

Title: Fuel and transport poverty in Scotland

Subtitle: Actions towards accurately identifying fuel and transport poor households in Scotland

Authors: Keran Sarah Boyd ¹, Christian Calvillo ^{2,*}, Tanja Mueller ³, Xiaoyi Mu ¹ and Tong Zhu ¹

¹ Centre for Energy, Petroleum and Mineral Law & Policy, University of Dundee, Dundee DD1 9SY, UK;

² Centre for Energy Policy, University of Strathclyde, Glasgow G1 1XQ, UK

³ Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow G4 0RE, UK;

* Correspondence: christian.calvillo@strath.ac.uk

Overview:

- We developed a literature review to identify key drivers, definitions and metrics characterising fuel and transport poverty in Scotland. For the full review analysis, please see Boyd et al., 2023.
- Fuel poverty in Scotland is a growing concern. Although the Fuel Poverty Act (Scot Gov, 2019) was recently introduced to formalise the national strategy, research suggests that the criteria for identifying vulnerable households will not adequately identify those in fuel poverty.
- Scholars have positioned transport poverty as sitting alongside fuel poverty as drivers for both overlap.
- The National Transport Strategy (Scottish Government, 2020) proposing equitable and affordable transport does not intersect with policy on fuel poverty and lacks recent data. Similar to fuel poverty, the government strategy to address transport poverty considers cost as the primary driver despite clear evidence in the literature that the issue is multidimensional, with many contributing factors.
- The research literature suggests the existence of 'double energy vulnerability', i.e., households are often vulnerable to both transport and fuel poverty for often overlapping reasons, and that risk-based assessments of vulnerability should guide indicators for both conditions.
- Using multidimensional indicators which take account of other non-expenditure-based factors may lead to better identification of fuel and transport poverty, allowing to mitigate negative consequences associated with both phenomena, including mortality.

Background

Fuel poverty is characterized by the inability to access energy and adequately heat homes. It is expected that 7.5 million households in the U.K. will be in fuel poverty by April 2023 (National Energy Action, 2023). The picture is worse for Scotland with a substantial portion of households, nearly a quarter, facing fuel poverty, with 1 in 8 experiencing extreme fuel poverty (ONS, 2023). Transport poverty is an adjacent issue often stemming from the same underlying vulnerability, and is inherently linked to fuel poverty with both being associated with household spending decisions. Transport poverty is where individuals or households experience difficulties in accessing affordable and adequate transportation.

Research on the underlying drivers for fuel and transport suggests a so-called 'double energy vulnerability' (DEV), indicating that the drivers for both conditions overlap (Robinson & Mattioli, 2020; Sovacool & Del Rio, 2022). The research provides a review of the legislative definition for fuel poverty which falls short of identifying vulnerable households, and that transport poverty can be addressed under the same framework to address 'double energy vulnerability'.

Overview of research

Various indicators are used to assess fuel poverty, including energy expenditure-based; subjective self-reported; and consensual social indicators. In Scotland, the Ten Percent Rule (TPR) is employed as an energy expenditure-based indicator under the Scottish Fuel Poverty Act (Scot Gov, 2019). However, criticisms of TPR highlight its failure to capture the complex relationships between fuel poverty and vulnerability. As a result, it is recommended to adopt risk-based assessments that consider multiple variables and underlying influences as more suitable indicators for accurately identifying vulnerable households. This follows the recommendation in the literature to use multidimensional indicators that capture different facets of vulnerability beyond income and expenditure (Faiella et al., 2022)

In practice this would mean considering factors such as physical and mental health, and debt in addition to income and expenditure (as defined in the Scot.Gov. 2019 Act). Inclusion of non-expenditure based and/or multidimensional indicators and/or risk-based vulnerability would also allow policy to target so-called "hidden fuel poverty" which occurs when households self-regulate energy consumption to manage their finances, leading to an underestimation of their vulnerability.

Standardising indicators by using a single indicator with a threshold (e.g. the TPR) overlooks unique variables and hinders the accurate identification of vulnerable households (Thompson et al., 2017). A more nuanced approach is needed to assess and address fuel poverty effectively. Factors such as age, illness, and disability should be considered to ensure better identification and support for vulnerable households affected by fuel poverty.

Transport poverty differs from fuel poverty as it exists at the individual level rather than the household level. It refers to the inability to afford or access adequate transport or the lack of motorized transport, leading to difficulties in accessing essential activities and, potentially, social exclusion. Transport poverty also encompasses exposure to negative externalities, such as road traffic accidents and health risks associated with emissions (Lucas et al, 2016).

Measuring transport poverty requires multidimensional indicators related to affordability, mobility, accessibility, and exposure to negative externalities. However, establishing a single indicator framework (like the TPR) is challenging due to context-specific factors. Solely relying on expenditure-based indicators for affordability may not adequately capture the conditions of mobility and social exclusion. Mobility poverty, accessibility poverty, and negative externalities are key dimensions that should be considered in measuring transport poverty. The Scottish National Transport strategy (Scot Gov, 2020) frames transport poverty through the lens of affordability and does not account for underlying vulnerabilities, nor the overlap with the drivers of fuel poverty despite the clear connection established between the two as it relates to household expenditure (Mattioli et al, 2018)

The concept of double energy vulnerability (DEV) combines fuel and transport poverty within the broader context of energy consumption. DEV arises from the intersection of domestic energy poverty

and transport energy poverty, leading to trade-offs in household expenditure. Low-income households are particularly affected by DEV, as energy and transport costs consume a significant portion of their incomes (Robinson & Mattioli, 2020, Lowans et al, 2021). Monitoring fuel and transport poverty together is recommended due to their interconnected drivers and outcomes.

The overlap between fuel and transport poverty has not been definitively proven in available research, primarily due to limited monitoring data and a lack of national surveys on energy-expenditure data. To address this gap, it is suggested to consider national monitoring which assesses transport poverty indicators alongside energy poverty indicators (Lowans et al., 2023). This comprehensive approach will provide a clearer understanding of the correlation between fuel and transport poverty and inform targeted interventions. By adopting risk-based assessments for fuel poverty, incorporating needs-based indicators, and considering multidimensional indicators for transport poverty, policymakers can better identify and support vulnerable households.

Policy Recommendations

- Adopt risk-based assessments or multidimensional indicators: Move away from solely relying on expenditure-based indicators for fuel and transport poverty, and instead employ risk-based assessments that consider multiple variables and underlying influences, including health and debt.
- Consider indicators which target 'double energy vulnerability': Indicators might capture affordability, mobility, accessibility, and exposure to negative externalities.
- Monitoring is needed: Increase national monitoring efforts to collect comprehensive data on fuel and transport poverty. By monitoring both issues concurrently, policymakers can gain insights into their correlation and design effective interventions.

Conclusion

Addressing fuel and transport poverty requires a comprehensive approach that recognizes the interconnectedness of these issues. By adopting risk-based assessments, multidimensional indicators, and monitoring efforts, policymakers can better identify and support vulnerable households. This approach will contribute to reducing social exclusion, promoting accessibility, and improving the well-being of individuals and communities affected by fuel and transport poverty.

Acknowledgments:

This research work was funded by the Scottish Universities Insight Institute (SUII). The authors are very grateful to SUII colleagues for all their support in this research project.

References

- Boyd, K.S., Calvillo, C., Mueller, T., Mu, X., & Zhu, T. The Intersection of Fuel and Transport Policy in Scotland: A Review of Policy, Definitions and Metrics. *Energies* 16, no. 13 (January 2023): 4978. <https://doi.org/10.3390/en16134978>.

- Faiella, I., Lavecchia, L., Miniaci, R., & Valbonesi, P. (2022). *Household Energy Poverty and the "Just Transition"*.
- Lowans, C., Del Rio, D. F., Sovacool, B. K., Rooney, D., & Foley, A. M. (2021). *What is the state of the art in energy and transport poverty metrics? A critical and comprehensive review*.
- Lowans, C., Foley, A., Del Rio, D. F., Caulfield, B., Sovacool, B. K., Griffiths, S., & Rooney, D. (2023). What causes energy and transport poverty in Ireland? Analysing demographic, economic, and social dynamics, and policy implications. *Energy Policy*, 172, p113313
- Lucas, K., Mattioli, G., Verlinghieri, E., & Guzman, A. (2016). Transport poverty and its adverse social consequences. *In Proceedings of the institution of civil engineers-transport*, 169(6), pp. 353-365.
- Mattioli, G., Lucas, K., & Marsden, G. (2018). Reprint of Transport poverty and fuel poverty in the UK: From analogy to comparison. *Transport Policy*, 65, pp 114-125.
- National Energy Action (2023) *Budget reaction: 7.5 million UK households still in fuel poverty*
- Office for National Statistics (2023) *How fuel poverty is measured in the UK: March 2023*
- Robinson, C., & Mattioli, G. (2020). Double energy vulnerability: Spatial intersections of domestic and transport energy poverty in England. *Energy Research & Social Science*, 70, p101699.
- Sovacool, B. K., & Del Rio, D. D. F. (2022). "We're not dead yet!": Extreme energy and transport poverty, perpetual peripheralization, and spatial justice among Gypsies and Travellers in Northern Ireland. *Renewable and Sustainable Energy Reviews*, 160, p 112262.
- Scottish Government (2019). Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 ([available here](#))
- Scottish Government (2020). National Transport Strategy (accessed 03/07/23, available here: <https://www.transport.gov.scot/publication/national-transport-strategy-nts2-delivery-plan-2020-to-2022/>)
- Thomson H, Bouzarovski S, Snell C. (2017). Rethinking the measurement of energy poverty in Europe: A critical analysis of indicators and data. *Indoor and Built Environment*, 26(7), pp 879-901