A social capital approach to household energy consumption

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Keywords
social capital, energy consumption, households, social networks

Abstract
This paper examines the concept of social capital in relation to household energy consumption in an effort to further understand social influences on energy use in the United Kingdom. The considerable focus on building science and technology notwithstanding, it is widely recognised that social factors influence energy use at the household level. Much of the research on changing behaviour has focused on influencing individual actions. Whilst promoting changes in individual behaviour is important, social level analysis provides a broader framework for understanding householder energy use. Social capital broadly refers to the social resources available through networks, social norms and associated levels of trust and reciprocity. The literature of energy, in the form of environmental protection and consumption, is investigated here with regards to social capital to determine the utility of any theoretical and empirical relationship. It is argued that insights from the associations of social and energy consumption can assist energy efficiency practitioners and researchers in understanding the broader social framework that underpins household energy use, but that more robust empirical research is necessary.

Introduction
The domestic sector in the UK accounts for approximately 30 % (DTI 2006) of final energy consumption and 27 % (40MtC) of the countries carbon dioxide emissions (Defra 2002). While transport accounted for a larger slice - 36 % of final energy use – the domestic sector contributed more than either industry (21 %) or services and agriculture (13 %) (DTI 2006). According to the UK Parliamentary Office of Science and Technology (POST 2005), approximately one-third of the energy used in UK housing is wasted. As this inefficiency leads to unnecessary greenhouse gas emissions and wastage of energy resources, the UK Government wants to tackle the problem.

The UK Government's main energy goals are to reduce greenhouse gas emissions, maintain a secure energy supply, keep people warm, and promote competitive energy markets (DTI 2003). Using less energy is "the cheapest, cleanest and safest way of addressing our energy policy objectives," (*ibid,* p.16). There are approximately 15 pieces of EU and UK legislation addressing energy efficiency (POST 2005), including the UK's national priority areas of the Energy Efficiency Commitment (EEC) and Building Regulations. The focus of these pieces of legislation have yielded successes, such as the first phase of EEC (which required energy suppliers to incentivise energy efficiency in their customers) surpassing its 2002-2005 target by more than 40 % (Ofgem 2005). However, despite improvements, particularly in the number of houses insulated and the efficiency of energy-using devices, household energy consumption is steadily increasing in the UK (DTI 2006).

It is generally recognised that there are two barriers to energy efficiency implementation in the domestic sector: technology and behaviour (POST 2005). Focusing on the latter, many studies and government programmes have sought to investigate and influence energy behaviour. Frustratingly, results find little predictability between attitudes and actions (Aune, Berker et al 2002; Wilhite, Shove et al 2000). Having an income to afford the cost of energy efficiency fixes may be responsible for action

on reducing energy consumption. However, even those with similar incomes (and houses of similar building fabric) can show considerable difference in energy use (Lutzenhiser 1993; Aune, Berker et al. 2002) which means ability to afford energy saving measures does not necessarily influence efficiency. Wilhite, Shove et al (2000) point out that energy consumers are less concerned about price or cost-minimisation than about comfort and convenience. As norms of comfort, convenience and cleanliness change, energy use can change. For example, Shove (2004) points out that the number of times householders do laundry has increased five-fold in the UK and the USA – not because of an increase in the dirtiness of clothes, but because of changes in what is 'normal' regarding having clean clothes. The social processes of creating and maintaining norms is complex. Social capital may be an appropriate and useful tool to examine how social norms, social networks and the associate levels of trust and reciprocity, interact with variables that affect household energy use, with focus on influences that underlie social interactions between people and technology and their environment. As well, notions of 'taste', lifestyle and cultural capital have significance in contemplating reasons for these 'normalities'.

Using a social approach with the concept of social capital, this paper examines questions regarding household energy use: does a positive relationship exist between social capital and household energy consumption?

Though there are many studies on energy consumption and social capital, there do not appear to be any that empirically attempt to directly examine a link between them. This paper examines the theoretical background of the relation of social capital and energy consumption, attempting to see if the theorised relationship is evident, and further examines the UK implications for policy and practitioners.

Social capital and energy consumption

> "*We have always said that human capital is at the core of the new economy. But increasingly it is also social capital that matters too – the capacity to get things done, to co-operate, the magic ingredient that makes all the difference.*"
> – Tony Blair, UK Prime Minister, NCVO annual conference 1999[1]

Though the term was coined relatively recently, 'social capital' has become quite popular amongst academics and policy-makers. The Performance and Innovation Unit of the UK's Cabinet Office addressed the policy options for social capital in the UK (PIU 2002). The Office of National Statistics implemented the Social Capital Project, a research programme that established and agreed a set of harmonised themes and questions on social capital to be used across government, which have been fully or partially implemented in a number of national surveys (Harper 2001). The resulting 'Question Bank' allows researchers to examine and use the identified survey questions for social capital measurement across many national surveys. Internationally, the Organisation for Economic Co-operation and Development has recognised the impact that social capital can have on societal well-being (Cote and Healy 2001). The World Bank (2004) also supports the social capital concept as a means to alleviating poverty and working for sustainable social and economic development.

WHAT IS SOCIAL CAPITAL?

Social capital broadly refers to the social resources available through networks, social norms and associated levels of trust and reciprocity. Social networks can be informal or formal. Norms are the modes of thinking and acting expected in daily life and are socially created in the context of a given culture. Trust encourages people to act in ways that may put them in vulnerable positions, and reciprocity is the expectation that there will be repercussions for trust, actions, etc (Devine-Wright, Fleming et al 2001).

The underlying concept of social capital is not new. The idea of being involved in community life, organisations, and trusting a neighbour – or even a stranger – are concepts that people understand. As well, prominent social scientists such as Durkheim and Marx discussed similar substantive issues without directly mentioning 'social capital' (Portes 1998). The concept was popularised in the 1980s and 1990s, through the influence of a number of social scientists, notably Pierre Bourdieu, James Coleman and Robert Putnam. Bourdieu and Coleman discussed the fungibility (or exchangeability) of social capital with other types of capital, notably economic and human capital. Putnam states that there are different types of capital, notably bonding, bridging and linking social capital. Bonding social capital is exclusive, existing in close relationships (e.g. among family members). Bridging social capital extends to larger social networks, is inclusive and useful for information diffusion. Linking social capital is similar to bridging, but extends vertically across socially stratified hierarchies.

Putnam, in particular, enlivened the discussion of social capital with his work *Bowling Alone: The collapse and revival of American community* (2000), drawing the title from the rising number of Americans who bowl alone rather than in group leagues. His research studied levels of trust and organisational and civic involvement of Americans from the 1960s onwards, using existing social survey data. He found that the numbers of people involved in organisations and civic activities (i.e. social capital indicators) had dwindled since the 1960s, and that where social capital had decreased, those people experienced lower employment, a decline in health and happiness, and were less safe (Van Rooy 2001). Though Putnam has been criticised over the direction and causes of social disengagement (Van Rooy 2001), he was instrumental in inspiring research and policy interest through his own work in Italy on civic life and social capital (Putnam 1993) and the USA (2000) and the 'Saguaro Seminars' which brought together key thinkers to address social capital and communities (Halpern 2005).

Seeking to understand the implications of Putnam's work in the UK, Hall (1999) studied UK and international surveys from the 1950s to 1990s, examining rates of organisational membership, charitable giving, and social trust. He found, unlike Putnam's findings in the USA, a more robust state of social capital. Organisational memberships in the UK were at similar, or slightly higher, levels in the 1990s compared as to the 1950s, though did exhibit a widening disparity between social classes. He attributes any rise to better access education,

1. http://www.ncvo-vol.org.uk/press/speeches/index.asp?id=2481

declining rigidity in class structure and government support of community involvement (Grenier and Wright 2006). However, Hall did find that levels of social trust had fallen, with differences appearing to exist between generations, i.e. younger people had lower levels of social trust. His explanation rests on what he sees as the increase in individualism, particular during Thatcher's leadership in the UK. Grenier and Wright (2006), in their research and review of Hall's and other authors longitudinal measurements of social capital indicators (such as organisational membership, trust, etc.), believe that the decline and social class disparity is actually much more drastic. They indicate that forms of organisational participation are concentrated mainly in the middle classes, and emphasise that "the benefits of strong social capital will not be realized by a society where some are highly networked participants and others are left outside to cope on their own" (p.50).

The concept of social capital has its critics. Fine (2001) criticises it as a "chaotic, ambiguous, and general category that can be used as a notional umbrella for almost any purpose" (p.155). Critics and proponents alike highlight the lack of clarity in the definition of social capital, often questioning whether social capital is 'capital' (addressed below), and noting lack of standardisation in testing for the concept. In addition, as Portes (1998) indicates, social capital may simply be a "label for the positive effects of sociability," but concludes that it still "has a place in theory and research" (p.22). Broadly, social capital research must be undertaken carefully, with precision in measurement and definition to clearly understand the consequences and make a case for social capital. This search for clarity is still ongoing in research, though the Question Bank developed by the Office of National Statistics in the UK has tried to address various models and indicators in their resulting matrix.

Bearing in mind the need for careful definition, measurement and analysis, it is argued here that social capital may be an appropriate and useful concept in considering diverse influences that underlie social interactions between people and their use of energy. Why social capital? As Portes (1998) summarises:

> *"The novelty and heuristic power of social capital come from two sources. First, the concept focuses attention on the positive consequences of sociability while putting aside its less attractive features. Second, it places those positive consequences in the framework of a broader discussion of capital and calls attention to how such nonmonetary forms can be important sources of power and influence …"* (p.2).

As alluded, social capital is seen as a 'good' thing, promoting social cohesion; lower levels of social capital are associated with higher crime rates (Lochner, Kawachi et al. 1999), higher levels of social capital are associated with better health and well-being and good economic performance (Halpern 2005; Hall 1999). However, there are instances where social capital does not promote broad social cohesion, and is considered a club good rather than a public good (Portes 1998). Old boys' networks, groups that exclude women and minorities, and, more extremely, the Mafia, can use social capital as a club good, which is non-inclusive, socially disadvantages people and can have negative effects. Non-socially cohesive outcomes of social capital are seen as 'perverse effects,' the 'dark side' of social capital (Field 2003). Policy-makers obviously prefer the 'good' effects of social capital, its ability to support social cohesion and the well-being of a community or nation. The warning here is that those studying, measuring, utilising or stimulating social capital must be very careful to understand that social capital can have 'good' (socially cohesive) outcomes, but can just as likely promulgate exclusionary – or flat out negative – effects.

LINKS BETWEEN TYPES OF CAPITAL

More commonly, social capital may likely trigger ideas of other types of capital, notably economic or financial capital (monetary wealth) and even human capital, a term popularised in the 1960s by policymakers referring to individual skills and knowledge (Coleman 1990; Schuller 2001). Other types of capital include cultural capital, which consists of social prestige (expressed in taste and 'distinction'), gained through knowledge, education and skills. Cultural capital is closely related to social capital, as it can either be acquired through social networks (Portes 1998; Monkman, Ronald et al. 2005) or considered a form of social capital (Gould 2001). In addition, the term physical capital covers physical and inanimate instruments, tools and objects in life, sometimes referring to money (economic capital) as a physical object. Relatedly, natural capital refers to naturally occurring environmental resources (Pearce and Barbier 2000). Are these forms of capital? Robison, Schmid et al (2002) argue that, at least in terms of social capital, the use of 'capital' is justified because it has "many important capital-like properties including transformation capacity, durability, flexibility, substitutability, opportunities for decay (maintenance), reliability, ability to create other capital forms, and investment (disinvestment) opportunities" (p.1).

Inevitably, social capital is most often reduced to its usefulness in promoting economic capital, or its 'fungibility' with economic capital. Many social scientists, such as Bourdieu, consider this tantamount. From a policy perspective, healthier, educated, well-adjusted and networked constituents living in low-crime areas (i.e. those exhibiting higher levels of social capital) have a better quality of life, and are also better able to maintain and increase the local and national economy. If this is true, or believed to be true, policymakers may be more willing to invest in measures to increase social (and / or human capital), such as voluntary or support programmes like Connexions Direct[2], as it will have larger benefits. Conversely, it may be appropriate to maximise investment of economic capital according to the type or level of social capital of an area. For example, energy efficiency programmes could be tailored according to the type of social capital of certain areas, communities, neighbourhoods or regions to increase effectiveness. To suggest some hypothetical examples, perhaps enhancement of local Energy Efficiency Advice Centres might be appropriate in one area with a particular type of social capital (i.e. high levels of bonding social capital amongst close-knit, smaller communities), while targeting areas for insulation-fitting or small-scale renewables would suit another area (where bridging social capital levels are higher amongst less close-knit, ur-

2. Connexions Direct, a UK government policy initiative that values social capital, is a service providing information and advice for young people between the ages of 13-19, http://www.connexions-direct.com/

ban neighbourhoods who may seek to increase their cultural and social capital by 'copying' neighbours). However, rigorous measurement and analysis of social capital, energy efficiency programmes and actual energy use would be necessary to establish the appropriateness of such targeting.

ENERGY CONSUMPTION

The UK Government's overall aim regarding householder energy consumption is to inspire change (DTI 2003). The government wants people to be able to maintain levels of comfort and lifestyle, but also use less final energy. Broadly, people can become more energy efficient in two ways:

1. Use less energy (i.e. as turn down thermostats in colder months, turn off lights when not in use, turn off electrical items in stand-by, turn off the heat when not at home) and avoid energy loss (shut windows and curtains in colder months, put reflectors behind radiators to direct heat into a room)
2. Use or purchase more efficient energy services[3] or energy efficient technologies (buy refrigerators, washing machines, dishwashers, etc. that have a high energy efficiency ratings, purchase and use energy efficient light bulbs, change energy supply, insulate cavity walls and loft spaces, draught-proof doors and windows, insulate hot water tanks)

The UK Government targets energy efficiency through legislation, through creation of advice points, and by researching ways to incentivise householders. To address the first point above, *using less energy*, essentially involves getting people to change their behaviour. The Energy Saving Trust and local Energy Efficiency Advice Centres were created to offer free advice on energy efficiency to householders. This advice is augmented with approaches addressing point two above, *using more efficient energy services*. This not only involves changing people's behaviour, but inspiring sustainable energy consumption. Legislation such as EEC, Part L of the Building Regulations, the Home Energy Conservation Act 1995 (putting voluntary 30 % reduction in energy use by 2010 on 1996 levels on local government) address energy efficiency in homes and buildings. To address consumer encouragement regarding motivation for purchasing of sustainable goods and services, the UK Government commissioned the UK Sustainable Consumption Roundtable to investigate the possibilities for maintaining a good quality of life, supporting social justice and a good economy while reducing stress on natural resources. The final report largely focuses on improving the energy efficiency of goods, producing clean renewable energy, and enabling a society and a market that will cater for such changes (SCR 2006).

ENERGY CONSUMPTION AND SOCIAL CAPITAL

Are social capital and household energy consumption related, and if so, how will this affect energy efficiency? Though there is only tangential research conducted specifically connecting energy and social capital (see Keuhn 1998, Aune, Berker et al 2002 below), particularly at the household, micro- level, there are several theoretical and empirical studies linking social capital to the state of the environment, climate change and sustainable consumption. Findings from these studies show mixed results, but demonstrate potential for exploring the issues of energy consumption further.

Environmental concerns and social capital

The research of social capital and the environment has largely been dominated by research conducted in the developing world. The World Bank established the Social Capital Initiative in 1996 to assess social capital, understand how outside assistance could impact social capital, and to develop indicators for monitoring and methods for measuring social capital impact (Grootaert and van Bastelaer 2002). Twelve studies were conducted, using a variety of methodologies (including primary qualitative and quantitative data gathering in various developing nations), about half of which focused on local environmental issues such as water supply and waste management. The conclusion of the studies included creation of three indicator proxies for social capital: "membership in local associations and networks, indicators of trust and adherence to norms, and an indicator of collective action" (Grootaert and van Bastelaer 2002, p.30). In general, they found that higher levels of social capital had positive outcomes for communities, such as collective action for environmental problems. The World Bank further states that social capital is an asset for environmental protection because it has the potential to mobilise communities, instigate organisation for development and ease sharing of crucial information (World Bank 2004).

Pretty and Ward (2002), based on a review of empirically-based social capital research, discuss social capital and the environment in regard to groups that form to tackle certain issues (in particular, management of watersheds, forests, pests, etc.). The authors focus on group or organisational maturity, suggesting that social capital, a necessary part of collective action, may grow stronger as groups mature through time, leading to better organisation for environmental aims. They suggest that it is necessary for government to support local collective groups to form and mature, but groups themselves must federate to influence the state and also ensure stable social capital, thus enhancing action for environmental sustainability. This meso-level (organisational) research may have limited utility in mobilising people to federate on energy efficiency issues, given the nature of household energy use, but does suggest that mature environmental groups with higher levels of social capital could lead on issues such as energy consumption.

Focusing on adaptive capacity, risk and climate change, Adger (2003) claims that bonding social capital and networking (or bridging) social capital are important in collective response. Though he admits the two different types of social capital are difficult to differentially measure, he asserts that networking social capital is important at the local level "for understanding social differentiation in vulnerability" (p.396) and bonding social capital (between family members) is useful to cope with extreme events. Further, like Pretty and Ward (2002), he states that governments are essential in understanding and utilising social capital in order to enhance local and national adaptive response to climate change. Not necessarily expecting

3. Energy services are "any activity (proposition?) taken by energy companies and/or other market actors which results in demonstrable and sustained savings 2 of supplied/delivered energy in their customers' households and which includes the option of initial investment by other than the household or property owner" (DTI Energy Services Working Group 2003)

the need for response to rapid climate change effects, the UK government does, however, seem to be adopting this strategy of encouraging local initiatives for energy efficiency and sustainability, such as Energy Efficiency Advice Centres. If Adger's theory proves true, this movement to supporting local initiatives could be useful for future risks of climate change or other environmental problems.

However, not all research indicates that social capital is necessarily 'good' for the environment. Grafton and Knowles (2003) conducted a macro-level cross-sectional analysis, drawing on the World Values Survey and a data set on environmental performance created at Columbia and Yale Universities, to assess the influence of social capital (civic and public), social divergence and social capacity on national environmental performance. Social capital variables included trust ('most people can be trusted'), judgements on justification of certain behaviours (such as cheating taxes and falsely claiming government benefits), activity in voluntary organisations, government responsiveness (i.e. democratic accountability) and corruption. Environmental variables included a general environmental index, an environmental systems variable, air and water quality, and urban concentrations pollutants. They found that "with the exception of measures of corruption and democracy, higher levels of social capital and related variables are not necessarily associated with better levels of national environmental performance" (Grafton and Knowles 2003, p. 17). While they found that social determinants were important for environmental performance, and admit that social capital on the local level may not be reflected in nationally aggregated data, they indicate that "the mere existence of social capital is not a sufficient condition for improved national environmental outcomes" (p.17).

Pennington and Rydin (2000) point out that environmental initiatives that have relatively invisible and disperse impacts on public resources (such as improvement in air quality, rather than something local, like a green space or park) can lead to free-riding. This distinction between communal resources, which have a visible public impact, and air quality, which does not, has implications for energy. Energy consumption is considered "culturally common and socially taken-for-granted" (Chappells and Shove 2005; see also Hallin 1994), making it an 'invisible' feature of daily life (Shove and Warde 1998). Indeed, the consequences of energy consumption (direct costs at point of use, pollution) are invisible as well.

Pennington and Rydin (2000) further indicate that communities will not engage as much with issues such as air quality, even if they feel part of the problem or solution. They examine whether "building social capital is seen as a way of changing the pattern of incentives concerned in order to improve the chances of overcoming the [collective action problems] associated with the provision and use of these goods" (p.235). The authors examine two case studies of seaside towns in Britain, with data partially gained through snowball-based interviews, of groups that work on policy delivery on three environmental issues: air quality management, clean beach promotion and green space management/nature conservation. They performed a network analysis which "suggest[ed] that any potential development of social capital in all three policy issues needs to be seen in the context of the dominant role taken by the local state" (p242). Finding limited existence of social capital, "it would appear to suggest that the prospect of utilising social capital to deliver environmental policy objectives … may, in the developed country context of contemporary Britain, be severely limited" (p.245). Particularly in the case of air quality, they felt there was "little prospect of developing the dense networks, which may be a prerequisite to stimulate community participation in decision making" (p.247-248). Again, if energy consumption were regarded similarly to their example of air quality, this may indicate a difficulty in engaging community groups (as opposed to individuals) in addressing issues of energy efficiency. They conclude that "insofar as there is potential to develop social capital around the provision of environmental goods, the institutional role of the state is fundamental" (p.248). By implication, in Britain, energy efficiency campaigns or local action to promote efficiency may be best supported through leadership and support of the local government. There would thus be potential for also building social capital, not just deploying energy efficiency programmes. However, while it is important to understand the implications for meso-level (group or organisational) social capital, the study does not have direct bearing on evidence of links between the similar issue of householder energy use and social capital.

Sustainable consumption and social capital

In order to examine household (micro-) level energy use and social capital, it is useful to examine 'consumption' more generally, as everyday consumption is generally regarded as an individual act. Consumption theories and studies are quite diverse, but it is generally recognised that consumption, whilst undertaken by individuals, is actually a social phenomenon (Aune, Berker et al. 2002; Briceno and Stagl 2006; Corrigan 1997; Lutzenhiser 1993; Warde and Tampubolon 2002; Wilk 2002).

Briceno & Stagl (2006) summarise the social impact by stating that consumers are constantly striving to consume the same (or better) goods and services as friends, neighbours, etc. The consumption of 'cultural goods' is key to maintaining integration in a social structure (Lizardo 2006). Those who do not engage in "culture consumption are therefore more likely to be disconnected from others and forgo all of the benefits that come from network relations and that have been glossed under the banner of social capital" (Lizardo 2006, p. 800). Or, as Briceno and Stagl (2006) state, society has become more focused on the 'individual,' leading to a decline in the 'sense of security' found in traditional community relations. Though this seems to be idealising the past, the point they make is that social capital is critical in inspiring sustainable consumption because it delivers satisfaction, which is what people are seeking when they act as consumers (i.e. substituting for loss of 'sense of security'). The authors do admit that sustainable consumption, as well, has "traps like the persistence of insatiable needs as well as rebound effects[4]" but that these can be avoided if sustainable consumption programmes[5] target strategies around "social culture, attitudes and behaviour" (p.1550). Whilst organisations such as the EST in the UK would say they are already trying to target attitudes and behaviour, the interesting point here is that for

4. The rebound effect refers to instances when gains in energy efficiency lead to the greater use of energy services (Greening et al 2000).

5. They conducted research on a specific type of sustainable consumption programme called Product Service Systems.

sustainable consumption incentives to be effective, it would be useful to add the 'social' sense of community and security back into the 'individual' act of consumption. The implication for social capital is that sustainable consumption programmes can "increase the benefits derived from the assets of social capital itself" (p.1544). However, it indirectly implies an increase in communal trust – people need to trust that their individual actions are part of a collective movement that everyone participates in, assuming others will not 'free-ride' by consuming unsustainably – without stating how to instigate this trust.

Regarding 'trust' on an individual level of consumption, Lai (2001) identifies trustworthy information, as a form of social capital in a study of Taiwanese middle class consumers. People trust others in their social networks more than advertisers or salespeople when it comes to deciding on products or services to purchase. "Social capital increases the efficiency of consumption practices" (p.82) because relying on advice from trusted friends or acquaintances enables easier, reliable, quicker decisions. However, this does not imply 'sustainable' consumption, only the facilitation of consumer purchasing. Regarding energy efficiency, this implies that people may be more willing to trust a friend than an advertisement when wondering which computer monitor or washing machine to buy. In this world of choice, even items with an energy efficient label can be overwhelming and confusing (as it is likely that more than one washing machine has a 'B' rating), so any trusted advice can help a person make a decision that much easier. However, if that friend is not concerned with energy efficiency, the result could also be one that did not encourage 'sustainable' consumption.

In a study conducted by Warde and Tampubolon (2002), the existence of the social capital indicator 'friendship' was found to affect 'leisure consumption' (participation in leisure activities) in a more sustained manner than the social capital indicator 'associational memberships' or activities. Though people drop out of clubs, friendships continue for longer periods of time – friends that people rely on for advice on consumption practices. In their secondary study of the British Household Panel Survey, the authors investigated the utility of social capital in considering leisure activities and found the concept lacking, when interpreted "as either a Bourdieusian or a Putnamesque account might suggest" (p.177). Though they had a preference for social networks (and network analysis) to social capital, their criticisms of the latter draw out interesting points for further consideration in the social capital research, such as the lack of accounting for complexities in assessing quality of relationships in bonding and bridging social capital. For example, one social network in a person's life might be considered 'bonding' while another similar network might be considered 'bridging' based on the different texture of the network relationships. But this difference is rarely captured in empirical work if a survey question merely asks what organisations a person belongs to.

Consumption practices are often related to lifestyle. Cultural capital is, in essence, the expression of a type of lifestyle, and can be considered an element of social capital. Energy consumption will inevitably play a role in household-based lifestyle, whether it is in providing energy for the latest gadget or simply the type and amount of lighting in a house. For example, in a cross-national study, Wilhite, Nakagami et al (1996) found an average of 9.6 light bulbs in living room areas in Oslo, Norway to achieve a 'cosy' effect, compared to an average of 2.5 in Japanese households, who prefer fewer, centrally placed lights (in Shipworth 2000). Here, lifestyle choice (i.e. cultural capital) and norms of 'cosiness' in Norway implies higher levels of energy consumption through light bulb use than Japan, where the lifestyle preferences are different. Socio-demographic variables are also useful to indirectly determine lifestyle choices and energy use. Carlsson-Kanyama and Linden (2007) found that the variable 'income' affected the type of house bought or rented, which can influence lifestyle and thus consumption patterns. Aune, Berker et al (2002) demonstrate the indirectness of this variable by highlighting two studies that both did not find correlations between energy use and the socio-demographic variables income or education, but determined that "the effect of income is through the size of the house" (p.13).

Encouraging energy efficiency through the attempted alteration of 'lifestyles' would be very tricky. This would involve changing how people live (which is a difficult and questionable task for a government or any group to undertake), but also because changing lifestyles and cultural capital means changing socialised ideas of taste and norms, which does not happen quickly (Keuhn 1998 in Aune, Berker et al. 2002). However, Askew and McGuirk (2004) suggest that putting emphasis on one part of a lifestyle, rather than another, could help discourage unsustainable behaviour. In their study of cultural capital, Askew and McGuirk (2004) examined the practice of watering gardens within middle class, suburban Australian families. They found that "the accumulation of cultural capital, through social distinction and social conformity, was generally found to increase domestic water use by influencing the frequency and patterns of water-use practices" (p.34). They argued that a solution to increasing water conservation would be an emphasis on social conformity (i.e. doing what the neighbours do) and the role of norms and notion of public responsibility (i.e water conservation). This slight contradiction - social conformity both increasing and possibly decreasing water use – illuminates the difficulty in measurement and decisions for action in encouraging environmental sustainability in terms of social capital, be it water conservation or energy efficiency. Reliable and replicable methods of measurement and results of social capital and sustainability measures are necessary to ascertain the best method for encouraging action.

Discussion

This preliminary investigation of the proposed micro-level relationship between social capital and household energy consumption has shown that there is the very beginning of theoretical and empirical research being conducted. Social capital is a relatively new way to understand already-identified social phenomena; it is simply coalesced in a new fashion, adding value with the concept of 'social currency'. Use of social capital has its critics, largely due to lack of agreement on definitions, measurement and operationalisation. But the potential benefits of social capital - better education, lower crime, better health, etc. - are recognised by UK policymakers who are starting to question methods of increasing it. This paper simply questions: Are social capital and household energy consumption related? The answer is not straightforward.

As literature on energy and social capital is very limited, the relationship between environment, climate change and sustainable consumption was examined. However, the results are rather mixed. No author denies the value of social networks, trust or the influence of social norms in determining environmental action and sustainable consumption. However, as a concept, some found social capital to be severely limited, while others saw it as crucial to collective action.

For householders, informal networks are the most common means to learn about energy efficiency, though the UK Government provides information through advice centres and, most recently, through home information packs. The government may try to inspire a sense of 'collective action', but action on energy efficiency is a household effort, rather than an organisational one. Any change in lifestyle and energy use will likely depend on the social aspects of norms, facilitated by trusted information, and maintenance of social standing through the consumption of 'cultural goods' (Briceno and Stagl 2006), in addition to factors such as cost, utility, and feasibility.

For energy efficiency campaigners, programmes are best mobilised at the community level. Though this 'community' may not be geographically bound, given the mobility and communications opportunities of today, local communication and campaigns may, nevertheless, be extremely useful. National support for local level action may instigate locally appropriate action for which local participants feel 'ownership', rather than being told what to do through national legislation (Adger 2003; Pretty and Ward 2002). Programmes based in, and lead by, a local community have the potential to efficiently utilise local knowledge that increases trust in the programmes (Shipworth 2000). On the individual level, trust of people in social networks can be important in passing on information to ease consumption (Lai 2001). If programmes build trust, they can inspire the messages of sustainable (rather than unsustainable) consumption of energy efficiency technologies, and help people understand how to use less energy whilst maintaining expected levels of comfort.

RESEARCH DESIGN IMPLICATIONS

Importantly, efforts to understand, use or influence social capital for the benefit of energy efficiency programmes should be based on sound research methods, carefully measured and analysed. In addition, socio-demographics (such as income), as well as attitudes and behaviours, should be conscientiously assessed to determine the historical and cultural background and evolution of social capital in a particular community.

Social capital is a complex concept, but the indicators in the literature on sustainability and social capital exhibit accepted measures for assessing levels of social capital. Social trust, 'can people be trusted in general?', is the most general indicator which Halpern (2005) indicates could be used alone as a rough proxy for social capital (supported by Grootaert and van Bastelaer 2002; Putnam 2000; Harper 2001; Lai 2001). Organisational membership is a traditional measure of social capital (Harper 2001; Putnam 1993; Putnam 2000; Grootaert and van Bastelaer 2002), though does not necessarily account for the quality of the resulting social networks. Collective action is here seen as an output indicator (Grootaert and van Bastelaer 2002; Pretty and Ward 2001), though is necessarily lacking in explanatory power, as it is not a 'cause' for social capital. To fully assess energy use and energy efficiency with regards to social capital, the UK Office of National Statistics Question Bank yields the most comprehensive conglomeration of survey questions asked in UK national surveys. Using this for quantitative analysis of existing surveys, or for creation of new ones, will guarantee results that can be compared to other national measures. Qualitatively interviews would need to bear the questions in mind, as well. The level of analysis of social capital is crucial when formulating a research design and method of analysis. There has been very little micro-level (i.e. household) analysis of social capital, as it is usually aggregated to the macro-level (i.e. national). As Grafton and Knowles (2003) indicate, having found little justification that social capital impacted national environmental performance, there is great potential of losing information on local social capital in aggregation.

Halpern (2005) notes that the effort of measuring social capital challenges conventional methods. He indicates that research design should be based on clustered sampling to "estimate ecological-level, or neighbourhood, effects" (p.287). Further, "direct behavioural measures, such as 'lost envelope studies' and blood donation, may prove more reliable estimates than conventional survey designs, which tend to be biased towards socially desirable answers and respondents who may be atypical of the general population" (*ibid*). As well, he points out that non-response itself could be a key indicator of social capital. Finally, as Putnam (2000) states, different types of social capital, such as 'bonding' or 'bridging', should be accounted for, particularly if they might have implications for the success of different types of energy efficiency campaigns. Social class disparities are a particular issue in the UK regarding social capital (Grenier and Wright 2006; Hall 1999; Halpern 2005), and research design would need to be sensitive to negative, exclusionary effects of social capital. Combining a social capital investigation with energy use would be novel, and probably require time series information of both energy use and social capital indicators.

Conclusion

Is there a relationship that exists between social capital and energy consumption? The findings are ambiguous, particularly on the household level, but do show justification for further research. The social nature of consumption – whether buying energy efficiency devices or consuming energy services – indicates a socially-founded approach to energy consumption is appropriate. There are indications that high levels of trust amongst, in particular, locally-based networks (i.e. community- or meso-level) would allow ease in dissemination of reliable and trusted information. Nationally supported, but locally federated action on energy efficiency can utilise existing social capital, and possibly even build social capital. Different groups may utilise social capital (bonding, bridging, high levels, low levels) in different ways when acquiring information about energy efficiency, and it may prove fruitful to properly assess types of social capital before designing an energy efficiency programme for any given local area. Overall, the literature substantiates the grounds for further research into the relationship of household energy consumption and social capital to be able to better determine the optimum way to encourage energy efficiency.

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Acknowledgements

I would like to acknowledge the Carbon Reduction in Buildings (CaRB) programme, under which I have financial support from the Engineering and Physical Sciences Research Council (EPSRC) Doctoral Training Account grant. Many thanks to my PhD supervisor, Dr David Shipworth.