Hack´bridging´ Sustainable Urban Development

a multi-level and spatial perspective on a sustainable urban transition

Amanda Gregor

Master Thesis Series in Environmental Studies and Sustainability Science,
No 2013:033

A thesis submitted in partial fulfillment of the requirements of Lund University International Master's Programme in Environmental Studies and Sustainability Science (30hp/credits)

LUCSUS
Lund University Centre for Sustainability Studies

LUND UNIVERSITY

Hack'bridging' Sustainable Urban Development

a multi-level and spatial perspective on a sustainable urban transition

Amanda Gregor
amanda_gregor@hotmail.co.uk

A thesis submitted in partial fulfillment of the requirements of Lund University International Master's Programme in Environmental Studies and Sustainability Science

Submitted August 12, 2013

Supervisor: Barry Ness, LUCSUS, Lund University
barry.ness@lucsus.lu.se

Abstract

Urbanisation has contributed to the acceleration of production and consumption causing strain on the urban environment. Sustainable urban planning aims to manage the transition within cities to reach more sustainable practices, however, there are competing interests in how this should be done from a 'compact city' and 'green city' perspective. This study aims to assess the potential for an urban suburb to facilitate a sustainable transition towards the goal in reducing consumption levels in accordance with 'One Planet Living'. Hackbridge, a suburb in outer London, UK is used as an instrumental case study to assess the barriers and constraints that an urban sustainable transition can encounter. Due to the varying factors of consumption, this paper specifically references the transportation system and local and sustainable food. Sustainability Science offers a valuable approach in addressing this complexity across the levels of macro, meso and micro. This study is analysed through a multi-level perspective to examine the complexity between institutional involvements affecting this transition. A spatial component is also analysed to further develop the multi-level perspective and provide opportunities for this facilitation to occur. The results of this study focus on the institutional interactions between the micro and meso levels. The main barriers are associated within financial pressures which are emphasised over restrictions with time. Avoidance of a 'lock-in' situation is key for Hackbridge to reach its environmental goals. The community involvement is a key driving force to assist in this transition. Areas of Hackbridge are in social deprivation and environmental targets are not a priority for certain actors. A more inclusive civil society could provide opportunities to strengthen and overcome the barriers through networking and knowledge sharing to bridge the gaps in reaching a sustainable suburb. Managing the spatial boundaries and implementing effective urban design would also contribute towards better access to transportation and sustainable and local food and promote a strengthening of social, economic and environmental aspects within the urban setting.

Keywords: sustainability, urban development, multi-level, spatial, Hackbridge

Acknowledgements

The highs and lows of this research paper solidified the experience that has been known as *thes.is life.* This thesis writing process has been the final chapter of a personal and academic journey which I am privileged to have experienced and I would like to share my gratitude.

Firstly to my supervisor Barry for your guidance throughout this paper especially with your time and support in the final lead up to the deadline. Thank you to all my interviewees for your time and knowledge shared. Also, a huge thanks goes to my friends back in the UK especially Kenty, Amy and Sherman for your continuous support at a distance. To my LUMES classmates, thank you for sharing the last two years with me and making this experience what it was; especially to the Malmö ladies for both the academic and red wine-related discussions we shared. Thank you to my family for your unconditional love and support, without which this experience would not be possible. Finally, I would like to dedicate this paper to my granddad.

Table of Contents

List of Figures

List of Tables

1. Introduction

1.1. Research Context

With a predicated population growth from 7 billion in 2011 to 8.2 billion by 2030 the United Nations (UN) has estimated that by 2030, around 60% of the world's population will be living in cities (UN Habitat, 2007). In the context of the wealthier countries, as more people move into cities (urbanisation), there is an increase in consumption of resources: energy, housing and food (Rees & Wackernagel, 2012). Since the UN World Commission on Environment and Development (The Brundtland Commission) was published in 1987 the concept of sustainable development has become a key aspect of politicians, administrators and urban planner's rhetoric (Næss P. , 2001). Production and consumption within the urban sphere has been driven by economic growth and has had detrimental effects to the social and environmental pillars of sustainability. The balance between the entities of the built and natural environment is a fragile one and there is increasing research on how to promote and manage a transition towards more sustainable modes of production and consumption within the urban environment (Markard, Raven, & Truffer, 2012).

The Brundtland Commission define sustainable development as "development which meets the needs of current generations without compromising the ability of future generations to meet their own needs" (Brundtland Commission, 1987) . 'Basic needs' are defined as food, water, clothes, shelter, work, energy and hygiene (Ibid). Living standards that go beyond these basic levels are only considered sustainable if they have a regard over the longer term impacts, yet many people live beyond the world's ecological means which has comprised many people and will continue to comprise future generations. Ecological Footprint is a means to communicate the anthropogenic consumption of the Earth's natural resources in relation to its capacity. Ecological footprint analysis therefore does not only measure the sustainability gap but it also provides an opportunity to create strategies that can bridge the gap and lead towards a more effective sustainable urban development (Rees & Wackernagel, 2012).

Drawing a bridge between sustainability and urban development is a challenging research area (Rydin, Holman, Hands, & Sommer, 2003; Turcu, 2012). Cities are networks of heterogeneous complex systems, yet despite their complexity and size they have the potential to achieve sustainability on a global scale through their collective infrastructures and economies of scale for waste disposal, public transit, housing and with higher population density it can relieve per capita demand for used land (Rees & Wackernagel, 2012). There are however competing positions as to what constitutes sustainable urban development within spatial planning realms. This further complicates the path forward towards the most suitable form of urban development. The 'compact

city' is an urban model accredited to reach urban sustainability. It uses the high population density (which supports increased social interaction) and mixed land uses to promote efficient public transport systems that encourage walking and cycling with low energy consumption (Næss P. , 2001; Jacobs, 1961). Opposed to this the concept of a 'green city', focuses on local self-support units which create closed cycles; they offer eco-villages as an alternative to the high density settlements found within cities (Næss P. , 2001). Some of the initiatives that fall within this concept of sustainable community ideals include 'healthy cities', 'urban villages', 'millennium communities', 'zero carbon communities' and the 'mixed communities' movement (Turcu, 2012).

While there is substantial research about the spatial and physical features that constitute a sustainable city, many of the environmental and sustainability aspects have not been a focal point within urban development (Næss P. , 2001). The planning policy in the United Kingdom (UK) tends to favour the use of the model of a 'compact city' (Ibid). The Planning Policy Guidance on Housing was introduced with this influence which resulted in increased brownfield[1] development and average densities for dwellings per hectare increased by 72 per cent from 2001 to 2009 (Department of Local Communities and Local Government, 2010). However there are pockets of examples that stem from the 'green city' concept. One of the most famous examples of this in the UK is BedZED, which was built in 2002 and is the UK's largest carbon neutral mixed-use eco village with 82 residential homes. Sustainability concepts like BedZED are defined as sustainability rich areas yet there is little knowledge on the effects that these have on surrounding areas and the extent in which they further progress towards sustainable development as a whole (Rydin, Holman, Hands, & Sommer, 2003). This raises the question if an urban area transitions towards sustainability, is it affected by a neighbouring area that is a sustainability rich area? A second question raised is that considering there are two 'camps' for progressing towards sustainable urban development, how are the applied in action on the ground level and not just as a macro level concept? Can they combined to create a more holistic approach towards sustainable urban development? This paper will address these sustainability challenges.

1.2. Research Aims and Questions

The aim of this research is to contribute to the field of sustainable urban development by exploring the potential to facilitate a sustainable transition within a borough of London suburb. This study adopts a multi-level perspective towards understanding the complexity of institutional influence across the macro, meso and micro levels (Næss & Vogel, 2012; Smith, Voß, & Grin, 2010). This

[1] Brownfield sites are areas of land that had previously been used for industrial or commercial use or are now abandoned. They offer a more sustainable opportunity for redevelopment instead of using an undeveloped 'greenfield' site.

analysis will also provide a spatial component to the analysis in order to sufficiently explore the driving forces and barriers constituted by the economical, institutional and social territories that are involved in the transition of Hackbridge becoming more sustainable by applying and integrating One Planet Living Principles (Coenen & Truffer, 2012). What makes this case unique is the neighbouring eco-village BedZED, which is a sustainability rich urban pocket. In order to achieve these aims, research questions have been set to guide the paper:

Q1: What are the driving forces that can facilitate Hackbridge in becoming a One Planet Living suburb?

Q2: What are the constraints that limit Hackbridge from achieving a One Planet Living suburb?

Q3: How can these constraints be resolved to optimise sustainability practices within Hackbridge?

Hägerstrand (1995) recommends approaching the problem of managing complex human-environment phenomena in two ways. The first is to understand the driving forces behind the observable behaviour. Secondly, the various barriers need to be identified which define the limitation placed on the potential choices of the actors. This theoretical approach was the foundation for setting the research questions which guide this paper.

1.3. Scope

This paper analyses the key actors within this system. Some of the actors who have less direct involvement have been referenced within the paper but an in depth analysis has not been done as it goes beyond the boundaries of this paper and could led to a saturation of information for the reader. Also because of the scope of the paper not all the One Planet Principles could be addressed therefore the focus of this paper uses examples of sustainable transportation and food systems yet other principles have been touched on. These systems focus on the end users and do not incorporate the entire life cycle of transportation and food systems.

1.4. Transferability

This study is based on a single case study thus is very context specific. As this paper is a contribution to level and spatial analyses within sustainability science it develops and explains phenomena contributing to the driving forces and constraints in a human-environment complex system and how these can be managed better (Gibson, Ostrom, & Ahn, 2000). The theoretical groundings assist the findings in this paper so despite being context specific certain mechanisms can be applied to the generalisation and transferability to other cases (Ibid).

1.5. Audience

This paper will explore the potential for Hackbridge to reduce its consumption levels by using the framework of the OPL principles used by the neighbouring community of BedZED. Consequently there are two main target audiences. The first are the stakeholders who are involved directly with this case study; these include Sutton council, BioRegional, Neighbourhood Development Group and local traders and residents. More specifically this could be a valuable source of knowledge for BioRegional who developed the OPL principles as a means to understand how their framework can be applied further and the interactions that apply across different levels. Secondly this paper is a contribution to the academic field of Sustainability Science by providing an exemplar of human-environment phenomena through the lens of multi-level and spatial analyses (Kates, et al., 2001; Hägerstrand, 1995).

1.6. Disposition

Chapter 2 defines the methodology implemented and the knowledge and reasoning behind the choice for these techniques. Chapter 3 offers the main theoretical concepts and framework that have been developed within the dimensions of sustainability and how they will be used in this research to develop the knowledge. The introduction of the case study is provided in Chapter 4; this incorporates the key people and places with maps and photographs to give the reader a full descriptive and visual impression of the case. This leads to Chapter 5 which provides the results structured under the research questions set in Chapter 1. Chapter 6 parcels the materials from the previous Chapters to provide a full data analysis and discussion offering solutions to optimise sustainability and further considerations for the study. Chapter 7 sums up the main findings in the conclusion.

2. Methodology

2.1 Meta Theoretical Perspective

Biocomplexity is the study of complex human-environment systems and is defined as ‘properties emerging from the interplay of behavioural, biological, chemical, physical, and social interactions that affect, sustain, or are modified by living organisms, including humans’ (Michener, et al., 2001). The complexity dealt with within this paper is defined as aggregate complexity because it attempts holism by focusing on how the individual elements that work in synergy interact and relate to the complex system (Manson, 2001). Understanding the epistemological position to fulfil this contribution to scientific knowledge is an important consideration to the research and the human-environment system (Manson, Does scale exist? An epistemological scale continuum for complex

human-environment systems, 2008). The epistemological stance is attributed to critical realism[2]. A critical realist perspective identifies the 'generative mechanisms' which aims to offer a position to introduce changes to the status quo so that inequalities and injustices can be counteracted (Bryman, 2008). This paper uses spatial concepts to show the social structures and power relations that are in place across different levels[3] (Archer & Elder-Vass, 2012; Næss & Vogel, 2012). A deductive approach is taken through theories of scale and multilevel analyses to guide the research on the interactions between the sustainable principles across different levels and the potential for them to be applied to the area of Hackbridge.

2.2. Strategy

This exploratory research adopts a qualitative strategy using a single case study of Hackbridge. The case study is the most appropriate strategy for the study because it allows a detailed story to be told about Hackbride. What makes this case unique and special is that it neighbours a sustainably rich area (BedZED) and this proves an interesting dynamic to assess the institutional interactions on different levels (Neale, Thapa, & Boyce, 2006; Yin, 2009). It is an empirical inquiry that allows investigation into contemporary phenomenon to be compiled in a real- life context (Yin, 2009). To ensure external validity to this case study, theoretical analysis accompanies the case study (Yin, 2009). To enhance further credibility to the case study, internal validity will be considered through the use of triangulation (Bryman, 2008). Methodological triangulation is the use of multiple methods to study a research problem; specifically this case-study is distinguished as *within-methods* because it uses primarily qualitative approaches (Denzin, 1978). The sources of evidence used in this study incorporate: documents, archival records, interviews and direct observations.

2.3. Methods and Techniques

2.3.1. Documents

Documentation is a valuable source of obtaining information within this case study. Documentation on the micro level was accessible because BedZED is the UK's first and largest mixed use sustainable development and it received a lot of attention so it is a well-researched project and both academic and non-academic documentation is prolific on the case. Data was sourced from a variety of avenues such as published documentation on progress reports carried out by BioRegional and proposals by

[2] See Isaksen, Karl Robert (2012) Can Critical Realism be an adequate Philosophy of Science for Sustainability Science? LUMES, for an interesting thesis on this topic.
http://www.lumes.lu.se/database/alumni/10.12/Thesis/Isaksen_Robert_2012019.pdf

[3] This is also applicable temporary however this is not a longitudinal case study so an in-depth analysis will not be given in this study, but has been acknowledged.

Sutton council. Documentation was also retrieved from minutes from community meetings, to give a review of the developments from this level which builds up a story on the developments on a temporal scale. These have been sourced from both internet searches and interviews. It has been acknowledged that documentary evidence reflects a communication among actors achieving their own objectives; therefore a critical eye has been applied when interpreting the contents (Yin, 2009).

2.3.2. Archival Records

Archival records provide a supplementary form of investigation to the case and are used in conjunction with other documents. Examples of archival records come in the form of quantitative data such as Neighbourhood Statistics from the the National Office of Statistics. In order to provide for the smallest practical spatial scale, the Super Output Areas developed by the Office for National Statistics uses statistical analysis from smaller geographical units 'designed to provide homogeneous building blocks with similar sized populations to overcome the problems associated with changes in administrative boundaries' (National Office for Statistics, 2013). This was used to offer supplementary information that did not come directly from the involved actors to reduce bias and provide an overview of the situation. Maps of the geographical characteristics of the area were also used to determine the spatial components, sourced from Google Maps.

2.3.3. Interviews

Interviews were used to underpin the findings from the documents, archival records and observations. These took the form of semi-structured structured interviews as they were guided conversations opposed to rigid structures (Yin, 2009). The interviewees were sourced by sending direct emails to actors; this was time consuming to locate relevant actors however resulted in a higher response rate. The researcher also signed up to the community group forum in the hope to access potential interviewees through this avenue however direct correspondence proved more successful. One interview followed a structured approach because the interviewee was ill on the arranged day and was unable to reschedule within the proposed timeframe. Therefore the interview was conducted over email correspondence however this was not as fruitful as the other interviews. The interviews were also transcribed which was proved effective to provide a thorough examination of what was said while also removing bias that may have been inflicted by the researcher values (Bryman, 2008). Direct quotations from these interviews have been used in the results and discussion for this paper to create a narrative that guides the reader through the data (Ibid).

2.3.4. Observations

Direct observation was conducted in an informal setting through a site visit. One of the interviews was conducted in the BedZED site and a walk around was conducted before the meeting.

Observations of the Hackbridge area were also carried out that lasted six hours. The researcher was accompanied by another observer to increase reliability of the observational evidence (Yin, 2009). Discussion followed post site visit to accumulate both perspectives. The field visit also allowed for photographs which were also used to convey important characteristics between the areas which have been shown within appendices section of this study (Dabbs, 1982 in Yin, 2009). Observations were also key, in order to assess the spatial components of the case study showing characteristics that are not easy to determine through a written report.

3. Theoretical Perspectives

3.1. Sustainable Development

Sustainable Development as a term is somewhat contested and "intrinsically normative, subjective and ambiguous concept and is therefore difficult to operationalize" (Rotmans, 2005:21). Interdisciplinary and theoretical orientations are key yet action orientated approaches are fundamental to the development of the field. The following section defines some of the key concepts for consumption.

3.1.1. Consumption and the Environmental Impact

Human activity has placed unprecedented pressure on the Earth's ecosystems. Anthropogenic demands on natural capital of the planet has resulted in deforestation, soil degradation, overfishing and global warming (Desai, 2008). The pressure that this exponential growth of human activities is placing on the Earth's system could trigger sudden or irreversible environmental changes that would be disastrous for human well-being (Rockström, et al., 2009). This essentially means that human activity cannot continue within the predominant social and economic paradigm that it currently resides (Ibid). The issues on how to promote and govern this transformation towards more sustainable modes of production and consumption is receiving greater attention within the policy and the social- science research arena (Markard, Raven, & Truffer, 2012).

3.1.2. Ecological Footprint

Ecological Footprinting is a means to relate consumption of natural resources to the Earth's biological capacity (Desai, 2008). A country's Ecological Footprint is established on its population, the amount consumed by its average resident, and the resource intensity used in providing the goods and services consumed (WWF, 2006). Comparison between the planet's biological capacity and current consumption rates would mean, to support the average person in UK, three planets would be necessary (Desai, 2008).

The WWF (2006) states that in order to reduce the Ecological Footprint of certain nations long-term investments are required within the fields of education, technology, conservation, urban and family planning and resource certification systems, as well as the development of new business models and financial markets (WWF, 2006). This research focuses on urban planning to reduce consumption but references other factors such as education, because these cannot be studied independently from each other.

3.1.3. One Planet Living Framework

There is no single definition of sustainability or measure for it (Turcu, 2012). The Commission on Sustainable Development (CSD) define fifty-eight sustainability indicators (United Nations, 2013). The definition or measurement of sustainability "is not a single, well-defined concept; rather, various positions and perspectives exist- whichever view is propagated, it entails a normative choice" (Zeijl-Rozema & Martens, 2010 in Turcu, 2012). Ecological Footprinting is a means to reduce consumption, but attaining sustainability is not a means end approach. Different practices use different methods to reach their goals according to their particular needs and how they wish to apply their strategies and enforce their policies (Shen, Ochoa, Shah, & Zhang, 2011). In this case, the most appropriate sustainability indicators to apply are defined within the One Planet Living (OPL) framework developed by BioRegional and WWF, represented in Figure 1. This is the most fitting as it is the framework used by BioRegional to assess the ecological impact of the BedZED development and further sustainability developments within Hackbridge, this maintains continuity between data analysis (London Borough of Sutton, 2013).

"One Planet Living is a model based on ten simple principles which provide a framework to make sustainable living easy and affordable for all" (BioRegional Development Group, 2013). Under each of the ten principles falls an array of more specific sustainability aims and assessments. The framework assists policy makers to ensure continued development on an overarching level while helping clarify issues of complexity and find solutions within context specific projects (BioRegional Development Group, 2013; Turcu, 2012).

Figure 1 shows the breakdown of each principal and the components that are defined within it. Sustainability approaches include many causes and consequences and because they will be studied over scales, levels and extents, it is not feasible to study all of these within this paper (Gibson, Ostrom, & Ahn, 2000). Sustainable Transport and Local and Sustainable Food will be examined to specifically within this paper. However because this is a complex system across many levels there will be evidently other principles that are touched upon such as land use and wildlife, equity and local economy zero carbon.

Figure 1: The One Planet Living Framework (BioRegional.co.uk/oneplanetliving, 2011)

The most pressing issues for sustainable urban development in wealthy countries are mitigating climate change, limiting energy consumption, reducing pollution, protecting natural areas and arable land while also providing a safe and healthy environment for the people especially the most vulnerable (UN/ECE 1998 in Næss & Vogel, 2012:37). Transportation and food systems are attributed to all of these issues. Transportation (both international and domestic) contributes to a 27 per cent of total UK Greenhouse gas emissions (Department for Transport , 2010). Reducing carbon emissions is primarily an environmental aspect of sustainability yet transportation also incorporates social components such as increasing mobility so people have access to services while also reducing pollution and increasing pro-active modes of transport like walking and cycling which improve human well-being, this is turn affects economy through health care and efficiency of services (Næss & Vogel, 2012). The concerns of transportation merge into the realm of Local and Sustainable Food through the Farm to Fork cycle; from the transportation used within production and distribution to the means of transportation that the consumer uses to source the food (Foster, et al., 2006). Local and

Sustainable Food is important because locality, ensures the food is sourced or produced near the consumers, reducing distance travelled but it also supports the local economy. Sustainable food also promotes a diet that is healthier for the consumer, while also reducing ecological footprint through reduced consumption of products like meat and dairy which have a high impact on the environment because of the energy needed to produce them (Ibid). The final component which incorporates Local and Sustainable Food is waste disposal; UK consumers throw away approximately one third of the food they buy which equates to approximately to 7.2 million tonnes of waste a year, this has detrimental effects on the environmental and costs the average household £680 a year (WRAP, 2012).

3.2. Scale, Multi- Level Analysis and Spatial Component

The potential for Hackbridge to become an OPL suburb will require an understanding about the driving forces and barriers across the boundaries, organisations, actors and institutions involved (Hägerstrand, 1995). Using a scale and multi-level analysis is one appropriate way to explore this complex situation. There is an increasing need and importance for interdisciplinary work especially in the social sciences to look at the human dimensions of global change which is assessed over scale and levels of analyses (Gibson, Ostrom, & Ahn, 2000; Hägerstrand, A Look at the Political Geography of Environmental Management, 1995). The multi-level perspective is attractive because it provides a relatively uncomplicated way to order and simplify the analysis of complex systems (Smith, Voß, & Grin, 2010). Gibson et al. (2000) define four important theoretical approaches to scale:

1. How scale, extent, and resolution affect the identification of patterns;
2. How diverse levels on a scale affect the explanation of social phenomena;
3. How theoretical propositions derived about phenomena at one level on a spatial, temporal, or quantitative scale may be generalised to another level (smaller or larger, higher or lower);
4. How processes can be optimised at particular points or regions on a scale.

3.2.1. Scale

Hägerstrand (1995) reviews the political and administrative channels where local actors can be supported to accomplish their long-term environmental goals through their territorial and spatial competence. The main problem according to Hägerstrand is that as the spatial scales of problems grow (globalisation for example), so does the distance between the people who hold the knowledge and devise the management goals (macro and meso level) to those that are requested to act (or refrain from it) on the micro level. This case study takes the form of a nested constitutional hierarchy. Hackbridge and BedZED are located on the micro level, where they can merge into ‘new units that have new organisations, functions and emergent properties’ (Mayr, 1982:p65 in (Gibson, Ostrom, & Ahn, 2000)). These levels are linked on a conceptual scale based on functional

relationships instead of a spatial or temporal scale (Gibson, Ostrom, & Ahn, 2000). In the case of constitutive hierarchies, the features on the macro level are not necessarily built up from the attributes of the micro, but can in fact show new collective behaviours (Ibid). This is relative to the study because looking at the phenomena of processes of change, it is necessary to examine the mechanisms from a multilevel approach so an understanding of these mechanisms can take place. Hägerstrand (1995) distinguishes between two different but closely connected mechanisms; social transactions and institutions, and secondly physical actions in the landscape. Cross-level interactions occur through the vertical interplay between or among regimes located at higher and lower levels on the jurisdictional scale (Young, 2006 in Cash, et al. 2006). This has been represented through multi-scale interactions that fall within the definitions of spatial, temporal, institutional, management, networks and knowledge and also take into consideration financial and political domains (Cash, et al., 2006).

3.2.2. Multi-Level Perspective

A multi-level perspective is a conceptual framework used within transition theory. Transition theory is an emergent field within Sustainability Science (Markard, Raven, & Truffer, 2012). Transition theory examines the networks of actors and institutions with material artefacts and knowledge and how these are interrelated and dependant on each other (Markard, Raven, & Truffer, 2012; Geels, Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study, 2002). Within a time of transition, it tends to occur over a considerable time-span of about 50 years or so and within this time new products, services, business models, organisations can arise while technical and institutional structures can alter as well as the perceptions of consumers (Ibid). The framework defines three scale levels that represent functional relationships between the interplay of actors, structures and working practices; the macro level, meso level and micro level (Geels, 2002; Markard, Raven, & Truffer, 2012; Rotmans, 2005). These are not defined as spatial or geographical scale levels (Rotmans, 2005). Næss & Vogel's (2012) recent paper shows the multi-level perspective is gaining more use within the realm of sustainable urban development in regards to land use and transportation systems .

3.2.2.1. National and Provincial Level: Macro

Power is seen as most dominant within this level and is exercised through political strategies and made up of instruments (ideological and scientific) (Avelino & Rotmans, 2009; Lefebvre, 2003). Projects on a global level are associated with the built domain of planning through buildings; monuments, large-scale urban projects and new towns. It also infiltrates unbuilt domains such as roads and highways, the overall organisation of traffic and transport, the urban fabric and neutral spaces and sites of 'nature preserves' (Lefebvre, 2003).

3.2.2.2. Territorial: Meso

This level can be defined on a geographical level as streets, squares, avenues and public buildings such as schools and city halls. If it is possible to hypothetically remove the global elements of higher-level entities then what is left within this realm is the relationship to the site (which is the immediate surroundings) and the situation (distant surroundings, global conditions). This creates the social unity of the urban ensemble through forms-functions-structures (Lefebvre, 2003:80). The institutional establishment that resides at this level is the borough council, which acts as a mediatory between the levels above and below.

3.2.2.3. Local and Community Level: Micro

This level is established through the urban fabric as mostly housing, including apartment buildings, private homes. It is also made up of minor economic or sociological agents such as family, neighbours and 'primary' relations (Lefebvre, 2003). This will be examined institutionally through the community groups, in order to use the concepts and categories that fall within the scope of the residents lived experience and how this relates to the unknown and the misunderstood of the everyday (Ibid).

This study will focus on the meso and micro level because the urban phenomenon and urban space are not merely a projection of social relationships but also a terrain where various strategies can clash. It is imperative to study these within the territorial space that it is occurring and through institutions, organisations and urban actors (Lefebvre, 2003). This level is fundamentally an "intermediary between society, the state, global power and knowledge, institutions, and ideologies on the one hand and habiting on the other" (Lefebvre, 2003:89).

3.2.3. Spatial Component

This paper applies the multi-level perspective, one of the most discussed concepts of transition theory; however, there are a number of challenges that arise when applying it to sustainability orientated studies in urban development and mobility therefore this paper will take the theory further (Næss & Vogel, 2012). The spatial and geographical component of sustainability transitions has largely been neglected, thus insufficient analysis has been applied to the conflicts and tensions constituted by the economical, institutional, social and cultural territories (Coenen & Truffer, 2012; Lefebvre, 2003; Coenen, Benneworth, & Truffer, 2012). Therefore, this paper looks specifically at scale but also incorporates the spatial gaps between the sustainable transitions of Hackbridge (Coenen & Truffer, 2012). This aims to provide a fuller analysis through the narratives of space and place by establishing what the actors' territorial and spatial competence can shape the actors' technical capability (Hägerstrand, 1995).

4. CASE STUDY BACKGROUND

Geographical and Spatial Components

4.1. Sutton, Hackbridge and BedZED

Hackbridge (Figure 3.) is a suburb located within the London Borough of Sutton. This area is in Outer London and lies just over 9 miles from central London. The shaded red area pined in Figure 2. highlights the boundaries of the London Borough of Sutton. Hackbridge contains 2,627 homes and has a resident population of just under 6,000 people (National Office for Statistics, 2011). The district of Hackbridge is home to the Beddington Zero Energy development. Hackbridge's boundaries are detailed in red and BedZED has been highlighted in green in Figure 3.

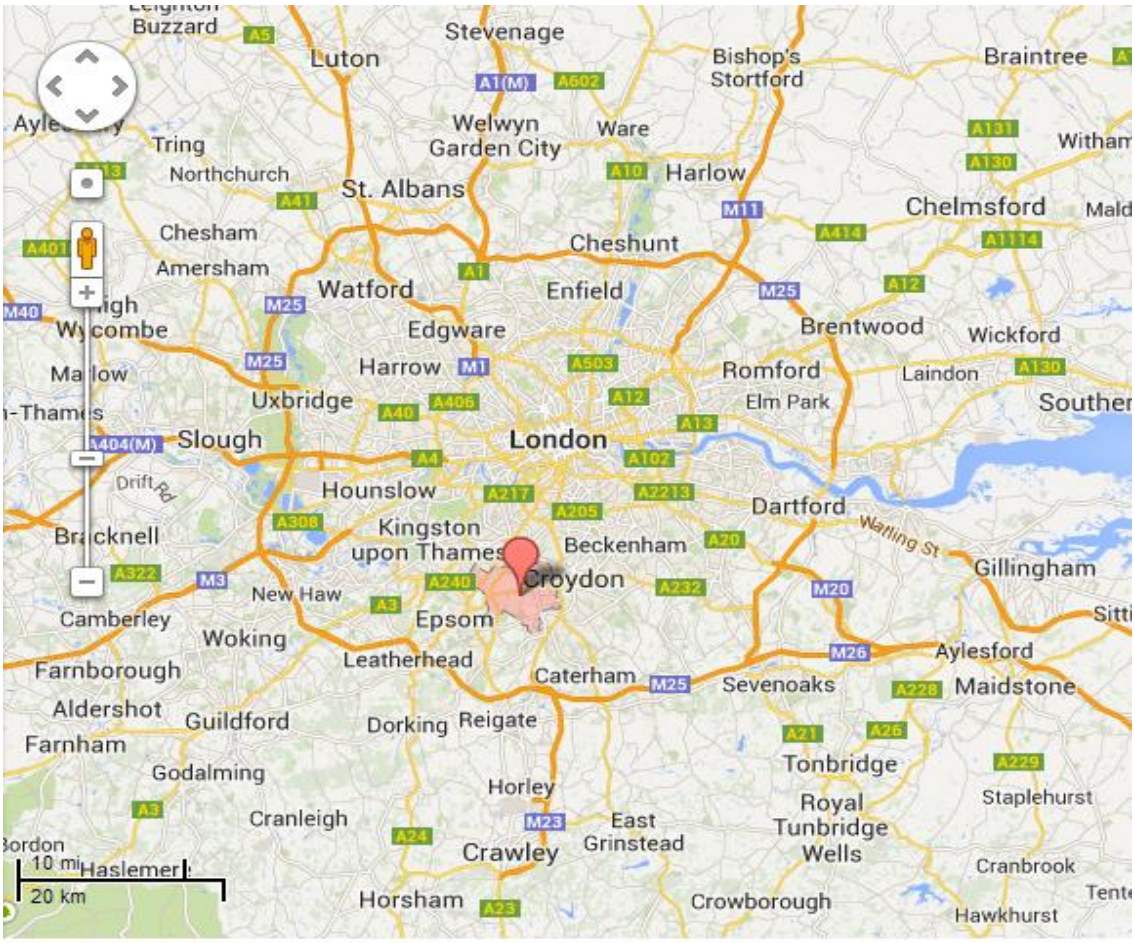

Figure 2: Map of London, UK with Borough of Sutton highlighted (Google Maps, 2013)

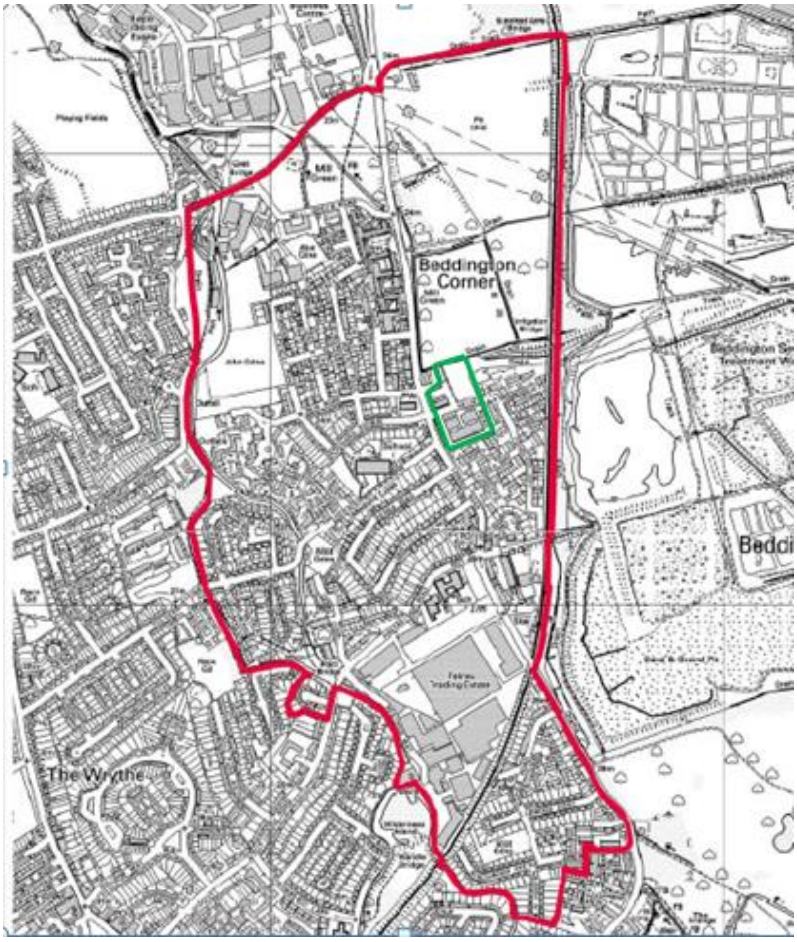

Figure 3: Hackbridge and BedZED boundary adapted by author (Sutton Council, 2011)

Beddington Zero Energy Development (BedZED) is the UK's first and largest mixed-use sustainable development which was completed in 2002 and is located in the area of Hackbridge (BioRegional, 2013). BedZED was designed to minimise its ecological impact both within its construction and operation (BioRegional Development Group, 2009). The development has been multi award winning, and is used as one of the most coherent examples of sustainable living within the UKand internationally. The project is in its eleventh year of establishment which makes it an interesting and valuable case study because the effects that it has had on the surrounding area are more ingrained in its urban setting.

BedZED was built on a brownfield site which was previously part of the local sewage works. The site comprises of 82 residential houses and is home to 220 residents. There is also 2,500m^2 of commercial live/work space. BedZED's energy achievements boast 45% lower electricity and 81% less hot water use than the average resident within the Borough of Sutton (BioRegional Development Group, 2009). BedZED has a strong community spirit; the typical resident knows an average of 20 of their neighbours; the average for the surrounding neighbourhood of Hackbridge is eight (Ibid).

4.1.1. Transportation System

Transportation attributes towards 13 per cent of Sutton's ecological footprint (BioRegional Development Group, 2009). The nearest train and tram stop in the area are both under a mile from BedZED. There are also three bus routes that run through the area; one that stops on the main road outside of the BedZED development (Transort for London, 2013). The 2001 census reported that 71 per cent of Sutton households own at least one car, but in the Hackbridge specifically this figure was 84 per cent, in BedZED 59 per cent of residents are car owners (BioRegional Development Group, 2009). However BedZED residents tend to have higher ecological footprints in this area because they travel more by air than the rest of Sutton (Ibid). This is a rebound effect (Jevons Paradox) from the savings that residents have made through their energy efficient standard of living meaning they have more disposable income to travel. Within BedZED 83 per cent of residents walk, cycle or use public transport to get to work in comparison to 59 per cent of Hackbridge residents (Sutton Council, 2012). One of the main issues is that 45 per cent of BedZED residents and 80 per cent of Hackbridge residents use their car as their main transport mode for local food shopping; this will be discussed further under the subsequent category (Ibid).

4.1.2. Local and Sustainable Food

Food contributes towards 25 per cent of Sutton's ecological footprint (BioRegional Development Group, 2009). There is no supermarket within walking distance of Hackbridge, and the town centre is a collection of tired facades of shops and fast food restaurants and is heavily congested with cars as shown in Figure 4.

Figure 4: Photograph of Hackbridge High Street (taken by author, 2013).

Thirty-nine per cent of the residents at BedZED and 44 per cent of the residents from Hackbridge grow their own food; however, this varies from a few pots on a window sill to council allotments (Sutton Council, 2012). Hackbridge have set an aim to reduce their current ecological footprint of food by 65 per cent by promoting healthier diets and sourcing local, seasonal and organic produce with low energy intensive products such as meat and dairy while also reducing low food waste (Ibid). This in turn impacts other OPL principles such as 'waste' and 'health and happiness'.

Institutional actors

The institutional establishment and interaction of each of these actors is visualised in Figure 5. on page 26. This section explains their internal functions independently in more detail.

4.2. UK Government

The UK Government is run by the Prime Minister who leads the government with support of the cabinet and ministers. The Conservative/Liberal Democrat coalition government came into power in May 2010. The strategy of neo-liberalism maximises the amount of initiative allowed to private enterprise and, with respect to the urban environment to developers and bankers (Lefebvre, 2003). The coalition government introduced the Localism Bill 2010 which is part of the 'Big Society' initiative which has three main strands: social action, public service reform and community empowerment. The three objectives to obtain this come through decentralisation by 'pushing power away from central government to local government…and drive down even further to the 'nano' (micro) level…to communities, to neighbourhoods and individuals'. The second is to increase transparency on data and information about the local level and finally through providing finance (David Cameron, 2010).

4.3. Greater London Authority (GLA)

GLA is the administrative body for Greater London and is made up of the Mayor Boris Johnson and the London Assembly which has 25 Assembly Members. Transport for London is one of the functional bodies which are part of the GLA Group. The GLA gives strategic roles through policy and funding in the aspects of London's areas such as economy, housing, policing, transport planning, environment, culture and health improvements (Greater London Authority, 2013). There are 32 councils of London boroughs and GLA shares local government powers with them as well as the City of London Corporation (Ibid). The Greater London Authority (GLA) work with many partners to play a strong role in coordinating action, monitoring success and exchanging the experiences of smaller projects across London.

4.4. Sutton London Borough Council

Sutton Council is the local authority for the London Borough of Sutton and is the statutory body referred to the first tier of Local Government. The council act independently yet their role in planning

is to create a partnership between the different institutional interests. Sutton Council initiated the Neighbourhood Development Group to strengthen the previous Hackbridge Community Forum with the aim to introduce neighbourhood planning and establish a neighbourhood planning group. Sutton council act as a link between the group and the developers (Sutton Council, 2012).

4.5. BioRegional

BioRegional is an entrepreneurial charity which establishes sustainable businesses and has devised their approach to strategic sustainable solutions as One Planet Living (BioRegional, 2013). Their aim is to deliver real-life solutions to the problem of overconsumption of resources which is significantly contributing to environmental degradation. Bioregional is a small team of 38 employees which is based in the UK but work internationally across North America, China, South Africa, Kenya, and Mexico. The UK office is based in BedZED and the co-founders of are Sue Riddlestone OBE and Pooran Desai OBE who both permanently live in BedZED. BedZED was initiated by BioRegional and developed by Peabody in partnership with Bill Dunster Architects (BioRegional Development Group, 2009).

4.6. Neighbourhood Development Group (NDG)

The NDG is an effectively self-managed group created in September 2012 with its own constitution with an elected Chair and secretary; and six themed sub-groups; housing, transport, environment, utilities, local economy and health and well-being (BioRegional Development Group, 2013). With the introduced of The Localism Act 2011 it gives the community the opportunity to draft their own neighbourhood plans. The first meeting was a re-visioning day held at the All Saints Church in November 2011. In June 2012 the group submitted its formal application to Sutton Council to register as a Neighbourhood Planning Group. The core working group consists of around 30-40 people who work on a voluntary basis (Interviewee A, 2013).

4.7. Heart of Hackbridge Project

HOH Project is a physical and economic regeneration programme for Hackbridge. The project is funded by the Outer London fund and aims to create a 'thriving, sustainable district centre set in the natural beauty of the Wandle Valley' (BioRegional Development Group, 2013). The results of the project intend to secure local jobs, improve the health of residents and make the area safer for pedestrians and cyclists in regards to road uses. The project is collaboration between residents, NDG, Sutton council and BioRegional and kicked off in 2009 (BioRegional Development Group, 2013).

5. Results

The results were analysed by assessing the data collection for reoccurring themes and interactions. Figure 5. is used as a visual multi-level representation to structure the main findings across the different levels to show the main determinants at each level and the driving forces and barriers that challenge this transition. The driving forces are detailed by green arrows that fill the spatial gaps between institutions. The constraints are represented in red and are focused within the meso and micro levels. The spatial disconnect between the levels has been highlighted by the red dotted line. The diagram shows that if a lock-in happens it will allow the economic component of funding to reach Hackbridge but will block the political component that has the goal for environmental improvement to reach the local level. This is a key driving force and entails a top-down, bottom-up strategy from political power in decision-making which increases action on the ground. This is restricted further by existing infrastructure and areas of deprivation. Finally the link between Hackbridge and BedZED on the micro level shows that BedZED is a strong driving force for the sustainability agenda yet there is a disconnect between the social integration between the two entities which creates a resistance from Hackbridge adhering to sustainability. The spatial territory between the community and local level has potential to bridge the political and knowledge drivers through BedZED's need to improve access to transportation and food systems. Political power has been decentralised giving the community empowerment and enhancing the role of civil society and the community's involvement is highlighted as the key driver to facilitate Hackbridge in reaching the OPL principles. Detailed findings and analysis are provided in the subsequent chapter under each level and solutions to these main findings are offered within the following chapter.

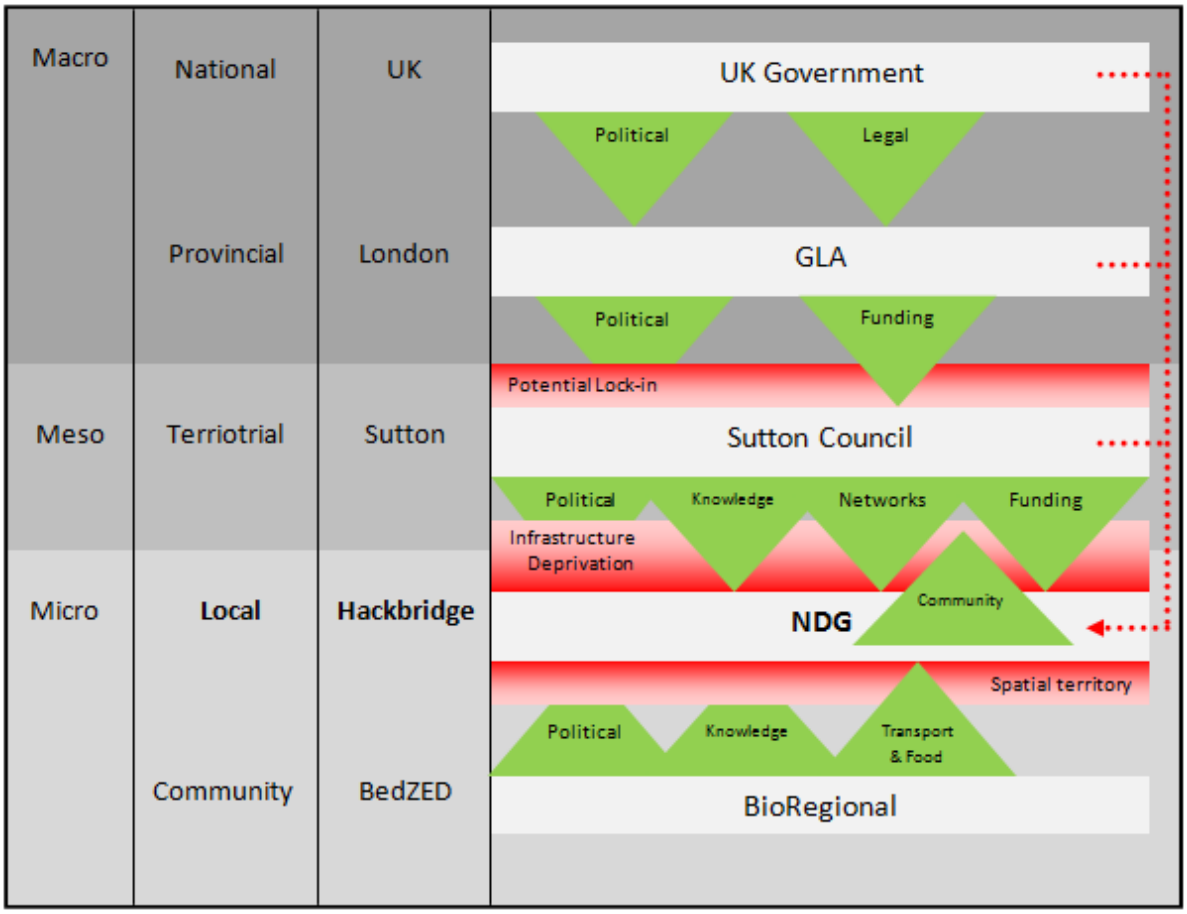

Figure 5:Diagram to illustrate the driving forces and constraints for Hackbridge over multi-level (created by author, 2013)

5.1. Driving Forces for Hackbridge becoming a OPL Suburb

5.1.1. National Level: UK Government

On the national level, there are societal development priorities which act as a driving force from this arena that make the potential for the OPL agenda feasible in Hackbridge. The political agenda states environmental goals: the transportation sector contributes to around a quarter of the current greenhouse gas emissions in the UK and food contributes to 30 per cent of the overall UK consumption these departments have been targeted to reduce levels (Department of Energy and Climate Change, 2013; Audsley, Brander, Chatterton, Murphy-Bokern, Webster, & Williams, 2009). These are enhanced through legislation because legally binding restrictions of carbon budgets have been placed on the total amount of greenhouse gas emissions emitted in order to achieve the aim to reduce the UK's greenhouse gas emissions by 80 per cent by 2050 (Department of Energy and Climate Change, 2013).

With the introduction of the Localism Bill 2010 it has given the community of Hackbridge the opportunity to become one of the 17 'front runners' to the Government's neighbourhood planning scheme (BioRegional Development Group and Sutton Council, 2011). The decentralisation of power is acknowledged as a key driver from many reports and interviews taken in this study (BioRegional Development Group and Sutton Council, 2011):

> "The coalition government is really pushing localism. Where neighbourhoods are being given much more power to influence the future of their neighbourhoods…planning rules are kind of scary in the way they are being stripped away at the moment as a means of incentive for development."

(Interviewee X, 2013)

5.1.2. Provincial Level: Greater London Authority

The societal development priorities set by the UK government have a trickledown effect to the GLA who have made a commitment to reduce carbon emissions aimed at a 60 per cent reduction by 2025 (Greater London Authority, 2013). The GLA act as a key financial driver because of the investment for funding through for example, the Mayor's Outer London Fund which contributed '£1.2 million towards the Heart of Hackbridge project' (BioRegional Development Group, 2013). This is an important driver because there may be a commitment to pro environmental agendas, but without funding for the development projects, they cannot be upheld. Funding also contributes towards research which is fundamental to development.

5.1.3. Territorial Level: Sutton Council

A continuation of the political driver to achieve environmental goals is apparent within the meso level. In May 2005, the borough set a 20-year vision to become the first sustainable suburb in London (Sutton Council, 2012). Sutton has adopted the OPL principles to achieve this target with the aim to become a zero carbon enabled borough under the project name One Planet Sutton (BioRegional Development Group and Sutton Council, 2011). This is an ambitious environmental target and it is favourable for them to apply projects to Hackbridge effectively as their chosen piloted area. Sutton as a council body has the political power to network effectively between Hackbridge and other actors to obtain sufficient funding. They have worked with EcoLocal and BioRegional, Sutton Nature Conservation Volunteers, B&Q, the Hackbridge Community Forum and Environment Agency to secure over £3m of external funding to deliver projects that help towards achieving a One Planet borough (Sutton Council, 2012).

5.1.4. Local Level: Hackbridge

The Neighbourhood Development Group (NDG) is a key driver in delivering community action on the ground. With 90 per cent of residents confirming that they are in support of the proposed vision to make Hackbridge one of the greenest suburbs in the UK there is a shared vision amongst the people that will be most affected (BioRegional Development Group, 2013). The 20-30 core working members of the group work on a voluntary basis, which is time consuming, so their passion for this project is a key driver to fulfil the goal to obtain an OPL Hackbridge (Interviewee A, 2013). The NDG work closely with Sutton council and offer advice and training both from internal and external sources which provides knowledge and deeper understanding to issues that the group are not familiar with (Interviewee A, 2013; BioRegional Development Group and Sutton Council, 2011). The group is made up of residents from an array of professional backgrounds such as architecture, journalism, teaching and ornithology (Interviewee A, 2013). This provides an array of knowledge and an interdisciplinary working environment. Smaller scale projects that have been accomplished through the HOH project like the cleanup of Mile Road (a derelict dumping ground which now is an access route to green space, picture shown in Appendices) show that the energy and input of community action does have results that the residents can be proud of (Interviewee Y, 2013). This is seen as a crucial component for community empowerment (Interviewee A, 2013).

5.1.5. Community Level: BedZED

BedZED residece in Hackbridge has been a catalyst for the borough's sustainability principles (Interviewee X, 2013). The neighbouring spatial boundaries has resulted in Hackbridge falling within BedZED's sphere of influence, having a spillover effect for the application of sustainability principles. The BedZED development and community is not large enough to reduce its environmental impacts

from the public services and capital investment, which accounts for 21% of the UK's average Ecological Footprint (BioRegional Development Group, 2009). This has a large contribution towards the OPL principles of transport and food.

> "I would say it [BedZED] wasn't big enough with 100 homes. I mean you really need a critical mass to support a row of new local shops or a new public transport system. I mean an example being, we are working on a couple of the only remaining eco-towns left and they're sort of around three, four, five thousand home developments. I think at that sort of scale with new settlements you can think about putting new infrastructure in"

(Interviewee X,2013)

The current situation is that as soon as BedZED residents leave the development they are likely to increase consumption to 'three planets worth' of resources impacted through their use of shared facilities such as the roads and services within the surrounding area of Hackbridge, Sutton or London (BioRegional Development Group, 2009). Therefore BedZED have a vested interest to integrate with the surrounding communities in order to fulfil their needs in the sustainability of their services. With the international success that BedZED has achieved it has become established as a benchmark for sustainability so is likely to obtain more attention and political power as its drives towards its goals. BioRegional is the institution behind the spatial domain that is BedZED and the Chief Executive and Co-Founders, Sue Riddlestone and Pooran Desai live on site and campaign the sustainability agenda from a residential and institutional perspective (Interviewee X, 2013; Interviewee A, 2013). Sue Riddlestone is an active member of the NDG and BioRegional currently have a strategic partnership with Sutton council so the sustainability agenda has a strong voice across both these levels, pushing from a bottom up perspective.

5.2 Constraints that limit Hackbridge becoming a OPL Suburb

5.2.1. National Level: UK Government

On the national level, the main concern is the friction created between planning for long-term solutions against a parliamentary vote that occurs every four years. Fundamentally if the political agenda changes this could be a severe threat to financial and institutional support offered to this project. The limitation of political power being governed on the higher level is that there is a disconnect between the macro level discourse and what actually happens on the concrete micro level, as shown by the red dotted line in Figure 5 (Hägerstrand, A Look at the Political Geography of Environmental Management, 1995).

5.2.2. Provincial Level: Greater London Authority

The GLA's environmental strategies are aims yet do not have any legal force; they are just a clear representation of a commitment to undertake the requirements of the agreement (Greater London

Authority, 2009). As these goals are not legalised the commitment towards implementation of those goals can be be argued as existing at a level of rhetoric instead of action (Rydin, Holman, Hands, & Sommer, 2003).

5.2.3. Territorial Level: Sutton Council

There is an array of complexities that put pressures on Sutton council achieving their 2025 target for Hackbridge becoming a One Planet borough. Economic pressures are one of these; tight budgets are the most prolific problem mentioned especially within the last few years as a result of the economic downturn (Interviewee X, 2013; Interviewee A, 2013). With financial budgets being reduced, there is less funding behind projects so resources such as staff are limited. Projects like the HOH and the strategies for OPL in Hackbridge become an extremely time intensive process for local authorities, particularly officers (BioRegional Development Group and Sutton Council, 2011). The involvement of the NDG also means that there is an increase in stakeholders opinions and views to take onboard through the decision making process, further enhancing the time and financial constraints. This increases the risk of 'neighbourhood planning fatigue' where the stakeholders could tire before the hardware aspects reach completion (BioRegional Development Group and Sutton Council, 2011; Interviewee Y).

The Felnex Development is another redevelopment project in Hackbridge of a derelict industrial site (about a quarter of the original size of Hackbridge). The Felnex development[4] offers a large investment opportunity to the area however if it unlikely that it will adhere to the OPL Hackbridge Action Plan stating that all new builds built after 2014 must be zero carbon (Sutton Council, 2012). The higher environmental standards will be a greater upfront cost for developers and they are likely to "take their business elsewhere" (Interviewee X, 2013). This tension between stakeholders can result in a potential lock-in situation because of path dependency with the need for external financial support and development (Geels & Schot, Typology of Sociotechnical Transition Pathways, 2007). The developers in this situation provide an exemplar of a financial power that does not share the same values as the other stakeholders and puts the council under pressure to evaluate the values within this trade off. The balancing of power structures amongst stakeholder's visions is a difficult environmental challenge to manage.

This challenge is further emphasised through infrastructural change which can limit the technical capabilities for the area. One of the main concerns regarding transportation is London Road which divides the area and does not foster an inviting use of the space for the users. The infrastructural

[4] This development offers 725 residential units, a 4000 square metre foodstore, retail and office space, a community building with open space and car parking facilities and access roads (Executive Head of Planning, Transportation and Highways, 2011).

territorial domains of the road cannot be altered due to the institutional disagreement and complexity between neighbouring councils and governmental influence through Transport for London. If any structural change is to be considered there needs to be further information required on land use, transportation impact and travel plans. The Transport for London department predict that a contribution of £220,000 per year is necessary just to research a mitigation of the impact of development to the bus service in order to increase car and cycling parking and trip generation (BioRegional Development Group and Sutton Council, 2011).

5.2.4. Local Level: Hackbridge

During the observation of the area it was evident that aspects of Hackbridge are in social neglect. Some of these areas are within the 25 per cent of the UK's most deprived areas for unemployment, bad health and antisocial behaviour (National Office for Statistics, 2011).

Figure 6:Photograph of derelict building perpendicular to London Road. (Taken by author, 2013)

This creates a limitation because the basic needs of the residents who are in a situation of deprivation may not prioritise sustainability principles. Even though sustainability principles provide a long-term solution, because basic needs are not being met cheaper and quicker short term solutions may be adopted. This is highlighted for example when looking at the food options in the area; the main street has a restricted selection of options to buy healthy food, there is a convenience shop with limited selection and some fast food restaurants and a café. As one interviewee stated:

> "I'm working with a lot of the shops on the high street and we are trying to change their behaviours for example, work with the restaurant and look at their menus and see how **healthy their food** is, trying to maybe **source more locally**, think about their energy consumption and their waste and things like that. It is a real uphill battle because they literally are concentrating on the day-to-day and surviving the day-to-day. Whilst they are trying to balance getting their kids to school while trying to sort out cover in their shop, they are not thinking about for example whether PV on their roof would be an investment or not. I think you can extend that to the wider Hackbridge. People are **more concerned or more preoccupied with their finances, issues at work, issues at home, issues at school,** things that like."

(Interviewee Y, 2013)

The problem of initiating OPL like sustainable food is challenging when there are limited options and to be able to source these is both time and financially consuming. For example Figure 7. illustrates the main food shopping areas.

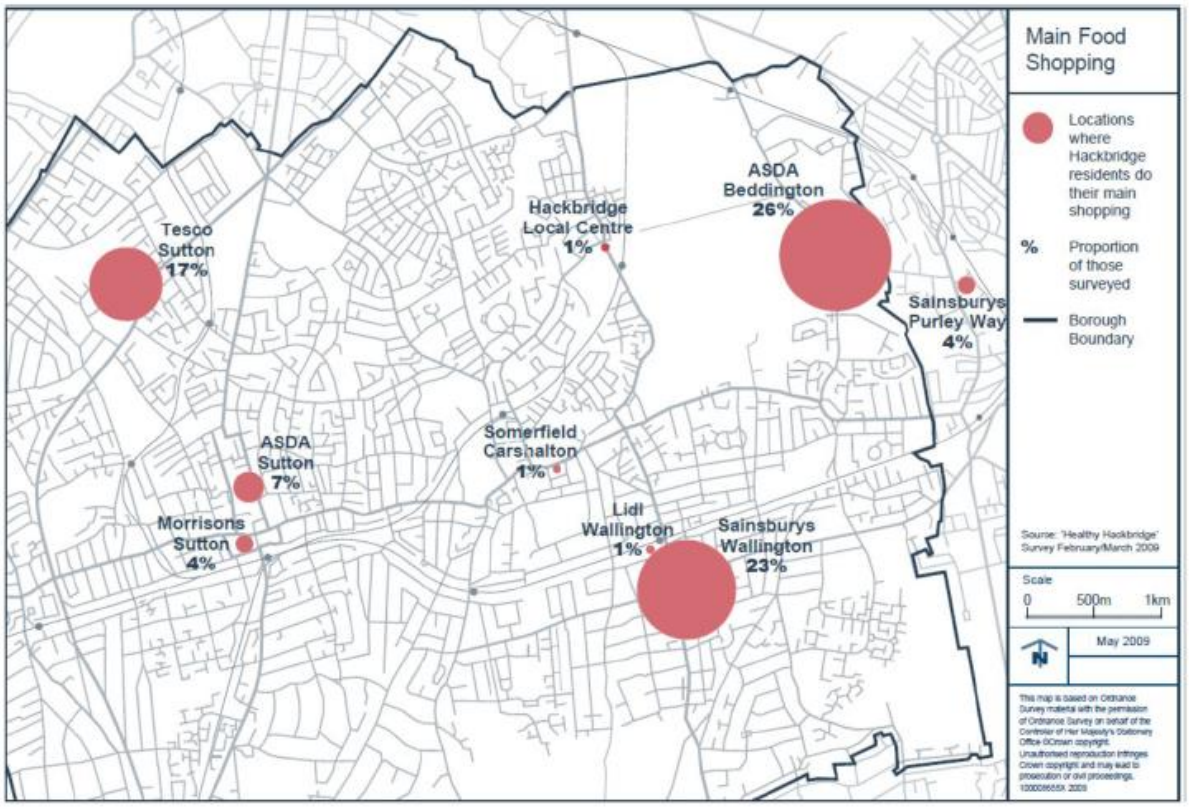

Figure 7: Location where Hackbridge residents do their main shopping (Sutton council, 2011)

Only 1% of the residents do their shopping in Hackbridge centre and the other areas are mostly accessed by car. This also makes shopping locally difficult because it does not support the local economy and access to a car is required to travel to the larger supermarkets. This is a challenge to the residents' technical capability through lack of accessibility (Hägerstrand, A Look at the Political Geography of Environmental Management, 1995; Sen, 1999).

Another limitation related to accessibility is through the work of NDG. The working group is made up on an entirely voluntary basis, the projects have long timelines, which is difficult when people cannot commit fully (Interviewee A, 2013). The working group who is effectively pushing community involvement within the development process is primarily made up of professional and educated people (Interviewee A). This shows that power relations run through the community group potentially leading to social inequality and differentiation. Also because the main avenue of information is obtained through their website Hackbridge.net, residents who do have access to a computer and/or internet are unable to access this knowledge. The NDG do not involve a broad section of the community for these reasons (Interviewee A, 2013).

5.2.5. Community Level: BedZED

The key finding between BedZED and Hackbridge was that there is a disparity between the interconnection between the integration of the two communities.

Number	Human activity enforcing territorialities
1	Fencing surrounding the sustainable development, no through flow access
2	Cars act as a second boundary, no through flow to neighbouring community
3	Entrance by footpath secluded by trees
4	Main car entrance
5	London Road: Busy 'A class' Road acting as a barrier
6	Building aesthetic does not fit with area

Table 1: Spatial components between Hackbridge and BedZED (created by author, 2013)

Upon observation, the physical boundaries are very distinct between BedZED and the neighbouring community of Hackbridge. Table 1. represents the spatial components of the case study area. The green boundary line annotates BedZED. The circled numbers illustrate the aspects of territoriality placed upon the land space.

This disconnection was highlighted by this interviewee:

> "Sometimes you feel there is a **wall** around BedZED. A **metaphorical wall**; a **forcefield** that people see a 'them' and an 'us'… in our a dealings with people in Hackbridge we have heard it referred to as 'Toytown' and 'Teletubby' land and so people don't see this as normality, it is **still very weird,** even living next door to it for 10 years they still have these pet names for it(see 6 in table 1.)… so even though they are **100 yards apart they are sort of worlds apart in many ways**, with the people who use them."

(Interviewee Y, 2013)

The interaction between the two groups does not foster an organic socialisation, which occurs naturally. This creates a social gap between the two communities; there are strong linkages between improving social interactions of residents, which tends to reinforce a sense of community, which contributes towards social well-being and builds trust (Hallsmith, 2007). This is an essential aspect within any level of power-sharing within a community. This is also problematic because if BedZED is seen as a benchmark of sustainability; the residents of Hackbridge cannot relate to it and are less likely to "to make any sort of behavioural changes over a long period of time, cause you will think that is just not me" (Interviewee Y, 2013).

6. Discussion

The preceding chapter details the findings in regards to the driving forces and constraints behind Hackbridge becoming an OPL suburb. This section will provide an analysis of the findings and offer some solutions with a focus on the meso and micro levels because this is where the small actions take place and amalgamate to create larger changes over space and over time (Hägerstrand, 1995).

6.1. Interactions related to symbolic transactions and social institutions

The results of this paper show that there is a political agenda to reach environmental goals throughout all levels of this case study. The link between austerity and the environment is well documented; however, short term solutions to long term problems do not make this link so obvious. The political driver for environmental goals is apparent in all levels as represented in Figure 5. However barriers from the macro level and the four-year political cycle to the micro with residents in Hackbridge making their daily food choices prevent these goals from being realised. This goal is impacted by a variety of factors such as economic drivers taking precedence over social values. Power relations from social construction are engrained in the system causing conflicts of interest and

resolution takes the form of lengthy negotiations each targeting the problem from their perspective (Rotmans, 2005). Rotmans (2005) defines these as 'persistent problems' which are complex because there are "multiple causes and consequences, their reach stretches beyond a wide range of societal domains and scale levels, and they are deeply embedded in our societal structures and institutions" (Rotmans, 2005: 7). Existing policies are needed however they are not sufficient when continued as *business as usual* (Ibid). There needs to be improved opportunities to accommodate local interests within regional planning (Hägerstrand, A Look at the Political Geography of Environmental Management, 1995). This opportunity has been realised in the case of Sutton with the introduction of the Localism Bill 2010 which enhances social action and community empowerment. However the experience that Hägerstrand (1995) argues is that regional policies do little towards regional development (Hägerstrand, 1995: 54). Legislation, is the fundamental instrument of governing however it is not effective unless the people affected can see the aim through their own belief and value system (Ibid).

Legislation on reducing ecological footprints has not been applied within Sutton council but a conscious aim and Action Plan towards achieving this has been established. However with economic constraints it is more difficult to fulfil these criteria. If the Felnex development project is accepted it could offer many opportunities to the area including financial investment, increased community facilities and a transformation of a derelict declining area. However there could be counter threats to the community; specifically the existing independently owned shops who may lose business to the supermarket that offers more selection, parking facilities and longer opening hours (Interviewee X, 2013; Interviewee A, 2013). There is also potential for the Felnex Development to mimic the gap created between BedZED and Hackbridge and become an isolated community. The One Planet Action Plan states that every residential and non-residential building built after 2011 should be Zero Carbon (Sutton Council, 2012). There is no mention of this occurring for the Felnex Development because the criteria is too expensive for developers and they will not fulfil to this (Interviewee X). If the Felnex Development goes ahead it could lead to a lock-in situation where the goals of Hackbridge attaining its potential to become an OPL suburb will be seriously comprised. A lock-in situation occurs when there is a continuation of *business as usual* and there is increasing path dependency where ingrained behaviour and resistance to change dominates the decision making progress (Rotmans, 2005). To manage this scenario it is useful to apply and adapt Tallis et al. (2008) framework to anticipate the outcome of how people manage ecosystem services (Tallis, Karelva, Marvier, & Chang, 2008). This work is applied specifically to biodiversity conservation and economic development but links human condition to environmental conditions, which is relevant for this case study. It anticipates if an outcome will be win-win, lose-lose or win-lose. In order to increase the likelihood of a win-win

outcome it is recommended that there should be improved scientific understanding of four main prevailing issues: sustainable use of ecosystems services, tradeoffs among different services, the spatial flows of services, and economic feedbacks (Tallis, Karelva, Marvier, & Chang, 2008). A scientific overview on the win-win outcome of the Felnex development offers a potential avenue for further research from this paper.

The most affluent groups of society are often models and trendsetters, creating ideals and desires that broad parts of the population strive to fulfil (Næss P. , 2001). In this study, this is found to be untrue; BedZED is the more affluent eco-village forefronting the ideals of sustainable living within this community but instead of creating a desire to imitate sustainability ideals it has created a dismissal; as the 'weird' and 'the other'. The areas are bound together geographically, administratively and through infrastructure such as transportation and ability to access to food, so the links are established on many other levels. A key consideration for this disengagement is the aesthetics that BedZED have adopted which are referred to as 'toytown' and 'teletubby'. There is an extreme difference between the architecture of local housing in Hackbridge and BedZED. This is one of the reasons that make it challenging using BedZED as an exemplar for sustainability as the residents of Hackbridge to not associate themselves with it. As a recommendation for further projects using 'green city' concepts such as eco-villages, sustainable architecture could be 'normalised', if it wants to be incorporated into the fitting of its surrounding area (for example, within a residential suburban area). The physical form and boundaries of an area are almost static and the domains of the public superstructure are rigid, however the actors within the area are mobile (Hägerstrand, 1995). There is a differentiation between the two communities of BedZED and Hackbridge, however there is an opportunity to increase the social spatial distance between the two communities.

6.2. Actors Technical Capability

6.2.1. Sustainable Transportation and Food System

The critical link between human society and its living content is contained in the parcelling of land, water and air in spatial terrains (Hägerstrand, A Look at the Political Geography of Environmental Management, 1995). Further influences are hindered through the public transportation spaces on land (Ibid). The main hindrance for the case study is London Road which is the busy main road that divides BedZED and Hackbridge, provides access to the train and tram station, is the main route for cars that move in to the city of London and out towards Brighton and is where the local shops are located. The links between transport and health are well established especially in concern with accessibility that is offers to fresh food, information and healthcare services (Hull, 2008).

Transportation is also a spatial component by examining the space in which the components, actors, infrastructures occur between the origin and final destination (Couclelis, 2000). Hull (2008) defines a sustainable transport system as one that allows the basic access needs and development of individuals, companies and societies to be met safely which limits emissions and waste within the planet's ability to absorb them, which is in line with the One Planet Living principles (Hull, 2008:95). Sustainable transportation is "closely associated with mobility, accessibility, urban form and function, environmental quality, and social and economic life" (Couclelis, 2000:342). On the macro- scale transportation services are a measure of the structural efficiency of the urban area.

In the case of London Road, the infrastructure itself cannot be altered in the traditional engineering approach due to institutional constraints, therefore the road space should be managed (Hull, 2008). The road space can be 'greened' with planting of trees, smoothing out the distinction between motor traffic, bicycles and pedestrians and speed bumps will be added to encourage traffic to move slower (Interviewee A, 2013; Interviewee Y, 2013; Hull, 2008). These 'soft' measures improve the *Place Making* of the area and it can become more user-friendly this is beneficial however a key issue that still needs to be incorporated is accessibility. Accessibility is a critical consideration for actors to obtain the opportunity to access services they may need and increase their technical capabilities. As Hackbridge is an area within the 25 per cent most deprived in UK it is imperative that equity is addressed in order to allow actors the opportunity to reach their capability (Sen, 1999). Transportation also allows for flows, networks and channels to move throughout the urban space, which is a critical element in the management of complex systems. The integration of sustainable transportation is integral to achieving access to source local, seasonal and organic produce food.

6.2.2. Community participation

The 'break' for localism through legislation is a key contributor to alter the societal structure and allows the actors on the ground level to have more power and control to increase the actors' technical capability (Hägerstrand, A Look at the Political Geography of Environmental Management, 1995; Rotmans, 2005). The establishment and work of the NDG is an example of what is attainable when communities are given the power and responsibility to define their own community (Interviewee A, 2013). The community group has been institutionalised in order to emphasise empowerment, trust and learning, this is an example of stakeholder participation, which is a key component for sustainable development (Reed, 2008).

NDG foster a multidisciplinary approach with different working members having a variety of professional backgrounds yet they have a shared interest; to improve their community. This is a passive form of cooperation where knowledge sharing is a central concept (Rotmans, 2005). The

group also practices a trans-disciplinary approach through the knowledge and expertise they have gained from Sutton council and other external training from consultants. While they offer advice and knowledge they do not interfere with proceedings, it takes a collaborative approach using the contributions to produce their final plan (Interviewee A, 2013; Rotmans, 2005). This also increases the web of networks that the NDG have.

However, the results show that the NDG represent only a small sample of the community, predominantly professionals. This means that there are still a number of residents who are constrained to reach their technical capability through lack of education both through educational background and potential to gain more. This becomes a positive feedback loop, by not having education you are limited to access the opportunities which will enhance ones education. The NDG exercise a co-existence power relation to the rest of the members of Hackbridge: NDG mobilise more resources but both have goals to improve their neighbourhood (Avelino & Rotmans, 2009). These strategies are determined by the skills, access to resources and willingness to fulfil these (Ibid). In order to empower the rest of community, knowledge is a requirement as it relates directly to the conditions of power. Avelino and Rotmans (2009) state that by "gathering knowledge, it makes knowledge (on how to exercise power) a meta-condition for the exercise of power" (Avelino & Rotmans, 2009: 559). This is an example of another positive feedback but as a means to gain empowerment opposed to an antagonism power relation (Ibid). With increased knowledge it also allows a space for reorientation of values which is required to manage environmental change (Hägerstrand, 1995). This is also required to 'underpin legislation in order to make it understandable and acceptable' to the aims of the individual (Hägerstrand, 1995:45).

Pride was a concept that came up within a number of interviewees, in order to generate something that all actors were proud of creating. As one interviewee stated:

> 'We need to deliver something to the GLA (Greater London Authority) that they are proud of, We need to deliver something that the Sutton Council are proud of and also give something to the community that they can use and are happy with.'

(Interviewee Y,2013)

Lefebvre (1970) refers to this in his discussion on levels and dimensions when analysing urban phenomenon. He states there is no reason for adults to behave proudly because they have already reached maturity which he sees as an endpoint in terms of "finality, meaning, accomplishment, perfection, term, termination and conclusion" (Lefebvre, 2003:84). He sees childhood, adolescence and young adulthood as incomparably richer than adulthood because they have the largest form of

wealth: possibility (Lefebvre, 2003). However what the mature members can offer is knowledge on their experiences.

6.3. Solutions to Optimise Sustainability

In order to address the third research question some solutions will be efficiently offered as a means to optimise sustainability practices. Figure 8. is an adaptation of Figure 5. to show the disconnects that can be resolved between meso and micro levels.

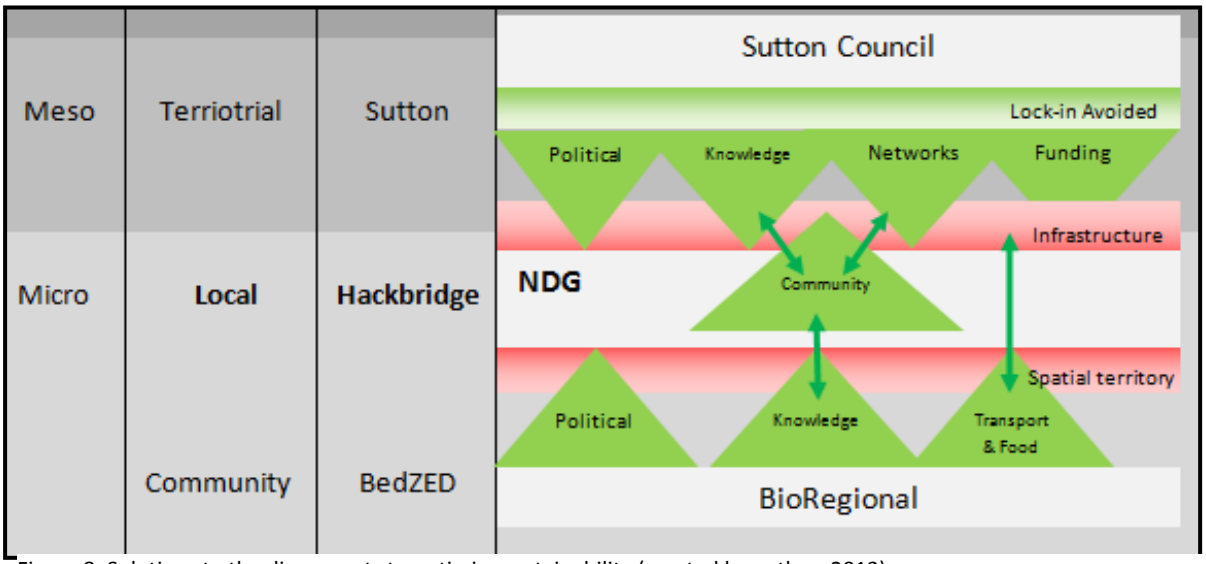

Figure 8: Solutions to the disconnects to optimise sustainability (created by author, 2013)

- Avoid lock-in

Large financial inputs from developers, who do not share goals of sustainability, create a trade-off scenario for Sutton council. Continuation of large unsustainable development will hinder Sutton's aim to reach OPL principles through an economic lock-in. Solutions to this would be to source developers with likeminded goals. Alternatively legislation is the instrument to governing and therefore legal requirements could be applied to the sustainable goals. For example code level 3 for Code for Sustainable Homes is built into building regulations for energy efficiency, so new build must adhere to certain sustainable criteria. Legislation is a long progress however it is an alternative route to consider to move away from 'business as usual'.

- Community Empowerment

The community group have been a driving force throughout the whole project and the recipe for success has many ingredients. Figure 9. sums up the key ingredients that make this process work. In the case of the NDG, they could improve their work primarily through inclusivity and accessibility.

The NDG core age is between 30-40 years however there is a collection of people who are above 65 years (Interviewee A, 2013). This provides an opportunity within the NDG for a youth group to be established to provide a voice for the younger generations. The process of achieving sustainable development must be inclusive and equitable and by giving the younger members of society an opportunity to be involved in the decision making process the goals of sustainable development are more likely to be reached. If these actors are included in the decision making progress it further progresses towards common goals throughout generations, while enhancing networks and social capital (Habermas, 1984). If younger members of society were to partake in the NDG they would have increased knowledge and understanding in the process and what it entails, increasing the likelihood of empathy and the continuation of projects.

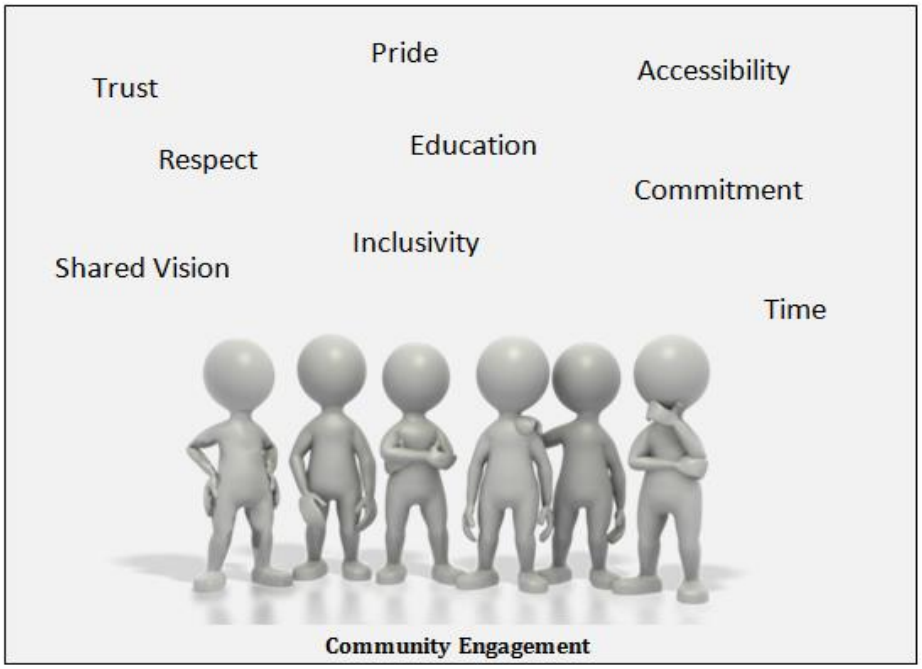

Figure 9: Components needed for successful community engagement (created by author, 2013**)**

- Transportation and Food

As the infrastructure in an increasing difficult component to change, management of how the road is used is an alternative to adapting the physical features. Urban planning measures can encourage a reconfiguration of road space which encourages simpler modes of transportation by walking and cycling. As discussed in the results section the physical boundaries of BedZED are not very inclusive for the rest of the region of Hackbridge. As a solution while the development of London Road is undertaken the concepts of *Place Making* can be applied to the development of BedZED creating an opportunity to interact and merge the sociality of the two communities. Place-making offers a form of work between urban planning, design and social sciences. It aims to move from co-existence to

integration by using interdisciplinary practices to understand the relationship between space and society. Forms of research span from 'The Human Scale' work by Gehl Architects on public spaces to MIT SLAB which focus on the public space of pavements and how they are used. The urban infrastructure is fairly static but how the space is used can hugely affect mobility and use. This in turn can connect and link up to a network of food shopping facilities that offer local and healthy food that is accessible through other means than car. As one resident stated even if getting to the shops is easier then you have to travel back to your home with shopping; issues like this need to offer flexible solutions such as home delivery services. For example, a concept that is fun, practical and innovative; bringing the Christiania bikes to Hackbridge. The cargo bike could be rented or offered as a service from the high street to bring shopping back to people's homes within a certain distance.

These solutions offer tangible actions that can optimise sustainability however a fundamental shift needs to happen across all levels but comes from a change in the cultural norms. These needs to be adapted to 'normalise' sustainability and will take time to infiltrate. The residents at BedZED stated after moving in to the development they felt like they were living in the future but within a week it felt 'normal'. This is an extreme example but is used to show how quickly humans can adapt to their environment even through behaviour change.

In Figure 5. the disconnects between levels (highlighted in the figure by the red dotted line) was defined as a barrier between political decisions made in the macro scale and how they affect the real-life context in the micro. A multi-level perspective therefore should take into consideration level jumping as a form to optimise sustainability. The example of BedZED gaining international success caused a level jump from the micro to the macro. This potentially could be achieved by Hackbridge if they can avoid a lock-in and facilitate a sustainable transition. As GLA play a strong role in monitoring the success and exchanging experiences of smaller projects across London, they could use this at a vantage point to achieve national and even international success. This would create new spaces for funding opportunities, knowledge sharing and networking.

6.4. Further Considerations

6.4.1. Up-scaling of project

This project shows the strength that community involvement can achieve in decision making for urban panning within this area. London is affectionately known as a city of villages however due to its size there is a differentiation between the outer and inner areas. Outer London has been described as the rejection area of the city; "problematic, unsustainable and socially exclusive and as static places worthy of little attention" (London School of Economics, 2011). However the relationship between inner and out London is one of dependency. Outer London houses the majority of the

London population and is key to the infrastructure of the city as a whole. Outer London's success is attributed to its flexibility and strong community ties and there is much to learn from the changes that the demographic of the communities can achieve (Ibid). Despite every case being context specific, the framework for the success of this case study can be applied to other London suburbs as whole. Hackbridge can be used as a frontrunner to show that community groups can have an impact on the future of their region. Solutions provided in this paper such as involving younger actors in the decision making process can be applied to maximise the efficiency of projects. As Hägerstrand (1995) states the importance of studying actions at this level is emphasised by discovering the effects and side-effects that the involved actors have because global change is not the "outcome of a few human actions of an immense scale, it is nearly the incalculable number of small actions which pile up to create major changes in space and over time" (Hägerstrand, 1995:37). This offers London the opportunity to reach its goals in sustainable development and a contribution towards the same development on a national level.

6.4.2. Validity of data collection

It was difficult to obtain interviews because as discussed many of the actors have limited resources in regards to time. Many interviewees' could not commit especially within the council, due to resource restrictions such as time. It would be beneficial if this research was completed in collaboration with the key actors. A common criticism in using a single case study is that it may not represent the generalization of a phenomenon (Punch, 2005; Yin, 2009). This case study has been supported with theoretical grounding to strengthen the findings.

6.4.3. Further Research

This paper gives a review of the process to date yet because of inertia, changes within the urban environment can alter the outcomes (Hägerstrand, 1995). Therefore it would be interesting to make this a longitudinal study. An offer for further research within this specific case would be to apply a scientific analysis on the aim to achieve a win-win outcome for sustainability with the proposed Felnex development, focused on sustainable urban development but based on similar approaches by Tallis et al. (2008). Alternatively further research could be undertaken on broader spectrum within the realm of sustainable urban planning. What this study has shown is that the concept of a specifically targeted sustainability rich area (BedZED) can affect the neighbouring region through a contribution from driving forces across multi-levels. A recommendation would be to examine more sustainable communities to assess if a network can be linked through urban greenways to promote a bridging point between the concepts of a 'green city' and 'compact city'.

7. Conclusion

This research has explored the facilitation of an urban area becoming a sustainable suburb by using Hackbridge as a case study. A multi-level perspective was applied with a spatial component to assess the main driving forces and constraints to this transition being successfully implemented. This research suggests that for the transition to take place, there needs to be a shared political agenda towards environmental goals, however, these can be comprised by shorter term development projects that provide funding options. To avoid a 'lock-in' situation the symbolic transactions and social institutions have been analysed with a focus on the meso and micro levels. For Hackbridge to reach a successful transition, this paper provides solutions by increasing the actors technical capabilities by encouraging an inclusive civil society to empower the community and enhancing accessibility to sustainable principles such as transportation and sustainable food. The spatial analysis shows infrastructure is inflexible to change due to financial constraints and spatial difficulties because of current land use. Urban planning strategies such as 'place making' offer a way to manage this component so actors can increase their opportunities and reduce levels of social deprivation. If Hackbridge can overcome these barriers and use the strengths of its civil society and neighbouring community of BedZED, a successful transition into a sustainable suburb will be more probable. The findings from this case study can encourage a network of similar projects to achieve sustainability across meso and micro levels which are linked under the macro level to contribute to the wider field of sustainable urban development within London.

8. References

Archer, M. S., & Elder-Vass, D. (2012). Cultural System or norm circles? An exchange. *European Journal of Social Theory*, 93-115.

Audsley, E., Brander, M., Chatterton, J., Murphy-Bokern, D., Webster, C., & Williams, A. (2009). *How low can we go? An assessment of greenhouse gas emissions from the UK food system and the scope to reduce them by 2050.* FCRN-WWF-UK.

Avelino, F., & Rotmans, J. (2009). Power in Transition: An Interdisciplinary Frameowrk to Study Power in Relation to Structural Change. *European Journal of Social Theory (12)*, 543-571.

BioRegional. (2013). *BioRegional.* From BioRegional's background: http://www.bioregional.co.uk/about-us/our-history/

BioRegional Development Group. (2009). *BedZED seven years on. The impact of the UK's best known eco-village and its residents.* Surrey : BioRegional Development Group.

BioRegional Development Group. (2013). *Heart of Hackbridge Consultation Feedback:A summary of results gained from Heart of Hackbridge consultations to date.* Surrey: BioRegional Development Group.

BioRegional Development Group. (2013, May 2). *What is One Planet Living*. Retrieved from One Planet Living: http://www.oneplanetliving.net/what-is-one-planet-living/

BioRegional Development Group and Sutton Council. (2011). *Creating a sustainable district centre in Hackbridge.* London: BioRegional Development Group and Sutton Council.

Brundtland Commission. (1987). *Our Common Future.* Oxford/New York: Oxford University Press.

Bryman, A. (2008). *Social Reserach Methods. Third Edition.* New York: Oxford University Press.

Cash, D., W., A. N., Berkes, F., Garden, P., Lebel, L., Olsson, P., et al. (2006). Scale and Cross-Scale Dynamics:Governance and Information in a Multilevel World. *Ecology and Society 11(2)*, 8.

Coenen, L., & Truffer, B. (2012). Places and Spaces of Sustainability Transitions: Geographical Contributions to an Emerging Research and Policy Field. *European Planning Studies 20:3*, 367-374.

Coenen, L., Benneworth, P., & Truffer, B. (2012). Toward a spatial perspective on sustainability transition. *Research Policy 41*, 968-979.

Couclelis, H. (2000). From Sustainable Transportation to Sustainable Accessibility: Can We Avoid a New Tragedy of the Commons? In D. G. Janelle, & D. C. Hodge, *Information, Place, and Cyberspace: Issues in Accessibility* (pp. 341-355). Berlin: Springer.

David Cameron. (2010, 19-July). *Speech. David Cameron: Our Big Society Agenda.* From Conservatives.com: http://www.conservatives.com/News/Speeches/2010/07/David_Cameron_Our_Big_Society_Agenda.aspx

Denzin, N. K. (1978). *The Research act: A theoretical introduction to sociological methods.* New York: Praeger.

Department for Transport . (2010). *Factsheet: UK Transport Greenhouse Gas Emissions.* Retrieved August 5, 2013, from Gov.UK: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3085/41.pdf

Department of Energy and Climate Change. (2013, June 13). *Policy. Reducing the UK's greenhouse gas emissions by 80% by 2050*. Retrieved from Gov.uk: https://www.gov.uk/government/policies/reducing-the-uk-s-greenhouse-gas-emissions-by-80-by-2050/supporting-pages/carbon-budgets

Department of Local Communities and Local Government. (2010). *Land Use Change Statistics (England) 2009.* Department of Local Communities and Local Government.

Desai, P. (2008). Creating Low Carbon Communitites: One PLanet Living Solutions. *Globalizations 5:1*, 67-71.

Executive Head of Planning, Transportation and Highways. (2011 йил 11-May). Planning Permission for Felnex Trading Estate. Development Control Committee.

Foster, C., Green, K., Bleda, M., Dewick, P., Evans, B., Flynn, A., et al. (2006). *Environmental Impacts of Food Production and Consumption: A report to the Department for Environment, Food and Rural Affairs.* London: Manchester Business School with Defra.

Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy 31*, 1257-1274.

Geels, F. W., & Schot, J. (2007). Typology of Sociotechnical Transition Pathways. *Research Policy 36*, 399-417.

Gibson, C., Ostrom, E., & Ahn, T. K. (2000). The concept of scale and the human dimensions of global change:a survey. *Ecological Economics 32*, 217-239.

Greater London Authority. (2009, May). *GLA Group Corporate Governance Framework Agreement.* Retrieved from Greater London Authority:governing the organisation: http://www.london.gov.uk/sites/default/files/group-framework_0.pdf

Greater London Authority. (2013). *Mayor and Assembly*. Retrieved July 30, 2013, from London.Gov.UK: http://www.london.gov.uk/mayor-assembly

Greater London Authority. (2013, 20-July). *Reducing London's Carbon Footprint*. From Greater London Authority: http://www.london.gov.uk/priorities/transport/vision-strategy/reducing-london-s-carbon-footprint

Habermas, J. (1984). *Reason and the Rationalization of Society, Vol 1. of The Theory of Communicative Action.* Boston: Beacon Press.

Hägerstrand, T. (1995). A Look at the Political Geography of Environmental Management. In A. Buttimer, *Sustainable Landscapes and Lifeways:Scale and Appropriateness* (pp. 35-58). Sterling, VA: Cork University Press.

Hallsmith, G. (2007). *The key to sustainable cities.* Gabriola Island: New Society Publishers.

Hull, A. (2008). Policy integration:What will it take to achieve more sustainable transport solutions in cities? *Transport Policy 15*, 94-103.

Jacobs, J. (1961). *The Death and Life of Great American Cities.* New York: Random House.

Kates, R. W., Clark, W. C., Corell, R., Hall, J. M., Jaeger, C. C., Lowe, I., et al. (2001). Sustainability Science. *Science vol. 292*, 641-642.

Lefebvre, H. (2003). *The Urban Revolution.* Minneapolis: University of Minnesota Press.

London Borough of Sutton. (2013, July 12). *Hackbridge Master Plan. Chapter 7: One Planet Living Principles.* Retrieved from Sutton Gov.Uk: http://www.sutton.gov.uk/CHttpHandler.ashx?id=4373&p=0

London School of Economics. (2011, Autumn). *Inner and outer London:a tale of two cities?* Retrieved August 6, 2013, from LSE: Briefing: http://www.lse.ac.uk/geographyAndEnvironment/research/london/events/HEIF/HEIF4b_10-11%20-newlondonenv/briefs/mace.pdf

Manson, S. M. (2001). Simplifying complexity:a review of complexity theory. *Geoforum 32*, 405-414.

Manson, S. M. (2008). Does scale exist? An epistemological scale continuum for complex human-environment systems. *Geoforum 39* , 776-788.

Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: An emerging field of research and its prospects. *Research Policy 41*, 955-967.

Michener, W. K., Baerwald, T. J., Firth, P., Palmer, M. A., Rosenberger, J. L., Sandlin, E. A., et al. (2001). Defining and unraveling biocomplexity. *Bioscience 51 (12)*, 1018-1023.

Næss, P. (2001). Urban Planning and Sustainable Development. *European Planning Studies, Vol. 9, No. 4*, 503-524.

Næss, P. (2001). Urban Planning and Sustainable Development. *European Planning Studies, Vol. 9, No. 4*, 503-524.

Næss, P., & Vogel, N. (2012). Sustainable urban development and the multi-level transition perspective. *Environmental Innovation and Societal Transitions 4*, 36-50.

National Office for Statistics. (2011, March 1). *Neighbourhood Statistics.* Retrieved from Neighbourhood Statistics- 2011 Census Sutton: http://www.neighbourhood.statistics.gov.uk/dissemination/NeighbourhoodSummary.d

o?a=7&b=6275269&c=SM6+7EN&g=346282&i=1001x1012x1013&j=6286627&m=1&p=2&q=1&r=0&s=1373989083066&enc=1&tab=1&inWales=false

National Office for Statistics. (2013, July). *Neighbourhood Statistics:About the Dataset.* Retrieved from Neighbourhood Statistics: http://www.neighbourhood.statistics.gov.uk/dissemination/LeadMetadataDownloadPDF.do?downloadId=29720

Neale, P., Thapa, S., & Boyce, C. (2006). *Preparing a Case Study:A Guide for Designing and Conducting a Case Study for Evaluation Input.* Watertown: Pathfinder International.

Punch, K. (2005). *Introduction to Social Research (2nd Edition).* London: SAGE .

Reed, M. S. (2008). Stakeholder participation for environmental management:A literature review. *Biological Conservation 141*, 2417-2431.

Rees, W., & Wackernagel, W. (2012). Urban Ecological Footprints. In J. Lin, & C. Mele, *The Urban Sociology Reader* (pp. 158-170). London: Routledge.

Rockström, J., Steffan, W., Noone, K., Persson, A., Chapin, S., Lambin, E., et al. (2009). Planetray Boundaries:Exploring the Safe Operating Space for Humanity. *Ecology and Society 14(2)*, 32.

Rotmans, J. (2005). *Societal Innovation:between dreams and reality lies complexity.* Rotterdam: Erasmus Research Institute of Management.

Rydin, Y., Holman, N., Hands, V., & Sommer, F. (2003). Incorporating sustainable devlopment concerns into an urban regeneration project:how politics can defeat procedures. *Journal of Environmental Planning and Management 46:4*, 545-561.

Sen, A. (1999). *Development as Freedom.* Oxford: Oxford University Press.

Shen, L.-Y., Ochoa, J., Shah, M., & Zhang, X. (2011). The application of urban sustainability indicators- A comparison between various practices. *Habitat International 35*, 17-29.

Smith, A., Voß, J.-P., & Grin, J. (2010). Innovation studies and sustainability transitions: The allure of the multi-level perspective and its challenges. *Research Policy 39*, 435-448.

Sutton Council. (2012). *One Planet Sutton.* Sutton: Sutton council.

Tallis, H., Karelva, P., Marvier, M., & Chang, A. (2008). An ecosystem services framework to support both practical conservation and economic development. *PNAS vol. 105 no.45*, 9457–9464.

Transort for London. (2013, July 11). *Transport for London.* Retrieved from Transport for London. Getting Around: http://www.tfl.gov.uk/gettingaround/default.aspx

Turcu, C. (2012). Local experiences of urban sustainability: Researching Housing Market Renewal interventions in three English neighbourhoods. *Progress in Planning 78*, 101-150.

UN Habitat. (2007). *Urbanization:Facts and Figures*. Retrieved August 1, 2013, from UN Habitat: www.unhabitat.org/mediacentre/documents/backgrounder5.doc

United Nations. (2013). *United Nations Sustainable Development Knowledge Platform*. Retrieved from http://sustainabledevelopment.un.org/index.html

WRAP. (2012). *Love Food Hate Waste*. Retrieved August 8, 2013, from About Food Waste: Love Food Hate Waste: http://england.lovefoodhatewaste.com/content/about-food-waste-1

WWF. (2006). *Living Planet Report.* Cambridge: BANSON Production.

Yin, R. (2009). *Case Study Reserach Design and Methods, Fourth Edition.* California: SAGE Publications.

9. Appendices

APPENDIX A-Table representing Interview Respondents

Name*	Association	Type of Interview[O]	Length of Interview (mins)
Interviewee X	BioRegional	Direct	57
Interviewee Y	BioRegional	Direct	57
Interviewee Z	Sutton Council	Email Correspondence	-
Interviewee A	Resident & member of Community Group	Skype	31

*Names of Interviewees have been altered to protect the identity.

[O] Transcribed Interviews available on supporting CD.

APPENDIX B-Pictures of Site

Hackbridge Community Board

Existing cycle path on London Road

BedZED development

HOH project to clean up Mile Road