

High consumption in the UK: an exploration of secondary data

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Short report for SYSC

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Contents

Overview	i
1. Introduction.....	1
2. Literature Review	3
3. Methodology	4
3.1. Limitations	5
4. Findings.....	6
4.1. Energy consumption.....	6
4.2. Travel consumption	10
4.3. Food consumption	13
5. Discussion.....	14
6. Conclusion and policy implications	15
7. References	16

Overview

Inequality in resource consumption keeps getting worse, but those with higher energy consumption and a more significant contribution to lifestyle carbon emissions are, to a large extent, excluded from academic enquiry and policy initiatives. This paper provides a review of existing data which helps us better understand high consumers in the UK through five diverse case study locations: Sheffield, London, and County Durham in England, Edinburgh in Scotland, and Powys in Wales. It focuses on three areas of consumption: energy, transport and food, which are the main sources of individuals' environmental impact in developed countries and reflect two of the three main themes around which SYSC is organised. Building on the analysis of quantitative data, the article explores how high consumers can be classified, the spatial distribution of high consumption across the UK, and how high consumers disproportionately contribute to environmental impacts. This work provides useful information for policymakers and argues for prioritising high consumers when designing consumption reduction initiatives. The analysis conducted across the five case study areas featured in this report can be replicated for any given geographical area in the UK, down to Lower Super Output level.

Introduction

As set out in our previous publications on this topic (Castano Garcia et al., 2021; Hawkins et al., 2022), households contribute to more than 60 per cent of global greenhouse gas (GHG) emissions and between 50 per cent and 80 per cent of total land, material, and water use, with those in wealthier countries having the most significant impact (Ivanova et al., 2016). Although the spending of British households has declined during the COVID-19 crisis, consumption inequality and income inequality have increased, with the most economically vulnerable groups experiencing the largest income reductions (Hacioglu et al., 2020). High consuming households are still poorly understood, which limits our understanding of what contribution reducing high consumption (especially in wealthier countries) might make to urgent carbon reduction efforts. As Dubois et al. (2019) explain, households should be a higher priority in climate policy strategies given their contribution to global emissions. The study of high consumers is bound up with issues of energy justice, as data suggests that lower income households have fewer negative impacts on the environment, and are also more likely to make changes to their consumption in order to conserve resources, potentially further compromising their health and wellbeing (Kartha et al., 2020; Kolokotsa and Santamouris, 2015; Department for Business, Energy & Industrial Strategy, 2017).

This paper provides a review of existing data regarding high consumers in the UK. It focuses on three primary areas of consumption: energy, transport and food, as the main sources of individuals' environmental impact in developed countries (Peattie and Peattie, 2009). The main aim of this output is to identify who and where high consumers are, and what impacts they are having. Primarily we are looking to establish how high consumption plays out spatially and socio-economically within cities across the UK.

We are motivated to conduct this analysis because inequality in resource consumption is getting worse, with a clear and worsening trend towards the most affluent households having disproportionately high energy consumption and carbon footprints (Hubacek et al., 2017). Beyond massive carbon footprints, high consumers pose a second challenge: they also set social and material aspirations for people who want to be perceived as successful (Hawkins et al., 2022). By better understanding high consumers, their drivers and impacts, we provide a foundation for further research and improve recognition of high consumption as an issue requiring specific policy attention in our region as well as every other.

The analysis conducted across the five case study areas featured in this report can be replicated for any given geographical area in the UK, down to Lower Super Output level and we would be glad to undertake further analysis focussed on South Yorkshire, identifying the spatial distribution of high consumption across the region, to support SYSC partners in better understanding this issue of huge significance to the attainment of net zero and to greater equity of access to resources across the region.

The rest of this paper consists of five sections. The next section very briefly summarises key points emerging from a literature on high consumption within the three primary areas of consumption, which is published in full as Castano Garcia et al., 2021. The methodology section outlines the methods employed for this study and the data sources identified. The findings section presents the results of the analysis. The importance and relevance of these results is explained in the discussion section and the final section outlines the conclusions of this study and its policy implications.

Literature Review

There is a significant gap in the sustainable consumption literature in relation to high consumption (in terms of definition, classification, characteristics and motivations). For this study, we focus on addressing some of the key research gaps, specifically:

- Consumption inequalities increase with income inequalities, and consumption varies greatly between different geographical areas. As high consumers are responsible for more emissions and more use of resources, there might be scope for mitigating their impact through policy interventions. This could be more feasible through space-based solutions. However, the spatial distribution of income levels, consumption and emissions (as interrelated issues) hasn't been widely investigated.
- Different dimensions of consumption are interrelated, which creates specific barriers for mitigating the negative impacts of high consumers. Looking at available secondary data is a way to both (1) better understand high consumption through available studies, and (2) find out what other data is needed to investigate this phenomenon more in-depth. The visualisation of high consumption as related to geographic and economic factors could help overcome some of those barriers.
- Policy initiatives to reduce the impacts of consumption have not explicitly targeted high consumers as a group yet, and many countries do not recognise high consumption as an issue, perhaps due in part to the lack of clear, widely accepted definitions on the topic, but also for ideological and political reasons. This study aims at bringing this subject to the fore, particularly in the UK, while also focusing on the diversity within the UK in terms of consumption by offering some evidence about the existence of significant differences within the UK regarding consumption.

Methodology

A range of secondary data sources linked to the three areas of interest in high consumption (energy, transport, food) were identified and explored to enable a relatively quick identification of existing patterns of high consumption across these areas. Secondary analysis was chosen for what is essentially a scoping exercise before undertaking further research. Attention was paid to the publication date of the data as well as the level of spatial granularity provided (such as the Lower Super Output Area (LSOA)) in order to appraise the suitability of the datasets for providing insights into current spatial variation in consumption. The research scope was limited to the UK as this allows for easier comparison across datasets, while offering an illustrative example of the nature and dynamics of high consumption.

The datasets in Table 1 were selected, and specific indicators of interest were highlighted in terms of their ability to answer questions surrounding the potential identification and classification of high consumers, as well as the extent of high consumption across the UK.

Table 1: Data sources

Dataset	Published (latest available data)	Lowest spatial granularity
National Travel Survey	DfT (2019)	Region
Sub-national total final energy consumption	BEIS (2018)	Region
Lower and Middle Super Output Areas domestic gas consumption	BEIS (2019)	LSOA
Lower and Middle Super Output Areas domestic electricity consumption	BEIS (2019)	LSOA
Road transport energy consumption	BEIS (2018)	Local authority
Sub-national residual fuel consumption	BEIS (2018)	Local authority
Detailed household expenditure by countries and region	ONS (2018)	Region

Descriptive analysis was conducted for each of the datasets in order to understand the broad range of consumption patterns, including mean consumption, and to identify geographical areas with notable patterns of consumption (either high or low). Analysis was carried out in Microsoft Excel with the exception of the National Travel Survey which was analysed in SPSS given the size and complexity of its datasets.

Five geographical areas were chosen as case studies: Sheffield, London, and County Durham in England, Edinburgh in Scotland, and Powys in Wales. These were selected based on initial exploratory analysis of gas consumption data that showed high consumption in County Durham and Powys, as well as a desire to have a good geographical spread across the UK.

Following data scoping, charts were produced in Excel focusing on the key identified variables, and geographical mapping of the data was carried out in QGIS. These maps were compared with maps of the Index of Multiple Deprivation¹ to look for correlations.

3.1. Limitations

A limitation of using secondary data is that the data collection was not designed to answer the specific research questions of this study, and therefore was not always able to provide variables and insights that could answer the research questions. The geographic areas for which consumption data is available is largely insufficiently granular to provide detailed insights in terms of where high consumers are located or how high consumption is distributed. This conditioned the analysis, as the data available in some cases does not account for consumption differences within regions, LSOAs or local authorities. As such, the transport and food analysis is unable to address the five geographical case studies nor speak to spatial patterns of consumption beyond the regional level.

¹ <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019>

Findings

4.1. Energy consumption

In 2019, 15 per cent of areas (LSOAs) in Great Britain were found to have above average gas consumption (17,000 kWh per meter), while just 0.5 per cent exhibit above average electricity consumption (7,100 kWh per meter).

Figures 1 to 8 show the spatial patterns of domestic gas and electricity consumption over the five case study areas. These have been cross-referenced with maps of the Index of Multiple Deprivation to explore connections between deprivation and consumption.

South and West Sheffield, where deprivation is much lower, have significantly higher gas consumption than North and East; electricity consumption is higher in a small part of the centre and the South West outskirts of Sheffield.

Figure 1: Domestic mean gas consumption by LSOA: Yorkshire and Sheffield

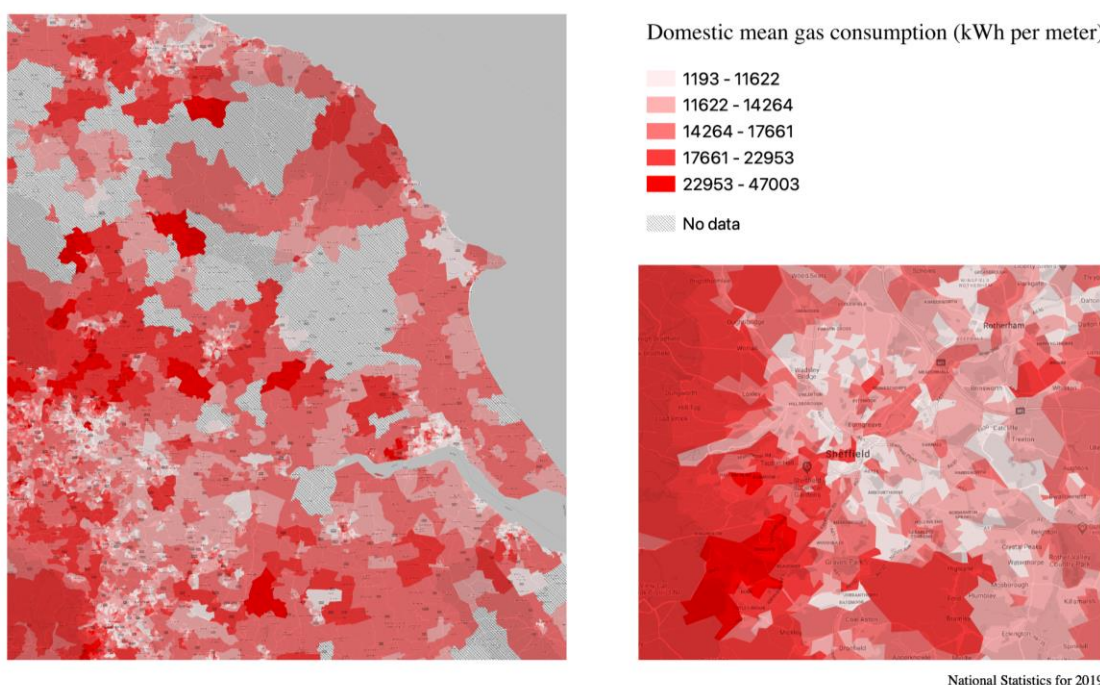
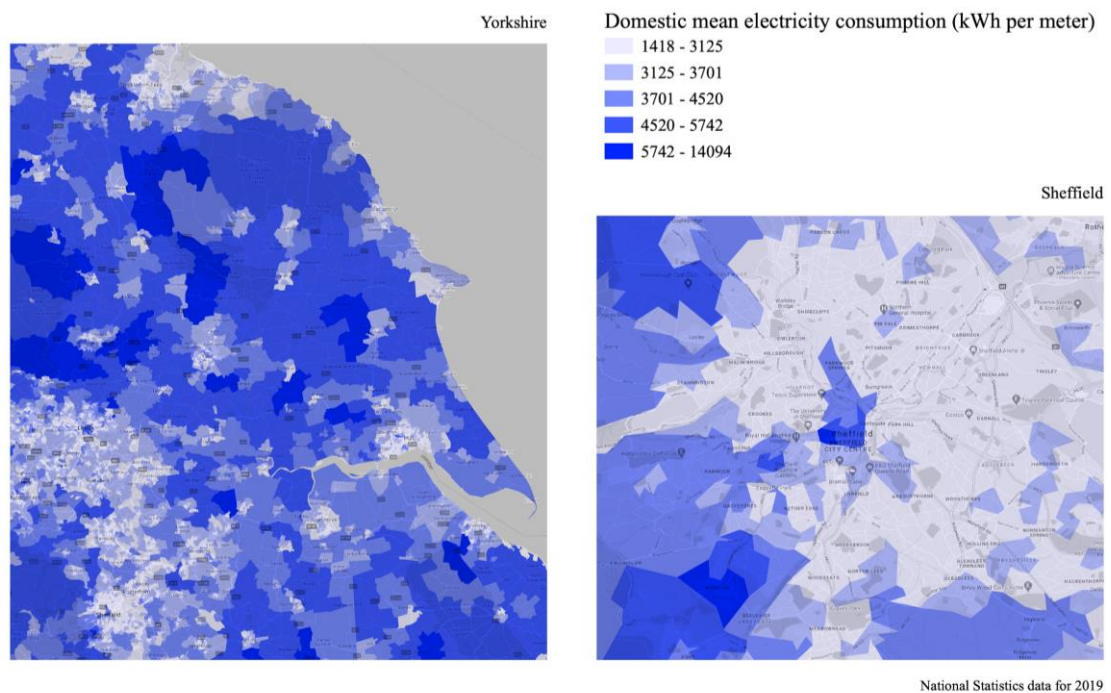


Figure 2: Domestic mean electricity consumption by LSOA: Yorkshire and Sheffield



Inner London has higher gas and electricity consumption than Outer London (exceptions in the City, South West and parts of North West); consumption appears to be negatively correlated with deprivation.

Figure 3: Domestic mean gas consumption by LSOA: England and London

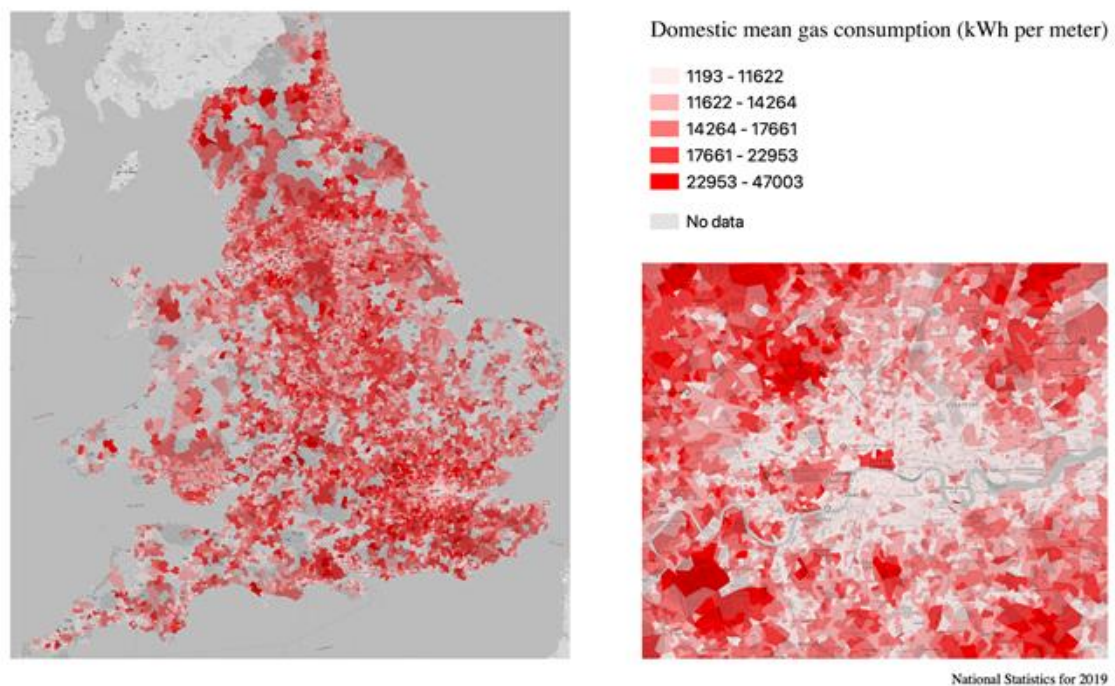
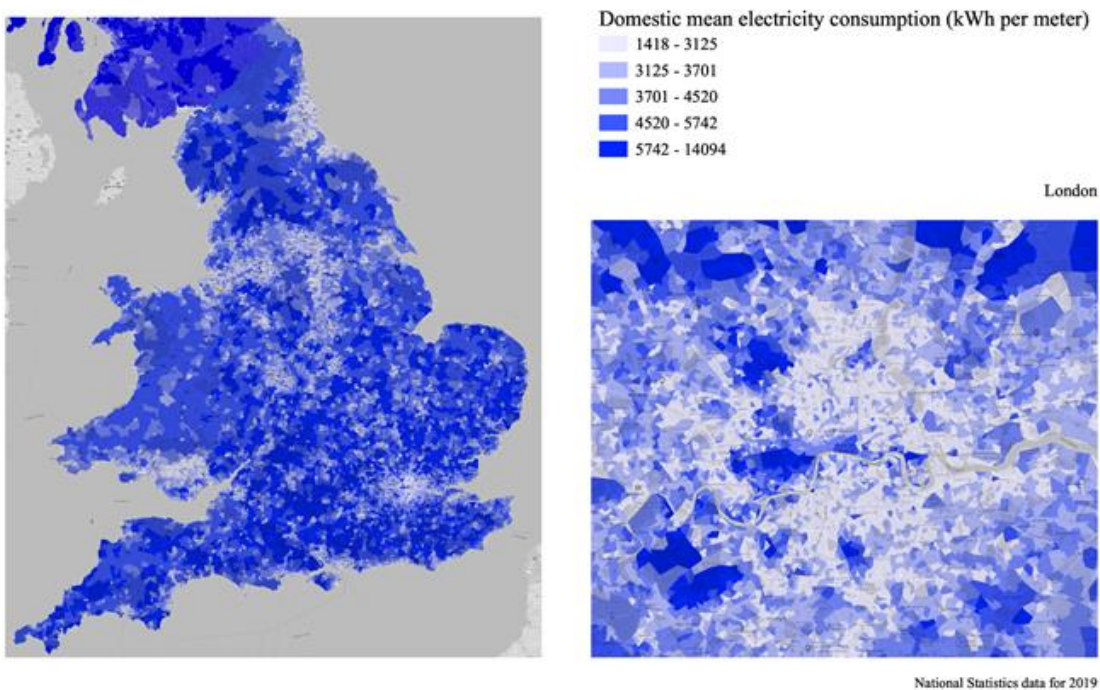


Figure 4: Domestic mean electricity consumption by LSOA: England & Wales and London



In County Durham, which is notable for its high level of total energy consumption, there is higher energy consumption in the city of Durham as well as in the North West, with pockets of lower consumption south of Durham in Spennymoor and Bishop Auckland; these patterns demonstrate the same negative correlation between higher energy consumption and deprivation.

Figure 5: Domestic mean gas consumption by LSOA: County Durham

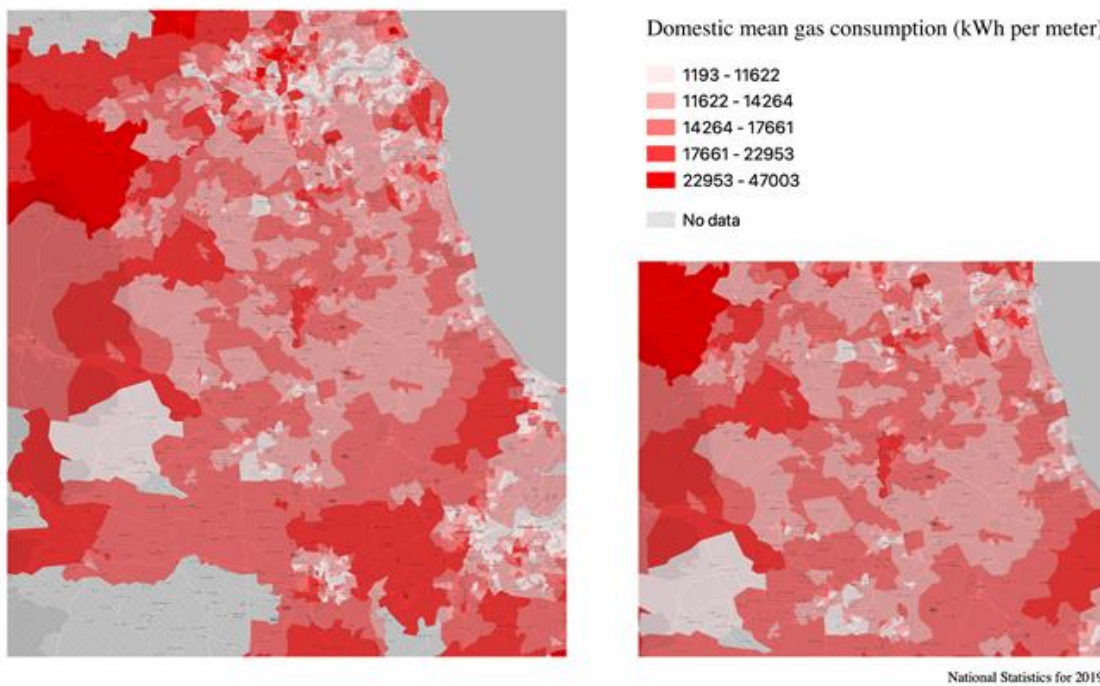
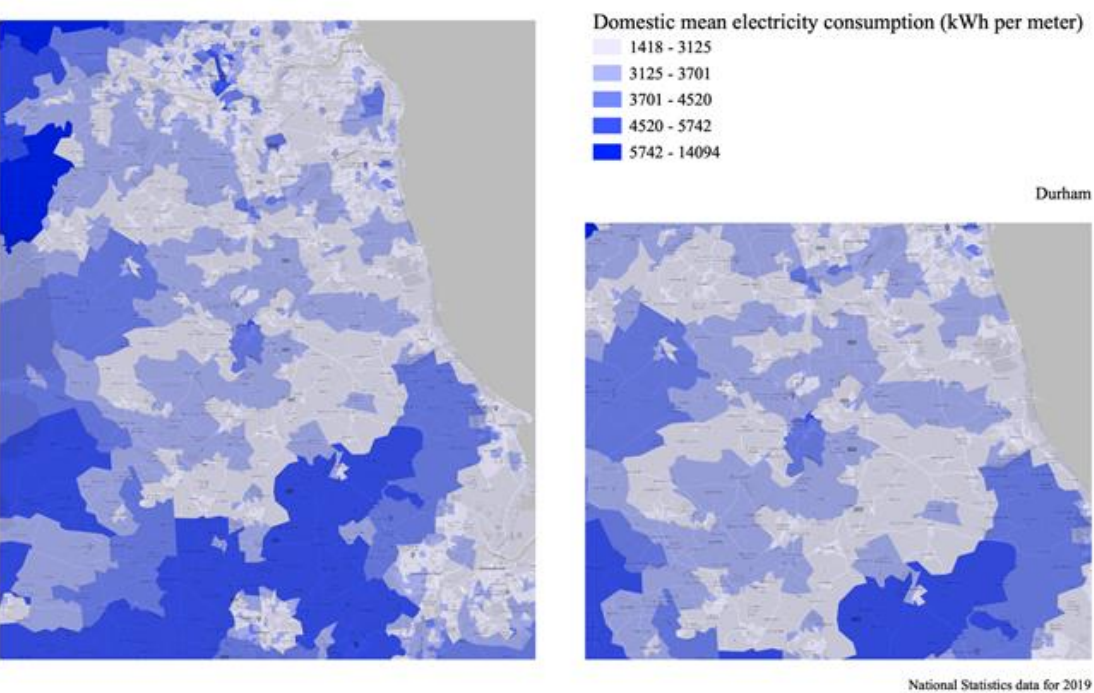


Figure 6: Domestic mean electricity consumption by LSOA: County Durham

Domestic mean electricity consumption by LSOA: County Durham



In Edinburgh, there is higher gas consumption in parts of the North and South as well as to the west of the city, with a band of lower consumption splitting the city in two; electricity consumption is less spatially correlated, albeit with a similar band of lower consumption--this band also features areas of higher deprivation.

Figure 7: Domestic mean gas consumption by LSOA: Scotland and Edinburgh

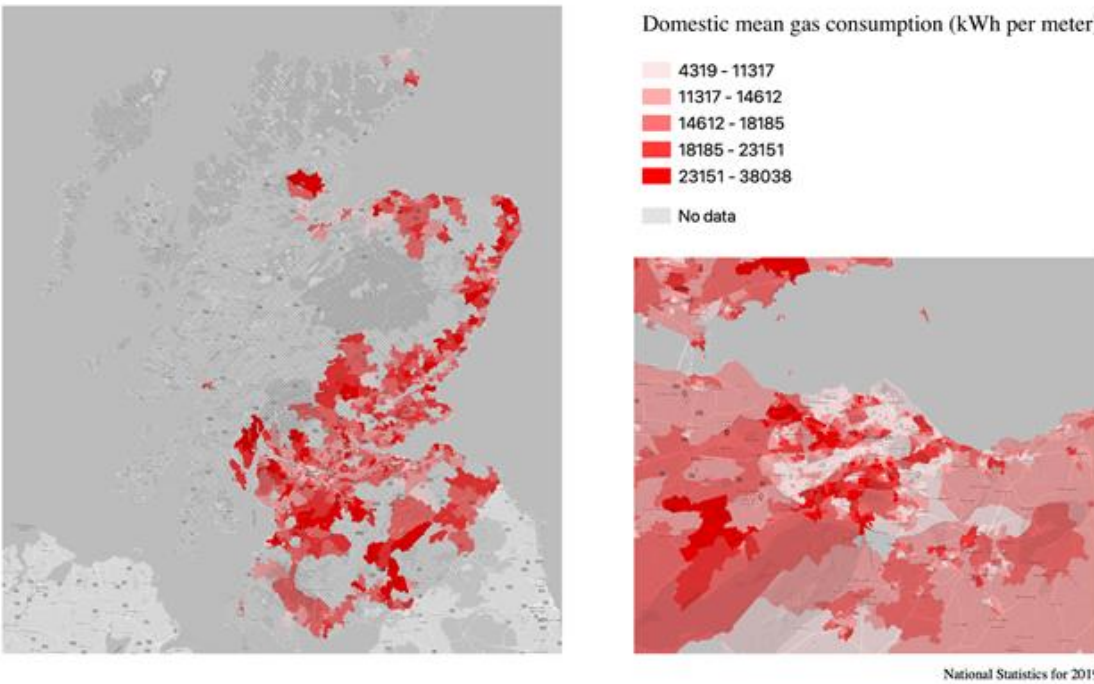
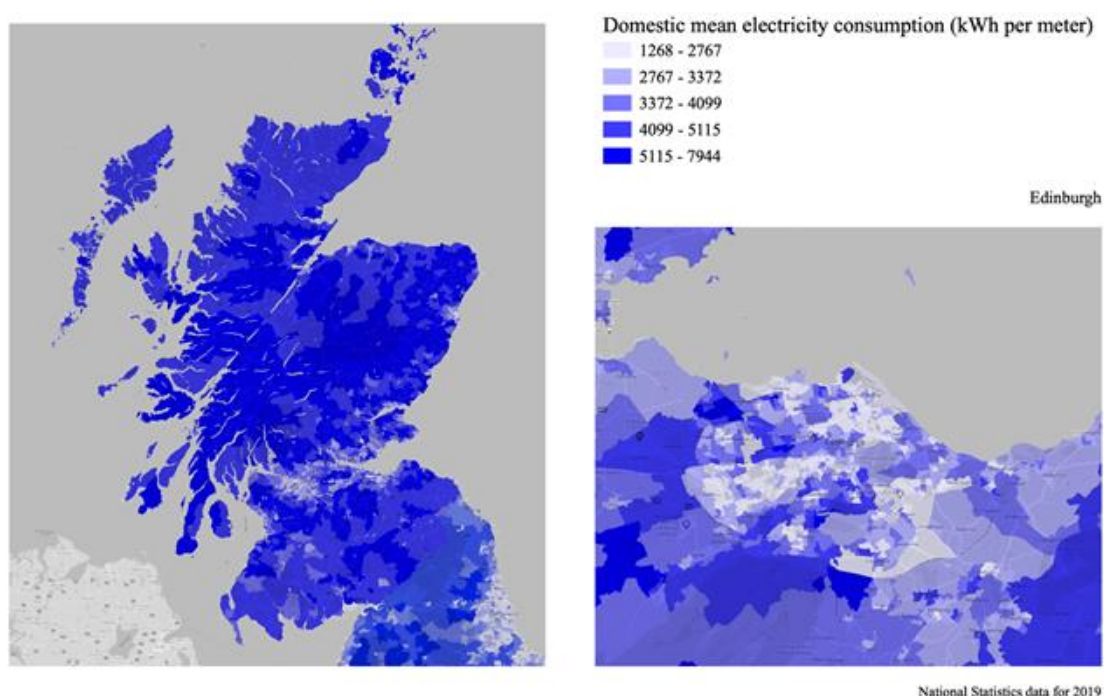


Figure 8: Domestic mean electricity consumption by LSOA: Scotland and Edinburgh

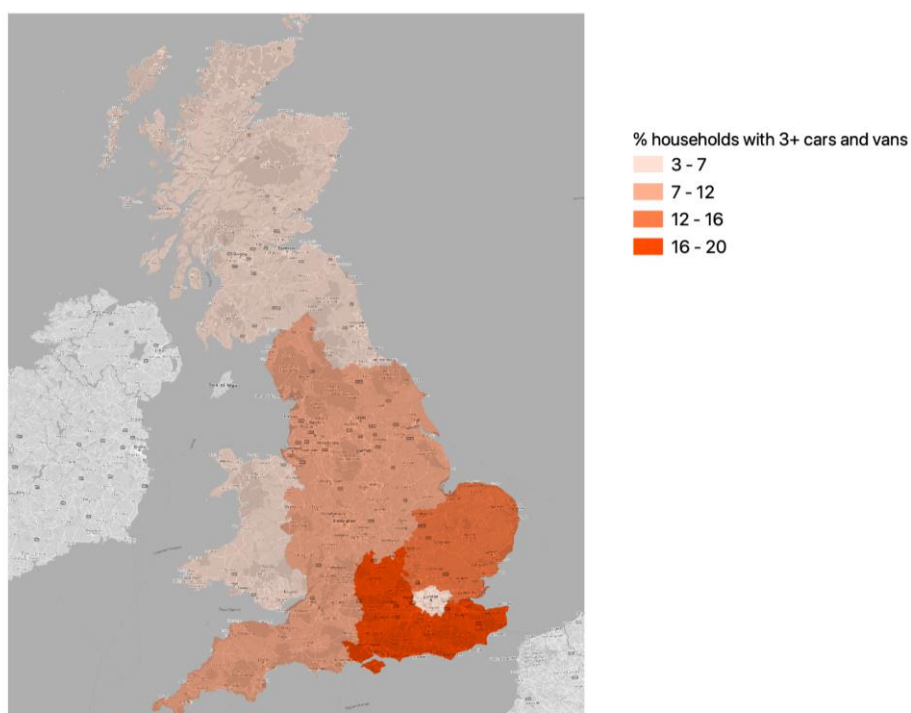


We also looked at patterns in Powys, based on the high level of domestic gas consumption, however missing data severely limited the possibility of discerning wider patterns or correlations.

4.2. Travel consumption

Links have been found between household income and both car ownership and air travel. Figure 9 shows that high car ownership, here represented by households owning three or more cars and vans, are concentrated in the South East.

Figure 9: Households with three or more cars and vans, by region



Data from National Travel Survey 2019

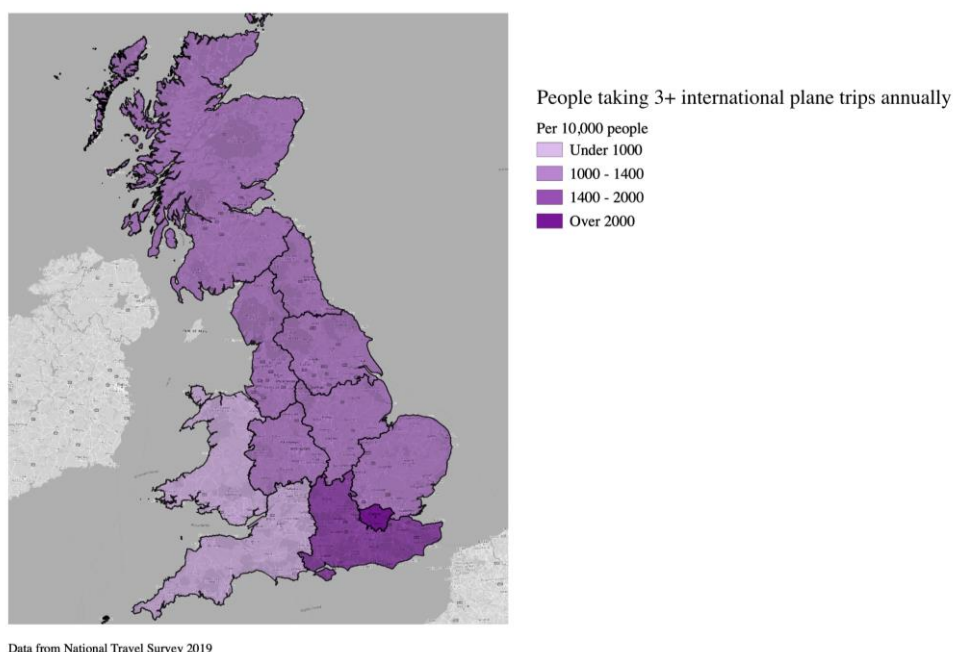
Figure 10: Number of household cars or light vans in the UK by income



The number of vehicles per household rises with income, as shown in Figure 10, where approximately two-thirds of households in the highest income bracket (over £50,000) have two or more vehicles, whereas that proportion is approximately 40 per cent and 15 per cent for the middle and lower brackets respectively.

According to data from the National Travel Survey, almost six per cent of households have three or more cars, vans and 4x4s. Of all household vehicles in England, 16.6 per cent are owned by only 5.9 per cent of households. Of those households with 3+ cars, vans and 4x4s, 39.3 per cent have only one or two people with a driving licence, pointing to what could be considered excessive consumption.

Figure 11: People taking three or more annual international plane trips, by region



In 2019, over a fifth of Londoners took three or more international plane trips per year.

The number of flights taken increases with income. First and second income quintiles average fewer than one flight per year, with the third at just over one, fourth at 1.6, and the fifth quintile taking over double the fourth at an average of 3.3 flights per year.

Figure 12: Number of annual international flights by income in 2019

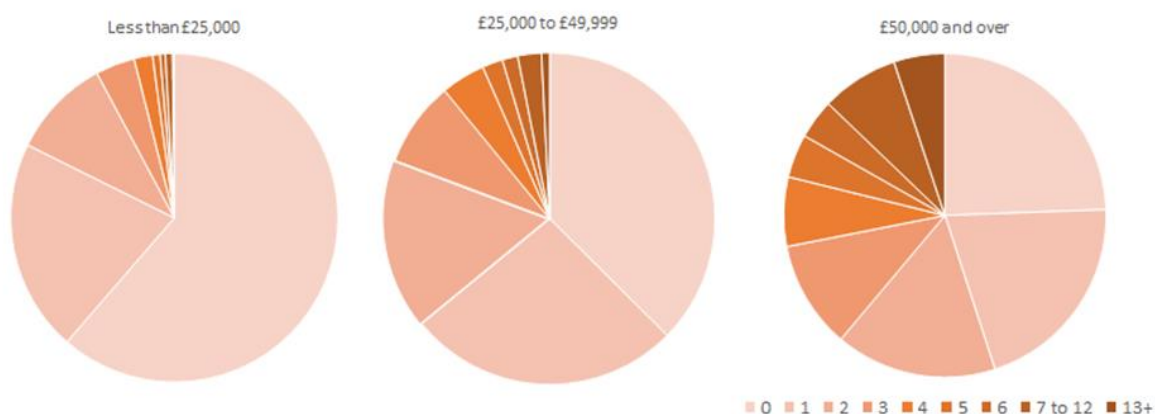


Figure 13: Average number of flights per person by income quintile in England in 2019



4.3. Food consumption

There is regional variation across the UK in average weekly household expenditure in food and non-alcoholic drinks (highest in the South East, London and Northern Ireland; lowest in Yorkshire and the North East) but this could be related to price differences between areas, rather than showing different levels of consumption.

There is limited data on food consumption patterns between different populations/regions. Much of this data may reside with supermarkets.

Discussion

This study offers some insights into possible classifications of high consumers, the identification of spatial differences in high consumption, and the distinct impact high consumers are having.

The results indicate that, as anticipated by previous studies, there is a link between higher household income and high consumption in energy and transport. This link is unclear in the domain of food, with limited data available for different regions of the UK.

In the case of energy, there is a negative correlation between high energy consumption and deprivation. As low levels of energy consumption are linked to poor indoor environmental conditions for low-income households (Kolokotsa and Santamouris, 2015), energy-saving initiatives that focus on reducing the energy consumption of high-income households where possible and retrofitting to improve their environmental performance would be more equitable than blanket measures.

In line with previous research, this study also shows that a relatively small proportion of households with high incomes have a disproportionate impact through the emissions related to their consumption, which is particularly apparent in air travel and the use of cars.

Conclusion and policy implications

The analysis of available consumption data offers some insight into the geographical differences and consumption rates within the UK. High consumers defy easy identification, due to the absence of a widely accepted definition of high consumption. However, there are some characteristics of high consumption that might help provide an initial classification system.

Type of consumption: There are differences between high consumption of energy, transport and food. The environmental impact of consumption is also related to all the stages of the life cycle of products and/or services that made that consumption possible (e.g., in the UK, eating strawberries from one's garden has arguably has less impact than eating strawberries imported from Egypt, even if the food consumption is similar in terms of nutrients).

The geographical area where consumption is analysed: Different geographical perspectives are likely to affect the location of a 'normal consumption' threshold and the recognition of environmental impacts (e.g., a national perspective does not account for the environmental and social impact of some imported goods and only allows a comparison with other people living in a particular country).

Cultural considerations: Although there are physical limits for comfort and health linked to minimum levels of consumption, what is desirable or acceptable is not always connected to easily identifiable material thresholds (e.g., alcoholic drinks are not necessary, but are part of common experiences for people in many cultures around the world).

This analysis of consumption levels has some implications policymakers should take into account:

- Targeting geographical areas or population groups where consumption is higher is a more efficient and fairer approach to lifestyle emissions reduction than aiming at the general population.
- Consumption reduction initiatives could help in tackling extreme inequality and the climate crisis at the same time, curbing the excessive emissions of the richest (i.e., through taxes) and investing in poor and vulnerable communities.

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