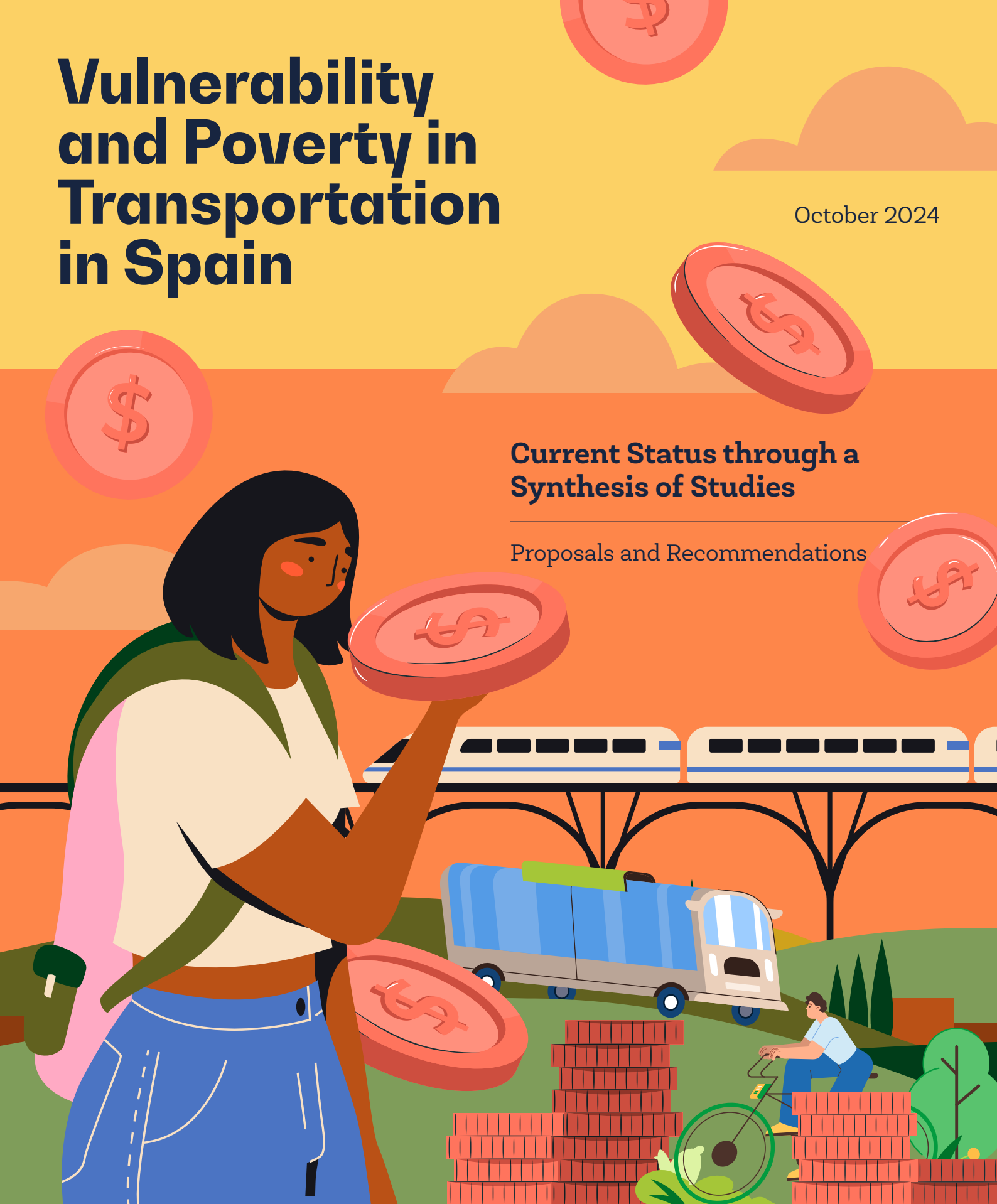


Vulnerability and Poverty in Transportation in Spain

October 2024

Current Status through a
Synthesis of Studies

Proposals and Recommendations



Working Group on Social
Inequalities in Transportation

—
Coordinated by ECODES

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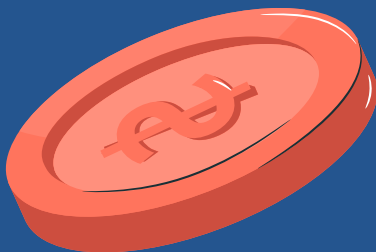
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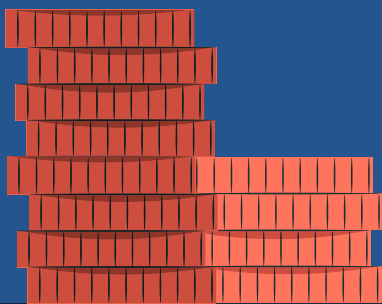
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Working Group on Social Inequalities in Transportation

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Coordinated by **ECODES**



The transition towards decarbonising the transportation sector and transforming mobility must be fair. Therefore, it is essential to act before, during, and after the process to prevent it from generating or contributing to existing or new inequalities linked to this sector, or from exacerbating levels and situations of poverty in Spain. This document is a synthesis of studies published to date on vulnerability and poverty in transportation or mobility. It is a compilation aimed at showcasing the state of the art on this issue in Spain, within a context of development and conceptualisation currently taking place in Europe.

Disclaimer

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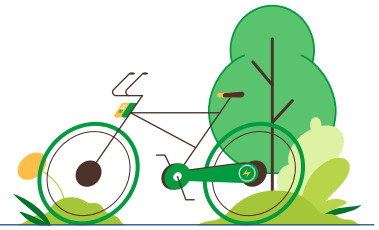
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1. Context





To meet the goals of the Paris Agreement, which aims to limit the global temperature increase to below 1.5°C compared to pre-industrial levels, the European Union has embarked on a path towards the decarbonisation of the economy, targeting net-zero emissions by 2050.

The transportation sector plays a pivotal role in this transformation, as it accounts for over 25% of the total greenhouse gas emissions in the EU. Projections indicate that domestic transportation emissions will only drop to 1990 levels starting from 2032. Meanwhile, emissions from international aviation and maritime transport are expected to continue increasing.

In recent years, significant efforts have been made to identify groups vulnerable to energy poverty. However, climate research and policy have not yet sufficiently emphasised another critical dimension of vulnerability and poverty which will be increasingly relevant in the coming years: transportation and mobility.

While the process of decarbonisation and energy transition presents numerous opportunities, it may disproportionately affect vulnerable households. It is therefore crucial to identify, from the outset, which groups may be impacted and to include them in policy design to minimise and, most importantly, prevent undesired social consequences.

Globally, the poverty and/or exclusion² rate in Spain affected 26.5% of the population in 2023, according to the 14th report *The State of Poverty*³. This means 12.7 million people living in poverty and/or social exclusion, an increase of around 400,000 compared to the previous year. Examining specific indicators reveals that 20.2% of the population

(approximately 9.7 million people) were at risk of poverty, 8.3% (about 3.9 million) lived in severe poverty, and 9.0% (about 4.3 million) experienced severe material and social deprivation.

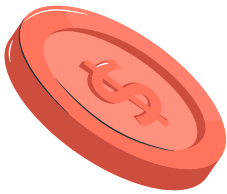
These very significant figures become even more alarming when focusing on specific demographics, such as children. Child poverty in Spain affected 28.9% of the population, making it the second-highest rate in Europe, surpassed only by Romania. This means that over 2.3 million children and adolescents were living below the poverty line. In the past year, this rate increased by 1.1 percentage points, adding 70,000 more children to this vulnerable group.

In late 2022, the European Parliament emphasised the need to develop a common concept of transport poverty, as well as mechanisms for its measurement and monitoring. This would enable the implementation of appropriate measures to reduce such situations among different population groups. This initiative stemmed from a recommendation by the EU Council, which highlighted that the current state of transport poverty could worsen during the transition process unless Member States ensured fair social protection systems, suggesting the development of indicators to evaluate and monitor the issue in each country to better understand its scale and devise solutions.

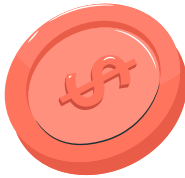
The European Parliament, the Council, and the Commission agreed on a common definition of transport poverty, establishing that it refers to *the inability or difficulty of individuals and households to meet the costs associated with private or public transportation systems, as well as limited or no access to transportation systems necessary for daily mobility to services and activities.*

² AROPE is a composite indicator made up of the sum of three sub-indicators that represent three population groups: people at risk of poverty, people with severe material and social deprivation (SMSD), and people with low work intensity per household (LWIH).

³ EAPN Spain (2024): XIV Report on the State of Poverty. Monitoring the Indicators of the EU Agenda 2030. 2015-2023. Madrid: EAPN Spain. Available at: <https://www.eapn.es/estadodepobreza/index.php>



In Spain, transportation is the third-largest household expense, following housing and food. It accounts for more than 10% of family spending, equaling or even exceeding expenses for domestic energy. As a basic necessity, transportation significantly impacts daily life and equal opportunities, being closely linked to equality, employment, health, education, and more.



Studies estimate that in Spain, 350,000 to 550,000 households—equivalent to 1.3 to 1.8 million people—experience severe vulnerability from a transportation perspective. Additionally, around 2 million households, over 10% of the population, find transportation costs to be an excessive financial burden. Socioeconomic analyses reveal that rural households, which rely more heavily on cars due to limited public transportation options, are more likely to face transport vulnerability. Similarly, low- and middle-income households where all members are employed often struggle due to greater mobility needs.



In this decarbonisation process, ensuring no one is left behind makes a just transition a central priority. Achieving climate neutrality entails significant transformation, which can only succeed if pursued with fairness, social justice, and gender equality, while paying special attention to the most vulnerable populations and eradicating energy poverty.

Given the significant role of the automotive sector in Spain, contributing 10% of the GDP and 9% of employment, decarbonisation represents both an opportunity and a challenge. It paves the way for the development of zero-emission vehicles, greater use of public transportation, and promotion of active mobility. Recognising this importance, Spain has developed key strategies, including the Integrated National Energy and Climate Plan 2021-2030 (PNIEC), the Just Transition Strategy, the National Energy Poverty Strategy, and the Long-Term Decarbonisation Strategy.

The sector's relevance stems from various factors. A preliminary study conducted by the Basque Centre for Climate Change (BC3) and the Observatory for Energy Transition and Climate Action (OTEA) in 2023 found that between 350,000 and 550,000 households in Spain were severely vulnerable in terms of transportation, impacting 1.3 to 1.8 million people. Additionally, around 2 million households, over 10% of the population, experienced transportation costs

that were an excessive financial burden. The study also revealed that rural households were more likely to be vulnerable due to their reliance on private vehicles, as well as low- and middle-income households where all members were employed and faced significant commuting needs.

In terms of accessibility, a preliminary analysis by the Institute for Technological Research (IIT) at Universidad Pontificia Comillas focused on metropolitan areas in Spain, incorporating not just cost but also travel time. The findings showed that a significant portion of residents in metropolitan areas faced excessive demands in either time, money relative to household income, or both. Spatial analysis further highlights various types of transport vulnerability, paving the way for indicators and measures to address these issues effectively.

The transition to sustainable transportation, driven by the need for decarbonisation, has broadened the traditional scope of mobility policies to

include environmental and sustainability criteria. However, this evolution introduces significant social challenges for measures designed to reduce the carbon footprint and urban pollution, such as low-emission zones, tolls, or fuel taxes, can disproportionately impact vulnerable communities, especially those with low incomes and a high dependence on private transportation.

It is also important to consider that the effects of such policies can extend beyond metropolitan areas, potentially impacting a larger population. Furthermore, at the local level, they may also affect commerce and economic dynamism. Therefore, transportation and mobility policies must incorporate social considerations to avoid exacerbating existing inequalities. As we transition towards sustainable mobility, no one should be left behind. A fair transition is one that includes and benefits everyone.



2.

Conceptualisation



Transport poverty is increasingly recognised within European policies on inclusion, sustainability, and mobility, yet it remains complex to address because it requires coordinated effort across multiple levels of governance.



Transport poverty is understood as the inability or difficulty of individuals and households to afford the costs associated with private or public transport, or to access (or only have limited access to) the essential means of transport needed for daily mobility to socioeconomic services and activities. This definition considers both the national and spatial contexts.

Accessibility is only one key aspect of transport poverty; availability, affordability, and acceptability of transport are equally crucial in its conceptualization. These concepts are defined and explored in various ways in current academic and EU literature (Lucas et al., 2016; Steer, 2022; Mejía Dorantes & Murauskaite-Bull, 2022). Recently, the European Commission commissioned a study to develop a definition, indicators, and mitigation strategies at a European level.

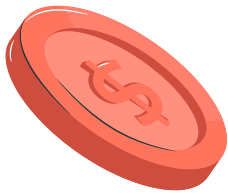
Existing indicators in the literature can generally be grouped into (i) individual or household indicators and (ii) spatial indicators. Individual or household indicators (found in studies within the EU or for individual Member States) are primarily based on survey data. Spatial indicators often focus on availability and accessibility, using various data sources such as transport network schedules, the location of essential services, and census data.

In some countries, such as the UK, the US, and Canada, detailed spatial information on access to essential services is publicly available. These

datasets are combined based on the smallest common geographic area, such as a postal code, and results are presented in map form.

In the UK, for example, approximately 5 million people are estimated to be below the poverty line due to transport costs. This issue disproportionately affects regions with limited public transport access and a higher dependence on cars, such as the northwest and northeast of England, where 12.5% and 11.9% of people, respectively, experience transport poverty. In contrast, only 4% of London residents face this situation, thanks to a more accessible and efficient public transport system. Overall, car use is the largest contributor to transport costs, with an average household spending over £5,650 annually on transport (Interchange UK).

Transport poverty measurement is not as standardised as other poverty indicators, but different studies propose various methods to quantify it:



RACF (2012)

Defines transport poverty as a situation where a household's transport costs exceed 10% of total household expenses (for both personal and public transport). Under this definition, 21 million people in the UK would be considered in transport poverty.



Sustrans (2012)

A composite indicator based on three variables:

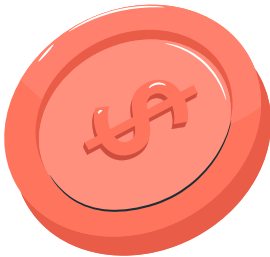
- Households spending more than 10% of their income on a vehicle
- Living more than one mile from the nearest bus stop
- The number of essential services located more than one hour away by walking, cycling, or public transport

Under these criteria, 1.5 million people in England are affected by transport poverty.



Lovelace and Phillips (2014)

Introduced the concept of "Commuter Fuel Poverty" defined as the proportion of people spending more than 10% of their income on work-related mobility.



Mattioli et al. (2016)

Identified transport poverty based on:

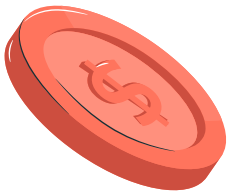
- Households with disposable income (after housing and transport costs) falling below 60% of the median
- Spending on motorised vehicles exceeding double the national median (approximately 9.5%)

9.4% of UK households, equivalent to 2.5 million, fall into transport poverty under these criteria.

Despite the absence of an official metric for transport poverty in the UK, organisations such as the SMF are advocating for a standard indicator akin to energy poverty metrics. Such an approach would better support policymakers in crafting effective mitigation strategies.

While less formally defined than in the UK, regional disparities and car dependency are known to be significant factors in Germany. Around 21% of the population is at risk of poverty or social exclusion, and within this group, many face difficulties affording essential transport. Rural areas and cities with limited public transport infrastructure experience pronounced challenges in affordable and efficient transportation access (Destatis).

At the European level, organisations such as the BC3 have utilised household budget survey data (Encuesta de Presupuestos Familiares, EPF) from the Spanish National Statistics Institute (INE) for 2006–2021 to propose four indicators for transport poverty. Thus, they propose 4 indicators that can be useful for evaluating the dimension of poverty in transportation, as well as for tracking policies aimed at alleviating this issue. The first three metrics assess households' ability to pay transportation bills or how "affordable" transportation is. These indicators have also been used to measure energy poverty in households. The last one (VTU) also takes into account the level of accessibility to public transportation for households.



10% Indicator

A household is vulnerable if more than 10% of its expenditure goes to transportation, including private vehicle costs and public transport services for short- to medium-distance travel.



Double National Median (2M)

A household is vulnerable if its transport spending exceeds twice the national median. That is to say, these are households that, due to their socioeconomic situation, must allocate a large portion of their resources to maintain an adequate level of mobility to meet their needs. To establish the spending threshold through the national median, households that use both private and public transportation have been considered.



Low-Income, High-Cost (LIHC)

A household is transport-vulnerable if the following two conditions are met:
i) Its disposable income (after housing and transport costs) falls below the poverty threshold (60% of the median).

In Sanz's (2023) analysis, different indicators (and different databases) are used depending on the aspect of vulnerability and poverty in transportation to be measured and analysed, as shown in the following table. In general terms, it can be considered that, at the state and regional levels, the most commonly used indicators were those related to household income and fuel expenditure, drawing an analogy with the 2M indicator defined by the EPOV.





Relationship between indicators and aspects of poverty or vulnerability related to mobility.

Source:
 Doctoral thesis “Energy Poverty Linked to Motorised Mobility. The Case of the Community of Madrid” (Sanz, 2023).

	Ausencia de alternativas de movilidad	Asequibilidad del transporte	Pobreza energética vinculada con la movilidad (PEM)	Accesibilidad limitada	Exposición a las externalidades del transporte	Pobreza vinculada con la movilidad (PM)
Number of accesible means of transportation	X					X
Local Usability				X		X
Level of household motorisation	X					X
Modal split	X					X
Trip time					X	X
Workplace				X		X
Distance to workplace				X	X	X
Income		X	X			X
Average fuel consumption		X	X			X
Characteristics of the vehicle fleet	X	X	X		X	X
Average spend on fuel		X	X			X
Income percentage allocated to fuel		X	X			X

Other studies with spatial indicators, such as the one by IIT-Comillas, analyse observed trips in different areas to determine the suitability of the transportation system in meeting mobility demand, thereby identifying vulnerable areas both inside and outside metropolitan regions. Once the spatial component is introduced, it is possible to incorporate the travel time dimension as an indicator of accessibility, using different modes of transport, which in turn have varying costs for the household. By combining accessibility and affordability of the available transportation options,

we can distinguish different types of vulnerability in transportation, which in certain areas is closely tied to access to housing and even urban sprawl. Additionally, with travel data, it is possible to identify the impacts of decarbonisation policies on different population groups: for example, it is possible to identify areas most affected by Low Emission Zones (LEZ), in cases where individuals need to replace their private vehicles with less polluting ones, or use public transport if it requires an excessive amount of time.

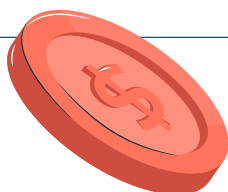
3.

What is the situation in Spain?



The complexity in quantifying the phenomenon of vulnerability and poverty in transportation in Spain, along with the obstacles in selecting indicators, leads to the use of a wide variety of indices at the national level.

The 10% and 2M indices have a broad focus and allow for the identification of households that are particularly vulnerable to changes in the prices of transportation goods and services. According to BC3 studies, it is estimated that:



Between 2.1 million (according to 2M) and 2.6 million (according to 10%) households allocate a large portion of their income to transportation costs in 2019, which equals 5.9 million and 7.3 million people, respectively.

However, these indices show a large number of false positives, so while they are useful for identifying households that spend a significant portion of their income on transportation, they do not succeed in identifying highly vulnerable households.



On the other hand, the LIHC and VTU indices allow for the identification of poor households that are also affected by transportation vulnerability. These indices establish that:



Severely vulnerable households total 348,947 according to the VTU measure and 559,106 according to the LIHC index in 2019, which equals 1.3 million and 1.8 million people, respectively.

The VTU index registers fewer vulnerable households than the LIHC index, as it also identifies households with limited access to public transport.

Vulnerability to transportation indicators 2019 and 2021.

Source: BC3.

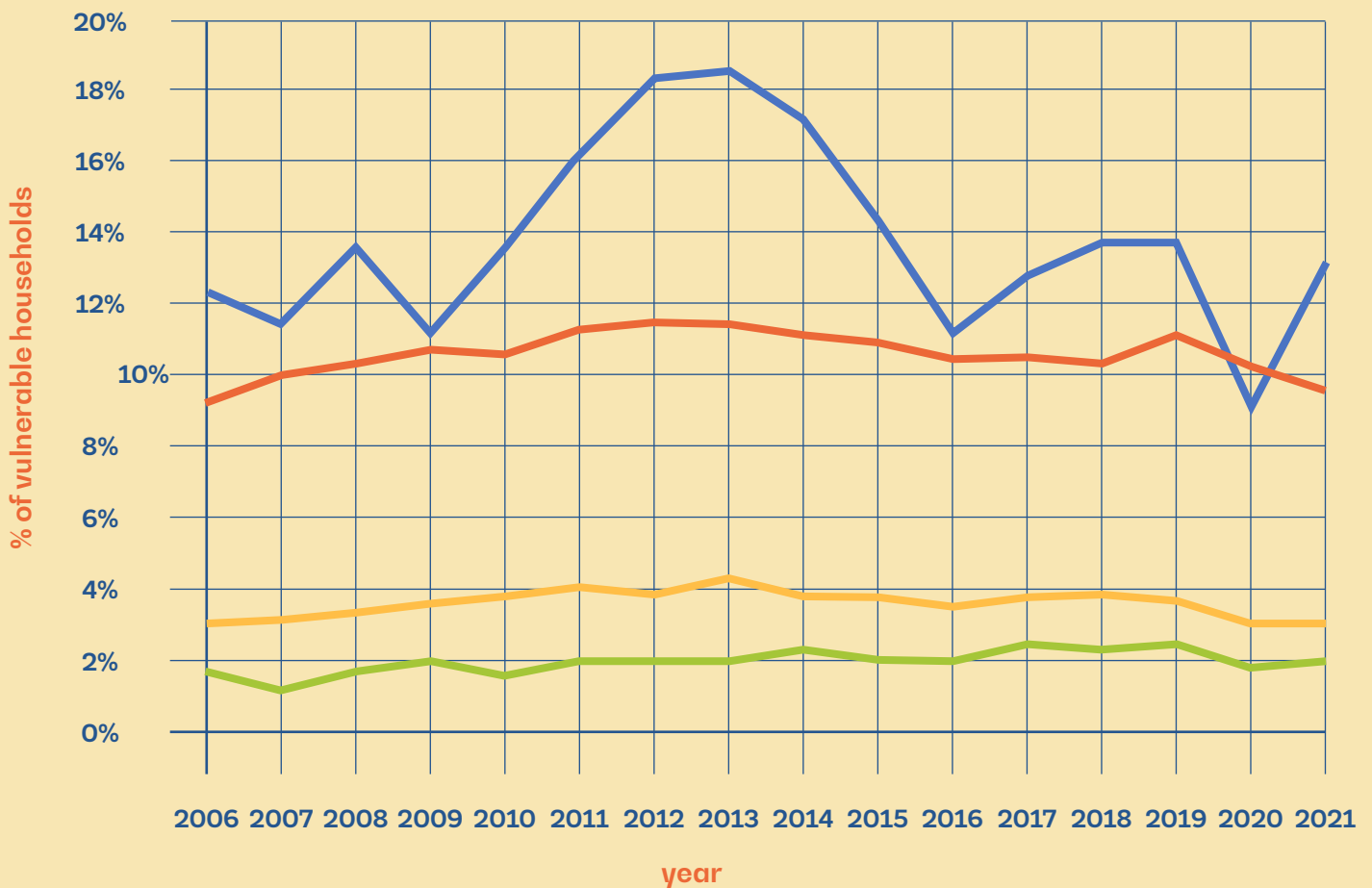
Year	2019		2021	
	Households	Number of people	Households	Number of people
10%	2.593,649	7.274,194	2.510,654	6.680.842
2M	2.093,978	5.878,794	1.809,928	4.759,204
LIHC	670,521	1.840,232	559,106	1.453,887
VTU	446,424	1.327,287	348,947	1.046,299

Regarding the temporal evolution of the phenomenon, transportation poverty rates, except for the 10% index, have followed a similar and slightly increasing trend until 2011-2014, and depending on the measure, a slight decrease until 2018.

For the period up to 2014, the rise in energy prices since 2006 (which by 2012 were already 49% higher than in 2006), combined with the decline in income and the increase in inequality due to the 2008 economic crisis, are behind the growing trend of vulnerable households. This trend has

been corrected with the post-crisis recovery, especially in the LIHC and 2M indices.

Finally, from 2020 onwards, there has been a greater decrease in all the measures, mainly due to the COVID-19 pandemic, which not only led to a sharp decline in mobility, and therefore in consumption, but also resulted in an unprecedented reduction in fuel prices. In fact, the number of households consuming transportation goods or services dropped by nearly 14 percentage points (from 69.4% in 2019 to 55.8% in 2020).



Transport vulnerability indicators 2006-2021.

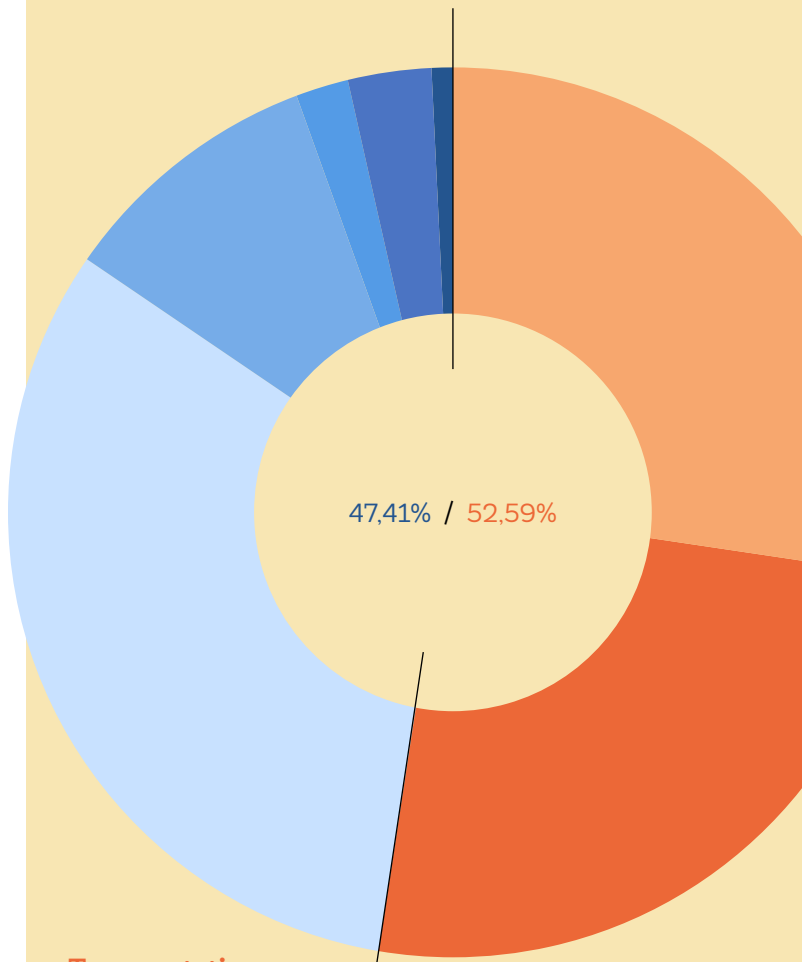
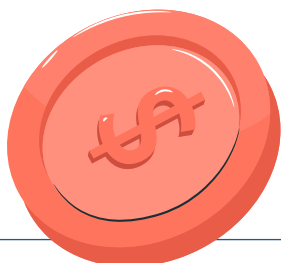
— 10% — 2M — LIHC — VTU

Source: BC3.

Similarly, Sanz Fernández focuses on household spending for mobility and its particularities at the subnational level. In particular, he concentrates on fuel expenditures and how they behave based on the household's income level. Approximately 21% of Spanish households would be spending more than twice the median (9%) of their income on fuels for mobility (Sanz Fernández, 2023). The territorial distribution of this phenomenon is uneven, affecting more obviously the southern and northwestern areas of the Peninsula, while having less presence in traditionally highly urbanised areas with high income levels and public transportation availability, such as the Community of Madrid, the Basque Country, or Catalonia.

Regarding how household fuel spending behaves, it is interesting to consider the hypothesis of inelastic fuel spending (Sanz Fernández, 2023). It has been identified that the total household fuel expenditure does not remain stable but rather fluctuates in line with changes in the unit cost of fuel. This can be explained because the distances to be traveled are “non-negotiable,” a fact likely derived from the recursive relationship between fuel spending and labor income. Fuel needs cannot be reduced; whereas the temperature of a home can be set to 16 or 18°C (instead of 20°C), the daily kilometers needed to reach a workplace cannot be reduced. Therefore, people invest in fuel according to the situation and will spend a greater amount and a higher percentage of their income if fuel prices rise and/or income decreases. This situation can lead to multidimensional deprivations affecting other areas that also experience the necessary economic adjustments to compensate for this higher financial burden, including the comfort within the household itself.

Another factor to consider is that household energy expenditure is almost evenly split between domestic energy costs and fuel expenditures for transportation. In other words, households spend as much (or more) on fuel as they do on domestic energy.



Transportation

Diesel	27,05%	52,59%
Gasoline	25,51%	

Domestic

Electricity	32,23%	47,41%
Natural Gas (CNG)	9,47%	
Liquefied Natural Gas	2,01%	
Liquid Fuel	3,04%	
Solid Fuel	0,66%	

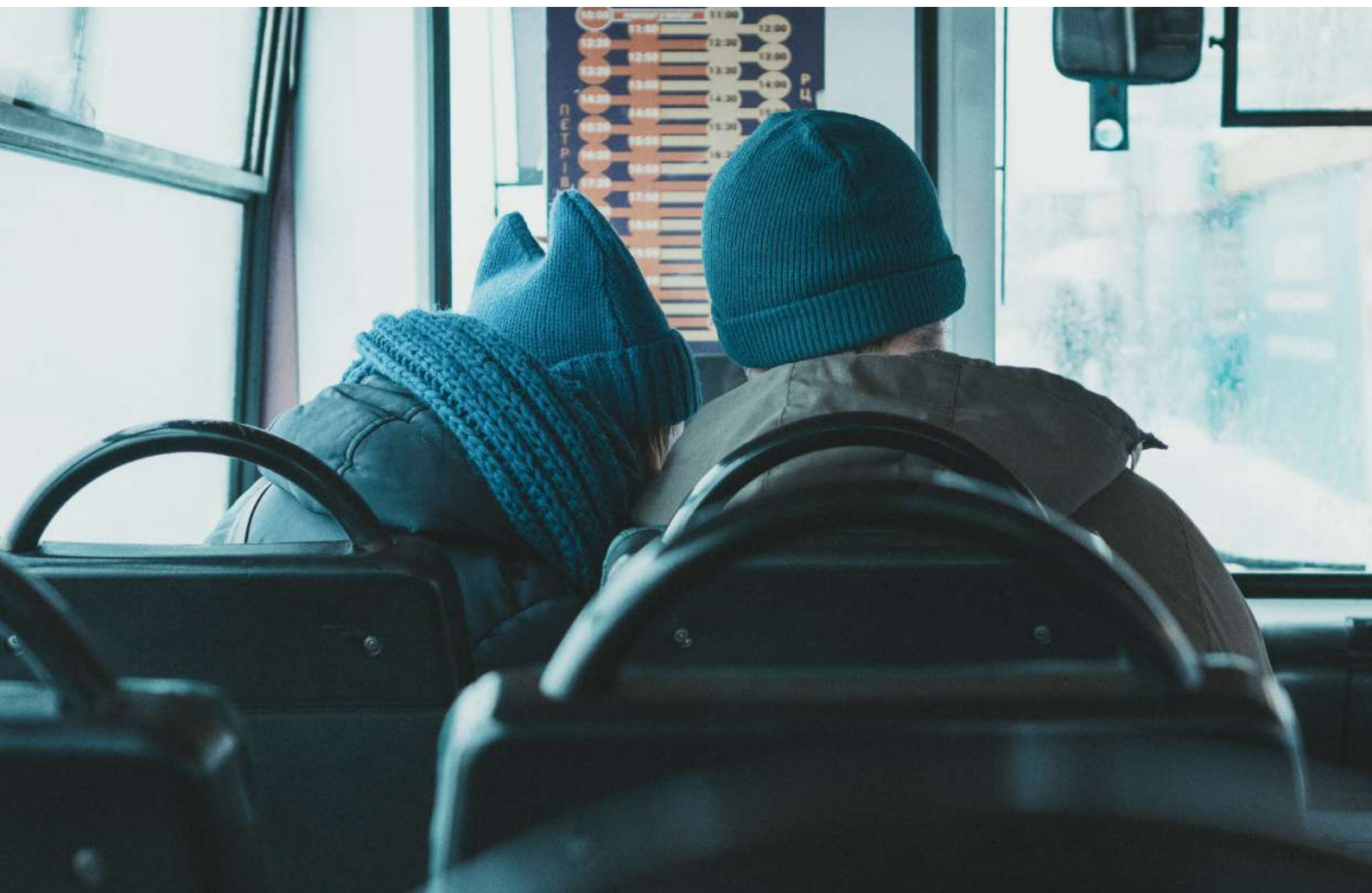
Average household expenditure on energy for transportation and domestic energy. Units: Percentage of total energy expenditure.

Source: National Statistics Institute (2017) in the doctoral thesis “Energy Poverty Linked to Motorised Mobility. The Case of the Community of Madrid”. Sanz Fernández, 2023.

The distribution of households in a situation of poverty or vulnerability linked to mobility is not necessarily homogeneous across the territory (Sanz Fernández, 2023). In general, and after conducting an analysis at the municipal scale, the municipalities in the three concentric rings of the Madrid region could be characterised based on their situation concerning mobility-related poverty. In the first ring, the most central one, we would find a generally favorable situation, except in some municipalities where there is forced mobility because employment is located in a municipality different from the residence, and where there are long distances. However, these values are nuanced by other indicators (such as accessibility to transportation or income levels), resulting in generally low risk levels of mobility-related poverty. In the second ring, there is a deterioration of values due to the emergence of clear deficiencies in public transportation, with 5 municipalities having medium-high risk levels. Finally, the third ring would present the highest vulnerability indices

in all aspects, as these are small municipalities with poor connectivity, employment deficiencies, and low-income levels.

Although after this analysis one might think that the spatial distribution of the phenomenon follows a clearly concentric pattern, when analysed at the sub-municipal scale, greater heterogeneity is identified, with pockets of “transport-related poverty” in municipalities whose average values are not necessarily the worst in the region and/or located in the two most central rings. However, it is noteworthy that, despite this, the most vulnerable areas tend to be found in the third ring, in municipalities with fewer than 10,000 inhabitants, where the only available means of transportation is interurban buses, where the average distances traveled are very long, and whose residents report making decisions influenced by economic factors (high transportation costs) or the absence of available alternative services.



4.

Lessons:

Factors and Characterisation
of Vulnerability

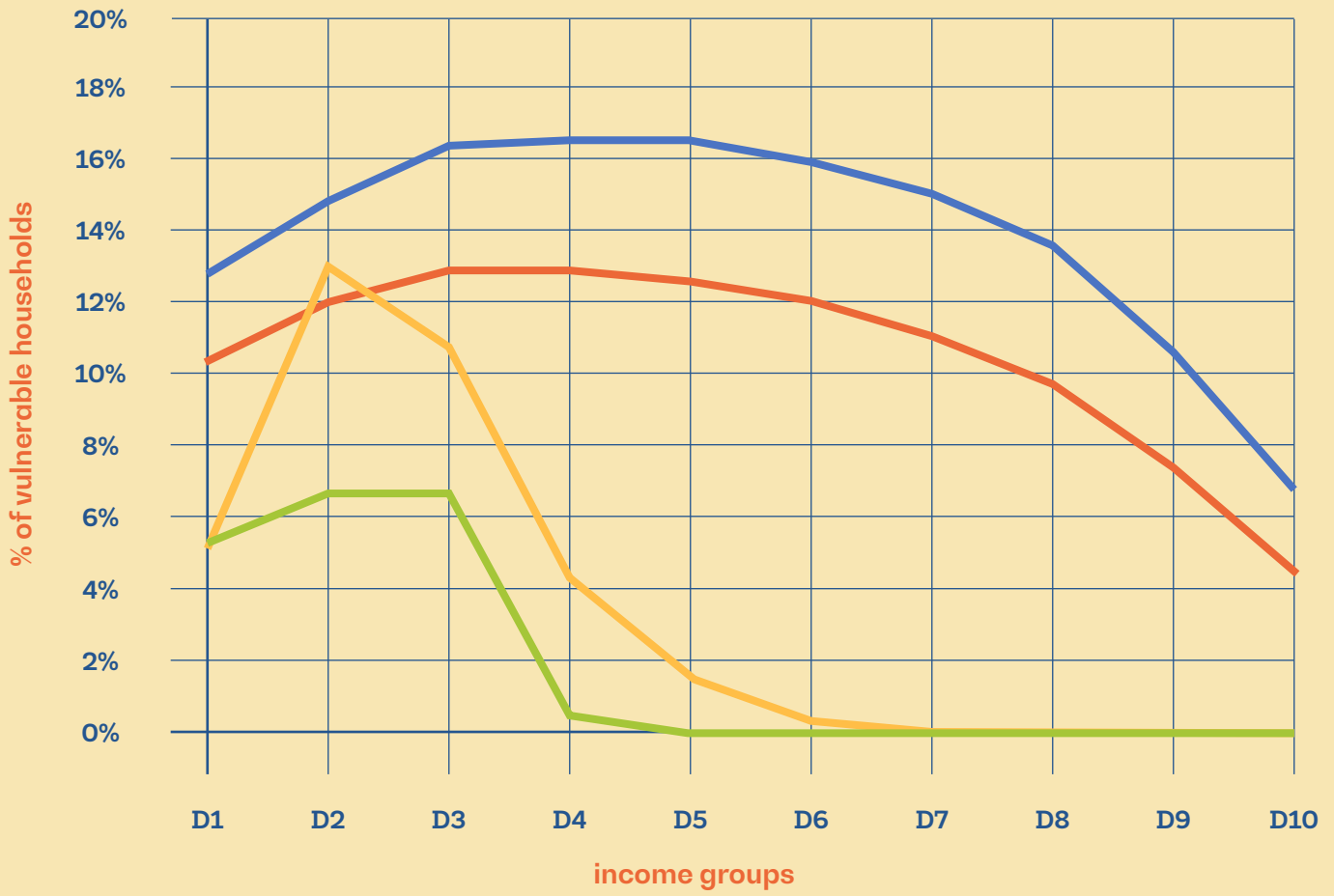


Which households are more vulnerable according to income brackets?



According to the 10% and 2M indices, the proportion of vulnerable households is higher in middle-income households (deciles D4-D6). A large proportion of households in lower deciles do not own vehicles: while in decile 1 only 50% of households consume transport goods and services, in decile 10 this rate rises to 83%. Thus, households in the middle part of the income distribution are more represented in these measures because they consume more private transport and dedicate a larger proportion of their income to transportation.

On the other hand, according to the LIHC and VTU measures, the most affected households are found in the lower part of the distribution. As mentioned earlier, these measures also include income thresholds and, therefore, identify households that are severely vulnerable in terms of transport. In the case of LIHC, the sharp increase from D1 to D2 is noteworthy. This is mainly because in D1, there are fewer transport users, as, as mentioned before, households in the lower deciles do not have frequent access to or use of private vehicles, and as a result, they dedicate a smaller proportion of their income to transport expenses.



Transport vulnerability indicators by deciles.

10% 2M LIHC VTU

Source: BC3.

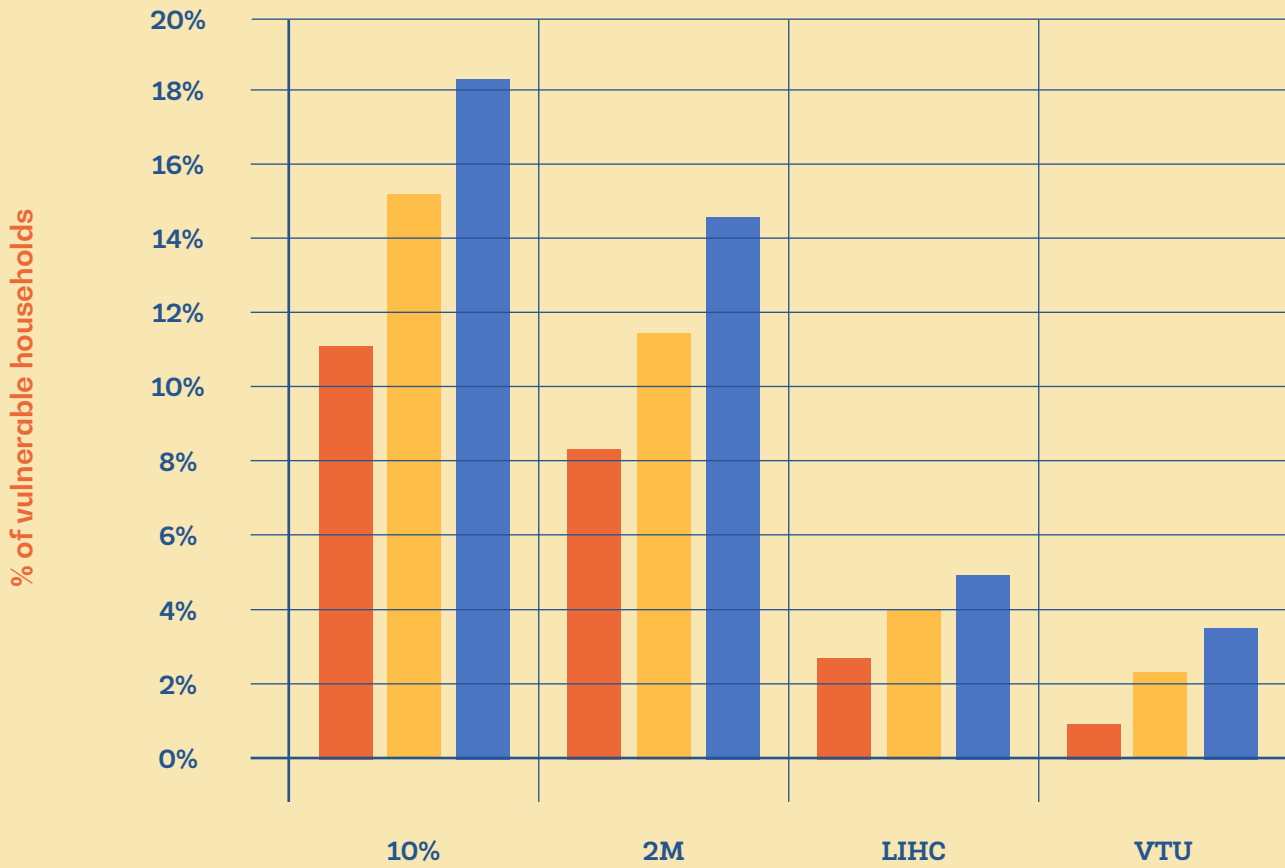


Are rural households more vulnerable to transport?



Regardless of the measure explored, rural households (those living in dispersed areas) are significantly more vulnerable to transport than urban households (those living in densely populated areas). This phenomenon can be explained by the higher mobility needs of people living in rural areas and the lack of alternatives to private transport: fuel consumption for private transport is significantly higher in rural households.

It is worth noting that the VTU index, which includes both affordability and accessibility dimensions, reports the greatest difference between urban and rural households. According to the VTU measure, the rate of vulnerable households in rural municipalities is nearly four times higher than that of urban households, and nearly half of the vulnerable households identified by the VTU are from rural areas.



Transport vulnerability indicators by the population density of the household's municipality of residence, 2006-2021.

— Dense — Intermediate — Dispersed

Source: BC3.



Characterisation



With the aim of identifying patterns and common points among vulnerable transport households, BC3 has grouped the distribution of relevant variables within each cluster:

Cluster 1

Older Rural Couples

This group represents 17% of the sample and corresponds to households vulnerable to transport according to the LIHC metric. These are middle-to-low income households that reside in rural areas, primarily composed of elderly couples without dependent children. Most of them own their homes outright, with no mortgage. The reference person is a man over 65 years old, born in Spain. In general, they have only completed primary school, although some may have completed what is now called compulsory secondary education (ESO).

Cluster 2

Poor Couples with Children in Rural Areas

This group makes up 31% of the sample. These households are typically made up of couples with children, residing primarily in low-population density rural areas. They are economically vulnerable due to their low-income status, though they benefit from owning their home with no mortgage. The reference person is an adult man born in Spain, who is usually the only one employed in the household. Regarding education, most have completed ESO (Compulsory Secondary Education).

Cluster 3

Homeowners with Mortgages

This group represents 22% of the sample. These households are middle-low income and, despite owning their homes, still have to deal with mortgage payments. They are usually composed of either a single person or couples without children, and they typically reside in areas with medium population density. The reference person is a man aged between 30 and 65, born in Spain, with high school or vocational training (FP) education.

Cluster 4

Couples with Children in Rural Areas

This group makes up 15% of the sample. These households are typically low-to-middle-income or very low-income families, often consisting of couples with children living in an owned home without a mortgage, located in a dispersed area. The reference person is usually a woman aged between 30 and 65, born in Spain, and with high school or ESO education. She is often the only employed person in the household.

Cluster 5

Immigrants

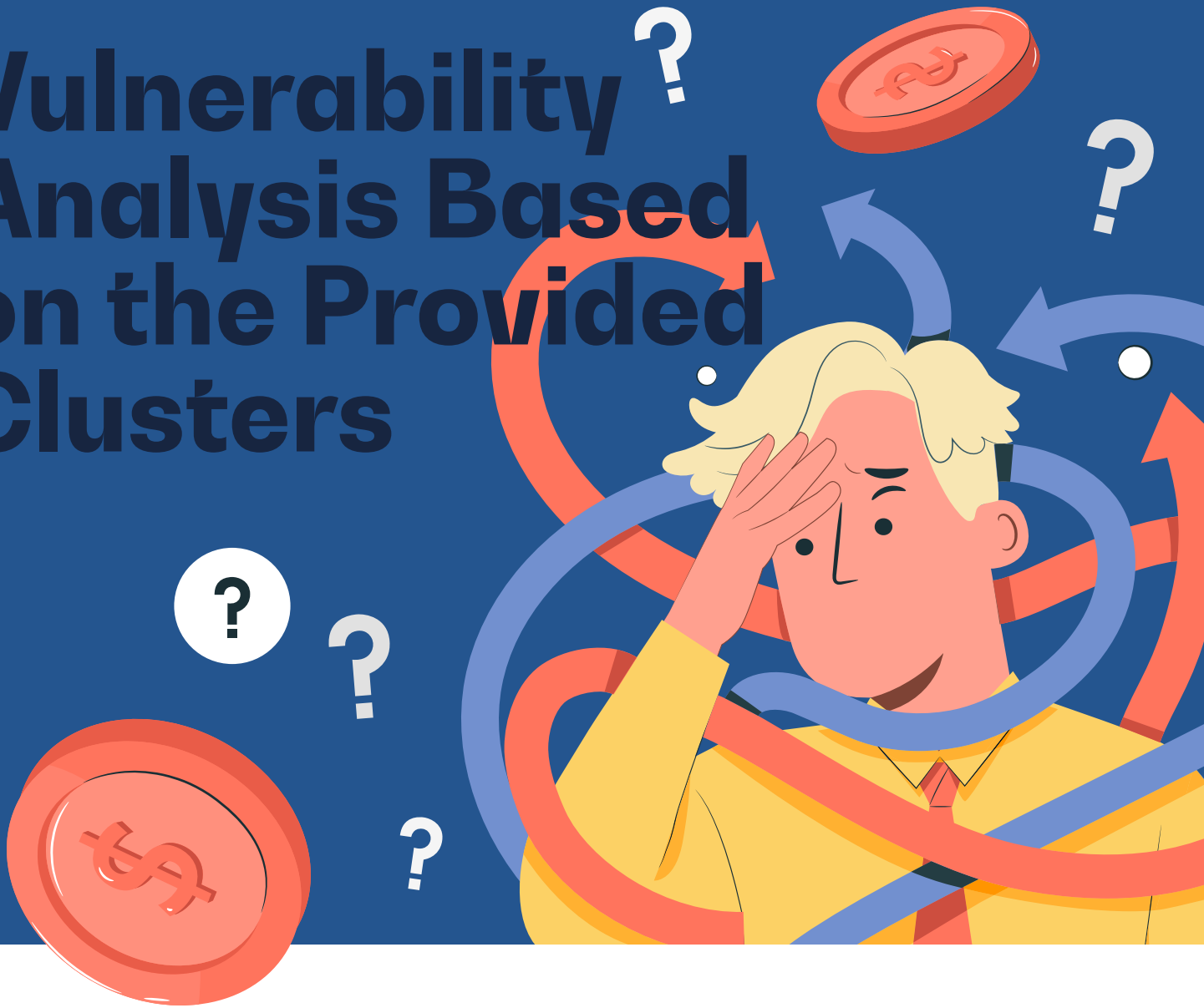
This group represents 9% of the sample. These households are composed of immigrant couples, usually with children, living in rented homes in urban areas. Despite having multiple employed members in the household, the family income remains middle-low. The reference person is typically an adult man from a non-European country, with high school, vocational training (FP), or ESO education.

Cluster 6

Single-Parent Families

This group makes up 6% of the sample and is characterised by being composed of a single parent and their children. These households are particularly vulnerable to transport because, in addition to having very low income, they often live in areas with medium population density, which makes mobility for both reproductive and productive tasks difficult. They also face monthly rent payments. The reference person is typically an adult woman, born in Spain, who has completed ESO.

Vulnerability ? Analysis Based on the Provided Clusters



As observed when analysing the profiles of households vulnerable to transport, there are certain factors that can determine their vulnerability. In fact, this vulnerability may be related to the household composition, economic situation, or housing location. In this sense, it is clear that most of the groups consist of low or middle-low income households, or those residing in rural or intermediate areas. In fact, there is only one group where households predominantly reside in cities: the immigrant group (cluster 5). This suggests that the vulnerability of this group is primarily determined by the socioeconomic factor rather than the demographic one. Despite having multiple working members, these are middle-low income families who allocate a significant portion of their income to paying rent.

Additional housing costs, such as rent or mortgage payments, considerably reduce the available income in households, exacerbating their vulnerability. A good example of this is cluster 3, defined as “Homeowners with Mortgages,” where middle-low income households, despite most not living in rural areas (with households in intermediate zones predominating), face worsened conditions due to the costs associated with mortgage payments. These households are often made up of a single person or couples with children. This type of household predominates in most of the groups (clusters 2, 3, 4, and 5), indicating that household composition also plays a significant role in vulnerability. This is often linked to greater mobility needs, as in these cases, mobility is necessary to carry out both productive tasks (e.g., commuting to work) and reproductive tasks (such as transporting children to school or going shopping).

However, even more vulnerable are single-parent households (cluster 6), where one parent must handle both types of tasks, their income is very limited, and most also face the challenge of paying rent for a home located in an area with intermediate population density. These households, despite representing only 6% of transport-vulnerable households, are extremely vulnerable because both socioeconomic and demographic factors lead them to allocate a large proportion of their income to transport consumption (16.7%). In fact, it is likely that these factors limit their ability

to afford transport to such an extent that they may not be able to manage the cost, falling into hidden transport poverty.

Lastly, cluster 1 (defined as “older rural couples”) also deserves special attention, as the combination of rurality and age (over 65 years old) can not only lead these households into transport poverty but also to social exclusion. The lack of accessibility to transport may make it difficult for elderly individuals to access basic services, such as healthcare or grocery stores.

Total expenditure (€) and proportion of expenditure on transportation goods and services (%).

Source: BC3.

	Average Spend (€)	% transportation	% private transportation	% public transportation
Cluster 1	17.498	15,0	14,5	0,5
Cluster 2	19.735	16,9	15,4	1,5
Cluster 3	17.683	15,3	13,2	2,0
Cluster 4	18.787	15,7	14,1	1,5
Cluster 5	22.287	16,4	12,0	4,4
Cluster 6	15.314	16,7	13,8	2,9



Case Study: Regional Situation in the Community of Madrid



When analysing the situation in the Community of Madrid, Sanz Fernández identifies different types of households that could be considered strictly affected by energy poverty, which together account for nearly 17% of the population.

Among these groups, it is easy to identify families living in peripheral areas with insufficient public transport alternatives, low income levels, and high job insecurity/temporary employment. In these cases, even low levels of mobility and transport-related spending represent a very significant percentage of their income. Another profile includes households (typically female-headed)

with very low incomes that spend almost nothing on transport, but live in areas where this may lead to very limited and insufficient mobility. There are also households with high levels of mobility, either due to their location in sparsely populated areas (because of the size of the municipality in which they live) or in low-density areas (since they live in detached homes). In general terms, there is a partially matching pattern: these households tend to have low income and education levels, reside in peripheral areas, and lack alternatives to public transport. More specifically, these are the four most affected groups:

Group 1

Energy and Monetary Poor

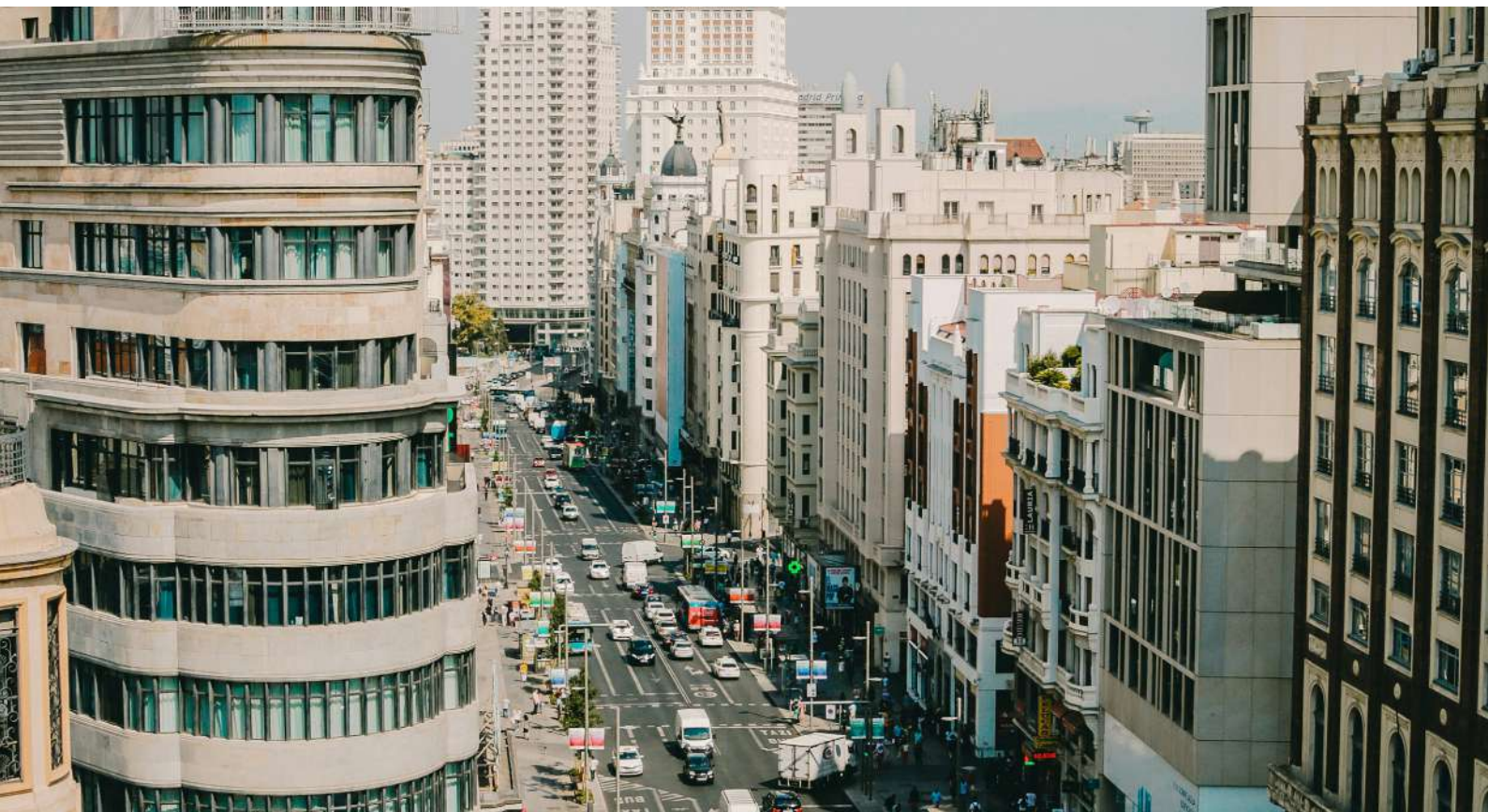
These are households that spend more than double the median of their income on fuel and are also below the poverty threshold. This group could be termed “poor peripheral families,” where their residential location does not allow them (neither through proximity nor public transport alternatives) to reduce their transport costs. High levels of job insecurity and temporary employment may also force them to accept any type of job, regardless of the hours and location, which impacts their daily mobility.

Group 2

Monetary Poor with Incidental Cases of Hidden Mobility Poverty

This group includes households below the poverty threshold but with no excessive fuel spending. Within this group, it's likely that there are two differentiated subgroups: “migrant and unemployed families in cities” (living in rental homes) and “retired city dwellers” (the group of homeowners identified in the analysis). Both profiles align with low levels of fuel consumption, due to their low levels of daily activity related to employment (retirement or unemployment) and their access to goods and services via proximity or public transport (since they live in the most densely populated, accessible, and well-served areas of the region).

The situation described applies to the majority of households in group G2, but some of them also live in sparsely populated areas and small municipalities (almost 7% of these households live in municipalities with fewer than 20,000 inhabitants), where accessibility and public transport are significant issues. The fact that their transport expenditure is so low likely indicates a deprivation of mobility when these households are located in less accessible areas.



Group 3A

Energy Poor and Monetarily Vulnerable

These households spend more than double the median on fuel but do not earn above the median income. They could be referred to as “rural precarious couples,” and their high mobility needs (due to high employment levels) combine with limited public transport accessibility in their towns (municipalities with fewer than 10,000 inhabitants), resulting in high fuel expenditure to meet mobility needs via private vehicles.

Group 3B

Energy Poor without Monetary Vulnerability

This group includes households that spend more than double the median on fuel but earn above the median income. They could be called “mortgaged families in detached homes.” These households exhibit high levels of mobility, likely more due to the low density of the urban fabric in which they live (due to housing type) than because of the type of municipality, which tends to be relatively large and assumed to have better public transport infrastructure. The lack of last-mile accessibility, coupled with the probable need for caregiving trips due to the presence of children and the high percentage of employed people, increases the number of trips and thus the costs incurred. In these cases, there may be a higher percentage of private vehicle use by choice, preference, or personal decision rather than strict necessity. This situation is likely aided by the income levels of some households in this group (all of which earn above the median income, but some may have very high incomes), allowing them to use a private vehicle without restrictions (and, in some cases, without it being essential).

Their classification as “energy poor” due to their expenditure of more than double the median (2M) on fuel should be questioned in cases where proximity or alternative transport options allow for reduced consumption without externalities or negative consequences for these users. In such cases, they could be reclassified as “large consumers by choice” instead of being considered “energy poor” in the strict sense. Therefore, this distinction should be made for this group and will be heavily influenced by the specific location of each household.



5.

Proposals and Recommendations



It is desirable to design policies and implement progressive measures aimed more at the prevention of vulnerable groups and addressing poverty situations. Combating transport poverty

requires a combination of measures to improve accessibility, reduce costs, and ensure equitable services for low-income individuals.

Proposal 1

Include the concept of transport poverty in the upcoming Sustainable Mobility Law, other regulatory documents, and/or official public policies such as the Poverty Strategies, and develop a National Strategy against Transport Poverty to promote prevention, support, and evaluation of these vulnerability situations.

Proposal 2

Include a social perspective in public transport and mobility policies, emphasising the spatial dimension in vulnerability analyses to identify socially exposed groups, thus avoiding degressivity and negative impacts on vulnerable households.

Proposal 3

Ensure the inclusion of a child perspective in mobility policies, aiming to recognise children and adolescents as active participants and promote the effective exercise of their rights in matters affecting their enjoyment of those rights.

Proposal 4

Publish an annual report on the state of vulnerability and poverty in transport in Spain, showing both national and regional levels. Promote the improvement of statistical databases for better definition, geolocation, and characterisation of the issue.

Proposal 5

Implement a Social Mobility Voucher for Public Transport users in severe vulnerability situations, and maintain and expand progressive subsidies and discounts for public transport, both at the national and regional/local levels, ensuring their use and accessibility for everyone across the country.

Proposal 6

Implement and manage the Personalised Unified Transport Ticket, proposed and promoted by various organisations, to ensure intermodality, encourage the use of public transport systems, and facilitate the application of social policies for vulnerable users and the general public by linking the card to their personal data, income, usage, etc.

Proposal 7

Introduce a comprehensive green tax reform that, among other fiscal policies and incentives, increases taxes on diesel, gasoline, and LNG/CNG, including progressive exemptions and/or direct subsidies for vulnerable individuals or households. Diesel currently benefits from favorable tax treatment compared to gasoline, which should be eliminated.

Proposal 8

Promote the implementation of an affordable social leasing program based on income and need criteria, with a specific focus on rural areas (municipalities with fewer than 10,000 inhabitants). In addition to enabling vulnerable households to access a zero-emission car at a reduced price, this measure would allow many of these vehicles to enter the second-hand market after the program's timeframe. It would also stimulate manufacturing in Spain.

Proposal 9

Fund and promote infrastructure and services to offer low-cost, sustainable non-motorised alternatives at the urban, interurban, and low-density population areas. Promote and extend bike lanes in cities, public bicycle rental services with subsidies for vulnerable individuals or households to ensure accessibility, and install secure bike parking.

Proposal 10

Provide direct subsidies for the purchase of 100% electric vehicles for private use by vulnerable individuals or households, or those with low or middle-low incomes, including criteria based on travel needs and the absence of alternatives.

Proposal 11

Digitise services and ensure (and facilitate) that transport systems use technology accessible to all people, with a particular focus on the elderly, offering options to plan routes or pay electronically without additional costs, for example.

Proposal 12

Adapt modal and multimodal stations, as well as vehicles, for people with disabilities or reduced mobility, ensuring accessibility to all public transport systems.

Proposal 13

Reconfigure transport lines, expand urban and interurban public transport systems, and integrate public transport systems, facilitating connections between different types of transport (bus, train, metro, bicycles) through an integrated system of fares and schedules, ensuring their availability for everyone across the country.

Proposal 14

Offer free public transport, managed by any territorial administration, for minors under 18 years old, to guarantee their right to mobility, especially in vulnerable or large households, and educating in favour of the use of less polluting, more sustainable and efficient means of transport and mobility.

Proposal 15

Promote shared mobility through the implementation of carsharing, bikesharing, and motosharing services, and launch subsidy programs for these services, with specific initiatives for rural areas where private vehicles predominate due to poor public transport coverage.

Proposal 16

Encourage the creation of zero-emission or coexistence zones in the form of pedestrian spaces that reduce or eliminate vehicle traffic, offer alternative public leisure spaces, and prioritise citizens' mobility, with special attention to women, children, people with disabilities, and the elderly.

Proposal 17

Expand, maintain, and generalise green areas in urban centers and promote the installation of climate shelters to improve citizens' health, reduce pollution and vehicle traffic, and help urban resilience against the effects of climate change.



6.

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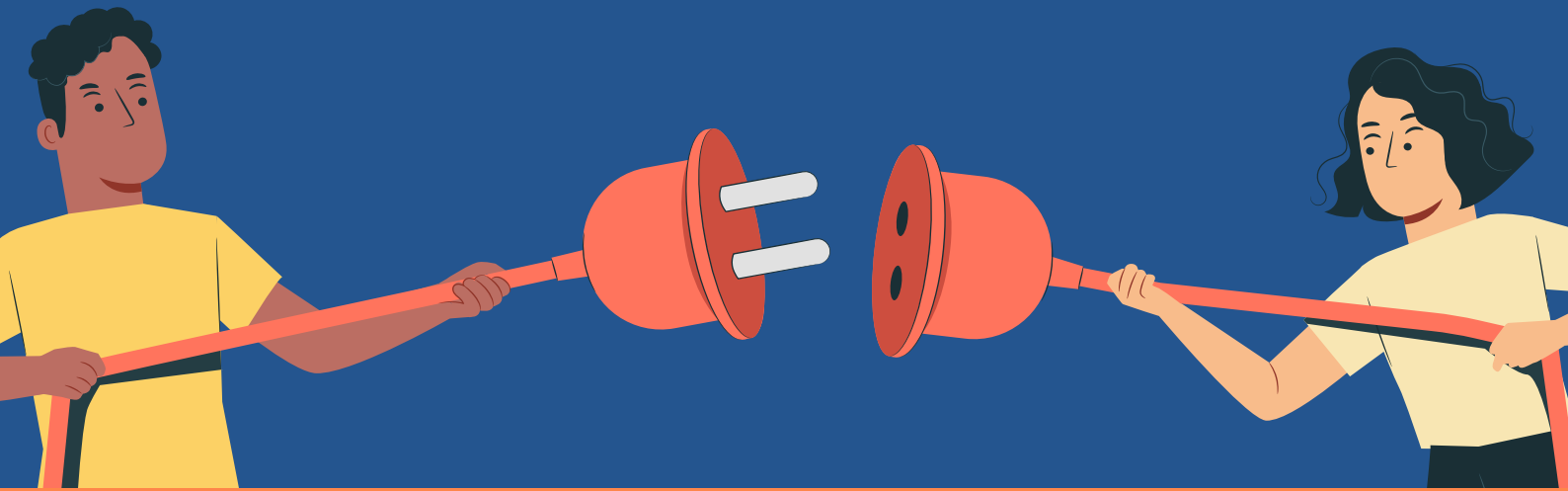
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