

1 New dimensions of vulnerability to energy and transport poverty

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17 **Summary:** *As we decarbonise societies, we need to consider how such transitions interconnect energy*
18 *and transport systems. In this Commentary, we argue that we need a better understanding of who may*
19 *be vulnerable in low-carbon transitions. Current energy poverty definitions and metrics focus*
20 *overwhelmingly on energy service consumption within the home, yet similar issues in the transport*
21 *sector are often neglected. Failure to account for the intersections between energy and transport*
22 *poverty may deepen structural forms of deprivation and worsen social and material inequalities,*
23 *therefore preventing equitable transitions.*

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25 **Keywords:** energy poverty, fuel poverty, transport poverty, low-carbon transitions, justice

26 Introduction

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28
29 There is an urgent need to decarbonise domestic energy and transport if we are to address climate
30 change. This must, however, be done in a way that avoids worsening inequality; by reducing the most
31 carbon intensive forms of consumption that cause the most emissions, while also paying attention to
32 the differentiated impacts for those who are vulnerable in society. Energy poverty generally refers to
33 the inability to attain socially and materially necessitated levels of domestic energy services,¹ such as
34 heating, lighting and hot water. Yet, while much research has focused on domestic energy poverty,
35 significantly less attention has been paid to ‘transport poverty’, i.e. the inability to attain socially and
36 materially necessitated levels of transport services.² Energy and transport services have direct impacts
37 on people’s wellbeing, life chances and the ability to fully participate in society. Living in energy
38 poverty, for example, can mean not having access to or being able to afford the required technologies
39 or appliances to keep a home at a comfortable temperature or cook hot meals. Someone experiencing
40 transport poverty, meanwhile, may not be able to afford or access essential transport services,
41 restricting their ability to travel for fundamental needs, such as employment, education or healthcare.²

42 Energy and transport poverty have largely been treated in isolation from one another in both research
43 and policy, and are often seen as having their own causes and consequences. Almost all energy
44 poverty studies, for example, have focused on domestic energy services, even though the ability to use
45 energy for transport is also vitally important to wellbeing and life chances. While not all aspects of
46 transport poverty are directly related to energy consumption, many of them are, and yet they remain
47 largely overlooked in energy poverty debates. This could be reflective of entrenched disciplinary
48 boundaries, whereby energy research sees ‘energy demand’ as something that occurs inside the home
49 (or the office etc.), while the consumption of motor fuel, for example, falls under a separate ‘transport
50 studies’ tradition. Similarly, the governance of energy and transport has traditionally taken place
51 through distinct policy areas, jurisdiction, budgets, and R&D projects, with limited capacity to design
52 and implement overarching policies across different departments. This siloed approach contributes to
53 different scholars and policy makers focusing on each of these domains, with the connections and
54 similarities between them often missed.

55 In this Commentary, we argue, first, that as we decarbonise societies, such transitions³ can mean new
56 forms of integration between domestic energy and transport systems – with implications for
57 domestic energy and transport poverty. We also argue that to develop equitable low-carbon societies,⁴
58 we need better recognition of those acutely vulnerable groups that are at greatest risk of experiencing
59 *both* energy and transport poverty simultaneously, and of the way the two issues are interlinked. It is
60 therefore vital to break down traditional disciplinary silos to conduct research, and develop policy,
61 that helps better understand, and address, these linkages.

62 **Intersections between energy poverty and transport poverty**

63 Taken together, the household and transport sectors consumed 56.6% of the final energy in the EU-28
64 in 2018 and low-carbon transitions are likely to see increased integration and connection between
65 energy and transport systems. There are several reasons why we should not neglect transport poverty
66 in energy poverty debates—here we focus specifically on affordability and access.

67
68 As different indicators are used in different countries, there is no single statistic to show how many
69 people live in energy and transport poverty. Europe has some level of comparative statistics available
70 on expenditure and consumption. In 2018, on average EU households spent 13.2% of their income on
71 transport and 24% on housing, water, electricity, gas and other fuels.⁵ The average share of household
72 expenditure on the ‘operation of personal transport equipment’ is higher than that on ‘electricity, gas
73 and other fuels’ within the home in the majority of the EU-28 (6.5% vs. 3.9%).⁵ Based on official
74 statistics, an estimated 44.5 million people lived in energy poverty in the European Union in 2016
75 (EU).⁶ Yet analogous statistics for transport poverty do not exist, illustrating how transport
76 affordability issues are not widely recognised. While EU countries are increasingly adopting official
77 indicators of energy poverty, currently France is the only EU member state with an official transport
78 poverty indicator. Based on this official measure, an estimated 10.2% of households in France were in
79 transport poverty in 2014 (vs. 14.6% in energy poverty),⁷ but alternative indicators suggest that
80 transport poverty may well affect an even greater number of French households (21%) than energy
81 poverty (18%).⁸

82
83 In terms of affordability, public debates on energy and transport costs loom large in many countries,
84 especially as carbon taxes, which may mean higher fuel prices that affect the cost of both energy and
85 transport services, are introduced. This was demonstrated, for example, by the 2018-2019 Yellow
86 Vests movement in France (see Figure 1) which originated as a protest against fuel price increases
87 introduced as part of climate change policies. The disproportionate impact of rises in fuel prices on
88 low income households was central to many of the protesters’ concerns, although it quickly grew to
89 include a wider range of social and political issues. Europe is not unique in facing such protests. The
90 Myanmar government removed state subsidies on natural gas and diesel in 2007, leading to a
91 doubling of domestic prices for bus fares and automobile fuel which later spilled over into an increase
92 in the price of basic commodities such as rice, beef, fish, milk, and eggs - hitting rural and poor
93 households the hardest, and leading to protests and a reactive state crackdown involving violent
94 deaths. Plans to raise LPG prices for mobility (used primarily by two-wheeled motorcycles and
95 scooters) in India in 2000 were later abandoned after they provoked mass demonstrations; in the same
96 year, farmers boycotted and blockaded petrol stations in the United Kingdom as the price of petrol
97 had been raised to 80p/litre.

98
99 **[Insert Figure 1]**

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101

102 Movements such as these in France, Myanmar, India, and the UK have a strong resonance with the
103 energy community, as climate mitigation measures, such as carbon taxes, ultimately impact household
104 costs for both energy and transport, and typically affect some communities and groups
105 disproportionately. This demonstrates a need for alternative forms of pricing design and related policy
106 implementation that can ensure fairness.⁹

107

108 A further overlap between energy and transport poverty is the increasing evidence of a ‘double
109 vulnerability’ phenomenon, whereby some social groups are at greater risk of experiencing poverty of
110 both energy and transport services simultaneously^{10, 11} (see Figure 2). Those on low incomes can be
111 hit particularly hard as energy and transport costs take up a greater proportion of their incomes and
112 they often lack financial resources to invest in the most energy efficient appliances or vehicles.
113 Single-parent households, and people belonging to ethnic minority groups can be at greater risk,
114 partly as they tend to be over-represented in low-income groups and may be living in poorer-quality
115 housing with fewer transport options. Households with children can also encounter relatively high
116 energy and transport costs caused by, for example, increased space heating or space cooling demand,
117 greater appliance use, and a higher frequency of journeys to transport children which often induces
118 car ownership. Those with chronic health conditions, disabilities or mobility problems have a higher
119 likelihood of experiencing both energy and transport poverty simultaneously, due to lower incomes
120 combined with increased energy and transport requirements. These can include, for example, a
121 combined need for keeping higher room temperatures, running medical equipment, and making
122 frequent trips to medical services. Finally, living in geographically isolated areas also increases the
123 risk of both energy and transport poverty, primarily due to the need to travel longer distances to
124 access key services and a reliance on expensive domestic energy and motor fuel.

125
126 Crucially, for vulnerable households the problem goes beyond simply experiencing energy and
127 transport poverty simultaneously – there are also likely to be mutually reinforcing causal links
128 between the two conditions. In terms of affordability, high transport costs reduce the disposable
129 income people have available to pay for energy bills, and vice versa. For these households,
130 expenditures on energy and transport are often traded off against each other in daily life, and they
131 must either sacrifice spending on transport to pay for home energy services, or ration their energy use
132 to afford journeys that many take for granted.^{2, 12}

133
134 In terms of access, a low-carbon transition could see some households having onsite energy
135 generation and storage technologies coupled with EV chargepoints, thus enabling them to participate
136 in new ‘flexibility’ and ‘vehicle-to-grid’ markets. Who can *access* and *benefit* from such systems, in
137 addition to who can *afford* them, are key questions going forward. A continued neglect of transport
138 poverty in these initiatives could have adverse policy effects, as could, for example, the development
139 of energy-efficient housing in areas where there are limited low-carbon or public transport options,
140 such as car-dependent periurban locations. In such cases, people may be living in newly built homes
141 that consume less energy, but still have to rely on energy-hungry and expensive private transport to
142 obtain vital services due to poor access to public transport.² In some contexts where racial segregation
143 is especially deep-rooted, such as South Africa and parts of the USA, transport and energy poverty
144 can also reinforce the spatial marginalisation of minority ethnic groups, who can be relegated to areas
145 with both poor transport and housing infrastructure.

146
147 [Insert Figure 2]
148

149 **Recommendations and Conclusion**

150 There are substantial connections between energy and transport poverty, with some people and places
151 at heightened risk of experiencing both problems simultaneously and in a mutually reinforcing
152 manner. Without carefully designed policies to address these as one problem, we run the risk of one
153 issue exacerbating the other. This highlights the need for a greater understanding of these links and
154 risks, particularly if we are to achieve a just and equitable low-carbon transition and address high
155 levels of consumption without causing new vulnerabilities. Previous research has shown that energy
156 and transport poverty are not experienced equally, but can affect particular communities and
157 geographies more than others. We should pay attention to the spatial and temporal aspects of the role
158 of transport within energy poverty debates, and subsequent impacts on life chances across places and
159 generations. Further understanding is therefore required, especially on how transport and energy costs
160 are traded off against each other in the everyday lives of the most vulnerable in our societies. Future

161 research should also examine the co-benefits of energy and transport poverty reduction, and what that
162 may mean, for example, for education and employment opportunities.

163 As energy poverty has begun to receive significant policy attention in the UK and the EU, the next
164 step for policy makers is to recognise that transport poverty also exists, and that it has an important
165 energy dimension. There are few policies that recognise the connections between energy and transport
166 systems, but areas and communities that could be exposed to the double vulnerability phenomenon
167 would benefit from low-carbon policies that address both energy and transport poverty
168 simultaneously. Inevitably, decarbonisation policies and initiatives, be it the rollout of electric
169 transport, the creation of new energy efficient housing, or moves towards electrification and domestic
170 energy system integration, are relevant to both sectors. Once policymakers have recognised transport
171 poverty as an issue, they can move towards more compositive and integrative metrics that grapple
172 with its intersections with energy poverty and capture the risk of double vulnerability. This could help
173 facilitate more targeted policy interventions in the areas and communities that are most susceptible to
174 this double energy vulnerability we have outlined here. Ultimately, if decarbonisation policies are not
175 designed effectively to address both energy and transport poverty, there is a risk that policies will be
176 unable to adapt to new vulnerabilities as they emerge. In building decarbonised societies, we must
177 ensure that as emissions from homes and transport are simultaneously reduced, they do not come at
178 the expense of worsening patterns of inequality.

179 **Acknowledgements**

180 The authors gratefully acknowledge support from UK Research and Innovation through the Centre for
181 Research into Energy Demand Solutions, grant reference number EP/R035288/1. Stefan Bouzarovski
182 additionally wishes to acknowledge the support of the STEP-IN project, which received funding from
183 the European Union's Horizon 2020 research and innovation programme under grant agreement No.
184 785125.

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187 **Declaration of Interests**

188 All funding sources have been acknowledged. We note that Dr Giulio Mattioli has a research
189 consultancy role via the University of Sussex as part of a larger research project funded by the Centre
190 for Research into Energy Demand Solutions.

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Figure details:

Figure 1: The 2019 Yellow Vest Protests in Paris, France. The protests affected the capital city for weeks, with insurance companies paying out 89 million euros (\$100 million) to cover thousands of cases of reported damage. The government also responded with 38 million euros (\$43 million) financial aid for workers who had been put on reduced work hours due to the anti-government protests.

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Figure 2: Groups at risk of energy and transport poverty*

Source: Authors. *Note that these groups are not mutually exclusive but often overlap and intersect.