respective payoffs would be the ones in the bottom left of the table. After a while, P1 might get annoyed by the lack of cooperation of P2, as not only would his payoff not be fully maximized, but he would also perceive a lack of fairness from the fact that P2's payoff would be higher. As a result, P1 might decide to bring back fairness at a cost, by ending his cooperation and generating the top left payoffs. This reaction, called *altruistic punishment*, is discussed by De Quervain et al. (2004) in regards to the Ultimatum Game, where in reality people choose not to maximize their payoffs when fairness is compromised.

Optimistically, there are good reasons to believe that participants would in fact cooperate. Residents who decide to get involved in the project are likely to be at least slightly concerned with environmental issues, rather than participating only for

economic reasons. Knowing that their 5% will transform into 15% and will be reinvested in further environmental sustainability projects should motivate them to select the donate option. Furthermore, not only will the funds be reinvested in sustainability projects, but these projects will be implemented in the community. Residents will thus directly benefits from these donations.

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