



Original research article

# Fuel poverty in Northern Ireland: Humanizing the plight of vulnerable households



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## ABSTRACT

Households in fuel poverty are unable to heat their homes at reasonable cost. Energy efficiency programmes aim to tackle fuel poverty and should target resources towards households in greatest need. Households often do not have access to these kinds of schemes, as policies do not acknowledge the complex interaction between households, incomes and domestic energy efficiency, and the high level of variability which results. This paper explores this interaction at household level, and the diversity of fuel poverty which results amongst households in Northern Ireland, a region particularly prone to fuel poverty. Survey data ( $N = 1595$ ) are used to generate pen portraits for 18 households in varying degrees of fuel poverty. Eligibility for free energy efficiency improvements is assessed and the impacts of tailored interventions on fuel poverty are predicted. The results reveal diversity amongst fuel poor households and, in many instances, households in most severe fuel poverty do not fit the criteria for energy efficiency upgrades, despite standing to benefit from significantly reduced fuel poverty. The impacts of retrofitting are greatest for those in greatest need, but even the most generous package would leave a considerable number of households in fuel poverty, for which additional policy measures are required.

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## 1. Introduction

Access to a warm and comfortable home is considered to be a basic human right and a prerequisite for a decent quality of life [1]. A recent survey in Northern Ireland found that being able to afford to heat one's home was viewed almost universally (99% of respondents) as essential for daily living [2]. However, not all households are able to achieve 'affordable warmth' – those which cannot maintain adequate heating at reasonable cost are said to be in 'fuel poverty'. Fuel poverty affects approximately 5 million households in the UK (20% of all households) [3] and up to 125 million people across Europe [4]. Households affected by fuel poverty may experience cold-related ill-health and psychosocial stress, which can have adverse impacts on well-being [5].

Energy affordability is an important governance issue [6] and responding to the needs of fuel poor households is regarded as a

key social policy concern. Authorities in the UK have developed fuel poverty strategies to tackle the problem, which encompass the broad goals of raising incomes, reducing energy prices and improving the energy efficiency of the housing stock and its inhabitants (e.g. [7]). Reducing domestic energy costs through the installation of energy efficiency measures (e.g. insulation and efficient heating systems) is the most sustainable and long-term solution to fuel poverty [8,9]. Doing so brings benefits for health and well-being, through the promotion of warmer indoor temperatures (thermal comfort) and reduced financial stress [10,11]. The refurbishment of homes is also central to achieving environmental goals (e.g. carbon reduction).

Energy efficiency resources must be distributed in a fair and equitable manner [6,12], which requires the accurate definition of households in fuel poverty. Traditionally, a fuel poor household has been defined as one which needs to spend more than 10% of its income to maintain adequate in-home heating,<sup>1</sup> as well as all other normal energy costs [8]. Recently, the English government has adopted a new definition, based on a 'Low Income, High Costs'

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<sup>1</sup> Adequate indoor temperatures are defined as 21 °C in living rooms and 18 °C in all other rooms [50].

(LIHC) indicator [13]. This indicator considers a household to be fuel poor if:

- their required fuel costs are above the national median level and
- were they to spend that amount, they would be left with a residual income below the official poverty line [14].

Whilst the LIHC indicator was developed to improve the identification of fuel poor households and the subsequent targeting of energy efficiency measures, it has a number of shortcomings which limit its effectiveness [1,15]. In particular, the setting of the energy cost threshold means households in smaller properties, which have lower fuel costs and need a lower income to cover these costs, are less likely to be counted as fuel poor. This means that vulnerable, lower income households, who tend to live in smaller dwellings, are less likely (1) to be classed as fuel poor and (2) to benefit from interventions as a result. We therefore use the 10% definition in this study, as it more adequately takes into account the key aspects of income, required energy spend and the physical condition of peoples' homes.

Nonetheless, targeting measures towards those most in need is difficult using either definition, due to the multivariate nature of what causes fuel poverty, and the extent to which at least two of these causes (energy prices and people's incomes) fluctuate over relatively short periods of time.

### 1.1. Variability of household fuel poverty

Household energy consumption is influenced by the physical infrastructure of the dwelling according to a complex arrangement of heat generation technologies and insulating materials [16]. However, this infrastructure does not operate in isolation. Wallenborn and Wilhite [17] argue that, set within this context, the characteristics and practices of the household also affect consumption. It is essential to account for household-driven effects in order to more fully capture the nature of energy consumption. For example, homes occupied by retired persons, those with limited mobility, young families and other 'vulnerable' persons are likely to be occupied for longer periods each day. This is likely to produce increased consumption, due to greater use of the heating system on a daily basis [18]. In addition, these kinds of households may need higher levels of heating, given their particular physiological susceptibility to colder temperatures [19].

The diversity of socio-technical characteristics produces a multiplicity of consumptions and expenditures across households. Previous research indicates large variations in energy consumption between similar, sometimes identical homes (e.g. [20,21]). Furthermore, there is no single factor which results in a household being a high or low consumer of energy: "in almost every case there [is] a unique or near unique set of factors that culminate[s] in them being a High or Low gas using household" ([22, p. 30]). Hence, energy costs encompass the price of fuels, the energy efficiency of the home and energy practices of the household. Incomes (the other determinant of fuel poverty) also vary widely amongst households, depending on age, education, employment status, etc.

Stern [23] discusses the complex interaction between household characteristics and domestic energy systems. In the case of fuel poverty, incomes are typically independent of the energy efficiency and energy requirements of the home, which results in fuel poverty being a highly context-specific condition [24]. Households therefore experience fuel poverty to different degrees. In a large-scale study which estimated fuel poverty for over 1500 similar households, Walker et al. [25] found a wide variation. Some 25% of households needed to spend just over 10% of their

income on fuel, whilst 17% needed to spend more than a quarter of their income to achieve adequate warmth. This variation can be conceptualized using a severity index ([26]; see Fig. 1) which categorizes households into varying degrees of fuel poverty, ranging from 'marginal' (fuel poverty ratio = 10–15%) to 'severe' (15–20%) to 'extreme' (>20%).

### 1.2. Targeting households most in need

From the discussion above, it could be argued that households experiencing severe or extreme levels of fuel poverty could reasonably be accorded greater priority for energy efficiency interventions, relative to those experiencing more marginal fuel poverty [27,28]. However, not all households can access such intervention measures. Policies typically adopt generalized approaches which do not account for household variations in fuel poverty [1,29]. Historically, eligibility for/access to energy efficiency improvements has been based solely on social criteria, e.g. the Northern Ireland Warm Homes (WH) scheme uses social welfare benefits as a proxy indicator for eligibility [30]. However, these criteria are not congruent with fuel poverty. The fundamental problem is that 40–60% of fuel poor households do not receive these benefits and are effectively excluded from the policy (false negatives). At the same time, households which are not in fuel poverty can qualify for measures, simply on the basis of satisfying the eligibility criteria (false positives). On a separate note, basing eligibility solely on social criteria fails to acknowledge that fuel poverty is simultaneously and independently affected by the energy efficiency of the house [1]. Under such generalized criteria, there is no guarantee that measures will be targeted towards households most in need. Fuel poverty is thus construed as a case study of inequity in the domestic energy sector, as affordable warmth is not available to all households, and many households in fuel poverty cannot access free remedial measures.

### 1.3. Study aims

This present paper aims to explore household-level variations in fuel poverty and the equity of the distribution of energy efficiency measures. It therefore examines two specific aspects of Walker and Day's [31] broad conceptual framework of 'fuel poverty as injustice': (1) access to affordable warmth (distributional justice) and (2) fair and equitable access to remedial measures which can assist vulnerable households in attaining affordable warmth (procedural justice). It draws on detailed survey data to generate in-depth individual scenarios for a small number of purposefully selected households in varying degrees of fuel poverty. The housing and personal circumstances of these households are used to assess: (1) energy efficiency and household fuel poverty, using a previously developed methodology (see [25]); (2) whether households would qualify for energy efficiency improvements under currently available government subsidized schemes, and (3) whether there is any relationship between eligibility for measures and household need. Quantitative modelling is then used to simulate a comprehensive, tailored package of energy efficiency measures and explore how much households in varying degrees of fuel poverty would stand to benefit from such an intervention, irrespective of their eligibility status.

The study engages with several issues raised in earlier volumes of *Energy Research and Social Science*. It responds to the call for greater representation of the themes of equity and justice within the energy research literature [32]. It reflects on the needs of the fuel poor and how well these are being met by energy governance systems [6], with specific focus on energy efficiency improvements [9]. It conceptualizes consumption as the product

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