Case studies on modelling the alleviation of Transport Poverty in Northern Ireland

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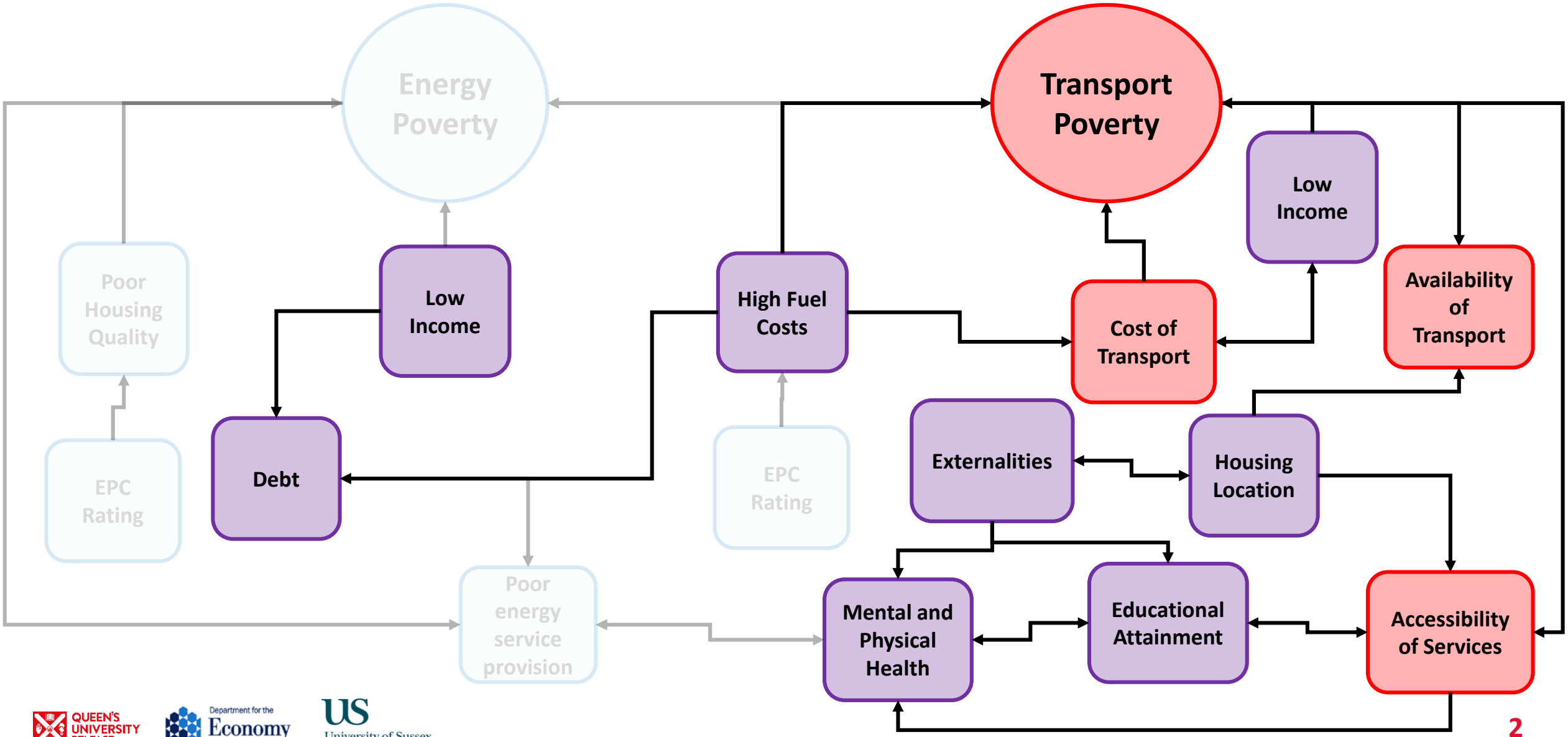
Introduction: definitions and context



Introduction: project aim and objectives

Project aim

Examine potential engineering solutions to transport poverty in Northern Ireland to further a Just Transition

Objectives

- Review and define.
  - Review the physical solutions. Review the modelling tools.
- Survey the lived experience.
  - Prioritise solutions
- Identify case studies
  - Conduct case study based analysis

Cost-benefit analysis of identified solutions on case studies

Literature review: solutions and models

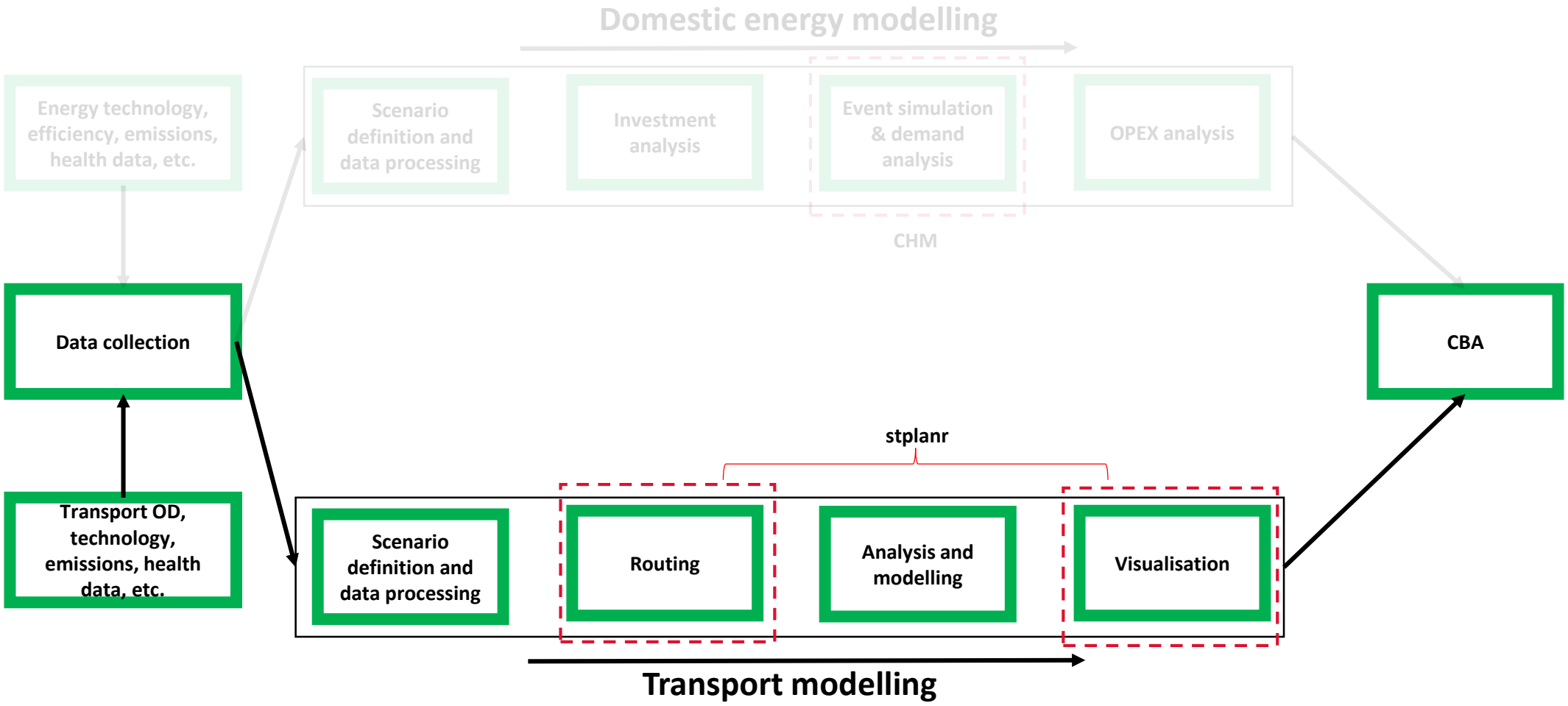
- Transport poverty is that it is the enforced lack of mobility services necessary for participation in society, resulting from **inaccessibility**, and or **unaffordability**, and or **unavailability** of transport

- Problems with technical modelling of solutions to transport poverty in the built environment:
  - **Unaffordability** - Cost of transport to the individual is largely dictated by prices (e.g., a bus ticket).
  - **Inaccessibility/Unavailability** - geographic data on the location of those vulnerable to transport poverty is usually only available at a resolution spanning multiple kilometres

- Transport poverty alleviation in the built environment is comprised of mode shifting, decarbonised transport modes, or incentives
  - Assessing mode shifting and use of routing software is a pathway to assess some elements of transport poverty alleviation – affordability where cost is directly felt by consumers, and application of routing software at the highest geographical resolution feasible.

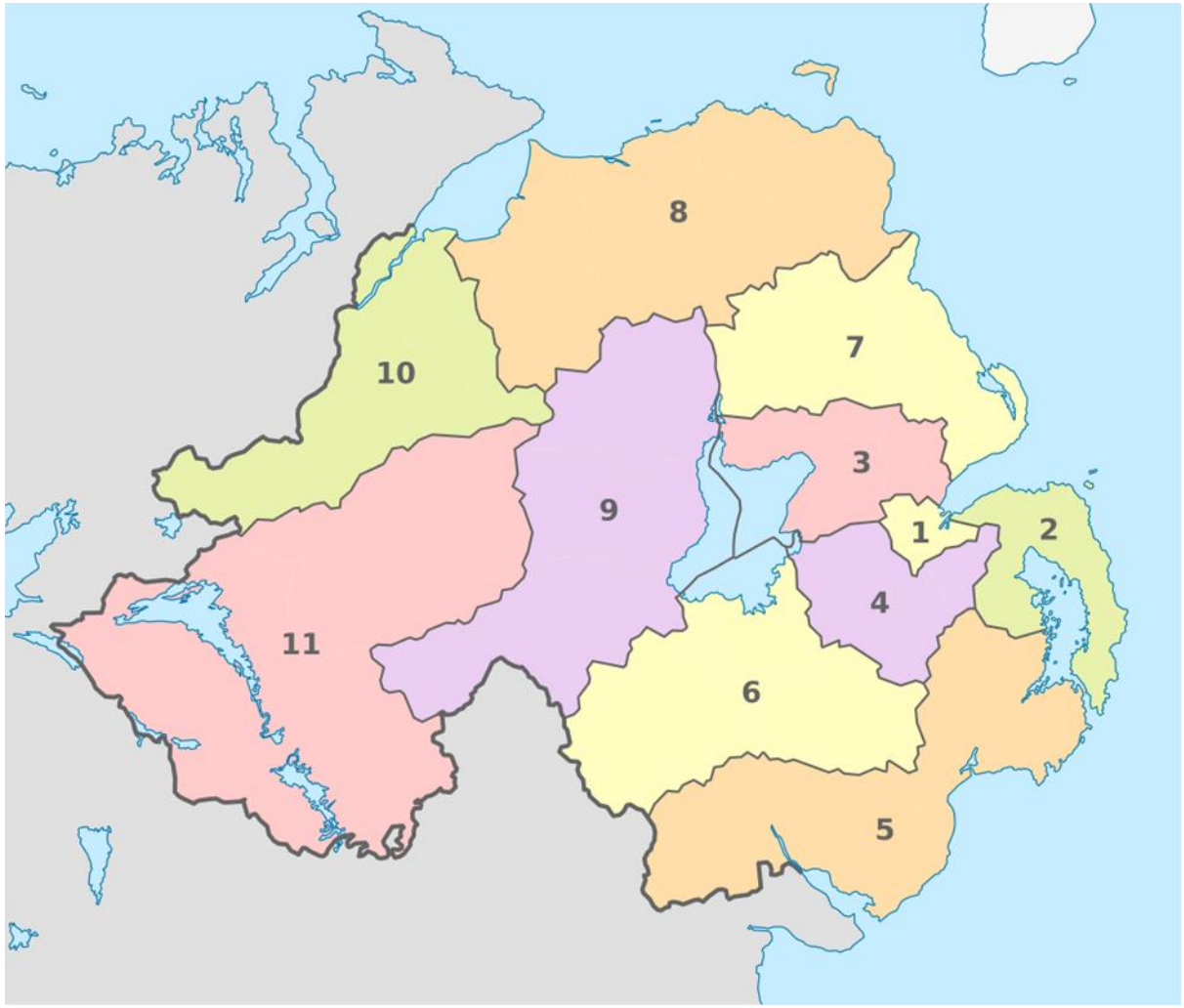
- Cost Benefit analysis allows for assessment of competing options

Methodology: modelling workflow



Methodology: case study selection

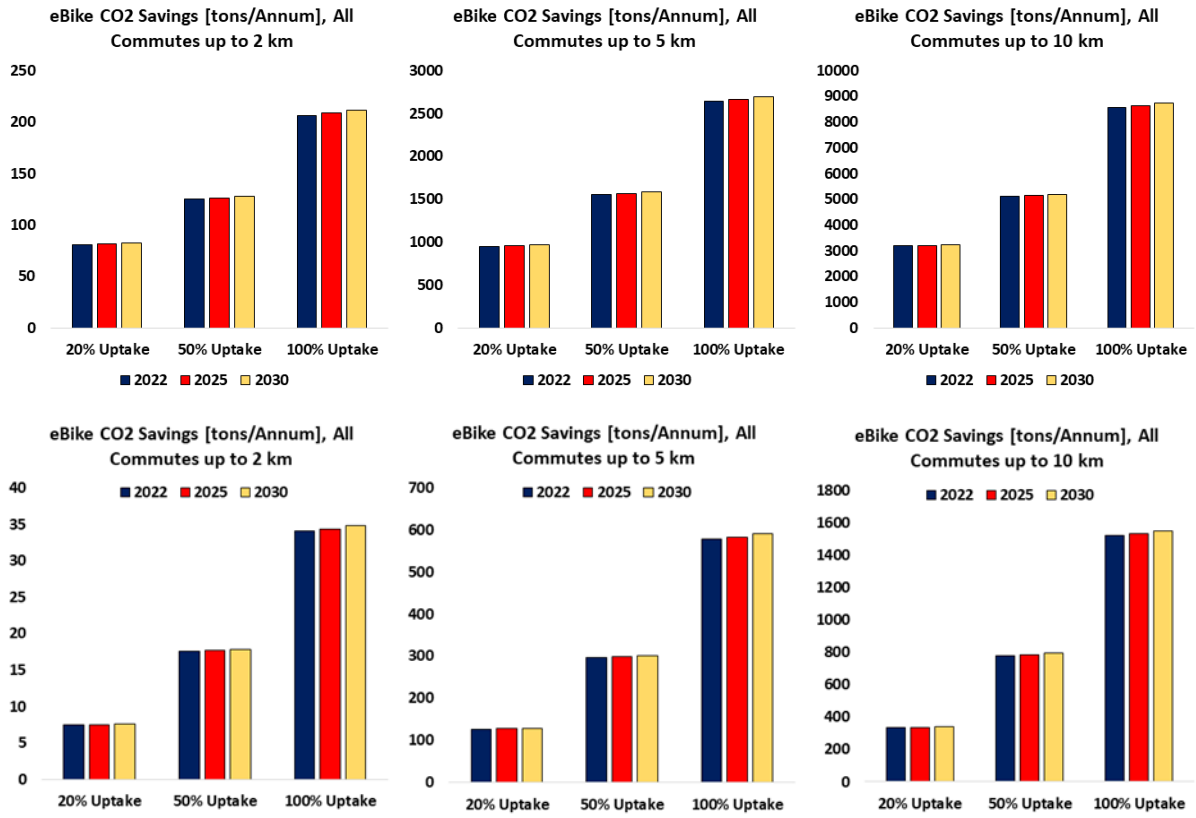
- Fermanagh and Omagh District Council (FODC) region - most overlap of energy and transport poverty - polygon 11
- The mean rank for SOAs in FODC is 317, placing it in the bottom third of areas on average.
- Inner urban areas of Belfast City Council (BCC) would be more vulnerable to energy poverty, while the suburban areas of BCC would be more vulnerable to transport poverty,
- The position of BCC is shown in polygon 1 in Figure 1. The mean NIMDM ranking for SOAs in BCC is 388.
- Active travel (specifically eBikes) and car sharingfor commuting using "what if" scenarios



Transport modelling, case study results

Key findings and conclusions:

- For short commutes, it has been found that using eBikes instead of cars is cheaper and has lower lifetime emissions.
- Policymakers should consider widening subsidies to encourage the modal shift to eBikes.
- Car sharing has a potential reduction of 80% in total cost of ownership (TCO) per user.
- Car sharing and replacing diesel cars with EVs could see a reduction in emissions per occupant by about 50% in rural areas today and over 80% by 2030.
- EVs become more cost-effective compared to diesel cars for car sharing as the distance and time travelled increases.



Annual emissions savings from eBikes for BCC study area (top) and FODC study area (bottom) by year of acquisition compared to diesel cars under various uptake rates, for distances commutable by eBike. Panel A) shows the results for commutes up to 2 km, Panel B) shows the results for commutes up to 5 km, and Panel C) shows the results for commutes up to 10 km.

Transport related cost benefit analysis results

Key findings and conclusions:

- All ride sharing scenarios, except single occupant EVs in 2022, produce a consumer surplus.
- For eBike uptake, in the urban case study all BCRs exceed 1, whilst in the rural case study BCRs exceed 1 when there is sufficient cyclist uptake.
- Case for immediate action on mode switching in BCC (urban) and should be examined further in FODC (rural).
- eBike uptake generates benefits public health benefits, whilst ride sharing results in fewer socialised benefits -> Balancing “buy in” with improving public welfare.

Conclusions

Conclusions

- Mode shifting and ride sharing warrant further support
- The alleviation of transport poverty provide economic benefits and should be further pursued – regardless of a policymaker's views on social equity.

Novelty

- Answers the call for Just Transition case studies with analysis based on Northern Ireland, modelling solutions to transport poverty in the form of mode shifting and ride sharing.

Limitations

- Data and models used to study this area are currently insufficient and should be studied and developed in much greater detail

Future research

- Further model development,
    - Transport - explicitly incorporate multiple elements of the transport poverty condition

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Thank you

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