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Policy Frameworks for Energy Transition in England: Challenges in a Former Industrial City

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ABSTRACT

This paper addresses the make-up and the limitations of a multi-level governance approach in tackling issues of fuel poverty and energy transition connected to poverty in England. Although the English planning framework offers unparalleled opportunities for innovative governance arrangements, and although much has been done in this area by national and local authorities, there are important limitations to how English cities are tackling fuel poverty and energy transition in a context of energy transition coupled with deprivation. The case analysed is an archetypical formerly industrial city dealing with socio-economic and spatial regeneration issues and transferable lessons can be learned. The questions addressed in this paper are: How does a former industrial city in Northwestern Europe deal with energy transition in the face of relatively high levels of deprivation? What is the governance of energy transition in the case and how does it help deprived citizens achieve energy security, if at all? This paper relies on extensive fieldwork research, interviews with several stakeholders and policy analysis carried out for the 7th Framework PLEEC Project (Planning for Energy Efficient Cities). Preliminary conclusions point at the failing of governance arrangements to include vulnerable actors and the inadequacy of solutions found for deprived or vulnerable households in the renting sector.

1. INTRODUCTION

Energy transition is of particular significance to former industrial areas in Northern Europe and North America, as these places have developed their economies based on the intensive use of fossil fuels and have experienced early urbanization unconcerned with energy conservation. This is visible in the current built environment of many cities across the region, with dwellings that are not insulated and rely on old fashioned heating systems and wasteful transport systems. To make matters more complex, former industrial areas usually have a hard time attracting investment and experience high levels of unemployment and deprivation. In short, former industrial areas need to deal with their physical and social heritage and with large housing stocks built before energy efficiency became a serious concern. This, combined with relatively high indices of deprivation, has led to an alarming deficit in the rights of vulnerable households to healthy and energy efficient housing.

Stoke-on-Trent, a middle-sized cluster of formerly independent cities in the English Midlands, faces serious challenges concerning environmental, economic and social sustainability. As a former industrial hub affected by sharp industrial decline, Stoke-on-Trent faces challenges concerning its environment, its economic base and its capacity to generate inclusive prosperity. The poor state of part of the housing stock in Stoke, combined with high indices of deprivation, contributes to create serious issues of fuel poverty in the city.

This paper introduces governance as a descriptive framework for energy efficiency and

addresses the make-up and the limitations of a multi-level governance approach in tackling issues of fuel poverty and energy transition. It does so by a thorough description of the policy frameworks in which decisions are taken, unveiling the roles and expectations of different actors in relation to energy policies.

Although the English planning framework offers unparalleled opportunities for innovative governance arrangements, and although Stoke-on-Trent has done much in this area, there are important limitations to how policy is tackling fuel poverty and energy transition in a context of deprivation and reduced state intervention. Stoke-on-Trent is an archetypical formerly industrial city dealing with socio-economic and spatial regeneration issues and transferable lessons can be learned. Although there are clear opportunities for the elaboration and implementation of measures that are realistic and acceptable by a range of stakeholders when implementing energy policies, there are also clear challenges concerning accountability and the representativeness of vulnerable groups.

The questions addressed in this paper are: (1) How does a former industrial city in North-western Europe deal with energy transition in the face of relatively high levels of deprivation and reduced state intervention? (2) What is the governance of energy transition in the case and how does it help deliver fair and sustainable energy efficient measures?

This paper relies on extensive research carried out for the EU research project PLEEC [1]. The methodology included semi-structured in-depth interviews with eight key stakeholders in June 2014. These included the head of the social housing association, two NGOs, the head of the local energy provider, and several representatives of the executive and legislative branches of the local council. It also included site visits, and two workshops organised by PLEEC partner cities. It was complemented by in-depth policy analysis and desk research. In the second section of this paper, we describe the case study and the ensuing energy challenges arising from its particular history. In the third section, a very short theoretical overview of energy governance is provided.

The fourth section introduces the national policy frameworks in which actions for energy efficiency are taking place. In the following section, we discuss the local reaction to that national framework and how the problem of energy efficiency is being tackled at the local level.

The ensuing section deepens the analysis of the local challenges concerning energy efficiency and the effect of the national frameworks and local policies. The ensuing sub-sections detail the issues concerning the housing sector in Stoke-on-Trent, the crucial sector in which the issues being discussed have a major impact, followed by general conclusions.

2. THE CONTEXT: A DEPRIVED FORMER INDUSTRIAL AREA STRUGGLES TO PUSH FORWARD

It is commonly accepted that the Industrial Revolution in the UK started in Birmingham and the Black Country area of the West Midlands, where Stoke-on-Trent is located. The Industrial Revolution has left a deep imprint in the landscape, the people and the urbanisation patterns of the area [2] and Stoke-on-Trent is representative of the challenges issued from this heritage.

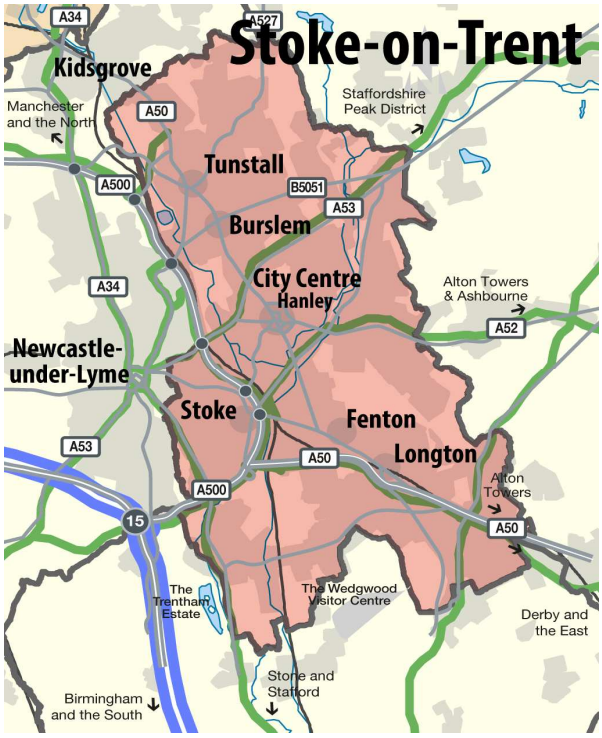

Fig. 1. Map of Stoke-on-Trent showing the six different towns composing the council. *Adapted from Tourist Information Centre. http://www.visitstoke.co.uk/*

Stoke-on-Trent is the largest city in Staffordshire County, one of the six counties forming the West Midlands. Stoke-on-Trent is set up in a linear conurbation stretching 19 km, with an area of 93 km² and has a population of 271,000 in the city proper (2014). Together with Newcastle-under-Lyme and Kidsgrove, Stoke-on-Trent forms the Stoke-on-Trent Built-up Area. Despite its economic struggles, about 9,000 firms were based in the city in 2014 [3].

According to the British employment programme, the manufacturing sector in Stoke-on-Trent is the eighth largest in the UK and continues to be the main source of employment in the city, accounting for around 28% of all jobs in the area – almost double the national average [4]. The City of Stoke-on-Trent is the biggest single employer in the area with over 14,000 employees. The wider public sector employs more than 32,000 people.

The conurbation is polycentric, having been formed by a federation of six separate towns and numerous villages in the early 20th century. The settlement from which the federated town took its name was Stoke-upon-Trent, where the administration and mainline railway station were located. After the union, the town of Hanley emerged as the primary commercial centre in the city. The four other towns that compose Stoke-on-Trent are Burslem, Tunstall, Longton and Fenton.

This conurbation is unique. Its historical development was based on mining, ceramics industry and other manufacturing industries and was largely conditioned by the existence of coal, steel and clay in the area. This unique combination of natural resources allowed North Staffordshire to develop into the main centre of ceramics production in the UK in the 18th and 19th centuries and become an international name in ceramics production, with world-renowned establishments like Thomas Wolfe Works, Elektra Porcelain, Bell and the celebrated Wedgwood and countless others. Once, more than 70,000 people worked in the ceramics industry in North Staffs. Today, only about 7,000 people work in the industry in the area [3].

A close network of towns grew up around this industry, each with its own town hall, Victorian park, main church and other unique urban features. A railway line known as 'The Loop' used to interconnect the six towns. It was deactivated in 1964, because of reduced use, as the main hubs of employment in the region had moved elsewhere [5]. Very localized industries and services led to a situation where people lived and worked very closely together, so mobility tended to be within short distances and on foot. This has determined the character of the area as a close-knitted polycentric area where inhabitants generally identify more with their own town rather than with the federation of cities as a whole. *"While people describe Stoke-on-Trent as a Federation of Six Towns, I prefer to describe it as a federation of 85 villages",* says a senior civil servant, as citizens seem to be very much attached to their own local communities.

Urban growth and housing clearances between the two great wars pushed urban development further away. As the city expanded in the 20th century, development happened in the peripheries of the original towns, along regional main roads leading to Birmingham and Manchester for instance, quite separate from jobs in the service sector, which are to be found in the historical cores. Post-war development happened in the form of big housing estates (e.g. Bentilee and Meir), which paradoxically were not built for mass car ownership, originally relying on buses. Many of the more qualified jobs attract people who prefer living as far as Birmingham and face longer commuting times to get to Stoke.

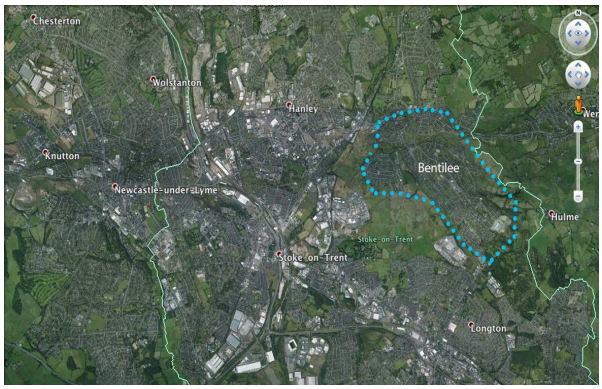

Fig. 2. Bentilee is a housing estate in Stoke-on-Trent, situated between Hanley and Longton. Built in the 1950s, Bentilee was at that time one of the largest estates in Europe, with approximately 4.500 properties *(source: Google Earth).*

Fig. 3. Victorian terraced houses made of red bricks are a common feature in Stoke *(source: "Stoke-on-Trent terrace housing" by Steven Birks. Licensed under CC BY-SA 2.0 via Commons - https://commons.wikimedia.org/).*

Because of the structure of the mining and pottery industry in the region, and the meagre salaries paid by the ceramics industry, there were not a lot of middle class households and the social make-up of the six towns was mainly composed by poorly paid industrial workers who often faced work instability. They were mostly lodged in single-walled Victorian terraced houses. This has left a legacy of poor housing stock, *"unfit for the 21st century"*, which is difficult and expensive to bring to modern standards of energy efficiency [6].

Industrial decline started in the second half of the 20th century and was caused by the exhaustion of resources and loss of competitiveness of the local industry and has led to sharp economic decline. This has resulted in the appearance of areas of deprivation. Stoke-on-Trent is the 3rd most deprived local authority in the West Midlands (out of 30) and the 9th most deprived Unitary / Metropolitan authority area in England (out of 92). The city has almost one-third of its population residing in areas classified in the 10% most

deprived in England, and one-in-six of its inhabitants living in areas in the worst 5% in terms of levels of Deprivation [7].

Inner neighbourhoods have become vulnerable to decline characterised by rapidly falling property values, population reduction and dereliction, which pushed middle class families to look for housing elsewhere. As a result, historic town centres lost their traditional role and their rich diversity. Densely built-up areas of Victorian terraced housing have become fragmented through redevelopment leading to the widespread loss of historical character [6]. Traditional Victorian terraced houses in private hands compose much of the housing stock in Stoke-on-Trent. Much of it has not been upgraded, leading to huge problems of energy efficiency and fuel poverty in the city.

The region has acute problems related to its capacity to innovate and increase economic competitiveness. Below average levels of enterprise and declining business start-up levels combine with lower than average proportions of highly skilled residents. Local employers identify gaps in terms of both higher-level skills and basic employability skills [8]. There are high concentrations of unemployment leading to the appearance of several areas of multiple deprivations in the area. In short: "*North Staffordshire needs to define a new 'purpose' for itself in the changing economy and to increase the proportion of higher skilled, higher value jobs in the area*" [9].

3. GOVERNANCE FRAMEWORKS

The effective integration of the three essential dimensions of sustainability, i.e. social, economic and environmental [10], into successful and fair planning processes requires a thorough understanding of the existing relationships between actors in specific arenas of decision-making and implementation. *"The theory and practice of public administration is increasingly concerned with placing the citizen at the centre of policymakers' considerations, not just as target, but also as agent. The aim is to develop policies and design services that respond to individuals' needs and are relevant to their circumstances"* [11]. To understand how these ideas operate in governance arrangements, we must acknowledge the normative and the descriptive dimensions of the concept. In the normative dimension of governance, the sectors of society (e.g. civil society, public sector and private sector) ought to be in 'positive tension' with each other. They simultaneously apply and suffer pressure from other sectors [12]. In doing so, they keep each other in check, providing mechanisms to guide each other's actions and promote accountability. The underlying argument is that, ideally, actors across the governance spectrum are compelled to check each other and feel accountable to one another. The problem with the normative model is that it assumes the presence of actors in decision-making networks and some sort of power balance. In practice, not all concerned actors are present or have a voice in decision-making networks and there are those whose views or wishes are not taken into account or are suppressed by others. But the point of the model is the dynamic relationship between different sectors, rather than the outcomes of this relationship.

This normative dimension of the concept of governance contrasts with a descriptive or explicative dimension, in which these relationships must be described in relation to real practices. From this point of view, 'governance' is rather a way to describe relationships in place in decision-making arenas. In the explicative dimension, one must find out what are real relationships between actors and how they influence decision-making and implementation and, by contrasting the explicative dimension with the normative one, one may draw conclusions about the effectiveness and fairness of existing governance arrangements. Describing governance "in place" is necessary if planners and other agents of urban development wish to effectively steer the actions of a large number of actors towards desired outcomes and provide some measure of fairness in urban development.

Governance systems manifest themselves in arrangements between formal and informal institutions. By formal institutions, we mean institutions that are formally regulated and recognised as legitimate and accountable by a large spectrum of actors in planning and implementation processes. The rule of law is a formal institution in itself [13], but it is also a meta institution that regulates all other formal institutions. The rule of law provides the framework for the public sector, the private sector, and the civil society to exist in certain forms and in certain relationships with each other. However, the recognition has grown that formal institutions are only part of what constitutes the architecture of social and political relationships. A large part of this architecture is made up of informal institutions, resulting from cultures, ingrained beliefs, norms and values [14]. These help us explain certain characteristics of legal systems, but also behaviours like patronage, nepotism, corruption and ingrained practices and traditions that are not acknowledged in legal systems.

The understanding of this complex architecture of socio-political relationships implies the recognition that policy makers cannot always 'enforce things by decree', but must act in the context of governance networks where policy making implementation are in the hands of a large group of actors. In this context, policy makers' main task is to 'shape the attention', help define priorities and courses of action, and influence the action of a multitude of actors located at different administrative levels and in

different networks of decision-making [15]. Moreover, as pointed out, actors are not necessarily embedded in institutional structures, but may be located in any formal and informal institutions.

Governance based policy-making entails a multilevel dimension and a networked dimension. Multilevel governance 'involves a large number of decision-making arenas, differentiated both along sectorial, administrative and territorial lines and interlinked in a non-hierarchical way' [16].

In networked governance, policy making and implementation are 'shared' by politicians, experts, dedicated agencies, semi private and private companies, the public, non-governmental organizations (NGOs), and others that operate through a complex network of relationships that create policy and inform decision-making across levels, territories and mandates [15].

In summary, effective policy-making must take into account networks of actors distributed throughout different levels. This presupposes a policy-making style that seeks to promote cooperation among government levels and between public and private actors and the civil society, where there must be sustained co-ordination and coherence among a wide variety of actors with different purposes and objectives from all sectors of society [15].

Following this analytical framework, this paper describes the architecture of energy efficiency policy-making in the UK and tries to unveil the imbalances and gaps this architecture presents in addressing the challenges proper to former industrialised areas where social vulnerability is widespread.

4. THE ENERGY CHALLENGE AND HOW IT IS BEING MET: NATIONAL AND LOCAL POLICY FRAMEWORKS

In this section, we describe the main policy frameworks in which decision-making for energy efficiency takes place. Here, the multi-level character of energy governance is highlighted.

The UK has legally binding CO2 emissions reductions targets of 34% by 2020 and 80% by 2050. The main framework is the National Renewable Energy Action Plan (NREAP) [17], [18].

The 2009 Renewable Energy Directive sets a reduction target of 15% of the UK's energy consumption from renewable sources by 2020. The plan sets out priorities to be pursued, which can be summarised as follows:

a). Reduction of reliance on fossil fuels in order to ensure energy security, in face of the depletion of domestic reserves and growth in global energy demand.

b). Growth of reliance on renewable energy sources should create opportunities for investment in new industries and new technologies.

c). There should be strong government action to help develop businesses in this area, in order to "put the UK at the forefront of new renewable technologies and skills".

d). The development of renewable energy sources, alongside nuclear power and the development of carbon capture and storage should enable the UK to "*play its full part in international efforts to reduce the production of harmful greenhouse gases*" [18].

'The Carbon Plan' adopted in 2011 by the UK states that *"if the country is to cut its greenhouse gas emissions by 80% by 2050, energy efficiency will have to increase across all sectors to the extent that energy use per capita is between a fifth and a half lower than it is today"* [2].

The UK's target for energy consumption reduction in 2020 was set at 18% reduction in final energy consumption, relative to the 2007 'business-as-usual' projection established by the EU.

The 'Mandate for Change', the core planning policy for Stoke-on-Trent, illustrates the commitment of the Stoke-on-Trent City Council to contributing to carbon reduction targets, making fuel security one of its top priorities [19]. The Council is a registered participant in the central government's Carbon Reduction Commitment Energy Efficiency Scheme (CRC EES). *"The scheme is designed to improve energy efficiency and cut emissions in large public and private sector organisations. The CRC affects large public and private sector organisations across the UK, together responsible for around 10% of the UK's greenhouse gas emissions. Participants include supermarkets, water companies, banks, local authorities and all central government departments"* [20]. As a result, the city has completed a Carbon Management Plan, which establishes a CO2 emissions reduction target for facilities and services run by the city of 30% by 2015. These goals do not include overall reduction of CO2 emissions.

The UK National Energy Efficiency Plan is a response to the EU Energy Efficiency Directive, which entered into force on December 2012. *"This directive establishes a common framework of measures for the promotion of energy efficiency within the Union in order to ensure the achievement of the Union's 2020 20% headline target on energy efficiency and to pave the way for further energy efficiency improvements beyond that date"* [21]. There is a myriad of actions and programmes enacted by the UK's Central Government to improve energy efficiency [22]. Some programmes are further explained in the subsequent section and the impacts are discussed along the text. It is notable, however, that programmes targeted at business and industry, households and the public sector exist.

From the programmes targeted at households, the 'Green Deal' is considered the most comprehensive. The Green Deal provides targeted information about

potential energy efficiency to households through a two-stage independent assessment. The first stage is based on the existing Energy Performance Certificate (EPC), which is mandatory on sale of a property. The second stage involves production of a more tailored report, based on actual occupancy information to identify the most cost effective measures. The Green Deal can support households to install energy efficiency measures, including: insulation (loft, cavity or solid wall); draught proofing; improved heating controls; double glazing; and renewable energy technologies (e.g. solar panels). The Green Deal is analysed in detail further. The programme is designed to help people make energy efficiency improvements to buildings by allowing them to pay the costs through their energy bills rather than upfront.

The Green Deal has replaced other successful policies after the rise of the current conservative coalition to national government in 2010. It is seen by many as an attempt to finance energy efficiency policies, and to cut on government obligations towards citizens. Most important, the Green Deal is criticised for not catering for the needs of vulnerable and deprived households most in need of protection against fuel poverty. Alternatively, it is also seen as an innovative tool to promote energy efficiency through a novel approach in financing energy efficiency measures.

For Iain Podmore, member of the Housing Enabling Team of the Council Housing Services, the Green Deal is a positive development that will enable households to finance much needed improvements. However, Podmore admits that the Green Deal is a *"complicated tool, not easy to access"*. For Podmore, it is best not to see the Green Deal as a product, but as a regulatory framework that enables households to carry out home improvements that are costly. For Podmore, the high costs of home improvements leading to energy efficiency are one of the main barriers for improvements in the housing stock of Stoke. *"People want to be energy efficient, but often they can't afford it"*.

As stated before, Stoke-on-Trent has 25,000 homes with single brick walls, which are difficult and costly to treat. Several interviewed stakeholders coincide that without extra grants, disadvantaged households would not be able to pay for single wall insulation, even with the help of Green Deal. Another complication pointed out by Podmore is that the Green Deal is quite expensive to access. A number of assessments must be completed before a household can apply for the programme and these assessments are costly. Once an assessment is completed and the necessary measures are listed, an installer will be appointed to provide the household with a detailed quote. If the quote is accepted, a finance plan will be agreed upon. Interested households are put off by the idea of paying so much for an assessment because having the assessment completed does not mean measures can be paid for and implemented.

The Green Deal operates effectively as a loan, but the loan is attached to the property, rather than to the individual contracting it. The interest rates can be anywhere between 7 and 9% of the amount lent. Interest rates can increase over the term of the Green Deal Plan, which means that presently it is cheaper to access alternative loans. Moreover, there is a large number of organizations involved in the process. They each provide different parts of the process, so it is difficult for customers to find a single organization that offers the service from start, when you first make contact, all the way through to the end product, which is to have the measures installed.

Between 2007 and 2012, Stoke-on-Trent put together a community interest company that would manage retrofit programmes. Much work was done in easy to treat properties (loft insulation, cavity wall insulation, heating systems installation). The funding available then covered the full cost of works. The programme was quite successful, with over 11,000 measures installed into 9,000 homes. Now, most properties left to insulate are 'hard to treat' properties. They are much more expensive to insulate and they take much longer to complete. Podmore summarizes: *"Governments are looking for ways to pass on costs to consumers, because obviously we are trying to reduce our obligations on energy suppliers, and we are trying to reduce our obligations on the grants that are offered. But unfortunately Green Deal, which is the only solution at the moment, is encountering a number of market failures that haven't been addressed just yet"*. For Podmore, *"you've got that catch 22 situation, where the people who need energy efficiency measures the most are the least able to afford them"*.

5. MUNICIPAL PLANNING FRAMEWORK IN RELATION TO SUSTAINABILITY AND ENERGY

In this section, we continue to describe the multi-level governance architecture of energy efficiency policy in the UK, while describing how it interacts with the networked governance approach that is adopted at the local level. For Fudge et al. [23, p. 2], *"local authorities have become more active players across a range of sustainability initiatives in the UK"*. Despite drawbacks concerning the removal of performance targets by central government, the focus of policy making in the UK still lies on the leading role of local authorities in energy conservation, generation and efficiency. In 2009, the Department of Energy & Climate Change (DEEC) issued the Low Carbon Transition Plan, which encouraged 'place based' initiatives for energy efficiency, led by coalitions of stakeholders in 'networked governance' [23]. In 2011, a new Memorandum of Understanding between the

Department of Energy & Climate Change and the Local Government Group was signed, indicating the continuation of devolution policies in energy efficiency matters. According to the 2012 Local Action Plan for Energy Efficiency and Sustainability, the council's Environmental and Sustainability Policy sets the following specific goals and ambitions: *"(1) Renewable Energy and Waste to Energy: the ambition to make the city self-sufficient in energy, from waste streams, such as biogas production from refuse; (2) Sustainable Transport: to ensure an integrated low carbon transport infrastructure is developed for the city; (3) Local/Regional Climate Impact and Sustainable Management: the council has developed a Climate Change Adaptation Risk Register, and has commitments to manage land and assets owned by the council in a sustainable way; (4) Energy Efficiency Measures: to ensure that the council acts to reduce its energy consumption, and its CO2 emissions, and to report on this progress annually in a Carbon Footprint report. Finally, (5) To continue to invest in the domestic housing stock to minimise the number of homes in fuel poverty"* [3].

Stoke-on-Trent follows a Local Development Framework (LDF) enacted in 2013. LDFs are spatial planning strategies introduced in England and Wales by the Planning and Compulsory Purchase Act 2004, which abolished Local Plans and Structure Plans, and replaced them with LDFs. The Local Development Framework is composed by several elements, including the Core Spatial Strategy and Saved Local Plan Policies. It follows guiding planning principles that are stated in the National Planning Policy Framework [20], which replaced Planning Policy Statements (PPS) and Planning Policy Guidance Notes (PPG) in England.

The current Stoke-on-Trent Core Spatial Strategy was adopted in 2009 [24]. The Core Spatial Strategy is the primary statutory planning document in the city and sets out a broad framework for the future development of Newcastle-under-Lyme and Stoke-on-Trent, and supports the delivery of regeneration priorities in the city. The Core Spatial Strategy "*seeks to deliver targeted regeneration to meet projected development needs in accordance with sustainability principles and to maximise development within the Inner Urban Core of the City. Tailored Area Spatial Strategies are set out for the city centre; inner urban core and the rest of the city*" [25]. The strategy sets out the overall vision for the future regeneration of the North Staffordshire area stated as: *"The Borough of Newcastle-under-Lyme and the City of Stoke-on-Trent will be a prosperous, vibrant, environmentally responsible and successful area of choice for businesses, visitors and residents in the period up to 2026*" [26, p.31]. The main objectives of this strategy are to retain existing population, raise income levels, strengthen housing markets, improve the health and well-being of the population and enhance the reputation of the area [26].

The supplementary document to the LDF is called 'Sustainability and Climate Change' and delivers measurable improvements to the sustainability of the built environment throughout the planning application process. This document aims to ensure that the sustainability of development proposals is a key consideration in the planning process and creates requirements for applicants seeking planning permission to consider the longer-term impacts of climate change. This document was adopted in February 2014 and is seen by the council as a big step towards energy efficiency and overall sustainability of new developments [25]. This particular strategic aim related to sustainability and climate change is underpinned by Policy CSP3 - Sustainability and Climate Change, which states: "*Development which positively addresses the impacts of climate change and delivers a sustainable approach will be encouraged*".

In 2013, the city cabinet agreed to proceed with the preparation of a new Joint Local Plan in partnership with the borough of Newcastle-under-Lyme. The strategies listed above underpin the overarching programme called 'Mandate for Change', the ambitious programme that aims to stimulate new investment in the city; protect existing jobs and create new ones and alleviate poverty [19]. Regeneration strategies connected to the upgrading of the existing housing stock in Stoke-on-Trent are one of the main policy focuses of the Mandate for Change, which sets forward several regeneration aspirations connected to structural spatial and economic reform and change.

6. THE LOCAL CHALLENGES: ENERGY EFFICIENCY IN THE HOUSING SECTOR AND FUEL POVERTY

In this section, we describe what several actors identified as the main challenge for local energy efficiency policy-making, namely the state of the housing stock and the rise of fuel poverty. Data from the Department of Energy and Climate Change Fuel Poverty Statistics 2010 show that Stoke-on-Trent's fuel poverty in privately rented houses has increased from 31% in 2004 to 46% in 2009. Several stakeholders mention the poor state of the privately owned housing stock and fuel poverty as one of the main challenges for the local government.

Approximately 19% of English households live in fuel poverty [27]. But what is fuel poverty exactly? According to the British charity Warm Zones [28], fuel poverty is the "*inability of a household to afford sufficient warmth for health and comfort. A fuel-poor household is one that needs to spend more than 10% of household income on fuel for heating, hot water, cooking, lighting and electrical appliances. The*

amount spent on heating must be enough to achieve a satisfactory level of warmth. This is generally accepted to be 21°C in the living room and 18°C in other rooms".

However, the current UK conservative coalition has challenged this definition. The current definition of fuel poverty adopted by the UK central government states that fuel poverty is driven by three key factors: energy efficiency of the home; energy costs and household income [27]. Critics point out that the change in definition has slashed the number of households considered to be in fuel poverty without significantly changing the state of the housing stock [29].

Since 2001, the UK government has had a legal duty to set out policies to reduce fuel poverty. According to Energy UK, which appoints itself "*the voice of the energy industry*" in the UK, a "*variety of schemes and measures have been introduced, but the number of households assessed to be in fuel poverty has not fallen in line with the targets*", but offers no explanation as to why [30].

Debbie Hope is Strategic Manager for Housing Growth at Stoke-on-Trent City Council. For Hope, *"the back story for the whole of Stoke is the level of poverty and the number of people who live in fuel poverty"*. These people are mostly concentrated in the private-rental housing sector, rather than in housing that is managed by housing associations, which according to Hope are easier to intervene in. For Hope, policies have focused on reducing fuel bills and making people more energy efficient from a fuel use point of view, rather than pursuing the wider green agenda in terms of energy production and infrastructure. Policies have concentrated on working with individuals and improving homes, especially when council-owned housing stock is concerned, while the council has been relatively powerless in relation to privately owned property. This trend is in line with national trends. *"(…) at a national level, fuel poverty in the social rented sector decreased by more than in the private rented and owner occupied sectors, and so areas with a high proportion of social housing are likely to see bigger decreases in fuel poverty levels"* [27].

'Beat the Cold' is a charity concerned with reducing the incidence of fuel poverty and cold-related illness in Staffordshire. Beat the Cold informs, advises and makes referrals for households through telephone advice, events, talks and displays. The charity targets disadvantaged households that need to spend more than 10% of their income on fuel, helping them to apply for measures and grants to improve energy efficiency and giving advice on using fuel, paying for fuel and services from other agencies. Martin Chadwick is the Chief Officer since the formation of the charity in 1999. For Chadwick, Stoke-on-Trent City Council is rather efficient at accessing public funds and implementing programmes. But according to him, there is massive withdrawal of resources at national and local level that is also reflected in programmes that help disadvantaged households keep warm. For Chadwick, there have been positive developments in terms of bringing housing units to acceptable standards of energy efficiency and comfort lately. The city, even in the face of strained resources, has tried hard to attract external funding and has successfully implemented programmes. However, says Chadwick, *"the scale of the problem defeats them"*. The predominance of 19th century terraced housing in Stoke-on-Trent makes it very hard for the council to effectively tackle the problem of fuel poverty. But Chadwick points out, as do many others, that tackling fuel poverty means primarily tackling low incomes and the state of properties, besides addressing behavioural changes.

Like several other stakeholders, Chadwick considers the Green Deal *"almost impossible to fit in the needs of most deprived households"*. The way the programme is conceived makes it much less attractive for low-income households in privately rented homes, since they are unwilling to contract long-term debts that have an impact on their monthly income. They will not invest in a property from which they will almost certainly move at some point. Fragile households (the elderly, the very poor, the illiterate) are much less inclined to seek the Green Deal, because it is a difficult programme to understand and their housing arrangements might be uncertain or short-termed. Despite the fact that Beat the Cold tries to inform people about the Green Deal, Chadwick is sceptic about the programme and says more time is needed to evaluate its results.

6.1. Local energy efficiency policies in the housing sector

Data from the Department of Energy and Climate Change Fuel Poverty Statistics 2010 show that Stoke-on-Trent's performance on domestic CO2 emissions is 2.2 tonnes per capita and estimated 25% of all households in the city lived in fuel poverty (national rate at 19%) [20]. Stoke-on-Trent City Council collects energy performance data related to the Standard Assessment Procedure (SAP), which is a methodology to assess energy performance of buildings. SAP is the methodology used by the Government to assess and compare the energy and environmental performance of dwellings to underpin energy and environmental policy initiatives [31]. SAPs are used in the Energy Performance Certificates (EPC) [32], which are needed whenever a property is built, sold or rented. It contains information about a property's energy use and typical energy costs and recommendations about how to reduce energy use. An EPC gives a property an energy efficiency rating from A (most efficient) to G (least efficient) and it is valid for 10 years. As mentioned,

energy efficiency performance in the social housing stock of Stoke-on-Trent is deemed adequate. However, the vast majority of privately owned terraced houses represent the real challenge. The Private Sector Stock Condition Survey [33] finds that fuel poverty increased in the private sector from 31% in 2004 to 46% in 2009. 75% of elderly people living in this type of housing are in fuel poverty, because of low incomes and very poor standards of accommodation.

Moreover, Stoke-on-Trent has an estimated 25,000 properties with solid walls (i.e. single brick with no option for cavity wall insulation) [34]. In these cases, solid wall insulation (SWI) must be carried out. However, SWI is expensive and may interfere in the aesthetics of a property. Past measures taken by the Council to improve energy efficiency of residential accommodation included the Warm Front Scheme and other complementary programmes (Carbon Efficiency Reduction Target and the Community Energy Savings Programme). These programmes aimed to improve home energy performance through heating repairs and replacements, loft and cavity wall insulation, solid wall insulation, new heating systems, and draught proofing.

But the Warm Front scheme was prematurely terminated by the central government in 2013. According to the UK Fuel Poverty Monitor 2013 [35], the Warm Front programme in England was terminated too soon, although funds of approximately £30 million were distributed across 61 successful bids involving 169 local authorities to fund additional fuel poverty programmes. Stakeholders in Stoke-on-Trent lament the end of a seemingly promising programme that was based on local government action and planning. *"Following termination of the Warm Front scheme in January 2013, England is the only UK nation without a Government-funded energy efficiency programme for low-income households (…) The Westminster Government is failing in its duties under the Warm Homes and Energy Conservation Act of 2000. The Government has previously conceded that reducing Warm Front funding to zero would put it in breach of its legal obligations but has done just that"* [35].

Although it may be argued that decision-making and much of the accountability for energy security rests on the shoulders of the local authority, initiatives like the Staffordshire Strategic Partnership and the Staffordshire Local Enterprise Partnership (LEP) show that a networked governance style is in place in the case study and decision-making emerges from multiple interactions between stakeholders, rather than from the planning office alone. However, there are clear challenges concerning accountability and representativeness of vulnerable groups. Questions arise concerning the rights of vulnerable households to energy security, in the light of their lack of representation in forums of discussion and their apparent weak voice when it comes to the formulation of demands. Housing is the sector in which governance is most deficient, because privately owned houses for rent are difficult to regulate within the current British liberalised market context.

Most of the social housing stock of the city is in relative good state, thanks to interventions from the housing associations that manage them. However, the large amount of rental Victorian 19th century terraced housing stock that is privately owned is in very poor condition and energy performance is very low. The rights of deprived households to energy security seem to be flimsy at best, since the local authority does not have effective tools to intervene in privately owned housing that is rented to lower-income households. Terraced houses built before WWII are particularly abundant in Stoke. This housing typology is very inefficient in terms of energy conservation and needs to be urgently reformed. The council seems sensitive to the needs of lower-income households living in such homes, but the way national funding is organised makes it difficult for the council to propose alternative tools to deliver energy efficiency to those households.

6.2. Housing energy efficiency measures in Stoke-on-Trent

The difficulties in delivering energy efficiency measures to privately owned homes for rental does not mean inaction. Stoke-on-Trent has developed and published the 'Green Homes and Affordable Warmth Strategy 2012-2015', which describes the city's domestic energy efficiency ambitions and priorities [36]. These include requirements for all new housing retrofit programmes to aim for a minimum 42% CO2 reduction (on 1990 levels) by 2016 (equal to Energy Performance Certificate rating C). The municipality believes that improving the energy performance of private sector housing is a priority [37]. The council also operates area-based schemes to deliver energy saving measures into the housing stock through the Green Deal and ECO (Energy Company Obligation) schemes.

Measures include identifying communities that may benefit from Affordable Warmth and Carbon Saving Communities Obligation funding under the ECO scheme. They also include setting up a local Green Deal and ECO Broker service that will secure highest rates of ECO funding available to help residents fund energy efficiency improvements to their property. It also sets out to develop and implement a Framework Agreement for Installers to install energy saving measures that are identified by the Green Deal and ECO Brokerage.

Moreover, the council won funding from the Department of Energy and Climate Change (ECC) to deliver 220 energy saving measures to households at most risk of fuel poverty. This programme will also offer free Green Deal Plans for up to 60 households in Stoke-on-Trent.

Stoke-on-Trent City Council has often worked with pilot projects where a relatively small number of housing units were improved in innovative ways. The council has also joined private partners in order to deliver energy efficiency improvements, as was the case with 60 units where E.ON (the electricity company) sponsored the implementation of photovoltaic panels through the ECO programme. In another pilot, a Victorian single-wall terraced house was retrofitted with the latest technology. This made the internal space of the house shrank considerably, which was regarded as undesirable by the users.

Another pilot project consisted of three houses that were retrofitted differently, with different technologies in each one. The tenants of these houses had black box recorders, so the patterns of use and the effectiveness of the technology could be retrieved and compared.

6.3. Housing ownership and technical expertise as barriers for implementation

For Debbie Hope, the council simply doesn't have the "*sticks to beat private landlords with*". In other words, there are no tools to make private landlords abide to better standards of energy efficiency. The council has a scheme called the Landlord Accreditation Scheme. The aim of this scheme is to *"improve the physical and management standards in the private rented sector. This will be achieved by providing encouragement, support and incentives to members*" [38]. Landlords can subscribe to it voluntary and get technical information and free training. Landlords can then advertise their adherence to the programme as an advantage for renters.

The council can only interfere when living conditions put the health and the wellbeing of tenants in jeopardy. This has also to do with capacity within the local authority. As the number of unhealthy housing units is quite high, the environment and health agencies do not have the resources to tackle cases that are not desperate. For Hope, incentive and coercive policies do have an effect on private landlords, but they need to be consistent.

Despite efforts from the council and the Housing Standards team, policies and stakeholders seem to be insufficiently connected: council, university, housing associations, citizens are still looking for a coordinating platform that would be able to gather stakeholders and give more coherence to the many efforts towards improving energy efficiency in the city. Some believe that this role could be fulfilled by CoRE, the Centre of Refurbishment Excellence recently opened in the city. CoRE is an independent, not for profit national centre of excellence for green retrofit skills in the built environment opened in 2013 whose mission is to support professionals working for a low carbon, resource efficient UK through the refurbishment of homes and buildings [39]. Several stakeholders in the public sector and civil society recognize that technical expertise is essential to formulate and carry out upgrading policies, and recognize that CoRE would be an important partner for policy-making.

7. CONCLUDING REMARKS

Stoke-on-Trent's identity is related to its rich industrial heritage and the level of urban development it reached very early in the 18th century, followed by a prolonged period of decline, with low levels of economic investment after World War 2. This is reflected in the built environment, as much of the privately owned housing stock has not been brought up to date in terms of energy efficiency.

Low levels of economic investment are also reflected in issues of human capital development. The structure of production of the ceramics industry resulted in excessive concentration of wealth, with low salaries being paid to industrial workers in the region. As families had to struggle and could not prosper and increase their life chances, the resulting high levels of deprivation today mean that the city needs to tackle high levels of fuel poverty. The transition towards a service economy seems to be the great challenge for Stoke-on-Trent in the 21st century.

Energy efficiency is therefore an absolute priority for Stoke, both in economic and social terms. The local government is keen on finding innovative ways to tackle those problems, but needs to abide to a complex planning framework, where funds are made available by central government through a bidding system, in which Stoke-on-Trent must compete for funds with other unitary authorities in England. But funds have become scarcer in the last few years, with budget cuts in all areas. Nevertheless, the local government has achieved some important goals in the last few years, winning a bid that will allow the council to build England's first district heating network system. This is important, both politically and strategically, because it allows the council to advance a *"green agenda"*, in which energy conservation is seen as an opportunity for innovation and economic growth. This means that new technologies, new forms of urbanisation and new forms of public-private partnerships can be tried, hopefully pushing the economy of the city forward.

New technologies are extensively being tried in the numerous pilot-projects the council has put forward and in the innovative CoRE (Centre of Refurbishment Excellence) located in Stoke. New forms of urbanisation are, for example, new requirements for the construction of *"green neighbourhoods"* (with the challenges this represents in terms of attracting real estate investment

in a depressed area) and the upcoming district heating system. The UK needs to deal with its industrial heritage and with a large housing stock built before energy efficiency became a serious concern. This, combined with high indices of deprivation, has led to an alarming deficit in the rights of vulnerable households to healthy energy efficient housing. New forms of governance arrangements in relation to energy are being tried through LEPs (Local Enterprise Partnerships) and ECO (Energy Company Obligations), both frameworks from central government that are being used in Stoke, but they fail to include the voices of deprived households. Governance arrangements present clear advantages for the elaboration and implementation of measures that are realistic and acceptable by a range of stakeholders, but questions arise concerning the rights of vulnerable households to energy security, in the light of their lack of representation in forums of discussion. The rights of deprived households to energy security seem to be flimsy at best, since the local authority does not have effective tools to intervene in privately owned housing stock that is rented out to lower-income households.

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