

Deliverable 4.2 / Stoke-on-Trent
**The Challenge of Urban Regeneration in
Stoke-on-Trent**

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Roberto Rocco (TU Delft)

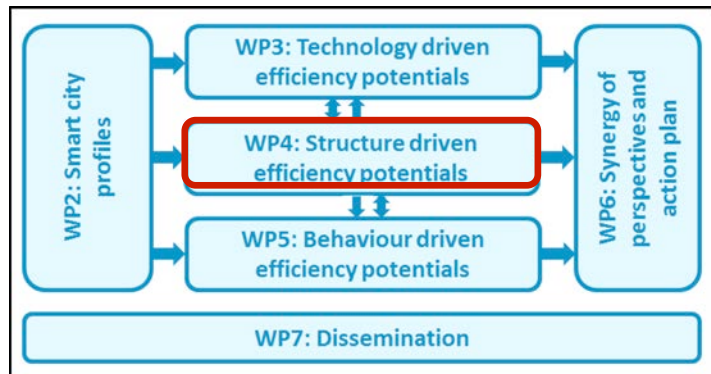


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Abstract

Main aim of report

The purpose of Deliverable 4.2 is to give an overview of urban energy planning in the 6 PLEEC partner cities. The 6 reports illustrate how cities deal with different challenges of the urban energy transformation from a structural perspective including issues of urban governance and spatial planning. The 6 reports will provide input for the following cross-thematic report (D4.3).



WP4 location in PLEEC project

Target group

The main addressee is the WP4-team (universities and cities) who will work on the cross-thematic report (D4.3). The reports will also support a learning process between the cities. Further, they are relevant for a wider group of PLEEC partners to discuss the relationship between the three pillars (technology, structure, behaviour) in each of the cities.

Main findings/conclusions

Stoke-on-Trent's main challenges are how to cope with the hampers of deindustrialization, both in terms of its social make-up (there are high rates of deprivation in the city, thanks to high levels of unemployment and low-skilled work force) and its built environment (much of the existing housing stock is old and not energy efficient. A lot if it is also hard to bring to modern standards).

Activities carried out including methodology used

The 6 reports are based on workshops (Stoke-on-Trent, Turku), interviews with stakeholders in the cities, the analysis of local reports, planning documents and news in the press, as well as close contact with our city partners. This is described further in the methodology chapter.

The PLEEC Project

Energy efficiency is high on the European agenda. One of the goals of the European Union's 20-20-20 plan is to improve energy efficiency by 20% in 2020. However, holistic knowledge about energy efficiency potentials in cities is far from complete. Currently, a variety of individual strategies and approaches by different stakeholders tackling separate key aspects hinders strategic energy efficiency planning.

For this reason, the PLEEC project – "Planning for Energy Efficient Cities" – funded by the EU Seventh Framework Programme uses an integrative approach to achieve the sustainable, energy-efficient, smart city. By coordinating strategies and combining best practices, PLEEC will develop a general model for energy efficiency and sustainable city planning. By connecting scientific excellence and innovative enterprises in the energy

sector with ambitious and well-organized cities, the project aims to reduce energy use in Europe in the near future and will therefore be an important tool contributing to the EU's 20-20-20 targets.

Index

1	Introduction.....	5
2	Methods	5
3	The regional setting	6
3.1	The Staffordshire County and the Stoke-on-Trent built up area	7
3.2	Regional and Municipal collaborations	9
4	Municipal profile and historical urban development	12
5	National and municipal energy planning	18
5.1	National and municipal goals	19
5.2	National policy measures	21
5.3	National planning framework.....	26
5.4	Municipal planning framework in relation to sustainability and energy efficiency	27
5.5	Regeneration aspirations.....	31
6	Energy Efficiency in the Housing Sector	33
6.1	Fuel Poverty.....	33
6.2	National frameworks for energy efficiency in the housing sector.....	35
6.3	Local energy efficiency policies in the housing sector.....	36
6.4	Perceptions of the Green Deal in Stoke-on-Trent	41
6.5	Perspective for newly built homes: Zero Carbon Homes	42
6.6	Future District Heating and The Powerhouse Central Project.....	43
7	Energy efficiency in the transportation and mobility sector	45
7.1	Urban form and energy efficiency.....	46
7.2	Mobility planning in Stoke.....	50
7.3	The reality of mobility in Stoke.....	52
7.4	Summary of mobility and transport in relation to energy efficiency in Stoke.....	56
8	Summary of urban energy planning in the city	59
9	Perspectives for the thematic report	61
10	Lessons and links to other PLEEC work packages.....	63
11	References	65

1 Introduction

This is one of six case studies in the PLEEC project, the goal of which is to describe how cities deal with climate planning and strategies. The focus is on relations between the 'urban', energy and key climate measures. By 'urban', we mean the structure of the city, its density and the cohesion between the built environment and the infrastructure. Finally, we discuss urban issues concerned with managing a city's built environment, its energy systems and services.

It is fair to assert that Stoke-on-Trent faces serious challenges concerning sustainability. As Larsen (2012) postulates, for sustainability to occur, it must occur simultaneously in each of its three essential dimensions: economic, social and environmental. As a former industrial hub affected by sharp industrial decline, Stoke faces challenges concerning its environment, its economic base and its capacity to generate inclusive prosperity. It also faces serious challenges concerning education and training and the valorisation of its human capital. Finally, the built environment needs to be adapted to new economic and environmental needs. The poor state of part of the housing stock in Stoke, combined with high indices of deprivation in some areas, contributes to create serious problems of fuel poverty in the city.

Luckily, however, the city has been working hard to achieve inclusive sustainable prosperity. With a comprehensive planning framework that is sensitive and reactive to energy efficiency and climate change, the city is turning its weaknesses into strengths. Stoke is able to find innovative solutions not only in technical aspects of energy efficiency, but also in innovative forms of governance and planning frameworks. Stoke could in the future become a hub for experiments in urban regeneration and energy efficient planning.

This case study was elaborated by the TU Delft team. This chapter illustrates how a city facing serious problems of energy efficiency is building up novel governance and planning approaches.

2 Methods

The case study was elaborated in three tiers. First, a template on content was discussed between the researchers at the backdrop of the first data collected about the six cities. Second, discussions between researchers and city representatives took place at the joint meeting in Stoke-on-Trent. A short workshop involving all PLEEC participants helped determine what were general attitudes towards energy efficiency in different partner municipalities. The workshop allowed some discussion of key prior to the field trip. Finally, the field trip was organized, and data obtained added to draft, which was submitted for comments. The workshops were complemented by a visit to CoRE, where aspects of energy efficiency in city, history and policies were discussed.

This case study report was developed in close cooperation with the municipality of Stoke-in-Trent, with the invaluable help of Edward Sidley and Sebastien Danneels, both civil servants working at the council.

The agenda of the field study is shown in Table 1 below, which contains the names and affiliation of interviewees. The interviewees were selected by the council, who tried to gather a varied group.

Table 1. Field trip agenda in Stoke-on-Trent 5-6 June 2014.

Thursday June 5 2014			Interviewee
10:00	11:15	Social Housing	Emma Griffiths (Staffordshire Housing Association). http://www.staffshousing.org.uk/
11:30	12:45	Civil society representatives	Barbara Andrew, vice-chair of the Potteries Heritage Society (local civic society for Stoke-on-Trent, involved in planning, urban design and a number of projects.) http://www.potteries.org.uk/
Lunch			
14:00	15:15	Energy provider	Phil Dawson (E.ON representative – one of the UKs leading power and gas companies. https://www.eonenergy.com/for-your-home
15:30	16:45	Council policies	Councillor Tom Reynolds (Stoke-on-Trent City Councillor. Cllr Reynolds is an elected politician who chairs the Planning Committee). http://www.moderngov.stoke.gov.uk/mgUserInfo.aspx?UID=1053
Friday June 6 2014			Interviewee
10:00	11:00	Planning and Transportation Policy	Austin Knott (Planning and Transportation Policy Team Manager at Stoke-on-Trent City Council - Austin leads the team responsible for all spatial and planning policy documents produced by the City Council. http://www.stoke.gov.uk/ccm/navigation/planning/planning-policy/
10:00	11:00	Fuel poverty/social issues	Martin Chadwick (Beat the Cold – An independent charity providing advice and guidance on fuel poverty and cold-related illness in Stoke-on-Trent. See: http://beatcold.org.uk/
11:00	12:15	Housing policy/growth	Debbie Hope, Strategic Manager for Housing Growth, Stoke-on-Trent City Council. http://www.stoke.gov.uk/ccm/navigation/regeneration/
Lunch			
13:30	14:30	Housing upgrade and regeneration	Iain Podmore, head of the Housing Enabling Team Housing, Stoke-on-Trent City Council. http://www.stoke.gov.uk/ccm/content/housing/

3 The regional setting

Stoke-on-Trent is situated in the English Midlands, the heart of the Industrial Revolution of the 18th and 19th centuries. It is divided between two Government Office Regions: West Midlands and East Midlands. Stoke-on-Trent is located in the former. The West Midlands is one of nine official regions of England. While English regions no longer have devolved roles, they continue to be used for some administrative purposes. Moreover, they define constituencies for purposes of elections to the European Parliament. Eurostat also uses regions to demarcate first level nomenclature of NUTS 1 regions within the European Union.

The largest regional centres are Birmingham and Wolverhampton, part of the West Midlands Built-up area with 2.440.000 inhabitants (Office for National Statistics, 2011). The total population of West Midlands was c. 5.600.000 in 2014.

It is commonly accepted that the Industrial Revolution in the UK started in Birmingham and the Black Country area of West Midlands. The Industrial Revolution has left a deep imprint in the landscape, the people and the urbanisation patterns of the area, which has suffered industrial decline and high rates of deprivation (UK Government, 2011c).

3.1 The Staffordshire County and the Stoke-on-Trent built up area

Staffordshire is one of the six counties forming the West Midlands (the others are Herefordshire, Shropshire, Warwickshire, West Midlands county and Worcestershire). Stoke-on-Trent is the largest city in Staffordshire. However, Stoke is a unitary authority independent of Staffordshire since 1997. **Unitary Authorities** are local authorities that are responsible for the provision of all local government services within a district. They allow large towns to have separate local authorities from the less urbanised parts of their counties.

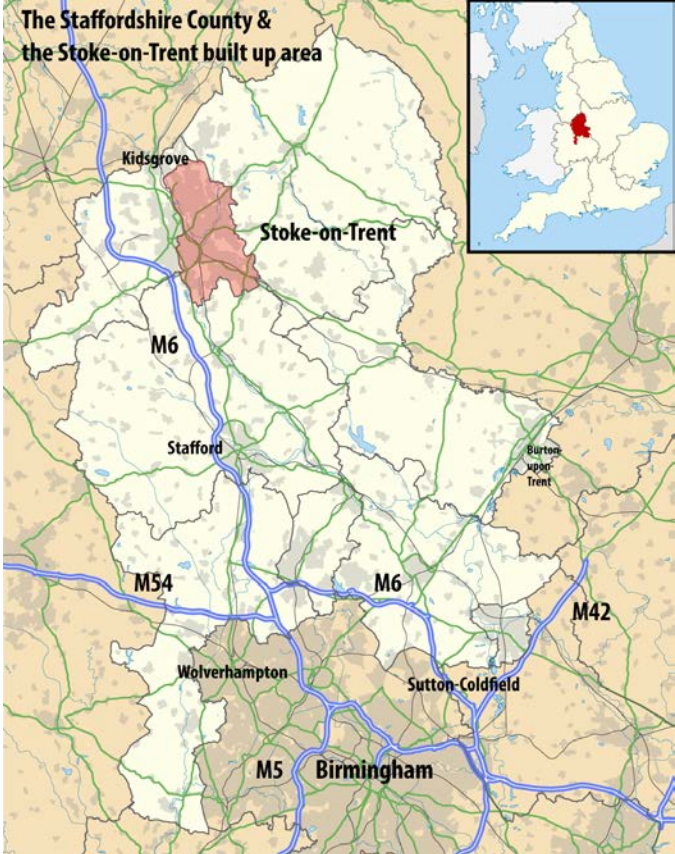


Figure 1 Map showing Staffordshire and the Stoke-on-Trent Unitary Authority highlighted in red. Adapted from "Staffordshire UK location map" by Contains Ordnance Survey data.

The Stoke-on-Trent Built-up Area, also commonly known as the 'Potteries Urban Area', includes the city of Stoke-on-Trent, and the towns of Newcastle-under-Lyme and

Kidsgrove. Stoke-on-Trent Built-up area had approximately 373.000 in 2011 (UK Government, 2011b).



Figure 2: Location of the ceremonial county of Staffordshire within England" by Nilfanion - Ordnance Survey. Open data. National Geospatial-Intelligence via Wikimedia Commons.

In general terms, Staffordshire finds itself lagging behind economically because of its many challenges concerning the transition from an industrial towards a service economy, having been formerly one of the earliest and most industrialised places on Earth. According to a report commissioned in 2008 by the **North Staffordshire Regeneration Partnership** (The Work Foundation, 2008), the county has lower than average proportions of knowledge intensive industries and of knowledge intensive workers and residents, thanks in part to unsuccessful attempts to increase and attract human capital and investment in new industries to the area. For the authors of the report, this makes it more difficult to increase the productivity of the county. Thanks to the decline of employment in the manufacture of ceramics and lack of growth in other sectors, productivity is quite low.

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 (Stoke LEP, 2014). There are high concentrations of unemployment leading to the appearance of several areas of multiple deprivation in the region. 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" (The Work Foundation, 2008).

However, there are several factors that might push the economy of the region forward.

First and foremost, the area benefits from its location at the heart of the UK, with strong connectivity via road and rail networks. For the **Stoke-on-Trent and Staffordshire LEP** (see section 3.2 about LEPs in the UK)(Stoke LEP, 2014), Stoke-on-Trent and Staffordshire's physical environments, including its historic urban centres and a high quality rural landscape, are core assets to the region. Moreover, says the LEP report, the rural economy has performed strongly in recent years, with growing employment and strong enterprise performance.

The county is home to two universities: Keele University (Newcastle-under-Lyme) and Staffordshire University, of which the main campus is located in Stoke-on-Trent. Design expertise in ceramics remains strong in the area. Staffs University Ceramic Design MA is regarded as one of the leading ceramics design course in the world. Research in urban regeneration, upgrading of buildings and urban energy efficiency could constitute a new area of economic growth, according to Stoke Staffordshire City Deal (Stoke Council and Staffordshire County Council, 2014).

The region is home to numerous international businesses including Alstom, Bet365, Coors, Goodwin International, JCB, Jaguar Land Rover, Michelin, Moog, Phones 4U, Steelite, WWRD, and Zytex, with incoming investment on the rise in the last few years, including “notable projects”, such as Jaguar, Land Rover and Amazon (Stoke LEP, 2014).

3.2 Regional and Municipal collaborations

The Staffordshire Strategic Partnership is the countywide organisation that promotes partnerships between local authorities, businesses and the civic sector in order to provide a framework for identifying and delivering outcomes and priorities for Staffordshire. The Strategic Partnership has a board composed by council leaders, council chief executives, political leaders, and senior civil servants. The board meets twice a year to set the vision for Staffordshire and aims to empower individuals with the responsibility and accountability to “oversee the delivery of shared priorities” (www.staffordshirepartnership.org.uk/). It is also responsible for checking that the priorities are being delivered and the right partners engaged.

One important component of the Staffordshire Strategic Partnership is the Stoke-on-Trent and **Staffordshire Local Enterprise Partnership (LEP)**. Local Enterprise Partnerships are voluntary partnerships between local authorities and businesses set up in 2011 by the UK Department for Business, Innovation and Skills to help determine local economic priorities and lead economic growth and job creation. They manage some of the actions previously managed by the Regional Development Agencies, abolished in 2012. **The Stoke-on-Trent and Staffordshire LEP** was formed in 2011. It “brings businesses and local authorities together to drive economic growth and create jobs” (<http://www.stokestaffslep.org.uk/about-us/>). Partners include the Stoke-on-Trent City Council, the Staffordshire County Council, several district and borough councils, several chambers of commerce, the Federation of Small Businesses, Keele and Staffordshire Universities. The Stoke-on-Trent and Staffordshire LEP aims to create 50,000 jobs and increase the size of the economy by 50 per cent by 2021, through investment in infra-

structure, educational institutions and amenities that will increase quality of life in the city (<http://www.stokestaffslep.org.uk>).

According to the Greater Birmingham and Solihull Strategic Economic Plan (Birmingham City Council, 2012), the economies of the six West Midlands Local Enterprise Partnerships (Black Country, Coventry & Warwickshire, Greater Birmingham and Solihull, the Marches, Stoke & Staffordshire and Worcestershire) are closely linked. The report recognises that “supply chains, transport links and skills needs do not stop at an individual LEP’s boundary and that businesses have similar needs in relation to support and access to finance. As such, the potential for collaboration and achieving better outcomes through joint working is great”. There is collaboration between LEPs in areas such as transport, bidding for national funds, business and growth hubs, housing, training and education, etc.

North Staffordshire enjoys a number of cross-municipal collaboration schemes, especially between Staffordshire County Council and Stoke-on-Trent City Council. The **North Staffordshire Regeneration Partnership** (NSRP) is part of Stoke’s **Core Spatial Strategy** (see section 5.4) and was set up to draw various organisations together and to encourage coordination of working practices. The partnership includes a programme of master classes, site visits and action learning sets to bring about culture change in terms of leadership and understanding of governance arrangements within NSRP.

Recently, The Stoke-on-Trent and Staffordshire **City Deal** was given the go-ahead by central government.

City Deals are made within a framework of devolution promoted by central government. They are agreements between central government and a city that aims to give the latter control over policies that affect their area and decide how public money should be spent, within a programme closely monitored by central government. Cities must present concrete project proposals that are evaluated by central government and only then the city deal is approved.

The first wave of City Deals involved the 8 largest cities outside of London, known in the UK as the Core Cities. The second wave involves 20 cities - the next 14 largest cities outside of London and their wider areas and the 6 cities with the highest population growth during the period 2001-2010.

“With the help of the Cities Policy Unit these cities negotiate deals that give each city new powers in exchange for greater responsibility to stimulate and support economic growth in their area”. In 2013, Stoke-on-Trent put forward a successful proposal connected to energy efficiency.

This particular city deal is built around a proposal for the UK’s first, low carbon, district heating network system. It is expected that the city deal will “take advantage of the area’s natural resources, support Stoke-on-Trent and Staffordshire’s world famous advanced manufacturing and applied materials (e.g. ceramics) sectors, and the emerging energy and renewables growth sector”. (Stoke Council and Staffordshire County Council, 2014).

According to the text of the deal, four connected goals are pursued: “delivering a new and local approach to energy production; providing local and incoming businesses with support to develop the next generation of products and materials; developing local sites for new businesses or existing businesses to expand into, along with a strengthened local planning and development context; and bringing employers and education together to ensure residents have the skills and training that they and our businesses need to drive the economy forward”.

Over its lifetime, Stoke-on-Trent City Council, Staffordshire County Council, and the Stoke-on-Trent and Staffordshire Local Enterprise Partnership estimate that delivery of the City Deal will deliver the Stoke-on-Trent District Heat Network, supplied with deep geothermal heat energy, a flagship project of the council (see section 6.6.)

4 Municipal profile and historical urban development

Stoke-on-Trent is located in Staffordshire, England. It 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. Together with Newcastle-under-Lyme and Kidsgrove, Stoke forms the **Stoke-on-Trent Built-up Area**. Stafford has a maritime climate with cool summers and mild winters. About 9.000 firms are based in the city. Large companies include Phones4U, Michelin tyre company, Vodafone and Fuchs Petrolub. Sainsbury's supermarket and The Co-operative Pharmacy have large warehousing operations in the city, and Stoke-on-Trent is a key hub for Eddie Stobart distribution, a British infrastructure and support services company. Wedgewood, one of the most traditional pottery firms in the UK, have their factory just to the south of the city in Barlaston. Stoke-on-Trent City Council is the city's largest single employer. Another major employer is the University Hospital of North Staffordshire, with over 7.000 staff. (Stoke Council, 2012b)

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**.

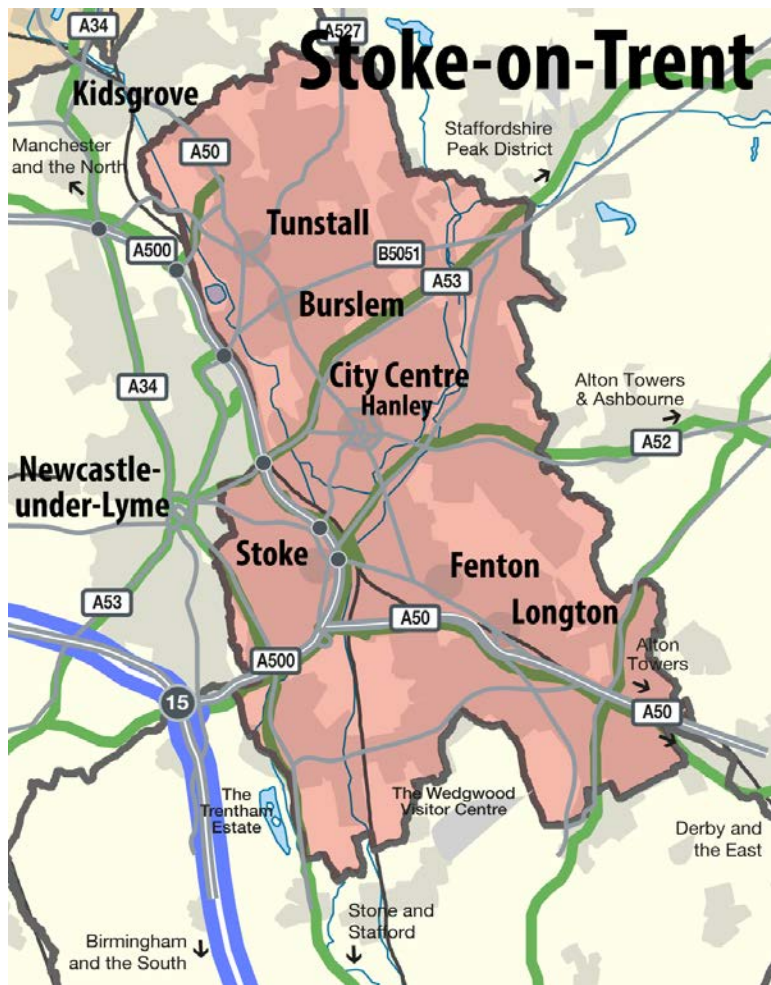


Figure 3 Map of Stoke-on-Trent showing the six different towns composing the council. Adapted from Tourist Information Centre. <http://www.visitstoke.co.uk/>

The North Staffordshire 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 to 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 (Morris, 2014).

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 (Walley, 2003).

Very localized industries and services led to a situation where people lived and worked very closely together, so movement tended to be along short distances and on foot. Longton, for instance, used to be one of the main manufacturing areas. Workers would have lived in or around Longton to get to their jobs in the ceramics industry. 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.



Figure 4 Bottle kiln on the corner of Normacot Road and Warren Street, Longton. This was once housed within a building which has since been demolished. Photo Gary Sheldon, 2013.

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.

Travel distances as a whole have gotten further, so citizens have to travel some distance to get to jobs in the original urban cores. Many of the more qualified jobs attract people who prefer to live as far as Birmingham and face longer commuting times to get to Stoke.



Figure 5: 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.

Because of the structure of the industry in the region, and the meagre salaries paid by the ceramics industry, there weren't 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.

Heavy industrialization in the past damaged the environment. The burning of coal in furnaces led to heavy air pollution. Hundreds of voids appeared in the ground where coal, clay and iron ore were once extracted. The smoke is now gone and many areas affected by mineral extraction have been reclaimed in a network of urban green spaces. However, what was left behind is fragmented landscape (Urban Vision: Conservation Studio, 2006).

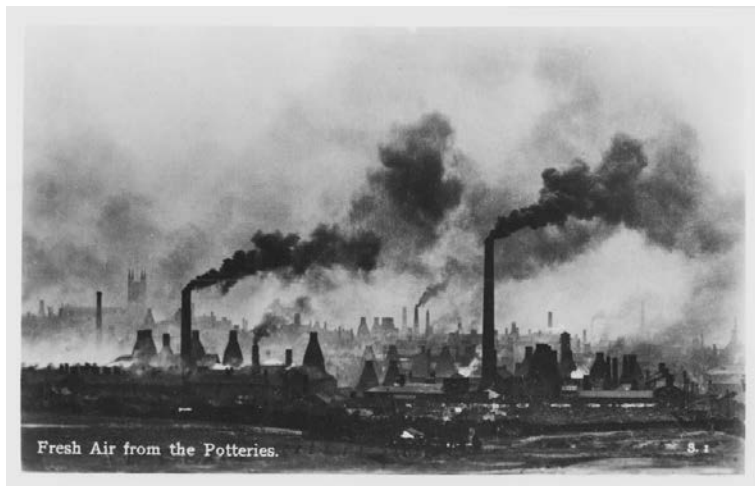


Figure 6 A humorous postcard from the 1950s shows the "fresh air" at the Potteries (the photograph is believed to be taken c. 1900). Simeon Shaw, in his *History of the North Staffordshire Potteries*, written in 1829, described the filth produced by the bottle ovens: "The vast volumes of smoke and vapours from the ovens, entering the atmosphere, produced that dense white cloud, which from about eight o'clock till twelve on the Saturday morning, (the time of firing-up, as it is called,) so completely enveloped the whole of the interior of the town, as to cause persons often to run against each other; travellers to mistake the road and strangers have mentioned it as extremely disagreeable, and not unlike the smoke of Etna and Vesuvius.". Source: Marshall Colman Fired Up Blog <http://marshallcolman.blogspot.nl/2012/03/old-postcard-of-stoke-on-trent.html>

Industrial decline happened 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 led to 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 (Stoke Council, 2010).

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 are losing 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 (Urban Vision: Conservation Studio, 2006). Traditional Victorian terraced houses in private hands compose much of the housing stock in Stoke. Much of this stock has not been upgraded, leading to huge problems of energy efficiency and fuel poverty in the city.

Instead of keeping the historical linear character of the city, the council wishes to develop Hanley and turn it into the centre of a radial city in order to accelerate urban regeneration and create a clear pole of attraction for investors in the area. The council suffers opposition from some sectors of civil society for whom it is important to keep the character of the six towns and the polycentric structure of the area, where services and jobs would be available in each of the six towns.

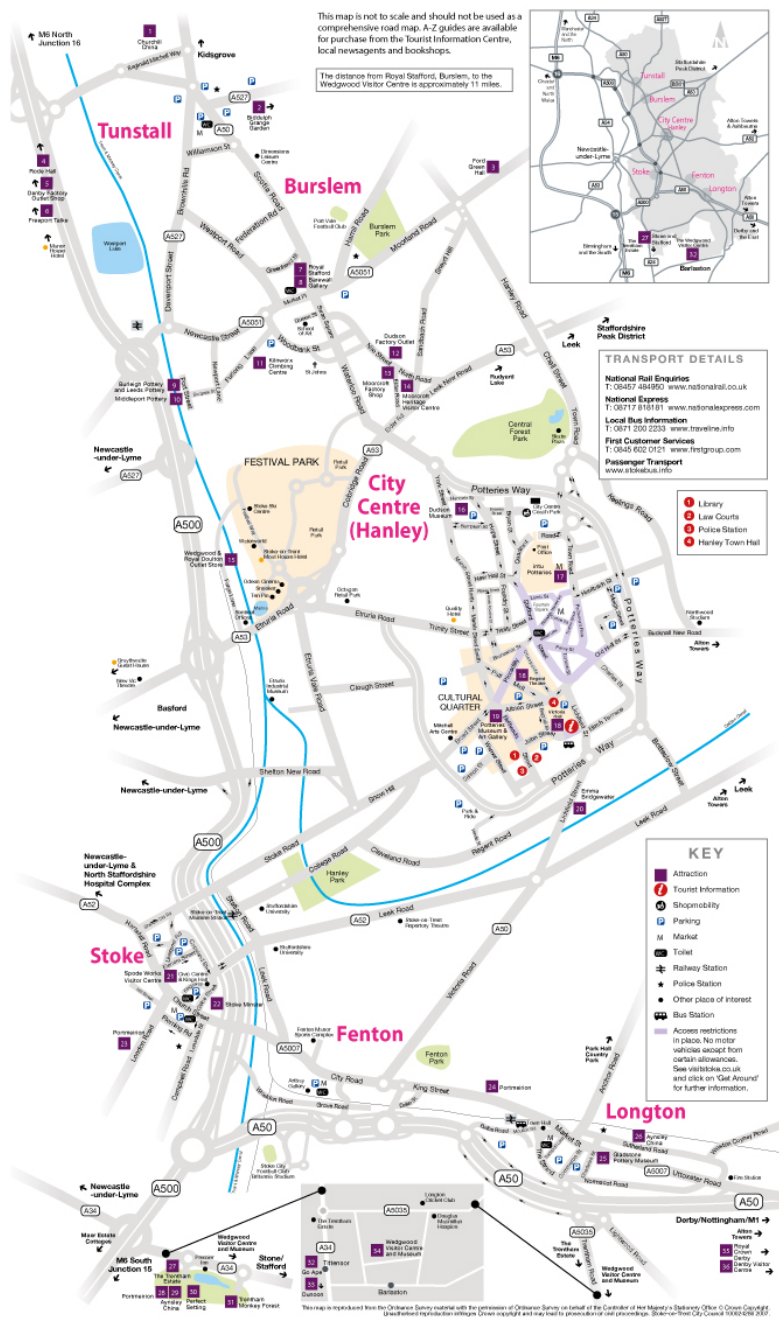


Figure 7 Detailed map of the urban structure of the 6 towns that form Stoke-on-Trent. Source: Tourist Information Centre. <http://www.visitstoke.co.uk/>

5 National and municipal energy planning

For Mulugetta et al. (2010), prior to 1990, “cheap oil and neo-liberal political ideology conspired against any radical changes in the collective behaviour of citizens or government policy”. However, “the economic conditions today are very different(...). Both the neo-liberal consensus and cheap oil seem to have come to an end, and humankind is faced with an uncertain future on a number of fronts.” (7541). For the authors, “Both the neo-liberal consensus and cheap oil seem to have come to an end, and humankind is faced with an uncertain future on a number of fronts. Questions of energy and climate security are interwoven with questions of economic and social security and talks of ‘green collar jobs’ or a ‘green new deal’ are not easily reconciled with the level of state debt following the financial bail-out of the banking system.” (7541). In other words, integrated sustainable development that takes social sustainability into account seems to have become a central concern for advanced liberal democracies. This seems to be the case in the United Kingdom, where a comprehensive and complex planning framework for energy efficiency and carbon foot print reduction has emerged in the last decade.

The main policy framework for energy efficiency is the **UK National Energy Efficiency Action Plan (2009)**. “The UK Government has introduced a wide range of policies to help households, businesses and the public sector reduce their energy use. These policies are working. Energy consumption in the UK has fallen for eight of the last nine years and final energy consumption is now 13% lower than in 2003. Moreover, energy consumption is now falling in all sectors of the UK economy. The UK’s declining energy consumption reflects our international leadership on energy efficiency; the UK now has the least energy intensive economy in the G8” (UK Government, 2014e).

But top-down centralised approaches must be combined with bottom-up initiatives, since no single intervention can deliver the systemic change to mitigate the effects of climate change and the exhaustion of fossil fuels. Mulugetta et al. cite Ostrom, for whom “while many of the primary effects of climate change may be global, the causes of climate change are located within the activities of individuals households and actors at local and community scales.” (Ostrom, 2009. World Bank, Washington DC.)

“Significant efforts are needed on many fronts, involving both small and large scale, implementing various ownership and delivery models, and deploying a wide range of low carbon technologies at the demand and supply ends.” (...) Local initiatives “(...) can make many important indirect contributions in **creating the space to evaluate models of social innovation, the platform for nurturing and sharing of technical skills, as well as the marketplace where low carbon options can gain some traction.** They can provide new political opportunities for active citizen engagement and challenge dominant discourses in energy.” (Mulugetta et al., 2010, 7542). It is clear that a multi-scalar, networked approach that is able to shape the attention of a variety of actors acting independently in different scales is needed, but the specific role of local initiatives must be highlighted.

Mulugetta et al. argue that local level and community scale energy interventions bring a number of direct and indirect benefits, of which they list:

- Allowing for real and measurable carbon emission cuts
- Demonstrating lower carbon exemplars in action
- Enabling individual to engage with communities through energy
- Creating a platform for inter-community conversation and sharing of experiences
- Democratising decision-making in future carbon reduction plans (Mulugetta et al., 2010, 7542)

In the subsequent sections, we will argue that these aspects are reflected in the creation of national and supranational frameworks of action (as in the frameworks enacted by the European Union and followed by the UK) as well as at the local level, where local governments like Stoke-on-Trent council have been trying to create spaces of debate and action, engaging different stakeholders in creating, evaluating and enacting energy efficiency policies.

5.1 National and municipal goals

The UK has legally binding CO₂ emissions reductions targets of 34% by 2020 and 80% by 2050. The **main framework for energy efficiency** is the **National Renewable Energy Action Plan (NREAP) (UK Government, 2009)**. NREAPs are national action plans on renewable energy that all member States of the European Union were bound to deliver to the European Commission by 2010. They must provide “detailed roadmaps of how each Member State expects to reach its legally binding 2020 target for the share of renewable energy in their final energy consumption”(European Commission, 2009).

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:

1. 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
2. Growth of reliance on renewable energy sources should create opportunities for investment in new industries and new technologies
3. 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”
4. 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”. (UK Government, 2009 p.3)

The **Carbon Plan** adopted in 2011 by the UK (UK Government, 2011a) 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”.

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 (Stoke Council, 2014b), illustrates the commitment of the council to contributing to carbon reduction targets, making fuel security one of its top priorities. 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”(UK Government, 2012c).

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 Council of 30% by 2015. These goals do not include overall reduction of CO2 emissions.

Source of City Council carbon emissions 2013/13 (tonnes of carbon).

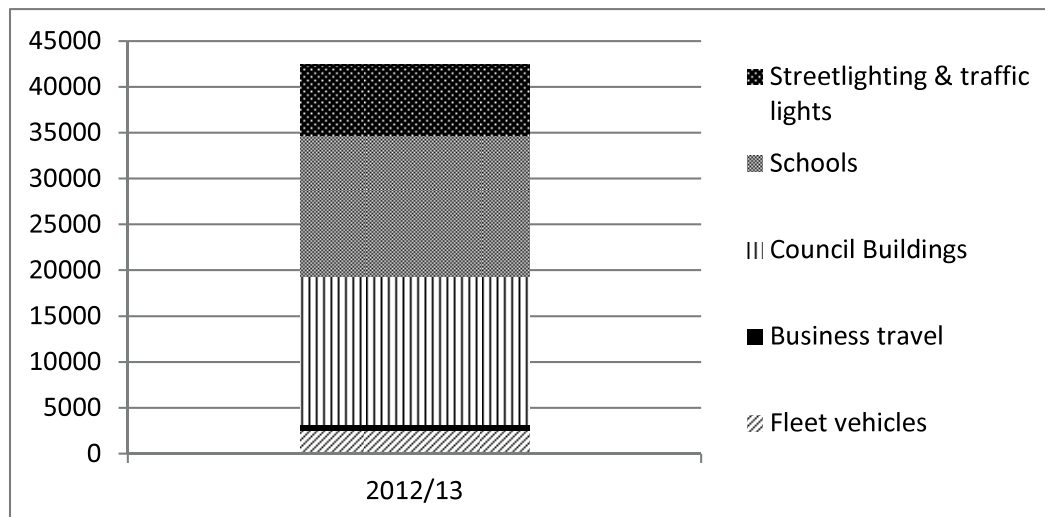


Figure 8: Source of Stoke City Council carbon emissions in 2013. Source: (Stoke Council Director of City Renewal, 2014)

5.2 National policy measures

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” (European Commission, 2012).

There is a myriad of actions and programmes enacted by the UK’s Central Government to improve energy efficiency. These are briefly explained below. Some programmes are further explained in the subsequent section and the impacts are discussed along the text. The following list is adapted from (UK Government, 2014d):

Programmes targeted at **businesses and industry**

- **Enhanced Capital Allowances (ECAs)** let businesses that invest in certain energy-saving equipment write off the total cost of the equipment against their taxable profit as a 100% first-year capital allowance.
- **Climate Change Agreements (CCAs)** give energy-intensive industries a discount on the Climate Change Levy (a tax on energy use in industry, commerce and the public sector) as long as they meet government-agreed energy efficiency improvement targets.
- **EU Emissions Trading System (EU ETS)**: Puts a price on greenhouse gas emissions to create financial incentives for industry and businesses to reduce emissions. It also limits emissions from electricity generation and the main energy-intensive industries.
- **CRC Energy Efficiency Scheme**, a mandatory reporting and pricing scheme to improve energy efficiency in large public and private organisations. Meanwhile, central government is making procurement more sustainable and reducing greenhouse gas emissions, waste and water usage.

Programmes targeted at **households**

- **The Green Deal**: Lets businesses and other non-domestic organisations pay for some or all of the cost of energy-saving property improvements through savings on their energy bills over time.
- **Smart Meters Programme**: Will see gas and electricity smart meters that provide near real-time information on energy use installed in households and buildings so consumers can save money on their energy bills and reduce emissions.
- **Electricity Demand Reduction project (EDR)**: Will reduce electricity demand through increase in efficiency. The EDR project was initiated in 2011 to fulfil a commitment made within the Electricity Market Reform White Paper, to assess whether there is sufficient support and incentives available for households, businesses and organisations to use electricity more efficiently.

Programmes targeted at the **public sector**

- **Salix Finance**: a government-funded scheme that provides interest-free loans to public sector organisations for energy efficiency improvements.

- **Guidance for local authorities and other public bodies:** The Committee on Climate Change guidance for local authorities helps local authorities plan how to reduce carbon emissions in their areas. It issues guidance on the Greenhouse gas emissions reporting and publishing process for local authorities. The purpose of this guidance is to encourage local authorities to report their emissions and help them submit and interpret the data.

5.2.1 Key national energy efficiency schemes further explained

Among the several schemes and action to improve energy efficiency, there are key policies that have a more significant impact on local plan-making and action. These policies are considered keystones in determining policy frameworks at the local level and they require energy measurement and/or energy auditing. These policies are explained further below (adapted from (European Commission, 2012, UK Government, 2014e)

CRC Energy Efficiency Scheme (CRC) – This is a mandatory scheme aimed at improving energy efficiency and cutting emissions in large, but non-energy intensive, public and private sector energy users. It includes around 2000 participants in the public and private sector, including Stoke council. Its aim is to encourage organisations to prioritise investment in energy efficiency and cut carbon emissions, through a tailored combination of drivers, including a carbon price, mandatory standardised monitoring and reporting of energy consumption (which raises awareness of energy use at the Board level of participating enterprises), and the publication of enterprises’ aggregated emissions data.

Mandatory greenhouse gas (GHG) reporting – From October 2013, all quoted companies will be required to report on their greenhouse gas emissions or explain why such a report is not necessary. This includes energy use emissions. The UK is the first country to make it compulsory for quoted companies to comment on emissions for their entire organisation in their annual reports. The introduction of these reports is intended to help investors see which companies are effectively managing the potential hidden long-term costs of greenhouse gas emissions.

Climate Change Agreements (CCAs) – CCAs provide energy-intensive industries with tax discounts in return for meeting energy efficiency targets. As such, measurement of energy use is one of the requirements of the scheme. Targets are set using evidence submitted by industry on reduction potential. CCAs cover around 9,000 facilities.

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 Green Deal is designed to help people make energy efficiency improvements to buildings by allowing them to pay the costs through their energy bills rather than up-

front. In section 6.4 experiences of using the Green Deal in Stoke-on-Trent are summarized.

Energy Performance Certificates (EPCs) – EPCs were introduced as part of the EU Energy Performance of Buildings Directive and present energy efficiency ratings of domestic and non-domestic buildings on a scale from A/A+ to G, based on an assessment of the age, size and fabric of the building. The EPC also contains recommendations on a range of measures to improve building energy efficiency. EPCs must be made available whenever a property is constructed, rented out or sold.

Of all listed policies, the **Green Deal** is one of the most contentious. There are several reasons for that. 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. These issues are discussed in depth in the following sections. The Green deal can be combined with one or more of the following schemes:

- **Energy Company Obligation (ECO)** : funds from private energy companies destined to assist low income households, or for certain hard-to-treat properties
- **Feed-in Tariffs**: payments from energy providers for households or institutions that generate their own electricity (e.g. through solar panels or a wind turbine)
- **Renewable Heat Premium Payments**: government funds to help households with the cost of installing renewable heating technologies

5.2.2 The Green Deal explained step by step

This section explains what conditions and steps are necessary for a household to contract the **Green Deal**. This section is based on several sources, but mainly on (UK Government, 2014a).

1. **Who can use it?** Any household with an electricity meter (including prepayment meters) in England, Scotland or Wales can use the scheme.
2. Both tenant and landlord must **agree on improvements** if property is rented.
3. Households can use the scheme for a range of improvements, including but not limited to insulation, heating, windows and products that generate energy, but only if the Green Deal assessment recommends them.
4. **Step one:** Get an assessment of the property to use the Green Deal. Households must contact a local Green Deal assessor or ask a Green Deal provider to find an assessor. Assessments are generally paid and fees must be agreed beforehand.
5. **Step two:** A Green Deal assessor visits household, evaluates property and household energy use and helps decide if household can benefit from Green Deal improvements.
6. **Step three:** Household gets a document, called a Green Deal advice report, containing (i) an **Energy Performance Certificate** that rates the property for energy efficiency, (ii) an **Occupancy Assessment** that measures how much energy is being used in the property, (iii) recommendation for improvements, (iv) an **estimate** of the amount the household

- could save on annual energy bills, (v) a **statement** on whether the improvements will pay for themselves through reduced energy costs.
7. **The Green Deal advice report** is valid for 10 years, or until significant changes or energy saving improvements are made to the property.
 8. After getting a Green Deal advice report, the household has **several alternatives** as for how the work will be done and how it will be paid for, such as a Green Deal finance plan.
 9. **Step four:** The next step concerns the selection of a contractor who will provide the household with a quote. A quote from a provider will include the repayment terms if the household is paying with a finance plan. Some companies provide all the services for a Green Deal package: assessment, finance and installation.
 10. In case the household chooses to pay with Green Deal, the provider will write the household a contract called a **Green Deal finance plan**. The plan contains an outline of the work that will be done, any financial help from other schemes, the repayments and interest rate, information on other incentives available and information on warranties and guarantees
 11. After the work, Green Deal repayments **are automatically added to the electricity bill**.

5.2.3 Energy Company Obligation (ECO) further explained

The **ECO** is a subsidy from energy suppliers that works alongside the **Green Deal** to provide energy-saving home improvements for deprived households and for properties that are harder to treat. The ECO was introduced in January 2013 to help reduce energy consumption in the UK and support people living in fuel poverty. It does this by funding energy efficiency improvements worth around £1.3 billion every year (UK Government, 2014b).

It replaces two previous schemes, the **Carbon Emissions Reduction Target (CERT)** and the **Community Energy Saving Programme (CESP)**.

According to OFGEM (Office of Gas and Electricity Markets, the government regulator for the electricity and natural gas markets in the UK), ECO places legal obligations on the larger energy suppliers to deliver energy efficiency measures to domestic energy users. It operates alongside the Green Deal to provide additional support in housing sector.

Under the rules of ECO, energy suppliers are obliged to help improve the energy efficiency of their domestic customers' buildings in three distinct areas:

1. **Carbon Emissions Reduction Obligation (CERO):** Energy companies must concentrate efforts on hard-to-treat homes and measures that cannot be fully funded through the Green Deal. Solid wall insulation and hard-to-treat cavity wall insulation are the primary areas for focus under this target. Other insulation measures and connections to district heating systems are also eligible if they are promoted as part of a package that includes solid wall insulation or hard-to-treat cavity wall insulation. CERO is unlikely to fully fund the cost of works so additional finance is required, such as Green Deal. CERO is available to all households in Britain. Energy suppliers must deliver measures worth £1.9bn over the life of ECO (30 months), which equates to £760m per annum.
2. **The Carbon Saving Community Obligation (CSCO):** Under this scheme, energy companies must focus on the provision of insulation measures and connections to domestic district heating systems supplying areas of low income. This target has a sub-target, which states that at least 15 per cent of each supplier's Carbon Saving Community Obligation must be achieved by promoting measures to low income and vulnerable households living in rural areas. CSCO funding targets specific areas of Britain as defined by the government's Indices of Multiple Deprivation (IMD). It concentrates on the poorest neighbourhoods in the IMD. CSCO requires energy suppliers to deliver measures worth £190m per year throughout the life of ECO, and should see 250,000 homes receive major insulation measures.
3. **Home Heating Cost Reduction Obligation:** Under this scheme, energy suppliers are required to provide measures which improve the ability of low income and vulnerable households (the 'Affordable Warmth Group') to heat their homes. This includes actions that result in heating savings, such as the replacement or repair of a boiler for example (OFGEM, 2014).

5.3 National planning framework

In the UK, local planning policies provide the framework to guide and control the development of land and buildings in a given area and set out proposals as to how a given area should develop in the future. The policies are then used to assess planning applications on a case-by-case basis and to decide what projects are suitable. Planning in the UK relies little on land use plans and comprehensive master plans and more on discreet decisions by the planning authorities and on negotiation (Cullinworth and Nadin, 2006).

This planning style allows for flexibility and easy inclusion of energy efficiency measures in planning practice. It also demands a networked-governance management style that is able to bring together different stakeholders from the public and private sectors as well as sectors of civil society. The perks and hitches of networked governance have been intensely discussed (Papadopoulos, 2007, Harvey, 1989, Wigmans, 2001), but it is fair to assert that issues of attribution, accountability and implementation might arise.

The **National Planning Policy Framework** (UK Government, 2012b) is general framework for plan making in England. It was published by the UK's Department of Communities and Local Government in March 2012, gathering and summarising previously issued documents known as Planning Policy Statements (PPS) and Planning Policy Guidance Notes (PPG). The Framework vastly summarised planning documents, reducing more than 1000 pages of planning guidance to around 50, to "make the planning system less complex and more accessible" (idem).

Planning Policy Statements (PPS) were UK government statements of national policy and principles regarding certain aspects of the planning framework. PPS were not legally binding, but they influenced the preparation of local development plans and condition planning applications.

The **National Planning Policy Framework** gathers and articulates previously issued PPS and "sets out the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities" (UK Government, 2012b).

"The National Planning Policy Framework must be taken into account in the preparation of local and neighbourhood plans, and is a material consideration in planning decisions. Planning policies and decisions must reflect and where appropriate promote relevant EU obligations and statutory requirements". (p.2) It sets out the Government's requirements for the planning system "only to the extent that it is relevant, proportionate and necessary to do so" (idem). It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

The framework acts as guidance for local planning authorities and decision-makers, both in drawing up plans and making decisions about planning applications.

In regards to energy conservation and efficiency, the **National Planning Policy Framework** states simply that “the purpose of planning is to help achieve sustainable development”, and emphasises development and growth, while limiting state interference and simplifying legislation. At the heart of the National Planning Policy Framework is the belief that sustainable development ought to pervade both plan making and decision taking (p. 14). For Huxford, among the framework’s core planning principles is the “support of the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourage the use of renewable resources (for example, by the development of renewable energy)” (Huxford, 2012)

In this framework, issues of energy efficiency are connected to the challenges associated to climate change. The main protagonists for energy efficiency measures are local authorities, which should plan for new development in locations and ways that reduce greenhouse gas emissions, consistent with the Government’s zero carbon buildings policy, taking account of landform, layout, building orientation, massing and landscaping to minimize energy consumption.

Local authorities are asked to produce “positive strategies” to promote energy from renewable and low carbon sources. Local authorities should also “design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily, including cumulative landscape and visual impacts; consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources; support community-led initiatives for renewable and low carbon energy, including developments outside such areas being taken forward through neighbourhood planning in line with the objectives and provisions of the Climate Change Act 2008”. Local authorities should also identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers”.

5.4 Municipal planning framework in relation to sustainability and energy efficiency

For Fudge et al. (2012), “local authorities have become more active players across a range of sustainability initiatives in the UK” (p.2). 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 (DECC) issued the **Low Carbon Transition Plan**, which encouraged ‘place based’ initiatives for energy efficiency, led by coalitions of stakeholders in ‘networked governance’ (Fudge et al., 2012).

In 2011, a new **Memorandum of Understanding** between the **Department of Energy & Climate Change** and the Local Government Group was signed (LGG and DECC, 2011), 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:

Renewable Energy and Waste to Energy – Stoke-on-Trent City Council has the ambition to make the city self-sufficient in energy. The council is committed to realising maximum value from waste streams, such as biogas production from refuse.

Sustainable Transport – Ensure an integrated low carbon transport infrastructure is developed for the city of Stoke-on-Trent.

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 and to maximise biodiversity and other benefits for the residents of Stoke-on-Trent.

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**. To continue to invest in the domestic housing stock to minimise the number of homes in fuel poverty". (Stoke Council, 2012b)

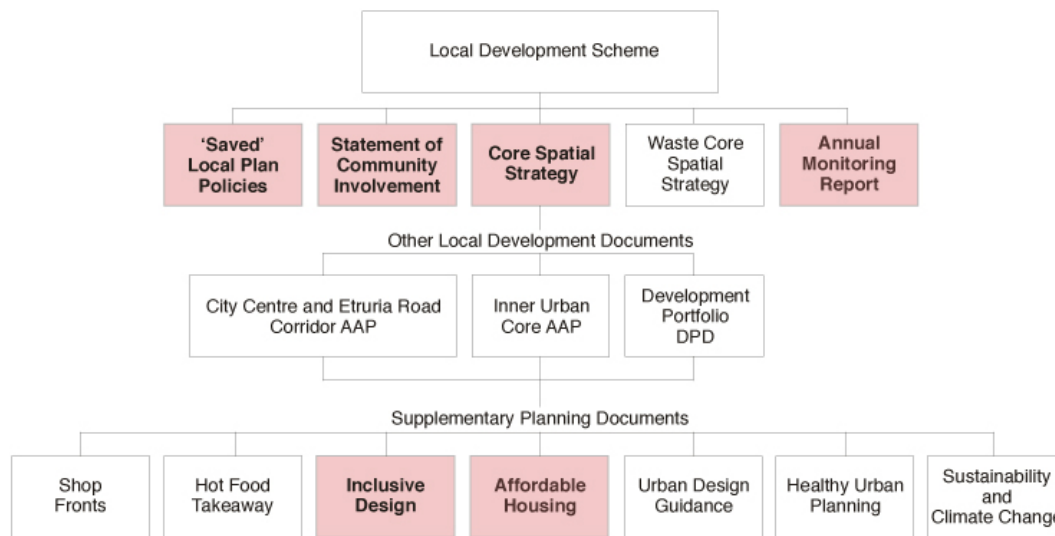
However, the city focuses its strategies on two main strands:

1. Renewable Energy and Waste to Energy
2. Sustainable Transport.

In terms of Renewable Energy and Waste to Energy objectives, the council aims to “make the city self-sufficient in energy generation, with the aim of protecting existing jobs and reducing fuel poverty”. It also aims to “maximise the recovery of value from all waste streams in the city for the benefit of the city and to engage all stakeholders in the development of plans and resources to make the city resilient against the impacts of climate change and fossil fuel depletion” (Stoke Council, 2012b).

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 Local Development Frameworks. LDFs were initially further detailed in **Planning Policy Statements (PPS)**, which, as we saw above, were replaced in 2010 by a single document, the **National Planning Policy Framework (NPPF)**, whose final version was published in 2012.

Stoke-on-Trent Local Development Framework



Red squares: policies being enforced in 2011. Source: STOKE COUNCIL 2011. Local Development Framework Consultation: healthy Urban Planning and Sustainability and Climate Change Supplementary Document. Stoke-on-Trent: Stoke Council, Planning Policy Team.

Figure 9 The Local Development Framework of Stoke-on-Trent. Red squares: policies being enforced in 2011. Source: STOKE COUNCIL 2011. Local Development Framework Consultation: healthy Urban Planning and Sustainability and Climate Change Supplementary Document. Stoke-on-Trent: Stoke Council, Planning Policy Team.

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** (UK Government, 2012b), 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 (**Stoke Council, 2009a**). The Core Spatial Strategy is the primary statutory planning document, which 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” (Stoke Council, 2014c).

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” (Stoke Council, 2012c, p.31). The main objectives of this strategy are:

- to retain existing population

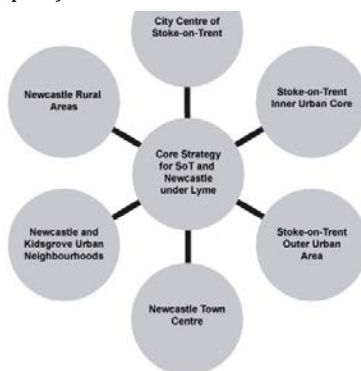
- to raise income levels
- to strengthen housing markets
- to improve the health and well being of the population
- to enhance the reputation of the area.

In order to provide detailed policy guidance the area was split into six districts with different policies and visions. “This approach captures the inherent differences in the starting points of each area and the likely investment targets that will drive economic prosperity, not just within these individual districts but in the plan area as a whole.” (Stoke Council, 2012c, p.31)

In relation to sustainable development and climate change the Core Spatial Strategy provides the overarching approach through Strategic Aim 17, which is “to minimise the adverse impacts of climate change through energy renewable energy sources and green construction methods in accordance best practice” (Stoke Council, 2012a)

The **Core Spatial Strategy** is accompanied by **Supplementary Planning Documents (SPDs)** and **saved policies** from the 1993 plan. The primary objective of **SPDs** is to detail the policy laid out in the **Core Spatial Strategy** and to deliver measurable improvements to the sustainability of the built environment. The measurability of improvements relates to reduction in carbon emissions, which needs to be objectively demonstrated.

Figure 10: Six districts contemplated by the Core Strategy (Stoke Council, 2012c, p.31)



The primary objective of **SPDs** is to detail the policy laid out in the **Core Spatial Strategy** and to deliver measurable improvements to the sustainability of the built environment. The measurability of improvements relates to reduction in carbon emissions, which needs to be objectively demonstrated.

Supplementary Planning Documents (SPDs) in place include the

‘Healthy Urban Planning’ document and the **‘Sustainability and Climate Change’** document, which are part of the **Local Development Framework of 2013**.

The **‘Sustainability and Climate Change’ SPD** 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 (Stoke Council, 2014c).

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. The highest standards of energy and natural resource efficiency will be achieved by: -

1. Requiring that all new development, as a minimum, complies with on-site or near-site renewable or low carbon energy targets set out in current or future national guidance and the Regional Spatial Strategy and takes positive measures to reduce carbon emissions to the levels set out in the Regional Strategy.
2. Ensuring the use of construction methods which minimise the use of non-renewable resources and which maximise the use of recycled and locally sourced materials.
3. Requiring all new developments to incorporate the use of Sustainable Urban Drainage Schemes (SUDS).
4. Developing habitat systems that are resilient to climate change in accordance with latest best practice.
5. Supporting local initiatives to address climate change such as the North Staffordshire Warm Zone¹ and other initiatives that may emerge.
6. Requiring best practice standards where supported by future local or regional evidence.
7. All new development shall be located in locations at the lowest possible flood risk as identified in the SFRA and all suitable flood mitigation measures shall be investigated and where possible incorporated into the development. Opportunities will be sought to open up culverted watercourses to alleviate flood risk, create and improve habitats and develop green corridors. Where these requirements are impractical and/or unviable, the onus will be on the developer to demonstrate that this is the case".(Stoke Council, 2012a) (p.2)

The **SPS** also has a number of subsidiary objectives, which have to do with a comprehensive approach to sustainable design and development and to the provision of practical tools to achieve sustainability of the built environment.

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. This plan is currently in preparation.

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 (Stoke Council, 2014b).

Regeneration strategies connected to the upgrading of the existing housing stock in Stoke 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.

5.5 Regeneration aspirations

Stoke-on-Trent has the aspiration to integrate the group of **UK Core Cities**. This is an alliance of the ten economically largest areas outside of London in England, Wales and Scotland that aims to promote collaboration and help set the development and planning

¹ This programme was posteriorly cancelled.

² <http://www.warmzones.co.uk/what-we-do/what-is-fuel-poverty>

agenda in the UK. (CoreCities, 2014). For Austin Knott, Planning and Transport Policy Manager for Stoke-on-Trent, “North Staffordshire Conurbation is a drain in the national purse. To become a contributor to the national purse we need to create the homes and the jobs”.

Stoke wishes to integrate that group and become one of the 10 largest cities in England, with a target population of 750.000 inhabitants. This aspiration is expressed in the core planning document **Mandate for Change** (Stoke Council, 2014b). The main objectives of the Mandate for Change are:

- To make Stoke-on-Trent the place to bring business
- To support and develop existing business
- To work with people to promote independence and healthy lives
- To make Stoke-on-Trent a great city to live in
- To support an effective and confident council

The council is active promoting those objectives. A recently submitted strategy to obtain EU Structural and Investment Funds by the Stoke-on-Trent and Staffordshire Local Enterprise Partnership (LEP) states:

“An economic powerhouse driven by the transformation of Stoke-on-Trent into a truly competitive and inspiring Core City and by accelerated growth in our County Corridors and urban centres. Our aim is to dominate the space between a number of the UK’s largest urban areas, by connecting growth sectors, an offer of super-connectivity and compelling sites, supplying higher skilled labour and exploiting our indigenous energy potential. Our ambition is to sustainably drive:

- Rapid growth in Stoke-on-Trent and its contribution to the county and national economy
- Development of the peri-urban areas along the County’s key transport corridors that provide a strong, agile and competitive offer locally and nationally

To do this we need a step change in the way we connect to neighbours, investors, customers and collaborators. Our stated aim is to grow the economy by 50% and generate 50,000 new jobs in the next 10 years.” (Stoke LEP, 2014)

Development towards a Core City relies on “rapid, planned growth of the conurbation centred on the city of Stoke-on-Trent (...) through the development of a strong, competitive city centre brand offering the full mix of city centre uses” (Stoke LEP, 2014). This vision depends on increased mobility and connectivity towards the neighbouring regions and beyond, though the high-speed rail line currently under discussion. The HS2 line will connect major cities in the North of England and the Midlands with London and the European high-speed railway network. Local authorities see this line as one of the great possible boosters for the region’s economy:

As a result [of the HS2 passing through Stoke], the city council predicts that business output will double, the population will rise to a million, and house prices will soar by 40 per cent. And if HS2 does not come? The chief executive, John van de Laarschot, says: “The economic consequences for Staffordshire are absolutely criminal.” The case for HS2 – as outlined in official documents – relies on services elsewhere being cut. If there is no HS2 station in Stoke, it will lose at least half of its existing fast trains to London, which run twice an hour. In the worst-case scenario, according to Mr Perez [Labour council leader], they could drop from 30 a day to just three or four in peak hours. (Moreton, 2014)

Stoke on Trent City Council has submitted an alternate HS2 route which includes an HS2 Station in Stoke-on-Trent, but so far the efforts of the municipality to change the route have not yielded results (Stoke Council, 2014a).

This vision also relies on the creation of “competitive urban centres”, a strategy whose main action is the strengthening of the town of Hanley as the main business and administrative centre of Stoke-on-Trent. This particular strategy is discussed in section 7.1. These actions are complemented by policies incentivizing sectorial growth in a few select business sectors and the enhancement of human capital in the area, enabling “all people to up-skill and re-skill to meet the needs of (...) growth sectors” (Stoke LEP, 2014).

Energy is an important part of this vision, as a programme of sustainable energy generation and distribution, through a pioneering district-heating development in the future, and through the development of regeneration strategies and technologies, are seen as opportunities to boost to skills, innovation and investment (see section 6.6 below).

6 Energy Efficiency in the Housing Sector

Data from the Department of Energy and Climate Change Fuel Poverty Statistics 2010 show that Stoke’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.

6.1 Fuel Poverty

Approximately 19% of English households live in fuel poverty (UK Government, 2012a). But what is it? According to the British charity **Warm Zones**², 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*”

² <http://www.warmzones.co.uk/what-we-do/what-is-fuel-poverty>

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 governing 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 income³. 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 (Read, 2014).

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 (Energy UK, 2014).

Debbie Hope is Strategic Manager for **Housing Growth** at Stoke 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”(UK Government, 2012a).

Beat the Cold is an active charity in Stoke concerned with reducing the incidence of fuel poverty and cold-related illness in Stoke-on-Trent and Staffordshire. It brings together local authorities, voluntary and statutory agencies, fuel companies, health and social care agencies and community groups. 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 and was interviewed for this project.

³ <http://www.energy-uk.org.uk/policy/fuel-poverty.html>

For Chadwick, when there is an external funding source, Stoke council is rather efficient at accessing those funds and implementing programmes. But according to Chadwick, there is massive withdrawal of resources at national and local level that is also reflected in programmes that help disadvantaged households keep warm.

According to Chadwick, there have been positive developments in terms of bringing housing units to acceptable standards of energy efficiency and comfort. The city, even in the face of very 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 makes it very hard for the council to effectively tackle the problem of fuel poverty. But for Chadwick and many others, tackling fuel poverty means primarily tackling low incomes and the state of properties, besides addressing behavioural changes.

Just 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.

6.2 National frameworks for energy efficiency in the housing sector

In order to guide local governments towards residential energy efficiency, the UK national government issued the **Home Energy Conservation Act (HECA)** in 1995. The HECA requires all local authorities to produce annual reports on domestic energy performance across all residential properties in their local area. The national Government expects reports to set out actions and opportunities that councils are proposing to improve the energy efficiency of housing in their areas, reduce fuel poverty and cut carbon emissions.

The poor state of much of the country’s housing stock and high levels of fuel poverty pushed the central government to enact the **Warm Homes and Energy Conservation Act (WHECA)** in 2000 (UK Government, 2000). This act required the Secretary of State to publish and implement a strategy for reducing fuel poverty, setting of targets for the implementation of that strategy.

In 2000, the Homes and Communities Agency set the **Decent Homes Standard** that had to be achieved by 2010. The **Decent Homes Standard** is a technical standard for public

housing (council owned housing and housing associations), which includes energy efficiency measures. This standard was meant to underpin the **Decent Homes Programme**, a programme designed to bring public sector housing to minimum comfort and energy efficiency standards.

The **WHECA** was recently amended by **The Energy Act 2013** that requires central government to set a new fuel poverty target in secondary legislation. The 2013 Energy Act contains a number of consumer protection provisions including the setting of a limit on the number of energy tariffs offered to domestic consumers, the automatic move of customers from poor value closed tariffs to cheaper deals, and the requirement for suppliers to provide information to consumers on the best alternative deals available to them.

The **Warm Home Discount** scheme was introduced in the Energy Act 2010, while **ECO** and the **Green Deal** were introduced in the Energy Act 2011.

The **Home Energy Efficiency Scheme Regulations** of 2005 upholds the **Warm Front** scheme (stopped in 2013).

In 2012, the **Department of Energy and Climate Change** required all English authorities with housing responsibilities to prepare a report by 31 March 2013 setting out the energy conservation measures that the authority considers practicable, cost-effective and likely to result in significant improvement in the energy efficiency of residential accommodation in its area. Authorities should have regard to measures that take advantage of financial assistance and other benefits offered from central Government initiatives, such as the **Green Deal**, **ECO** and **Renewable Heat Incentive** to promote significant energy efficiency improvements of residential accommodation; and to list measures which local authorities have developed to implement energy efficiency improvements in residential accommodation.

According to the UK Fuel Poverty Monitor 2013, a national domestic energy efficiency programme operational at community level and with local authorities at the heart of the scheme should represent the most efficient and cost-effective model to deliver heating and insulation improvements. *“Despite repeated endorsement of such a model by many key stakeholders there is little evidence that the Westminster Government will seek to build on the knowledge and experience gained from the **Community Energy Saving Programme**. This approach could have been strengthened and formalized in the recently revised guidance to local authorities in England under the **Home Energy Conservation Act**. However, the guidance imposes no duties on local authorities other than preparation and publication of progress reports and no associated funding are provided. That such an opportunity has been missed is seriously detrimental to energy-related social and environmental aspirations”* (National Energy Action, 2013).

6.3 Local energy efficiency policies in the housing sector

Data from the Department of Energy and Climate Change Fuel Poverty Statistics 2010 show that Stoke’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 (above the national rate of 19%) (UK Government, 2012a).

Stoke 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. (<https://www.gov.uk/standard-assessment-procedure>).

SAPs are used in the **Energy Performance Certificates (EPC)**⁴, 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 previously mentioned, energy efficiency performance in the social housing stock of Stoke is deemed adequate. However, the vast majority of privately owned terraced houses represent the real challenge. The **Private Sector Stock Condition Survey** (Stoke Council, 2009b) 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)(Stoke Council, 2013). In these cases, solid wall insulation (**SWI**) must be carried out. However, **SWI** is expensive and may interfere in the aesthetics of a property. Solid wall insulation may be done through external wall insulation (**EWI**) to all sides of a property or internal wall insulation (**IWI**) to the front and **EWI** to the back and sides 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 (National Energy Action, 2013), 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 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 con-

⁴ <https://www.gov.uk/buy-sell-your-home/energy-performance-certificates>

ceded that reducing **Warm Front** funding to zero would put it in breach of its legal obligations but has done just that” (National Energy Action, 2013).

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)** (see section 3.2) 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, although there are clear advantages for the elaboration and implementation of measures that are realistic and acceptable by a range of stakeholders, 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.

While most of the social housing stock of the city is in relative good state, thanks to interventions from the housing associations that manage them, the terraced Victorian 19th century housing stock that is privately owned is in very poor condition and energy performance is very poor.

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 WW 2 are particularly abundant in Stoke. This housing typology is very inefficient in terms of energy conservation and needs to be urgently reformed. Although the council seems sensitive to the needs of lower-income households living in such homes, the way funding is organised from central government makes it difficult for the council to propose alternative tools and means to deliver energy efficiency to those households.

These issues are discussed in detail in the following sections, specifically in 6.1.

The UK needs to deal with its industrial heritage and with a large housing stock built before energy efficiency became a serious concern. In the words of an interviewee, the UK housing stock was built to use cheap solid fossil fuels largely made available in the 19th and first half of the 20th centuries. This, combined with high indices of deprivation, has led to an alarming deficit in the rights of vulnerable households to healthy energy efficient housing. This is one of the main challenges for local administrations in terms of energy efficiency and sustainability.

6.3.1 Housing energy efficiency measures in Stoke

As a result, Stoke has developed and published a **Green Homes and Affordable Warmth Strategy 2012-2015**, which describes the city’s domestic energy efficiency ambitions and priorities (www.stoke.gov.uk/greenhomes). 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 municipi-

pality believes that improving the energy performance of private sector housing is a priority (Stoke Council, 2014b).

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:

- a. Identifying communities that may benefit from Affordable Warmth and Carbon Saving Communities Obligation funding under the Energy Company Obligation scheme (ECO).
- b. 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.
- c. Developing and implementing a Framework Agreement for Installers to install energy saving measures that are identified by the Green Deal and ECO Brokerage.
- d. Installation of solar panels.

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.

The 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. This was funded by the **Pathfinder Program**.

6.3.2 Sustainable development in North Staffordshire

North Staffordshire used to be one of nine **Housing Market Renewal Pathfinders** established by the National government in 2002 (UK Government, 2011) as part of the **Sustainable Communities Agenda**. The aim of the Pathfinders programme was to enable housing to play a part in the creation of sustainable cities and towns, by revitalising weak and failing housing markets in the context of industrial decline which has led to the appearance of areas of deprivation in inner cities and towns especially in the formerly heavily industrialised Northern part of England.

The objective of this programme was to facilitate a permanent solution to the problems of low demand and abandonment in the housing market in North Staffordshire. Accord-

ing to the programme's vision, by 2019 North Staffordshire should have been a "thriving and diverse conurbation where people would want to live, work, invest and study". This transformation would be measured through population retention, rising income levels and sustainable neighbourhoods (JMP et al., 2008). The programme involved demolition of inadequate housing stock, rebuilding and action to strengthen the economy to bring new employment and investors. This particular scheme was not particularly focused on energy efficiency, but its implementation would have greatly improved energy efficiency in the city. However, the scheme was stopped in 2012 "without warning" and few results were attained.

6.3.3 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 high 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" (www.landlordaccreditation.co.uk/). Landlords can subscribe to it voluntarily 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 are putting 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 and that abide to very minimum standards, which according to Hope is the case for most properties in the city. 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 not to be sufficiently 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. CoRE's mission is to support professionals working for a low carbon, resource efficient UK through the refurbishment of homes and buildings. It brings together training providers, manufacturers, contractors and trades who are seeking guidance on green retrofit skills and knowledge.

CoRE's claims that its Network of Fellows is the largest knowledge bank of retrofit knowledge and experience in the UK, which enables CoRE to transfer specialist knowledge through events, training and information. (<http://www.core-skills.com>).

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.

6.4 Perceptions of the Green Deal in Stoke-on-Trent

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 also 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 has 25,000 homes with single brick walls, which are difficult and costly to treat. Both Podmore and Chadwick 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 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 treat 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”.

6.5 Perspective for newly built homes: Zero Carbon Homes

There are relatively few new housing units being built in Stoke, but this could change dramatically if the new high-speed train has a stop in the city.

For the construction of new housing units, the council and developers must follow **The Code for Sustainable Homes**, launched in 2006 by the Department for Communities and Local Government, it is a national standard for sustainable design and construction of new homes (Energy Saving Trust, 2008). The code aims to reduce carbon emissions and promote higher standards of sustainable design above the current minimum standards set out by the building regulations (UK Government, 2014c). The Code measures the whole housing unit as a complete package, assessing its sustainability against nine categories (energy/carbon dioxide, water, materials, surface water run-off, waste, pollution, health and well-being, management, ecology).

The minimum standards for compliance have been set above the requirements of Building Regulations established elsewhere. The Code is intended to signal the future direction of Building Regulations in relation to carbon emissions from energy use in the home, providing greater regulatory certainty for the home-building industry.

A programme called **Zero Carbon Homes** ensures that all newly built homes are prepared to meet zero carbon standards by 2016, and responds to the requirements set in the **Sustainability and Climate Change Supplementary Planning Document** (www.stoke.gov.uk/LDF).

This programme is informed by the **Energy Performance Certificates**, which includes a grading of the property according to its energy performance and rely on data collected on over 60,000 homes in the city. According to the council, further work is underway to understand the data requirements for Green and ECO and what information is required to enable the effective monitoring of progress against fuel poverty and climate change obligations.

For sites where a large number of units will be built, the council intends to push combined power district heating as the norm for new development. The council will incorporate district heating in the master planning of new areas and developers will have to abide. Currently, however, there are no district-heating schemes in place.

But how keen are developers to follow green regulations and to provide well-insulated homes? Debbie Hope believes initial intentions are good, but the cost of energy efficient measures inhibits developers from pursuing them.

According to Hope, smaller developments (up to 30 or 40 units) are more problematic,

because small developers are easily put off by requirements that modify the appearance of properties significantly or that will have a significant impact on final prices for buyers, although they are ready to comply with simple measures of insulation and the quality of boilers, for instance. Hope believes that technologies that can be “sold” to final consumers as money saving are easier to implement.

Apart from the **Code for Sustainable Homes**, developers must follow the **2010-10 protocol**. In 2010, the council signed a protocol that requires up to 10% renewable energy for any new building, whether commercial or residential. For Hope, that’s quite easy to achieve with existing technology.

The **2010:10 Protocol** is a climate change civic campaign with the aim of getting individuals, companies and institutions to reduce their carbon footprints by 10%. The protocol was an attempt to raise awareness of businesses and individuals about the need to reduce emissions immediately, rather than setting goals into the far future. The campaign is backed by a broad coalition ranging from newspapers and major NGOs to major companies, leading political figures and the Carbon Trust (‘10-10 Campaign Explained’, The Guardian, September 1st, 2009).

6.6 Future District Heating and The Powerhouse Central Project

In February 2014, the Stoke-on-Trent Council together with Staffordshire County Council, under the local **LEP (Local Enterprise Partnership)** won a bid for energy efficiency funds from central government with an application entitled “**Powerhouse Central Project**” (Stoke-on-Trent & Staffordshire LEP, n.d.).

Powerhouse Central aims to promote growth and prosperity through a string of inter-linked actions connected to energy production, energy conservation and innovative technology. Powerhouse Central has four key strands, each addressing a key local challenge, including actions to ensure energy security to local industry (which is, as seen, very energy intensive), promoting research and development in the city and the application of research on energy conservation into commercial manufacturing; provision of land for development, in order to support businesses in the city and finally, addressing the identified skills gap in the area with a particular focus on training in the applied materials and advanced manufacturing sectors.(Stoke-on-Trent & Staffordshire LEP, n.d.)

The ‘**Powerhouse Central Project**’ aims to boost energy production and training in the North Staffordshire area. It relies on funds of £113 million over the next 10 years. This includes £31 million from central Government, £33 million from the North Staffordshire councils, £43.8 million from private sector partners and £5.6 million from the European Union. This falls well short of the £1 billion originally requested by the local authorities to central government to push this scheme forward (‘£31m City Deal just start for ‘powerhouse’ Stoke-on-Trent’, The Sentinel, March 14, 2014).

Around £20 million will be spent on the Stoke-on-Trent District Heat Network fed by deep geothermal energy. Stoke-on-Trent is situated about two kilometres above a naturally occurring source of geothermal energy, enabling the city to pursue an innovative

source of energy. Another £5 million are going to Keele University's smart energy network demonstrator and another £5 million will be spent on boosting skills.

The benefits of the project include the production up to 45GWh of heat energy annually, lowering heating costs for businesses by up to 10%, saving approximately 10,000 tonnes of carbon dioxide annually and creating or securing a number of jobs (REA welcomes multimillion pound City Deal investment in Stoke geothermal heat project, News from the Renewable Energy Association, 14 March, 2014).

This agreement happens with the framework of the **Stoke-on-Trent and Staffordshire LEP** (cf. section 3.2). With these investments, the city expects to create the infrastructural conditions for job creation and economic growth. *"The district heating network will be used to provide energy in Etruria Valley and all along the city centre spine, making these sites more attractive to investors in the future."* (£31m City Deal just start for 'power-house' Stoke-on-Trent, The Sentinel, March 14, 2014).

Andy Platt, Cabinet Member for Green Enterprise at Stoke-on-Trent City Council, connects the construction of a new district-heating network to a vision of "localized energy security". For Platt, the absence of clear national policy in that respect has pushed the council to "take matters into our own hands to shield vulnerable businesses and communities from the excesses of the energy market". Platt writes:

"It would be easy to argue that, having invested tens of millions of pounds in retrofit energy saving improvements for local homes in recent years, as well as supporting the creation of the multi-million pound Centre of Refurbishment Excellence (CORE) in the city, the council has done all that it could to meet this challenge – particularly at a time when financial constraints pose a threat to our core services. But we are determined to go much further than this and bring to fruition our own unique vision for localised energy security" (Platt, 2014).

7 Energy efficiency in the transportation and mobility sector

Energy efficiency in the transport sector concerns mainly the excessive reliance on fossil fuel for personal travels by car and bus, which generally represent the largest share in commuting modal split in developed economies. “Worldwide, 98% of the energy consumption by transport is based on oil (IEA 2004). For that reason the transport sector is very dependent on the price and availability of oil” (Smokers and Kampman, 2006, p. 3). This is also the case in Stoke, where 91% of the modal split concerns car and bus trips (the modal split is described in detail further). Excessive reliance on fossil fuel for urban mobility is a problem because of energy security (fluctuations in the price of oil due to geopolitical issues) and the emission of CO₂, with its consequences for health and climate change.

The **Stern Review on the Economics of Climate Change** (Stern, 2007) is a lengthy report commissioned for the British government and released in 2006. It is considered to be the most comprehensive review ever carried out on the economics of climate change and has heavily influenced transport planning in the UK. In response to the Stern Review, the UK national government highlighted four principal areas of policy that when correctly tackled, would enable the UK to meet its obligations to reduce the carbon output from transport. These were:

- To increase the fuel efficiency of vehicles and develop new technologies aimed at reducing the emissions of vehicles;
- To encourage a move towards more environmentally friendly forms of transport, particularly walking and cycling;
- To include transport in emissions trading schemes; and
- To reduce the fossil carbon content of transport fuel.

An earlier report, the **Eddington Transport Study** (Eddington, 2006) demonstrated that “the performance of the UK’s transport networks is a crucial enabler of sustained productivity and competitiveness”. “Good transport systems support the productivity of urban areas, supporting deep and productive labour markets, and allowing businesses to reap the benefits of agglomeration. Transport corridors are the arteries of domestic and international trade, boosting the competitiveness of the UK economy” (Stoke Council, 2012c, p.24).

According to the **Stoke LPT**, “Following the publication of the Stern and Eddington reports, the Department for Transport embarked on a policy review process building upon the recommendations from both studies and the ‘Towards a Sustainable Transport System’ white paper. The resultant policy document ‘Delivering a Sustainable Transport System’ (DaSTS) embodies five national goals for transport:

- To support national economic competitiveness and growth, by delivering reliable and efficient transport networks;
- To reduce transport’s emissions of carbon dioxide and other greenhouse gases, with the desired outcome of tackling climate change;
- To contribute to better safety, security and health and longer life expectancy by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health;

- To promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society; and
- To improve quality of life for transport users and non-transport users, and to promote a healthy natural environment”. (Stoke Council, 2012c, p.26)

These recommendations meant a great deal for the formulation of transport policy in the UK. They emphasised the role of transport planning in supporting growth and competitiveness, and brought about notions of equality and well being, connecting transport planning efforts to policies addressing climate change and excessive reliance on fossil fuels.

In its 2012 Local Action Plan, the Council states the following objectives concerning sustainable transport:

- “Improving the local environment through reducing the impact of traffic (air and noise) and moving towards more sustainable transport technology and modes, coupled with improving the appearance of local areas
- Caring for local health through improving access to transport, transport safety and encouraging active travel such as walking and cycling.
- Supporting the local economy through increasing productivity for existing businesses and encouraging new investment by making the area more attractive – better connectivity and easier to move around” (Stoke Council, 2012b, p.8)

But these are not the only issues to be taken into account by policy-makers when discussing energy efficiency in relation to urban mobility. Several other issues have a direct impact on mobility patterns and on energy efficiency. Urban form and the location of business and industry, as well as the distribution of jobs, for instance, have a huge impact on those issues as well (Rodrigue, 2013b).

7.1 Urban form and energy efficiency

How does Stoke’s urban form affect energy efficiency?

For Rodrigue (2013a, p.108), “Historically, movements within cities tended to be restricted to walking, which made medium and long distance urban linkages rather inefficient and time-consuming. Thus, activity nodes tended to be agglomerated and urban forms compact”, but evolution of transportation in the last century has led to changes in urban form. This is true for Stoke, which is a multi-centric urban area thanks to the development of several industrial clusters around natural resources such as coal and clay, around which housing and other functions developed. This spatial configuration is changing quickly and is being challenged by the needs of a post-industrial mid-sized city.

The unique structure of Stoke-on-Trent has resulted in a patchwork of urbanization. This has created an irregular pattern of mobility in the city. People must travel “all over the place”, according to Knott, Planning and Transport Policy Manager for Stoke-on-

Trent. Only 10%-12% of trips go into Hanley, the main centre for jobs and services. This makes it even more difficult for transport operators to organize services.

According to the **Stoke-on-Trent Local Transport Plan** (Stoke Council, 2012c), “travel to work data from the 2001 Census shows that over 75% of those who live in Stoke-on-Trent also work within the City, while 11% commute to neighbouring Newcastle-under-Lyme, with smaller proportions commuting to nearby Stafford and the Staffordshire Moorlands area. Data for Newcastle-under-Lyme residents show that just over half work within the Borough, while almost one-third commute into Stoke-on-Trent. The census also shows that relatively few journeys into both Stoke-on-Trent and Newcastle-under-Lyme originate from outside of the North Staffordshire sub-region”.

The built-up area of North Staffordshire extends beyond the city boundaries, which makes it necessary to plan transport beyond the city’s borders. The city council works closely with the neighbouring authorities of Newcastle-under-Lyme, Staffordshire Moorlands District and Staffordshire County, as well as the North Staffordshire Chamber of Commerce to develop the sub-region’s economic and transport strategy. The transport strategy is contained within the **Local Transport Plan 2011-2026**. The city council has two existing sustainable transport steering groups - the **Strategic Bus Partnership** and the **North Staffordshire Cycle Forum**.

The **Local Development Framework (Stoke Council, 2012a)**, a joint plan between Stoke and Newcastle-under-Lyme, promotes a revitalized and strengthened urban core in the town of Hanley, which fits into the vision set by the **Mandate for Change** (Stoke Council, 2014b). This ‘reinforced’ and revitalised urban core is the object of much debate, but investment is well under way. The project entails, among other things, the moving of the main offices of the council from the town of Stoke-upon-Trent into the new central business district in Hanley.

The project, known as **Smithfield Stoke-on-Trent**, will see the city council relocate to new headquarters and will develop more than one million sq ft of offices, shops and entertainment. Meanwhile, the council plans to have a small hub in each of Stoke-on-Trent’s six towns, so that citizens will be able to access some services locally. In terms of mobility, the project relies on connecting the city centre to the national transport network trunk roads A500 and A50 and to the future high-speed rail network, which stakeholders consider very high bets, as well as a new bus station already built.

Smithfield is a multi-functional development that will combine public functions, office space and dwelling. The council expects to attract investment and to **provide the city with a focal point for future investment and a stronger identity**. But this action is met with concern by sectors of the civic society, who lament the likely loss of the poly-centric nature of the city.



Figure 11 Aerial photo highlighting the area of the Smithfield Stoke-on-Trent Development, formerly known as Stoke-on-Trent Central Business District. According to the website of the development, "Smithfield will provide the crucial link between existing residential, shopping, cultural and heritage areas bringing the city together into a coherent whole". Source: <http://www.smithfieldstoke.com/location.php>

For the developers, Smithfield will improve Hanley's nighttime economy by providing new restaurants, bars and hotels, and even suggested it could eventually include homes. For Mike Smith of Genr8 Developments, in charge of overseeing the development: "*Regeneration has to start from the centre. Over the last few decades, businesses have moved to out-of-town developments. While these will have plentiful car parking, they are soulless places with no amenities. I think most people would prefer to be in a city centre. Unfortunately in many cases the offices have not been available. The development will provide a total of 1.2 million square feet, which will be a mixture of offices, leisure and retail. There is also the potential, in time, for residential.*" (Corrigan, 2013)



Figure 12: The Master Plan of the Smithfield Development, located in the centre of town of Hanley, one of the six towns that forms Stoke-on-Trent. According to the website of the development, "People are encouraged to dwell and enjoy the environment by strategically located ground floor leisure and retail". Source: Smithfield website, <http://www.smithfieldstoke.com/master-plan.php>.

Groups like **Potteries Heritage Society**, a local charity involved in issues of preservation and liveability, would rather see municipal plans follow the old pattern of urbanisation of the 6 towns and promote "local work for local people". "We need to go back to the idea of connecting energy and living. We need to get people to live near where they work, using old infrastructures instead of creating new ones" says Barbara Andrew, vice-chair of the society.

The group defends the preservation of the character of the six towns and the original urban structure. They support densification and local job creation, rather than the emergence of a new radial structure for Stoke.

In summary, Stoke-on-Trent presents several singularities that make energy efficiency connected to urban mobility a big challenge for policy makers there.

First, as pointed out, the **polycentric nature of the city** has the potential to decrease the need for traveling, as people ought to be able to find jobs near to home. This is unfortunately always the case, as we shall see. However, it also creates complicated travel patterns that are difficult to manage. Second, **high levels of multiple deprivation** decrease mobility opportunities, as households have fewer choices in relation to alternating modes of transport. Surprisingly, the city has low levels of car ownership but a high percentage of commuting by car, which might be explained by the low overall mobility of inhabitants who do not own a car. This has consequences for the accessibility to jobs and services and might have an impact on the quality of life of the inhabitants and on

their life-chances. In the following sections, we will describe and analyse these problems in detail.

7.2 Mobility planning in Stoke

Since the publication of the **Planning Policy Guidance 13** of 1994, followed by **A New Deal for Transport** in 1998 and the white paper **Transport Ten Year Plan 2000**, unrestrained growth in road traffic is seen as not desirable in transport planning in the UK. This happens because of negative effects on the environment and the sustainability of fuel use, besides the perception that road transport discriminates against vulnerable groups in society such as the poor, the elderly and the disabled.

Paradoxically, the management and organisation of public transport has been increasingly liberalised in the UK in the last decades. **The Transport Act of 1985** increased fares, eliminated timetable coordination and created free competition in bus services provision. In 1996, public transport was further deregulated and municipally owned bus companies were privatized. As a result, there is very little local authority control over public transport in the UK, particularly over buses. In the current regulatory framework, councils are generally not allowed to run their own bus companies. London, with its local government-run Transport for London (TfL), is an exception. Instead, councils need to manage bus mobility through direct negotiation with operators. The regulation on buses that does happen is done by **Regional Traffic Commissioners**. The one regulating Stoke is based in Birmingham.

More recently, reregulation and franchising of bus services by local authorities is being again re-discussed and central government is considering devolution over “franchised bus services, with control over fares, routes, ticketing and service frequency” (Bridge, 2014). This follows progress on **Quality Contract Schemes (QCS)** by English ‘**Combined Authorities**’, which would allow local authorities to take London-style powers to map out routes and services rather than letting bus operators decide. In 2014, the **North East Combined Authority** announced it was submitting a bid to national **QCS** board to initiate proceedings to develop a local **QCS**.

Combined authorities are voluntary legally recognised entities gathering councils, with the aim to improve transport, economic development and regeneration. Local authorities pool appropriate responsibility and receive delegated functions from central government in order to deliver transport and economic policy more effectively over a wider area. The **Greater Manchester Combined Authority**, to which Stoke belongs, was established on 1 April 2014.

The Local Transport Plan (LTP) is the instrument used by the council to plan and regulate transport in the city. It presents a vision for transport in the city towards 2026 and provides a strategy and a 3-year implementation plan. The **LTP3** is an update of the long-term transport strategy of the North Staffordshire Local Transport Plans formulated for the periods 2001-2006 (LTP1) and 2006- 2010 (LTP2).

The LTP is built upon several binding assessments, such as the **Equality Impact Assessment (EIA)**, which helps determine how the LPT affects different groups of people based on race, disability, gender and other issues, a **Strategic Environmental Assessment**, a **Health Impact Assessment**, a **Habitats Regulations Assessment (HRA)** and **advisory Strategy Focus Groups**.

The previous **LTPs** identified seven main priority areas in which transport planning should have a significant impact: supporting regeneration, improving accessibility, tackling congestion, improving air quality, improving travel safety, enhancing quality of life. Each of these priorities was aligned to the **Regional Spatial Strategy** principles. Energy efficiency is not a priority area in transport planning at the moment.

Figure 1 North Staffordshire LTP (2005/06-2010/11: LTP2) priorities



Figure 13: The seven priorities identified in previous versions of the LTP. (Stoke Council, 2012c)

The **Core Strategy** policies regarding transport were measured against the principles of sustainability defined in the **Regional Spatial Strategy** and **Planning Policy Statements**. The emphasis adopted for developing criteria for assessment involves the ability of transport policies to promote or facilitate growth.

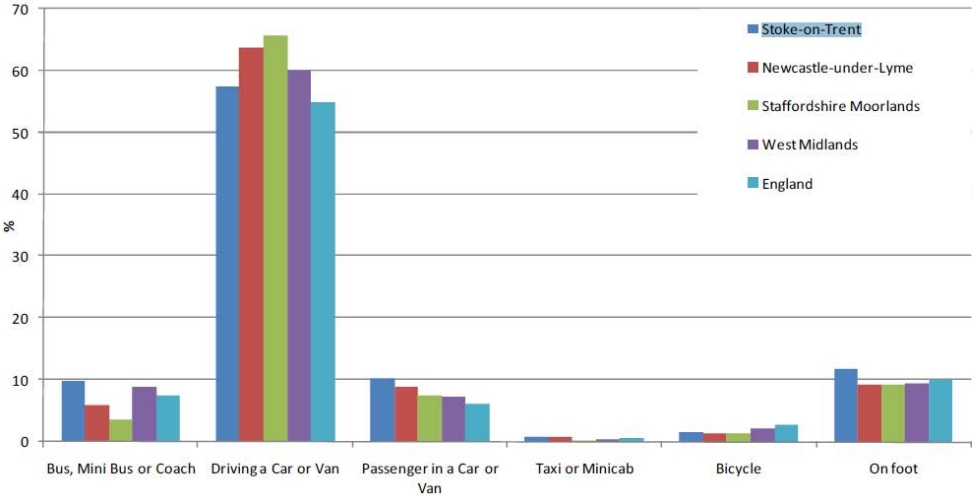
The **Core Strategy** transport policies “clearly emphasise the importance of improving the transport offer in the City, primarily through providing bus priority to improve reliability and journey times. This investment is seen as integral to supporting economic

growth without increasing traffic congestion. In addition there is a very clear spatial investment priority in getting the public realm right in the city to attract investment and improve the quality of environment for existing residents and employees.” (Stoke Council, 2012c, p.41). However, environmental concerns and energy efficiency are likely to occupy a much larger space in the agenda for transport planning, in the words of Austin Knott, the Planning and Transportation Policy Team Manager at Stoke-on-Trent City Council.

7.3 The reality of mobility in Stoke

The Local Transport Plan (LTP) strategy devised by Stoke Council evidences poor internal transport connectivity within the conurbation and sets objectives to tackle this. According to the LTP (Stoke Council, 2012c), trips in the area happen mainly within the urban area itself. Census data shows that up to 59% of the population travels less than 5km every day. This is seen as an opportunity for investment in sustainable commuting, including walking and cycling, which combined represent only 13% of current total mode share.

Figure 29 Mode used to travel to work (2001)



Source: ONS Neighbourhood Statistics April 2001 data

Figure 14: Mode share in Stoke-on-Trent compared. STOKE COUNCIL 2012. Stoke-on-Trent Local Transport Plan: Supporting Economic Growth. Stoke-on-Trent: Stoke-on-Trent Council, p. 108.

According to the European Platform on Mobility Management (EPOMM, 2011), the modal split in Stoke-on-Trent in 2011 was 71% automobile trips, 16% bus trips, 11% walking, 1% bike trips and 1% motorcycle trips.

Stoke-on-Trent

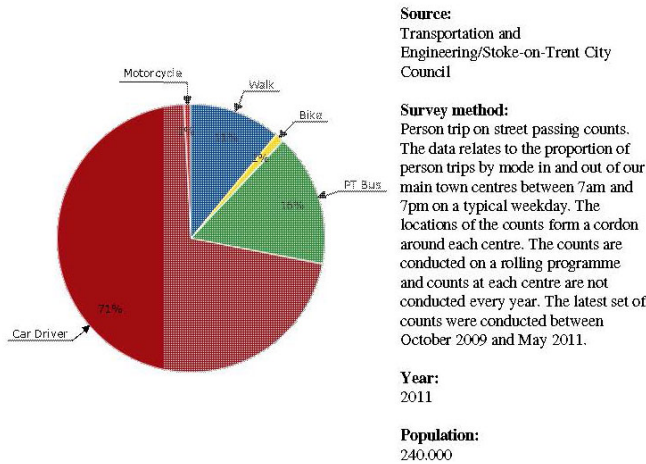


Figure 15. Modal Split in Stoke-on-Trent in 2011. Source: (EPOMM, 2011)

Austin Knott points out that the current transport modal split in the area (2014) has changed slightly towards an even greater dependence on private cars and a decrease in the share of bus trips (Cars 80%, Bus 11%, Walking 5%, Rail 2% and Cycling 2%). The bus share is a mere 11 to 12%. For Knott, it should be something between 15 to 18% in a city the size of Stoke. Although walking represents only 5% of all trips to work, in central wards this figure reaches 20%. Although Stoke-on-Trent has the lowest percentage of trips by automobile of its neighbours, it is still higher than the national average.

The share of private automobile trips is currently approximately 80%. This is a very high figure, particularly in an area where car ownership is still low and where there are high levels of deprivation. For Knott, the high share of private automobile use and the decrease in the share of bus trips is due to the high inefficiency of the bus transport network.

Travel problems are increased by the polycentric structure of North Staffordshire, resulting in many instances of poor accessibility by public transport. In some locations travel by bus can take almost twice as long as the equivalent trip by car. This means that bus users are penalised through choosing this mode, which makes it difficult to encourage increased use of buses, which would ease congestion.

This is particularly relevant to the 60% of the population (approximately 150,000 people) who have no or limited access to a car. In Stoke-on-Trent, car ownership is low with many reliant on walking, cycling and public transport. Car dependency in low-income areas can also lead to 'transport poverty' (Oxby, 2014). Transport poverty is analogous to 'fuel poverty' and means households might commit more than a reasonable amount of their monthly income to transport or to maintaining a private automobile. Many households in the UK are currently struggling to sustain acceptable levels of mobility (Sustrans, 2014). Car ownership might not be an option for these households and the

lack of public mobility schemes jeopardises their life changes. According to a report prepared by the Bristol-based charity Sustrans, “(...) nearly half of all households in England could already be struggling with the costs of car ownership. And the absence of practical alternatives – including inadequate and expensive public transport and hostile walking and cycling environments – is forcing millions of people to choose between debt and social exclusion” (Sustrans, 2014).

In summary, many Stoke-on-Trent citizens have a limited commuting horizon. Analysis carried out for the **Local Transport Plan** “has revealed very limited travel horizons for those travelling to work: most notably 56% of the population travel less than 5 km to get to work” (Stoke Council, 2012c, p. 85). The LTP puts this down to a “strong sense of localism”, which is “facilitated by the polycentric make-up of the city”. But the **LTP** also finds that some areas have reduced job opportunities following the closure of industry and as a result access to job opportunities would require more travel. The plan speculates that “job horizons are currently being limited by the public transport network”, as existing public transport provision seems to be driving employment searches rather than actual job locations (Stoke Council, 2012c, p. 127).

Currently, however, the lack of local control over bus routes and other aspects of bus operation create numerous problems. Cross-city journeys by bus can be particularly time consuming. According to Knott, “buses are a mode of transport of last resort” in Stoke-on-Trent. This is because one of the main concerns of traffic commissioners is to ensure punctuality. This results in the local operator allowing a large amount of “dead time” in timetables to ensure that they comply with punctuality rules. This means that buses must wait long intervals at bus stops, making bus trips inefficient. If citizens want to travel efficiently, they will aspire to car ownership, which has huge implications for the environment and for energy efficiency.

According to Oxby, the **Key Cities Group** (<http://keycities.co.uk>), an association of 23 English middle-sized cities that lobbies for an agenda of growth and devolution, is calling for extra powers to regulate buses in the same way **Transport for London** does. “The commercial nature of the bus market, with less regulation outside of London, means that buses not only compete with other modes of transport, but there is inefficiency in bus operation as different bus companies compete for customers, causing the focus to be on busy routes and busy times”(Oxby, 2014).

Stoke council aims to speed up bus journey times by encouraging bus operators to invest in electronic ticketing to reduce the time drivers spend with cash fare payers. It is also working to provide bus priority at traffic signals and encouraging bus operators to run more cross-city services to avoid the need for passengers to have to change buses. This is particularly difficult in a polycentric city.

Despite the high rates of car usage, the city is not grid locked. Ease of travel by car around the city is generally good in comparison to other urban areas. However principal routes do have slow average journey speeds in the peak hours due to high levels of congestion caused by a mixture of delays at key junctions but also due to problems on links. (Oxby, 2014).

There are no alternative public transport schemes, such as light rail or trams. However, the council is seeking active partnerships with the rail industry and train operating companies to press for improved local rail services and by linking Stoke-on-Trent Station to the city centre by bus and bike, and the **Stoke-on-Trent Station Travel Plan** (Oxby, 2014).

According to data from the **Office of Rail Regulation** (ORR, 2013), the number of rail customers to and from Stoke-on-Trent stations has more than doubled over the last 10 years. Within this doubling, the number of customers at the local rail service stations of Longton and Longport in the City, and Kidsgrove and Blythe Bridge, just over the city boundary, has more than tripled. For Matt Oxby, Senior Transport Policy Officer at Stoke Council, this is mainly due to growth in the number of trips to Manchester, Birmingham and London following service improvements, but also a significant increase in the still small proportion of local travel by train. Part of the increase may also be attributed to increase in car parking spaces around Stoke stations, as well as better cycling facilities (Jones, 2012). Through initiatives such as the **North Staffordshire Community Rail Partnership** and Rail North, the council is seeking to increase frequency and capacity on local rail services in North Staffordshire to provide the city with a local rail network that provides attractive travel times compared to car.

But the **Local Transport Plan** also highlights a **cycling strategy**. In the last 15 years, the municipality has invested in circa 160 km of bike routes in the city. Many of these routes are on the tracks of the old railway loop that used to connect the different towns forming Stoke. According to Knott, cycling has gone from virtually nothing to perhaps 2% of trips in the last few years, but the ambition is to increase this figure.

In 2008, the city was successful in a bid to Cycling England for funding through the 'Cycle Town' initiative in order to establish a 3-year programme to improve and upgrade the cycling infrastructure in the city. This scheme ended in 2010. Stoke has recently earned more money through a much smaller scheme called **Travel Smart**.

"An additional point in relation to cycling is the relatively low levels of cycle ownership in the city (16% for adults own a bicycle, significantly less than in other Cycle Cities), which is likely to be a result of the relatively low incomes in large areas of the city and the general view that a bicycle is luxury rather than an essential [mode of transport]. This reflects wider attitudes towards cycling, which for many people is associated with leisure rather than the daily commute" (Stoke Council, 2012c).

7.4 Summary of mobility and transport in relation to energy efficiency in Stoke

Stoke-on-Trent must tackle two crucial aspects related to transport efficiency, and the energy efficiency associated to it: **governance** and **urban form and structure**. While it seems clear that the governance of urban transportation needs to be reviewed towards increased devolution and new forms of partnership between local government and private transport companies, as well as citizen participation in decision-making, there are also tough choices concerning the transformation of the urban form and the organisation of mobility in the city and in the region.

According to Oxby (2014), “(...) gaps in council powers hamper attempts to manage transport as a whole. The current system is neither locally devolved, nor wholly top-down, but an inconsistent mixture of the two, which serves neither local nor national interests”. This is evident in the gaps observed in Stoke concerning the management of bus services.

But choices concerning the development and transformation of urban form and structure seem much less clear. Stoke seems to enjoy an enviable polycentric structure that is the product of a long historical trajectory and that contributes to its identity. This polycentric structure facilitates the clustering of basic services around clear smaller local centralities and invites walking and cycling. This spatial configuration is cherished by inhabitants, who treasure the small communities around which they develop their daily activities. On the other hand, it is not easy to plan and manage mobility around the region as a whole. Managing traffic flows around so many centres is problematic. Moreover, the city seems to lack a strong focal point for investment. Most importantly, the lack of mobility options for citizens living in areas with multiple deprivations is hampering their life chances.

The council proposes to create a much stronger centre in Hanley, to which they intend to move many of their services and offices. It has created a new development, Smithfield (described in section 7.1), which is meant to generate a strong focal point for real estate investment, in order to attract business and create jobs. A new modern bus station opened in the area in 2013.

In short, the **Core Strategy** formulated by the council seems to go against the polycentric nature of the city. Smithfield has been the object of heated criticism in the press. But it is also possible that the council’s strategy will operate at a higher level of connectivity and will indeed provide a focal point for investment and for the planning of transport, while local functions will remain. But it seems fair to conclude that the council must do much more to encourage local activities and services within a coherent strategy that takes local identities into account, while tackling the problem of ‘transport poverty’.

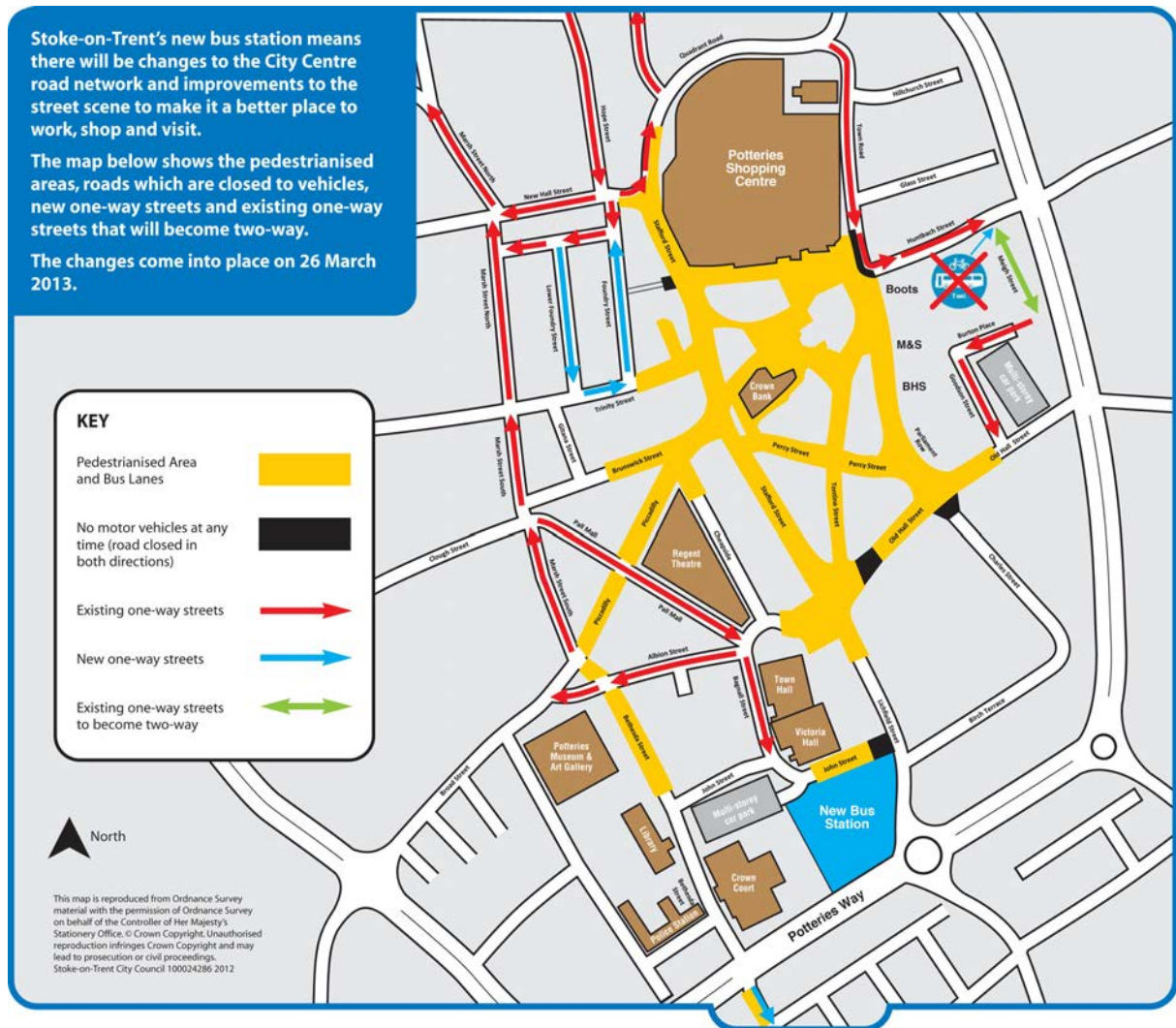


Figure 16: Schematic map of the "city centre", which corresponds to the centre of the town of Hanley, one of the towns that form Stoke-on-Trent. Source: Stoke Council. <http://www.stoke.gov.uk/ccm/navigation/transport-and-streets/public-transport/new-bus-station---city-centre/>

In order to assess these actions and policies, it is useful to use criteria that address sustainable urban development in the age of climate change. "To unlock a new wave of sustained, long-term urban productivity improvements, cities will need to shift to compact, connected and coordinated urban development, termed the "3C" model of urban development":

1. Compact urban growth
2. Connected infrastructure
3. Coordinated governance (Global Commission, 2014).

Stoke scores low in the three dimensions suggested by the 3C Model. Although it does present compact urban growth in its traditional development, the tendency in the last decades has been to develop at the fringes of the municipality. According to developers (Corrigan, 2013), the main causes for this are the existence of parking space in suburban locations and their amplified connectivity to other areas in Staffordshire and beyond, thanks to the highways (especially the M6). This is a common development all over the UK. " The outcome has been increased car-dependence, reduced levels of

healthy active travel, and the effective exclusion of many non-car-users from the opportunities and facilities that the car-owning majority take for granted. Despite the rhetoric of “sustainable communities”, therefore, there has been little if any progress towards sustainability in outer city areas” (Barton, 2011, p.3).

In this sense, the council’s strategy to focus development in Hanley appears as not implausible, but might bring developers back to the centre of the area.

As for connected infrastructure, the polycentric nature of the city can be seen either as a boon and an obstacle for energy efficiency in the mobility sector. It is a boon because inhabitants may enjoy compact urban environments locally, to which they are very much attached. But such a uniquely shaped city must come up with innovative solutions to connect its various ‘parts’ and to avoid urban sprawl and the appearance of characterless suburban office locations, which might attract employees from as far afield as Birmingham and Manchester, but which seem to contribute less to the vitality of the area.

As mentioned, the city used to have a rail line interconnecting all its six towns, known as ‘The Potteries Loop’, but this rail connection was considered obsolete and closed in the 1960s. Many of its tunnels and overpasses have been demolished. Historian Steven Birkin asserts “(...) it was a terrific and popular route that connected the people of North Staffordshire who otherwise would probably have remained isolated. And of course it brought Kidsgrove people to Hanley when they may have gone elsewhere for shopping, working and entertainment” (Hughes, 2008). It is explicable that such connection would be abandoned in times of economic decline, but an analogous structure seems to be again necessary now that the city is seeking for new prosperity.

Coordinated governance is also a challenge. Although the English planning framework offers unparalleled opportunities for innovative governance arrangements, and although Stoke has done much in this area (the LEP is an example of connected innovative governance), the city still needs to work towards better governance of its transport system. In this sense, the council must deal with the national planning frameworks that hamper devolution of bus transport planning.

Urban density, distribution of job opportunities, alternative green mobility solutions, alternative transport technologies are also issues that need to be considered in mobility planning frameworks in relation to energy efficiency.

8 Summary of urban energy planning in the city

The UK Government White Paper Strong and prosperous Communities (UK Government, 2006) lays out the importance of local action for climate change and emphasises four principles:

1. Strong and visible leadership
2. Leading by example through services delivered and in-house practices
3. Responding to calls for action and the priority placed on addressing these issues by local people
4. Coordinating innovative partnerships capable of delivering real changes and progress

It seems clear from this report that Stoke-on-Trent Council scores high in all but one principle for local action.

(1) It has **demonstrated strong and visible leadership in tackling energy efficiency** through:

- **Actively incorporating energy in its planning policies.** E.g. **The Mandate for Change** explicitly recognises energy conservation and generation as targets connected to economic prosperity, social welfare and environmental protection. It explicitly sees energy generation and efficiency as opportunities to generate jobs and prosperity.
- **Pursuing innovative solutions.** E.g. experiences with housing treatment and more recently through the PowerHouse Central scheme demonstrate the capacity of the council to pursue innovation.
- **Actively pursuing central government grants** to implement energy conservation schemes.

(2) It has **led by example** through services delivered and in-house practices. It has successfully implemented energy saving measures in its own facilities and delivered assistance to vulnerable households through upgrading programmes

(3) It has **responded to calls for action** and the priority placed on addressing these issues by local people. It is not clear from the information gathered whether calls for action in the privately owned housing stock have led to effective action.

(4) It has **coordinated innovative partnerships** through the Stoke-on-Trent and Staffordshire Local Enterprise Partnership (LEP), even though governance of the transport system is failing.

Here we use the framework proposed by Mulugetta et al. to assess energy planning in Stoke-on-Trent. According to the authors, local initiatives in energy planning may:

1. Allow for real and measurable carbon emission cuts
2. Demonstrate lower carbon exemplars in action

3. Enable individuals to engage with communities through energy
4. Create a platform for inter-community conversation and sharing of experiences
5. Democratise decision-making in future carbon reduction plans (Mulugetta et al., 2010, 7542)

We will review each of these criteria separately. Energy planning in Stoke-on-Trent must:

1. Allow for real and measurable carbon emission cuts. The relevant question to be answered here are: is energy planning at the local level working in Stoke-on-Trent? What are the gains? Are there advances? Concerning Stoke's main problem, the renewal of its housing stock, there are mixed results. While the social housing managed by housing associations has been upgraded, privately owned Victorian terraced houses are in urgent need of renewal. The UK as a whole is very successful in energy efficiency. "The **Department of Energy and Climate Change (DECC)** forecasts that energy efficiencies will continue to offset population growth, so that we will use about the same amount of energy in 2030 as we do today. In other words, the UK will use less energy in 2030 than it did in 1970" (Anderson, 2013). According to that report (Prime et al., 2014), "households (in the UK) use 12% less, while industry uses a massive 60% less. This is largely offset by a 50% rise in energy use in the transport sector, due to the huge rise in the number of cars on the road - more than 27 million today compared with 10 million in 1970. The big increase in the number of flights is another important factor" (Anderson, 2013).

2. Demonstrate lower carbon exemplars in action. In Stoke, this is done through experiments and pilot projects. At present, only the experiments with new insulation technologies and photovoltaic panels installed in social housing can be considered successful exemplary actions that demonstrate the possibilities of energy efficiency in the housing sector. Much more needs to be done in terms of incorporating energy efficiency to urban development, not only concerning requirements for new buildings and the renewal of old building stock, but also towards innovative ways of urbanisation. The Powerhouse Central project (Stoke-on-Trent & Staffordshire LEP, n.d.) is leading the way in this sense, but it remains to be seen what real problems in implementation. The implementation of energy saving measures is a big political challenge, which is approached through networked multi-level governance arrangements, especially through the LEP (Local Enterprise Partnership) which includes Staffordshire council and its **Strategic Economic Plan**

3. Enable individuals to engage with communities through energy. There is evidence that civic society is very active in the UK. Charities are the voice of groups who normally can't find a voice in policy making and resources management. Through charities like **Beat the Cold**, the voices of deprived households (the "fuel poor") can be heard by policy makers. However, there is little evidence of more direct involvement of citizens in energy planning at the local level.

4. Create a platform for inter-community conversation and sharing of experiences. The main platform for inter-community conversation is the **Local Enterprise Partnership (LEP)**, the voluntary partnership between local authorities and businesses to help

determine local economic priorities and lead economic growth and job creation. **One of the LEP's priority sectors is energy generation.** "Building on the presence of Alstom in Stafford, ABB, Siemens Wind Power, GE Power Conversion and the sustainable energy programme centred around Stoke-on-Trent, to meet growing local and international energy demands by diversifying into geothermal, anaerobic digestion, biomass and energy-from-waste and increase transmission efficiency" (Stoke-on-Trent & Staffordshire LEP, 2014, 7). Another important platform is **CoRE (Centre of Refurbishment Excellence)**, which has an impressive list of partners. Both act as networking platforms that may provide the public sector with knowledge for local policy making.

9 Perspectives for the thematic report

Stoke-on-Trent's singularity 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. These low levels of economic investment are 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 through education and training, **the resulting high levels of deprivation today means 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 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. It needs to abide to a complex planning framework, where funds are made available by central government mostly through a bidding system, in which **Stoke must compete for funds with other unitary authorities in England.** But **funds have become scarce in the last few years,** with budget cuts in all areas. In the words of a member of civic society, "Stoke council is efficient when it comes to bidding for funds made available by the central government", but bidding opportunities are increasingly scarcer.

Nevertheless, the local government has had some important achievements in the last 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.** 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. **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.

Another important aspect that distinguishes Stoke is its unique polycentric configuration. Because the city is originally a federation of six separate towns, the unique resulting spatial structure is both a boon and a challenge. It is a **boon** because inhabitants are very much connected to their own communities, which are compact and walkable. This could in theory decrease the need to travel, if inhabitants could find the necessary services at walking distance. It is a **challenge** because **such a polycentric structure makes it harder for investors to find focal points where to invest.** The lack of some services at neighbourhood level produces the **need to travel around this polycentric area**, and the travel patterns are difficult to figure out and to plan, in the words of a transportation expert. The council has little say over the planning and the operation of local bus lines, which makes **public transport inefficient**, in terms of time and energy. The six different towns used to be connected by a railway loop, which was deactivated in the 1960s. In its place, a system of cycle routes and parks has emerged, but the share of trips made by bicycle is still very low (around 2%).

One of the main strategies of the current council is to promote Hanley, one of the six towns, as the “city centre”, where most high-end services and employment would be located. This is being done through **the development of a new area called Smithfield**, where the council itself expects to locate most of its services and workers in a newly constructed building. In view of the suburbanisation trend that has prevailed in the area in the last decades, this strategy might provide the city with a focal point for investment, a clear hub for the planning of transport and make the centre of Hanley more lively.

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)** (see section 3.2) 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, although there are clear advantages for the elaboration and implementation of measures that are realistic and acceptable by a range of stakeholders, there are also clear challenges concerning accountability and the 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. 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.

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. This is one of the main challenges for local administrations in terms of energy efficiency and sustainability.

In summary, the city's current performance in terms of tackling energy efficiency seems to be in the right direction, but there are serious challenges ahead. This results in both economic and social costs. The complex and sophisticated energy efficiency policies the UK has enacted since 2002 have yielded much praised results. The multi-level networked governance measures introduced by central government have produced interesting partnerships between business, governments and citizens. The challenges for Stoke-on-Trent are severe, however, as the city struggles to attract new forms of industry and employment, while providing citizens with opportunities to prosper and increase their life chances and reforming the existing housing stock.

10 Lessons and links to other PLEEC work packages

The issues of 'fuel poverty', fuel vulnerability and civil society participation in energy planning were not contemplated in the WP2 key fields and domains to discuss energy efficiency. These are issues that arise when an updated sustainability framework is applied, in which the three crucial dimensions of sustainability (environmental, social and economic) are simultaneously addressed (Larsen, 2012).

In his 'Inquiry into the theoretical basis of sustainability', Larsen (2012) argues that "Sustainability occurs in three fundamental dimensions _ social, economic and environmental . For sustainability to occur, it must occur simultaneously in each of the three dimensions " (p. 48). In other words, energy efficiency and the sustainability of solutions must contemplate the social dimensions of energy efficiency. The very notion of 'efficiency' must be put under this light. As efficiency can be understood as a measure of the efficacy of processes, measures and actions to achieve certain goals, those goals must involve the well being of vulnerable citizens and their capacity to influence policy in democratic systems. This is not only a moral imperative, but part of an understanding of sustainability that involves the long term functioning of a certain mode of production and political organisation.

But the moral imperative is crucial: vulnerable groups must be protected and their voices must be heard when it comes to decision-making and policy formulation. The European Union is founded on a clear set of values that must be pursued by policy makers. "The [European] Union is founded on the values of respect for human dignity, liberty, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities" (European Commission, 2003).

The issue of fuel poverty is characteristic of Stoke-on-Trent. It is not a strong issue in either the Nordic countries or in Spain. However, it is possible to extrapolate this issue to several other regions of Europe and the world. We must therefore strive to formulate criteria to evaluate the social sustainability of energy efficiency and of measures taken. Suggestions in this direction include understanding how policymaking is able to include the demands and discourses of different groups in complex governance arenas, and especially the voices of vulnerable groups, such as the elderly, single parent households and the poor. It also includes objective measurement of fuel poverty and energy deprivation and assessments on how policies and actions are tackling these problems. Most importantly, it means a review of the expression 'energy efficiency' to include social, economic and environmental dimensions.

How to bring the results of this report further in WP6? Suggestions for an Action Plan for the city must include governance measures that allow for participation of vulnerable groups in the discussions that lead to the formulation of policies. Stoke-on-Trent must create tools that allow the public sector and planners to have a bigger say in how privately owned terraced houses can be brought to acceptable energy efficiency standards, including innovative models of progressive taxation, incentives and information campaigns. Innovative involvement of the private sector in strategies of urban regeneration must be pursued in order to influence the upgrading of obsolete housing stock.

Hence, new governance arrangements and innovative ways of collaboration between public sector, private sector and civil society must be sought. Innovative energy efficient transport solutions are also a priority for cities like Stoke-on-Trent. Technical solutions are there, but changes in behaviour are important. Soft measures like the implementation of bicycle lanes must be accompanied by supporting measures that will encourage citizens to take up new habits.

Finally, energy efficiency must be one of the main frameworks for urban regeneration and urban expansion. The SMART city framework, which is popular among researchers and policy makers, must incorporate the social dimension of sustainability to ensure justice and increasing equity of access to the benefits of economic prosperity.

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