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## **BELIEF OR COMPLIANCE? DRIVERS OF URBAN RENEWABLE ENERGY INITIATIVES**

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The UK has set an ambitious plan to substantially cut its GHG emissions. In order to meet this 2050 target of 80% reduction, the UK is facing a significant challenge of restructuring its energy system. One of the ways to do so is to introduce wider use of decentralised energy systems. There is, however, a significant lack of understanding regarding which main factors actually drive these urban energy projects. Following semi-structured interviews with key stakeholders, nine UK and four international exemplar cases have been analysed and critiqued in order to demonstrate and investigate the variety and inter-relationship of the drivers encouraging their implementation. The role of regulation and belief in sustainability as drivers for implementing innovative urban energy initiatives are explored, as are the differing impacts of these drivers in the UK and abroad. This paper demonstrates that currently there is a lack of investigation into the motivations of the organisation to implement decentralised energy (DE) projects. Thus, it is important to focus on understanding the reasons why companies might improve environmental performance, as this could aid authorities in formulating more appropriate policies to enhance this improvement.

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# BELIEF OR COMPLIANCE? DRIVERS OF URBAN RENEWABLE ENERGY INITIATIVES

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**ABSTRACT:** The UK has set an ambitious plan to substantially cut its GHG emissions. In order to meet this 2050 target of 80% reduction, the UK is facing a significant challenge of restructuring its energy system. One of the ways to do so is to introduce wider use of decentralised energy systems. There is, however, a significant lack of understanding regarding which main factors actually drive these urban energy projects. Following semi-structured interviews with key stakeholders, nine UK and four international exemplar cases have been analysed and critiqued in order to demonstrate and investigate the variety and inter-relationship of the drivers encouraging their implementation. The role of regulation and belief in sustainability as drivers for implementing innovative urban energy initiatives are explored, as are the differing impacts of these drivers in the UK and abroad. This paper demonstrates that currently there is a lack of investigation into the motivations of the organisation to implement decentralised energy (DE) projects. Thus, it is important to focus on understanding the reasons why companies might improve environmental performance, as this could aid authorities in formulating more appropriate policies to enhance this improvement.

## 1 INTRODUCTION

In its 2003 White Paper, the UK's Department of Trade and Industry (DTI) described that the future energy systems will be characterised by *"more local generation, in part from medium to small local/ community power plant, fuelled by locally grown biomass, from locally generated waste, from local wind sources, or possibly from local wave and tidal generators. These will feed local distributed networks, which can sell excess capacity into the grid. Plant will also increasingly generate heat for local use."* However, for this future vision to be achieved, the UK needs to overcome a great challenge of energy system restructuring, possibly via introducing and supporting larger numbers of decentralised energy (DE) projects.

As Vaze and Tindale (2011) argue, whilst energy problems are large-scale, there are small-scale solutions. Discussion related to a shift towards a more DE systems is not new, However, there is an increasing recognition that in order for this shift to be made, it is important to understand the complex set of stakeholders involved in this shift as well as their motivation and drivers to perform the shift (Cole, 2011).

Despite the increasing amount of literature available on DE, the empirical analysis of drivers and motivations remains scarce. Building on the Oxford dictionary's definition of driver – *"a factor which causes a particular phenomenon to happen or develop"* - the authors of this paper understand drivers as factors that potentially contribute to the development of DE projects, can be specific to a particular location, or general to the context; and can also be internal (organisational) or external (related to society).

The most significant research found up to date is conducted by Marques et al. (2010, 2011) who look at drivers promoting RE in the EU and suggest that both the lobby of the traditional energy sources and CO<sub>2</sub> emissions restrain deployment of RE, whereas the objective of

reducing energy dependency stimulates RE use; and Watson and Devine-Wright (2011) who discuss five drivers for moving to DE (climate change, energy security, technology trend, the governance of energy markets, and social change) in order to understand their impact on energy system scale. Many of those discussing drivers argue that financial drivers such as financial policy instruments and procurement mechanisms play the most crucial role in promoting DE (e.g. Alagappan et al., 2011; Foxon et al., 2005). However, others have argued that the drivers behind DE project instigation are more diverse and play different roles across sectors (Wiersma and Devine-Wright, 2013).

There is a considerable amount of literature suggesting that legal drivers, such as regulations and policies, are an effective tool in driving energy efficiency and environmental performance (e.g. Testa et al., 2012; Marques et al., 2010). The role of the regulations is to provide the environment for the DE, i.e. provide support that will establish a system for market development of the DE (White et al., 2013). Several studies (e.g. Menz and Vachon, 2006; Carley, 2009) emphasise that political motivation demonstrated via implementation of regulations is the best way of promoting DE, and that the promotion and use of DE through price regulations are the most favourable for the DE use. Regulations are thus seen as a set of rules that should lead RE users towards achieving the governments' aims for DE, regardless of the difference of the RE projects (e.g. energy, sustainability, climate change, employment) that fall under the jurisdiction of various governmental bodies (White et al., 2013). Lund (2007) evaluates the effectiveness of the policies and concludes that, while their effectiveness may vary considerably depending on the context, policies are an effective tool for deploying RE. By setting the targets, the national policies provide framework that then has to be implemented on local level. This can be done using variety of instruments, from subsidies to RE developers (e.g. the case of Morris Model) to city carbon targets (e.g. BESP) to strict regulations (e.g. Riverside Dene).

However, despite the great variety of policies and regulations encouraging implementation of DE, some projects find that regulations are not the only driver (or not at all a driver), and they still are implemented regardless the lack of regulations. Existing literature mainly focuses on fiscal, financial, information and other incentives as non-regulatory motivations (e.g. Feige et al., 2011; Hoffman and Henn, 2008) that can be used to kick-start DE projects. The effectiveness of these motivation tools depends on a local context, as well as a type of a stakeholder, as different types have specific concerns. However, it is often overlooked that many projects are implemented without the desire to gain financially – in this case the stakeholders are more interested in pursuing their own beliefs and have the opportunity to show what can be done (e.g. Bruvoll et al., 2002; Rege, 2004). This driver depends on two factors: the belief that the action would benefit others; and the perception that the action is governed by an applicable norm observed in the community. It also allows achieving and maintaining a self-image as socially responsible (Nyborg et al., 2006). These findings are in line with the motivations of the DE project stakeholders described in this paper.

Taken the above mentioned literature into account, the authors of the paper aim at discussing the importance of two sets of drivers: regulations as it is suggested to be the strongest driver, by the academic literature and belief in sustainability as a driver that is often overlooked in academic literature but is suggested by the DE users. In this approach, this paper explicitly focuses on the reasons behind the emergence of certain socio-technical innovations, rather than on their effectiveness in influencing niche development or regime shifts as studied in the transition studies literature (Markard, Raven & Truffer, 2012). In light of the earlier work described above, the main objective of this paper is to critically analyse the role of regulations as drivers behind implementation of urban DE projects in the UK and abroad and evaluates the role of beliefs in sustainability when regulation as a driver is absent.

## 2 METHODOLOGY

This study analysed 13 case study projects (nine UK and four non-UK projects), which were selected from a database of 180 possible case studies. The 13 case studies were selected based on diversity in terms of location, technology deployed, and type of leading stakeholder. For the non-UK projects another consideration was that the cases were innovative and have not yet been attempted in the UK.

The research employed a qualitative case study methodology, including semi-structured face-to-face interviews, review of the relevant literature and media coverage of the project, reports and site visits where possible. For each of the case studies, extensive preliminary data regarding the project was collected; this helped shaping the interview questions.

In the 48 interviews conducted, the respondents were asked questions about the main drivers and about the role of regulations in implementation of the project, among other questions. Interviews were recorded and transcribed, and then coded using Nvivo 8 coding software. Subsequently, thematic analysis (Braun and Clarke, 2006; Joffe, 2011) allowed identification of a variety of drivers. Thematic analysis was chosen due to the complexity of the dataset and the need for a flexible analytical process to provide structure. Material coded under project drivers and impact of regulations was used in this paper.

Although the research does not aim to compare the UK with non-UK countries, it allows highlighting the variety of possible motivations for the implementation of DE projects since the researchers could make observations that would perhaps not be as apparent in a single-country setting.

## 3 RESULTS

For the purpose of this paper, building on the distinctions made in the literature as outlined above, drivers were divided into two groups: the first group relates to the compliance with regulations and policy-related advantages; the second group relates to belief in sustainability which shows a high level of environmental awareness and concern about preserving environment, and includes willingness to demonstrate that the project can be carried out without the support of the policy. This paper focuses specifically on only a subset of non-regulatory drivers, excluding drivers such as those related to financial or carbon savings, as these have already been extensively covered in the existing literature mentioned earlier in this paper.

The drivers across the cases vary greatly. It is important to bear in mind that drivers discussed in this paper do not represent the whole set of drivers experienced by the stakeholders when the project was implemented, e.g. it does not mean that the only driver for the Hague case study was belief in sustainability, but rather that their motivations were outside the scope of this paper. The main drivers experienced in these projects have already been described in detail elsewhere (see Wiersma and Devine-Wright, 2013; and Chmutina and Goodier, 2013). By any means, the impact of some drivers is much higher than the others, but having such a wide range of drivers shows that the adoption of DE projects is more complex than just a cost-benefit model and cannot be explained by only economic or governance factors.

### 3.1 *Compliance: The role of policies and regulations as drivers in implementing DE projects*

The idea behind most of the environmental regulatory instruments is that the companies would not undertake any environmentally beneficial projects without any regulatory pressure from the authority; this is due to the costs often associated with undertaking environmentally sustainable actions, which are borne by the company alone but are shared by the society

(Gangadharan, 2006). Some argue that the main disadvantage of compliance as a driver is that it does not engage the stakeholders proactively as they are likely to be driven by principle of 'satisfying rather than optimising' (Morton et al., 2011).

Despite the literature describing the importance of the regulations and policies in implementing DE projects, the case studies indicated that carbon targets and direct regulations played only a small part as a driver and were only important when the project was implemented by the local government or when the private companies had to comply with the regulation.

Compliance with energy regulations was only mentioned as a crucial driver in one case study, where a local authority and its social housing management partner needed to comply with a national standard relating to building quality: *"We obviously were very driven by having to meet the governments Decent Homes Target. And we knew that unless we came up with a workable plan that tackles the issue of these multi-storey blocks then they would never achieve their target"* (Riverside Dene).

Most of the cases discussed were said to be driven by policies rather than regulations: the local authorities have signed various voluntary agreements with established carbon targets, which showed the willingness of local authorities to be involved in sustainability projects: *"The Council has signed up to the Covenant of Mayors subsequently and things like Nottingham Declaration on Climate Change. So the council has obviously quite aspirational CO<sub>2</sub> reduction targets"* (Riverside Dene).

Local authorities across the case study projects have also set carbon reduction targets and thus were interested in getting involved in DE project that could potentially contribute to the achievement of these targets. Thus the projects were initiated to help reaching the targets rather than the companies had to comply with regulations. In order to help reaching the Morris County 30% carbon reduction target by 2030, Morris Model was instigated and created a great environment for solar business to develop – and for the Morris County to reduce their energy payments and increase the use of renewable energy: *"There's nothing that's in the law that really pushes us towards that [using renewable energy]. It's more, you know, you're doing it on your own."*

Interestingly, most of the case studies actually over-complied with regulations or implemented their projects despite a lack of regulations. Over-compliance with the regulations, or the implementation of the DE project regardless the lack of the regulations was indicated by stakeholders to be driven by their willingness to 'be ahead of the game', particularly when the regulation was anticipated or the company was eager to gain a competitive edge: *"We are regulated by the Environmental Agency who is sourcing all their offices power from green sources. And we thought, well it wouldn't be very long before they require the people who are regulated too to do a small proportion of their own supply from green as well."* (Newport).

When regulations were not in place some of the cases self-imposed targets. Such, the operator of the biomass district heating system in the Riverside Dene project was obliged to use the biomass boiler at least 40% of the time. Jernhusen had an aim of reaching 50% less energy consumption in their Kungsbrohuset building per square meter compared to current building regulations in Sweden. Vestia Housing Corporation tried to come up with the heating system for the Duindorp area which would be 50% more efficient compared to conventional gas heating; in addition, The Hague seawater project acted as an inspiration for the City of The Hague in implementing 2050 Carbon Neutral City Programme.

In some of the UK cases, the lack of the regulation acted as a driver, as stakeholders perceived this signified a lack of urgency in this particular area of addressing 'hard to treat' pre-1919

homes, while the project itself also acted as a demonstration project which was hoped to identify best practice which was meant to inform local policy guidance in relation to planning permission for solar panels: *"It's kind of anti-legislation really, it was more the fact that we were using legislation to refuse these things when we shouldn't be doing that."* (Renewable Heritage)

### 3.2 *Belief in sustainability as a driver for DE projects*

As demonstrated in the previous section, some of the projects were implemented regardless the lack of regulations, and while the drivers for implementing were never singular, one of the drivers present in most of the cases was belief in sustainability. Undoubtedly, it is a complex driver that incorporates both altruistic and egoistic motivations and is related to the previous section in the sense that it can underlie a desire to prove a project's or technology's feasibility. Belief in sustainability can sometimes be attributed to the instigating stakeholder – or a project champion – whose presence does not guarantee the success of the project but their personal motivation is often 'contagious' and lead to a faster development of an energy initiative. The literature demonstrates (e.g. Dunlap et al., 2000; Andersson et al., 2005) that personal environmental beliefs influence the environmental actions of organisation to which the person belong.

Interviews showed that across cases, project champions shared the following characteristics: vision, credibility and respect, access to resources, experience, and active engagement in the project. Literature defines project champion as a single person, however the case studies showed that a group of people or organisation can also act as one, for example the Vestia Housing Corporation, which belief in sustainability as a corporate value allowed the implementation of the seawater district heating in The Hague: *"It has always amazed me that Vestia had the initiative to be energy efficient. They were miles ahead of regulations, miles ahead of what the municipality asked then and actually wanted."*

Similarly, the fundamental values of the wider Camphill Community acted as a driver in Glencraig project implementation: *"Environmental considerations have always been part of Camphill's ethos, besides the care for people with learning disability or people with needs, the care of the land and so on."*

Importance placed on sustainability was indicated to originate from various sources most notably religion: *"We're Quakers which means that we're particularly interested in social justice and preserving the environment and all those sort of things"* (Sustainable Moseley).

While these personal religious motivations acted as a central driver behind the project, in other projects individual beliefs about renewable energy played a more indirect role by enabling a company to work on the growth of the wind energy sector: *"Of course we need to make profit but we're here because we're passionate about renewable energies and the climate"* (Newport).

The willingness to demonstrate their belief was also a driver – it was related to innovation and pioneering, and appeared in some of the cases with the aim to demonstrate the feasibility of the DE project as well as ability to carry it out. The projects did not necessarily feature innovative technologies, although some haven't yet been used frequently in the UK, but rather the innovative ways of using existing technologies: *"We wanted to show that it's [energy efficient building] possible anyway. We had no research in this building. This is all purely made with normal stuff that you can find everywhere. And put together in a very delicate way, [...] thereby showing people that you can do it as well if you just put your effort in it"* (Kungsbrohuset);



Another aspect of this driver was to prove to skeptical audience the feasibility of such projects. In the Renewable Heritage project, one of the central drivers was to demonstrate, especially to potentially skeptic stakeholders such as conservation bodies, the feasibility of doing energy generation work on historic homes: *“One of the things we really wanted to show that the key to pushing the agenda and being able to make these [hard to treat] buildings energy efficient and generate their own energy is partnership working (...) there is a real fear in building conservation circles of too much energy efficiency and renewable energy because they think it can ruin the buildings”* (Renewable Heritage).

#### 4 DISCUSSION AND CONCLUSIONS

The objective of this paper was to discuss two sets of drivers for implementing DE projects in the UK and abroad: regulations as a driver (that is often mentioned in the existing literature); and belief in sustainability as a driver (that is overlooked in academic literature but is often suggested by DE stakeholders).

While the list of drivers for each of these projects is extensive and incorporates a variety of drivers from energy and financial savings to religious beliefs, the authors have focused on these two sets of drivers, as they are seen as encouraging one another rather than contrasting. Regulatory drivers are widely described in literature, as discussed here, however over-compliance with regulations has been largely ignored. The same refers to the beliefs of the stakeholders: literature mainly focuses on the internal motivations and beliefs of energy end-users, leaving DE projects stakeholders and their beliefs neglected. This paper attempted to cover this knowledge gap by investigating the importance of the above-mentioned drivers in the implementation of DE projects.

Despite the large number of regulations implemented both in the UK and internationally, regulatory drivers do not seem to play as important role as they are thought to when it comes to the implementation of DE projects. Table 2 illustrates that belief in sustainability is present in most of the cases discussed here, whereas compliance with regulations was only reported in 4 of the 13 cases. This does not mean that regulations are less important than belief in sustainability, but shows that having such beliefs stimulates the implementation of DE projects regardless of the existence of legally-bound targets. Regulatory drivers that play a role in our cases are implemented on a local level; additionally most of them are self-imposed in a form of voluntary agreement or internal target. The participation in voluntary regulation shows that the stakeholders are willing to have carbon targets due to their belief in sustainability and eagerness to play a role in it, or at least a desire to be perceived as environmentally friendly. Compliance with regulations encourages taking the projects further, and acts as a kick-start to new ideas of those believing in sustainability and wanting to do something about it, but not sure how to go about it rather than putting pressure on the stakeholders and forcing them to do something they oppose to.

**Table 2 Summary of motivations across the case studies**

Case study	Impact of regulations or lack of such	Belief in sustainability
The Hague, The Netherlands		X
BESP, Germany	X	x
Morris Model, USA	X	X
Kungsbrohuset, Sweden		x
Energy neighbourhoods		X

Glencraig biomass district heating		X
Newport - Solutia wind turbines	X	X
Renewable Heritage		X
Riverside Dene	X	
SHIMMER		X
Sustainable Moseley		X
Wandle Valley Low Carbon Zone	X	X
Zero Carbon Homes	X	

At the same time, Table 2 shows that compliance with regulations and belief in sustainability are not mutually exclusive; instead, internal motivations encourage people to comply (or often over-comply) with regulations. It is obvious that regulations is not a straightforward driver that, when complied with, leads to the benefits; however, the benefits are not necessarily short term and tangible, and therefore may be ignored by those who are not interested in sustainability. Thus, when belief in sustainability exists, these benefits become clearer and the stakeholders are more eager to achieve them.

Over-compliance and implementation of DE project despite the lack of the regulations is mainly driven by business decisions related to new business opportunities in the context of anticipated regulations. Over-compliance also allows companies to gain a competitive edge by proving that a project can be implemented and that the stakeholders engaged in the project have an expertise to do so; this aids improving of the company's reputation and presenting the company as more 'green', which also can act as a driver on its own. Over-compliance also relates to the 'demonstrating project feasibility' driver in a sense that many of the stakeholders tried to prove that the implementation of the project is possible despite the lack of governmental support.

Demonstrating project feasibility is an important aspect of many DE projects and is undoubtedly related to the belief in sustainability. As shown in the cases described here, while potentially risky, demonstrating feasibility was mentioned as a driver in the majority of the cases. The ability to find new and innovative ways of project implementation is often relevant to DE projects, as they are seen as being niche and not widely used. It can be argued that the role of the project champion is thus important: throughout the cases project champions – individuals as well as groups of people – shared vision, credibility and respect, access to resources, experience, and active engagement.

Our cases have demonstrated that these projects would not have been implemented if the involved parties did not believe in sustainability, even with regards to the business-led cases such as Kungsbrohuset and the Morris Model. While the financial aspect is important for all businesses, it was noticed that the stakeholders involved in the DE projects are passionate about sustainability; in some cases it has also been demonstrated that the projects are carried out even when they are not financially feasible.

Demonstrating feasibility is an integral part of the belief in sustainability: stakeholders are willing to demonstrate their belief by showing that something can be done and thus be first in the field. Belief in sustainability can encourage innovation. These drivers can reinforce each other and help bring more benefits at a later stage.

As demonstrated, beliefs in sustainability can be triggered by various information sources, as well as moral and ethical values. While ethical values are personal and are normally driven by cultural context, information sources are external and impact the opinion on such topics as climate change and sustainability. It is therefore crucial that media awareness regarding

sustainability and climate change should be improved to avoid inaccuracy and inconsistency in reporting and hence public awareness and understanding.

This paper has demonstrated that compliance with regulations is often informed by a belief in sustainability. The basis for regulatory drivers for DE projects lies in a local demand for climate policy rather than in multilateral or national policies. Belief in sustainability is however a complex and diverse notion; it can range from personal religious belief, to altruistic feelings towards worse-off, to organisational ethos. Belief in sustainability can be informed by new information as well as by norms and values relevant to the instigating stakeholder or a group of stakeholders. Belief in sustainability can also play an important role in business decisions: once it can be demonstrated that DE projects can be status-enhancing and improve reputations, they may achieve an important demand, which would lead to economies of scale, and making the implementation of DE projects more popular due to the lower financial risks. Often sustainability is seen as a three-dimensional incorporating economic, environmental and social justice. Sustainability is seen as a way of improving the living and health standards as well as financial well-being, whilst contributing to carbon reductions, and DE projects are seen as a way of achieving all three.

This paper demonstrated empirical evidence regarding the possible drivers and their potential role in the implementation of DE projects. Currently there is a lack of investigation into the motivations of the organisation in the implementation of DE projects. Thus, it is important to focus on understanding the reasons why companies might improve environmental performance, as this could aid authorities in formulating more appropriate policies to enhance this improvement.

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