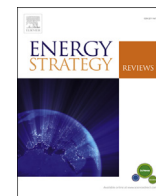


Contents lists available at [ScienceDirect](#)

Energy Strategy Reviews

journal homepage: www.ees.elsevier.com/esr

CASE STUDY

Local energy policy and managing low carbon transition: The case of Leicester, UK

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ARTICLE INFO

Article history:

Received 26 May 2014

Received in revised form

29 January 2015

Accepted 6 February 2015

Available online 18 April 2015

Keywords:

Local energy policy

Local authorities

Energy transition

ABSTRACT

National and local energy policies are implemented within a complex energy landscape that makes any evaluation of their impacts far from straightforward. Drawing upon a case study of Leicester this paper argues that the ability of local authorities to deliver significant energy savings within this landscape is questionable, albeit with other additional benefits being realised (e.g. job creation, community engagement). It examines existing domestic energy demand and multiple deprivation data for Leicester and neighbouring cities and combines this with a qualitative description of the transition process. The paper identifies the need for a more systematic analysis of how national energy policy translates to the local level and concludes that it is problematic even for a leading, pro-active and innovative local authority to have a statistically meaningful energy policy. Even where energy policies are favourable, carbon reduction is less easy to realise than other – more local - co-benefits and that in the light of significant financial and co-ordination constraints more attention needs to be given to how local communities can be more effectively supported in their desire to meet (or exceed) national targets.

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1. Introduction

In their analysis of energy transition, Verbong and Geels [1] are critical of attempts to link the low take up of renewable electricity options to policy and of failures to adequately recognise the importance of the wide range of actors outside of policy makers. More recently Simmie [2] argues that energy pathways invariably emerge through incremental improvements to existing technologies and innovations in how those technologies might be integrated, and or, used in new ways. Both of these analyses

suggest that energy transitions are determined by the dynamic interconnections between the national landscape made up of climate change, fuel prices and policy initiatives, and local contexts as defined by levels of deprivation, building stock, geography and local government initiatives.

The following paper will consider how these complex landscapes determine the ability of UK energy policy to reach down to the local level and, concurrently for local initiatives to respond to national policy. It is framed around a case study of one urban centre, the City of Leicester, which has been selected due to its reputation in sustainability, energy efficiency and climate change mitigation. Within the general theme of sustainability, we focus more narrowly on energy policy because this is potentially a

measurable and tractable set of policies around electricity and heat production and consumption. The specific goals of the paper are: to explore, quantitatively and with a focus on domestic energy use, the impact that energy initiatives are having on total energy consumption; to present a qualitative picture of the local factors (e.g. levels of deprivation); and to summarise the network of agents who have been involved in that transition at the local level. The quantitative and qualitative aspects of the paper are then pulled together to consider, first, how improved data at the local level, and the expertise to manage that data, is key to the generation of local energy policy and, second, how national policies must be formulated with a better understanding of the local contexts into which they are to be introduced.

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1.1. Leicester city: the study context

Leicester is the 11th largest city in the UK with a population of 329,900.¹ In 1990 it became the UK's first "Environment City" and later, in 1996, became Europe's "Sustainable City" [6] and one of twelve cities to receive local government honours at the 1992 Rio Earth Summit. The city's 2008 carbon dioxide emissions amounted to 1.9 million tonnes (0.36% of UK total emissions [42]) and the council's (LCC) own CO₂ emissions for 2008/9 was 66,179 tonnes [3]. Among other environmental objectives, LCC has set itself a target of reducing its CO₂ emissions to 50% of 2008/09 levels by 2025/6 and to reduce city-wide emissions to 50% of 1990 levels by the same date [3]. Fleming and Weber [7] discuss a substantial improvement in energy efficiency between 1996 and 1999 with annual savings of 86,667 MWh (312 TJ), equal to 6.0% of Leicester's 2009 electricity demand. The national UK Government has recognised Leicester and its council as being "impressive" in terms of energy efficiency [8] and the city is one of the eleven board members of the European Energy Cities network, which has 1000 towns and cities as members.²

Based on environmental performance, quality of life and future-proofing criteria, Leicester was assessed by Forum for the Future [10,12] as the most improved city, year-on-year between 2007 and 2010, and was Britain's second most sustainable city in 2010, up from 14th in 2007. It was noted that the One Leicester Partnership, which was a non-legally binding agreement between groups pursuing a sustainability agenda, was an important strategic step for the city to have taken in tackling the issues encompassed by the future-proofing category [5,11].

The paper will now consider the data requirements for assessing the capability of local authorities to manage low carbon transition, particularly where there are high levels of deprivation. Section 2 will introduce national data for the consumption of gas and electrical energy before discussing a quantitative analysis of this consumption as it relates to levels of deprivation with a specific focus on the performance of domestic users in Leicester. The paper will then compare the energy performance of the city with two similar locations in the Midlands of England (Nottingham and Coventry). Section 3 will draw upon a systematic review of local energy initiatives within Leicester, supplemented by semi-structured

interviews with key players, to present a qualitative energy landscape of the city before Section 4 relates this analysis to the present and near-term energy policy goals of the UK Government. The final section of the paper will offer conclusions on what our analysis means for local authorities (and the central governments that support them) seeking to have a statistically meaningful energy policy.

2. Data sources for understanding local energy use

Detailed explanatory notes for how regional electricity and gas data are reported are available from the Department of Energy and Climate Change [25] and the key points are summarised as follows. In 2003 and 2004 the DECC released experimental electricity statistics for LAU1 NUTS administrative regions. There are 410 LAU1 areas in the UK, 356 of which are in England and Leicester city constitutes one; these have been classified as National Statistics since 2005. In 2004 provisional electricity statistics were also reported for Mid Level Super Output Areas (MLSOA) [26] and subsequently awarded National Statistics status in 2005. There are 7193 MLSOAs in England and Wales, of which 36 are in Leicester. Local level (LLSOA) electricity data was first released in 2007, although only for 45 local authorities; in 2008 and 2009 the reporting scheme remained experimental but data is now released for the whole of England and Wales. There are a total of 34,482 LLSOAs in England, 1896 in Wales and 187 from the City of Leicester. The available data is not controlled for the variation from average weather conditions that each region experienced in the years reported for; it is reasonable to assume however that no significant variations exist between the nearby cities represented in the following analysis – Leicester, Coventry and Nottingham.³

2.1. Deprivation data

The Department for Communities and Local Government (DCLG) has developed a methodology for quantitatively determining the degree of deprivation experienced by UK residents. Data is collected for the whole country using this methodology and is reported for each LLSOA layer. Each LLSOA is then ranked relative to the others with Rank 1 corresponding to the most deprived area [27]. Deprivation data is not reported for MLSOAs and it is not possible to accurately calculate MLSOA deprivation based on the LLSOA data

due to the latter boundaries not always residing entirely within a single MLSOA. The measure of deprivation is determined by an Index of Multiple Deprivation (IMD), which is based on seven categories – income, employment, health and disability, education, barriers to housing, crime and living environment - with an individual weighting according to their influence on the overall IMD. According to the DCLG's IMD measurements [28], Leicester's 187 LLSOAs are more deprived than the average for England and 25% of Leicester's LLSOA's are also among England's 10% most deprived areas.

The MLSOA and LLSOA consumption data [29] and the NUTS LAU1 consumption data are available from the DECC [30,31] and the deprivation data from the DCLG [28]. Only data defined to be for domestic consumption is considered in this analysis.

2.2. Gas and electricity data with deprivation

Lemon et al. [38] provides a detailed analysis of MLSOA data ranked by deprivation over the period 2006–2009. They look at the fitted mean changes in gas and electricity consumption against the IMD rank discussed above. In 2009 the city's consumption of gas had reduced by 16.3% of the 2006 demand and the country as a whole had reduced by 15.6%. However adjusting for the index of deprivation the fall in gas consumption was actually lower in MLSOAs in Leicester than for similarly deprived MLSOAs in England as a whole.

Similar results were also observed for electricity demand. The MLSOA data shows that over the 2006–2009 period Leicester's mean household electricity demand reduced by 5.6%, while the mean English reduction was 6.8%. However once deprivation is taken into account electricity demand fell faster in the rest of England. The more detailed LLSOA data (also analysed in Ref. [38]) shows similar effects for the fall in gas and electricity observed between 2008 and 2009: that adjusting for relative deprivation demand in Leicester's LLSOAs fell less than LLSOAs in England as a whole.

Analysis of the detailed MLSOA and LLSOA data suggests that deprivation rank is likely to be a major driver of the absolute differences in the consumption of electricity and gas. Leicester is relatively deprived and does not show a notably superior drop in either gas or electricity consumption over the period 2006–2009 compared to the rest of England, adjusting for its level of deprivation.

2.3. European gas and electricity data

The local administrative (LAU1) data shows that in 2004 Leicester's gas demand per household was greater than the average of

¹ Source: ONS Census website. <http://www.ons.gov.uk/ons/interactive/vp2-2011-census-comparator/index.html>, (accessed 25.03.14).

² See <http://www.energy-cities.eu/>, (accessed 14.01.14).

³ The monthly highest and lowest temperatures for Leicester, Coventry and Nottingham are almost identical. See <http://www.worldweatheronline.com> – (accessed 24.03.14).

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