2023

EnvEcon – Research for a Just Transition

Private Road Transport – Total Cost of Ownership
Published 2022

Transport Poverty Risk Index – Spatial Composite Index
Published 2023

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TFIAM 52

EnvEcon

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EnvEcon Background

Specialised economics **research operation** spun-out of UCD in 2006.

Team of **economists, modellers, computer scientists and policy** analysts.

Major interest in **transport, built environment** and **agricultural** sectors.

Strong focus on **environmental policy (*driver*)** but have a **broader outcome** focus.

Decision support for a just transition

Modelling provides compelling insights for policy action

Research generates refined insights on pathways for change

Policy can still fall down when it comes into contact with politics and people

Air and Climate policy change on the scale and speed required will face resistance

Policy needs objective support in managing a just transition

Emotive or opinion-based assessments without data and spatial refinement are unhelpful

The climate and air transition will carry risks but those risks are not uniform across all of society

Spatial refinement is critical to avoid derailing policy for all and to better manage resources for change

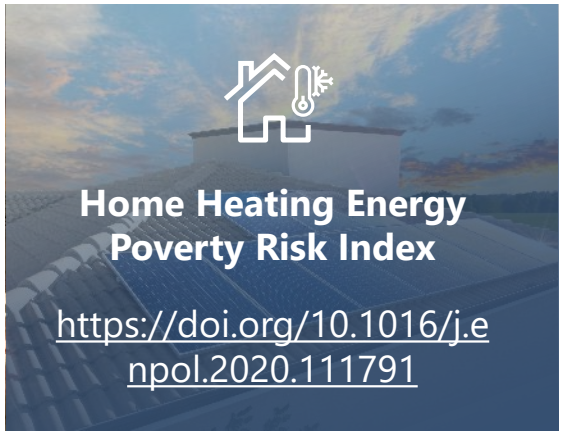
Objective analysis can identify risk, communicate progress and support better risk and effect management

EnvEcon Just Transition Policy Support Index

Elements

Health - Air Pollution– Hitting the hotspots

https://doi.org/10.1016/j.aeaoa.2022.100155



Home Heating Energy Poverty Risk Index

https://doi.org/10.1016/j.enpol.2020.111791

Mode satisfaction and transport investments

https://doi.org/10.1016/j.tra.2020.04.007

Remote working - preference and potential

https://doi.org/10.1016/j.indic.2022.100190

Road Transport – TCO

https://doi.org/10.1016/j.commtr.2022.100071

Transport poverty risk index

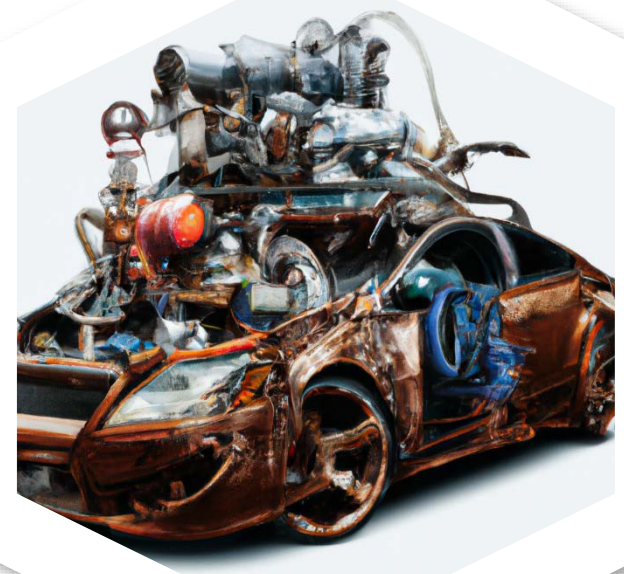
https://doi.org/10.1016/j.indic.2023.100254

Employment risk index

Forthcoming

Pipeline of Work

Forthcoming



PAPER 1 - TCO

Variability in total cost of vehicle ownership across vehicle and user profiles

https://doi.org/10.1016/j.commtr.2022.100071

Guo, Kelly, Clinch (2022)

EnvEcon Decision Support

UCD DUBLIN

The Idea

Why?

Total cost of ownership is more meaningful than upfront purchase costs

Traditional thinking carries a message that EVs are **expensive to buy**

Slightly refined thinking knows that they are generally **less expensive to operate**

Variations across vehicle types and user profiles are often side-lined in discussions

The **scale of variability really** matters for policy design and consumer decisions

The Plan

What?

- Calibrate a **refined model** of the Irish road transport fleet
- Include detailed **data on the actual mileage** of different vehicles types
- Assemble comparable **panel**s of electric (EV) and internal combustion engine (ICE) cars
- Build a comprehensive **structure for assessment** of Total Cost of Ownership (TCO)
- Analyse and **understand the scale of variability** in TCO for policy design

The Research

How?

- The fleet structure and evolution was **tailored** to detailed Irish data on stock and sales
- **NCT Mileage data** at a vehicle level was used to adjust mileage and mileage age corrections
- Vehicle **pricing** data, **tax** data, **fuel** costs and so on were all collected, collated and analysed
- An updated **schema** for TCO analysis was developed and **deployed** for the assessments

The Result

So What?

1. There are substantial variations in TCO across vehicle types and use profiles.
2. BEVs could be ~65% more expensive on OMSP (purchase) than ICE equivalents
3. Top 2 BEV segments still 26% and 42% cheaper than petrol and diesel over TCO-4 years
4. Depreciation remains the dominant cost – policy (e.g. roadworthiness tests) will impact this
5. Prestige cars fare worst on the TCO analyses – TCO should be mainstreamed on labels

Table 1
Selections of ICEVs and EVs for comparison.

Car segment	Diesel cars	Petrol cars	BEVs	PHEVs	HEVs
A1: Micro Standard	Fiat 500	Hyundai I10	Renault Zoe	—	—
A2: Micro Prestige	Smart Car Fortwo	Smart Car Fortwo	Smart Car Fortwo e-Drive	—	—
B1: Mini Standard	Hyundai I20	Toyota Yaris	Opel e-Corsa	—	Toyota Yaris Hybrid
B2: Mini Prestige	Audi A1	Audi A1	Mini Cooper Electric	Mini Cooper Countryman PHEV	—
C1: Small Standard	Ford Focus	Toyota Corolla	Hyundai Ioniq BEV	Kia Niro PHEV	Toyota Prius Hybrid
C2: Small Prestige	Audi A3	Mercedes-Benz A 160	Mercedes-Benz B 250 Electric Drive	Audi A3 E-tron	—
D1: Medium Standard	Hyundai I40	Toyota Avensis	—	Kia Optima PHEV	Toyota Camry Hybrid
D2: Medium Prestige	Audi A4	Mercedes-Benz CLA 180	Tesla Model 3	BMW 330e	Mercedes-Benz C 300
E1: Large Standard	Volvo V90	Volvo V90	—	Volvo V90 PHEV	—
E2: Large Prestige	BMW 520	BMW 520	Tesla Model S	BMW 530e	Mercedes-Benz E 300 Hybrid
F2: Luxury Prestige	Mercedes-Benz S 350	Mercedes-Benz S 500	—	BMW 740e	Mercedes-Benz S 400 Hybrid
G1: Sports Standard	Volkswagen Scirocco	Mercedes-Benz CLA 180	—	—	Honda CR-Z
G2: Sports Prestige	BMW 640	Mercedes-Benz SL 350	Audi e-TRON	Audi Q7 E-tron	—
H1: Jeep/SUV Standard	Ford Kuga	Hyundai Kona	Hyundai Kona BEV	—	Toyota C-HR
H2: Jeep/SUV Prestige	BMW X5	Audi Q2	—	BMW X5 40e	Land Rover Range Rover P400e
M1: MPV Compact	Hyundai IX20	Hyundai I20	BMW I3	—	Honda Fit-Shuttle Hybrid
M2: MPV Large	Ford S-Max	Volkswagen Sharan	Nissan e-NV200	—	Toyota Estima Hybrid

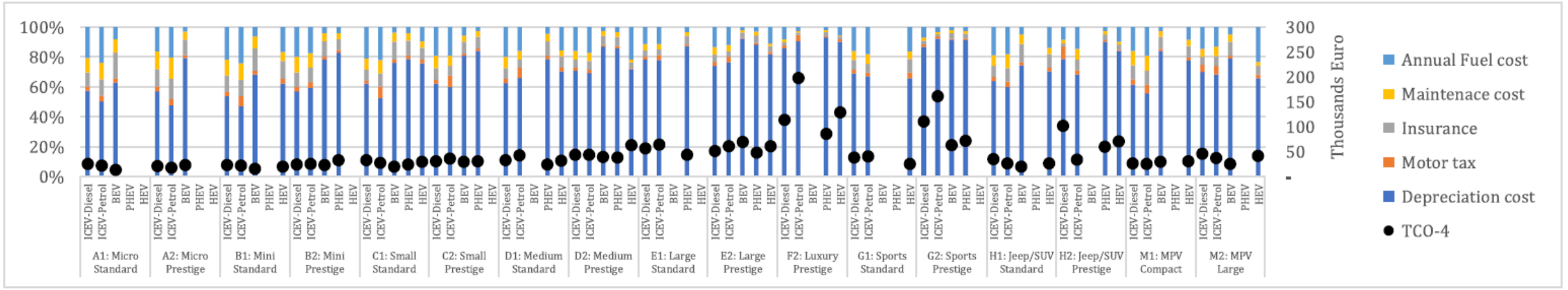


Fig. 7. Components of TCO with 4 years ownership period.

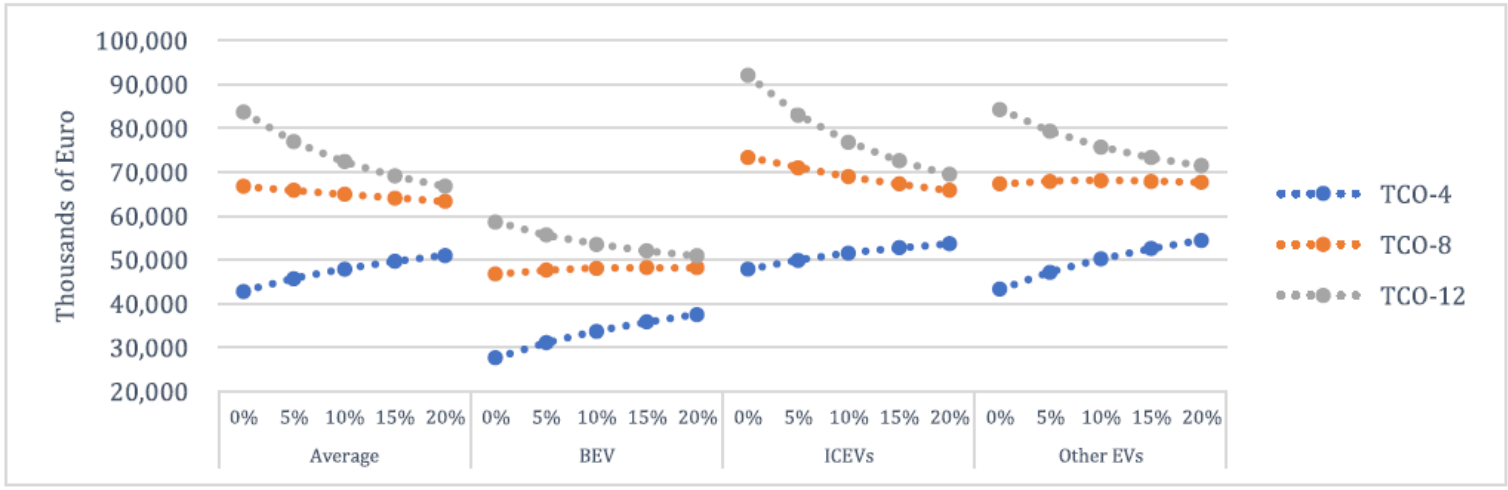


Fig. 16. TCO of all cars averaged, BEV, ICEVs and Other EVs with different discount rates.

PAPER 2 - TPR

Transport poverty risk

A composite spatial index to support policy design and investment targeting as part of a just climate transition

Kelly, Kelleher, Guo, Deegan and Patil (2023)

https://doi.org/10.1016/j.indic.2023.100254

The Idea

Why?

Environmental policy requires substantial reductions in transport emissions

Road transport emissions are particularly problematic for a just transition

Avoid – Shift – Improve frameworks broadly capture the options for change and policy

ASI will require changes and will not affect all in the same way or to the same extent

Transport policy often faces opposition on broad generic grounds (e.g. rural communities)

Objective spatial analysis of Transport poverty can assess risk and support action

The Plan

What?

- Assemble routine and reliable data at small area level (18k+ in Ireland)
- Review and assess international literature on Transport Poverty
- Build an objective composite index around pillars of access, affordability and mobility
- Demonstrate the potential of the tool under a range of relevant policy scenarios
- Embed the approach in policy design and communication as an objective analysis

The Research

How?

Census data was the key source for many variables in the TPR Index

Additional data on fuel costs, granular mileage data, public transport density and prices etc.

Developed **three pillars** around Affordability, Accessibility and Mobility

Affordability considered fuel cost, travel distances, social class, public transport costs

Accessibility considered drive time to key services and public transport density

Mobility considered existing mode ratios (car drivers, passengers, active travel, public transport)

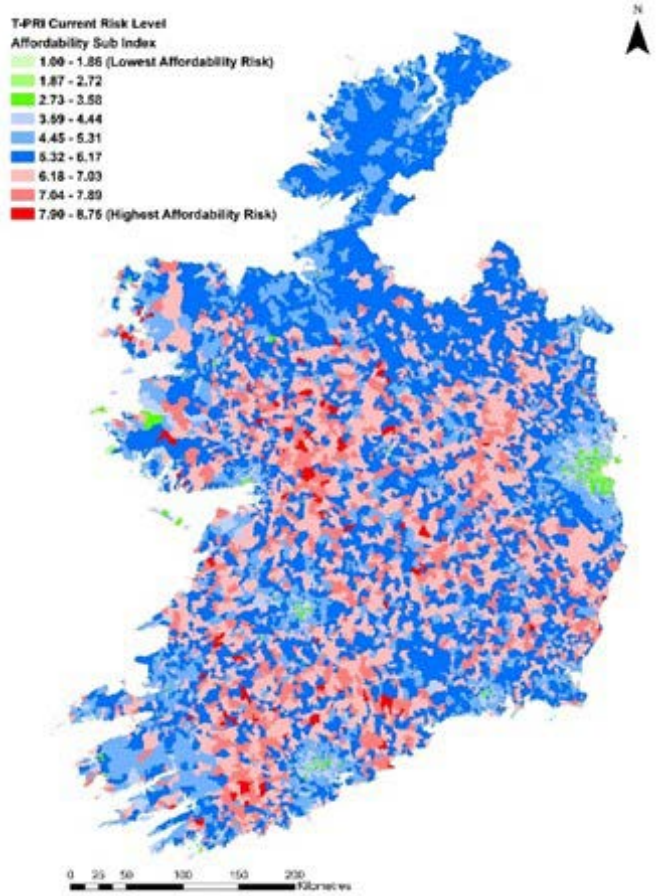
The Result

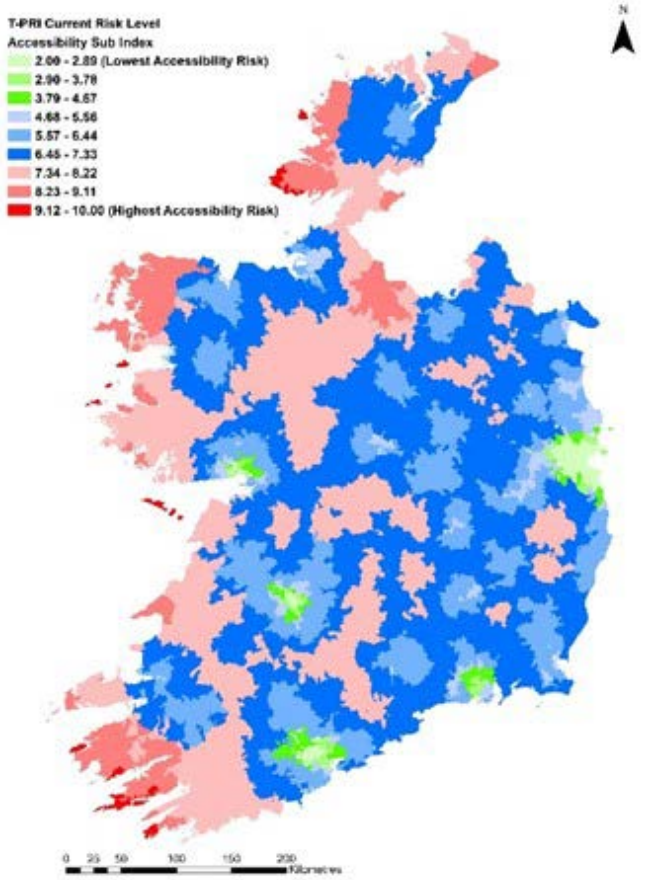
So What?

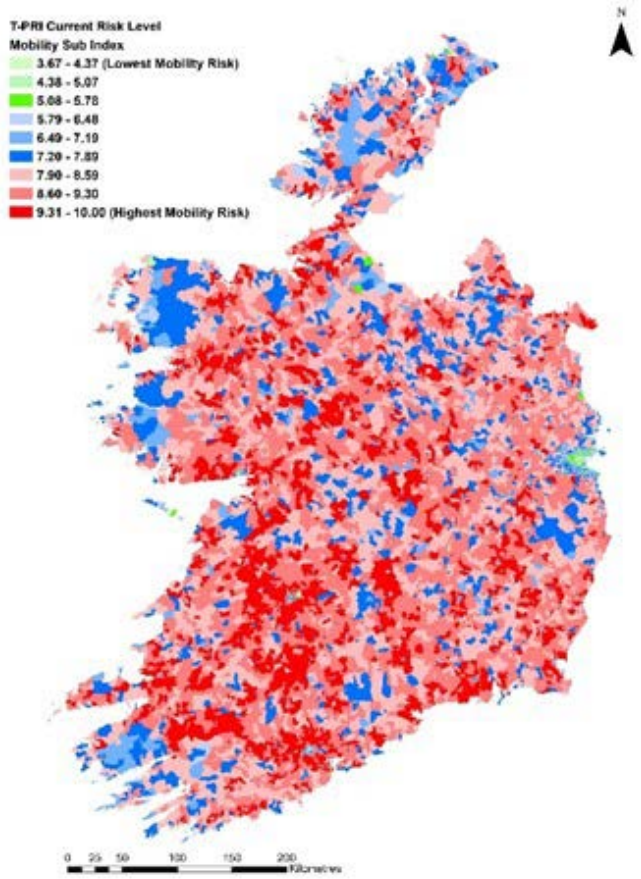
1. The results on a bird's eye view are broadly as we might expect
2. However, transport poverty risk varies spatially and there are **pockets** across Ireland
3. Transport poverty risk is **not an exclusively rural problem**
4. Different policies will have **different impacts** on exacerbating or alleviating risk in areas
5. TPRI can track **progress**, offer **alternative metrics** for consideration, and **guide** policy action

Working from Anywhere Index

Affordability, Access, Mobility



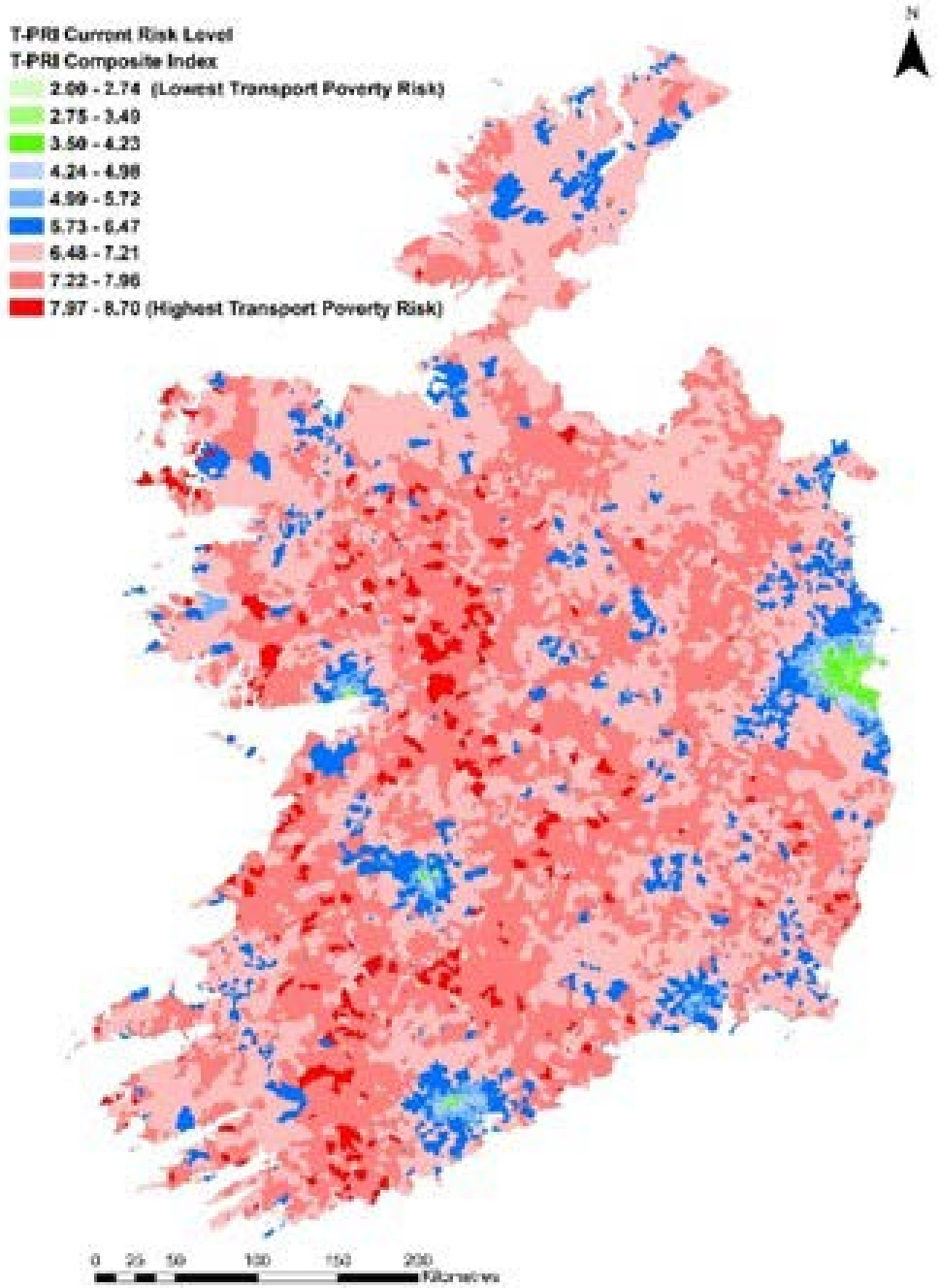




Affordability

Accessibility

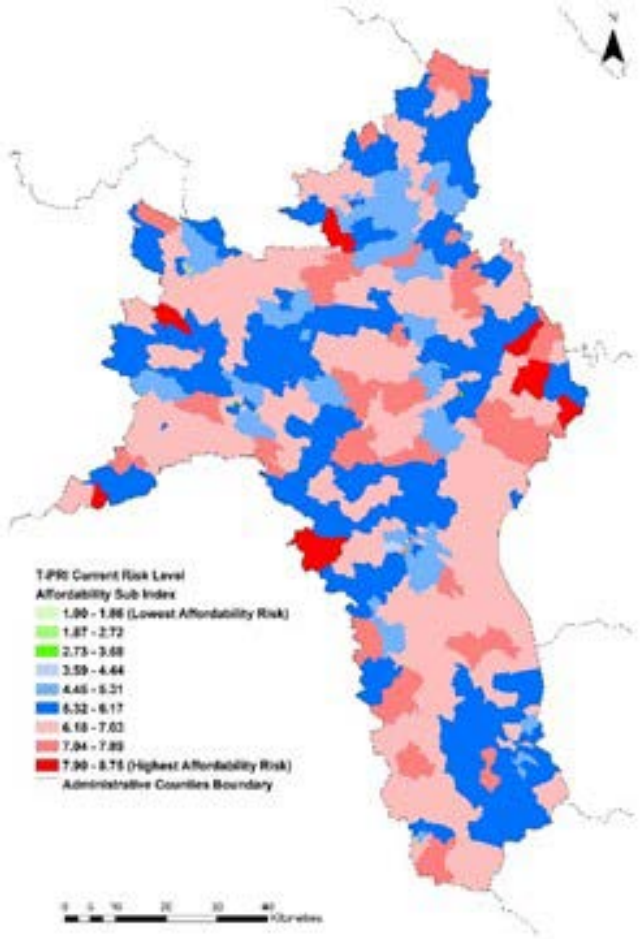
Mobility



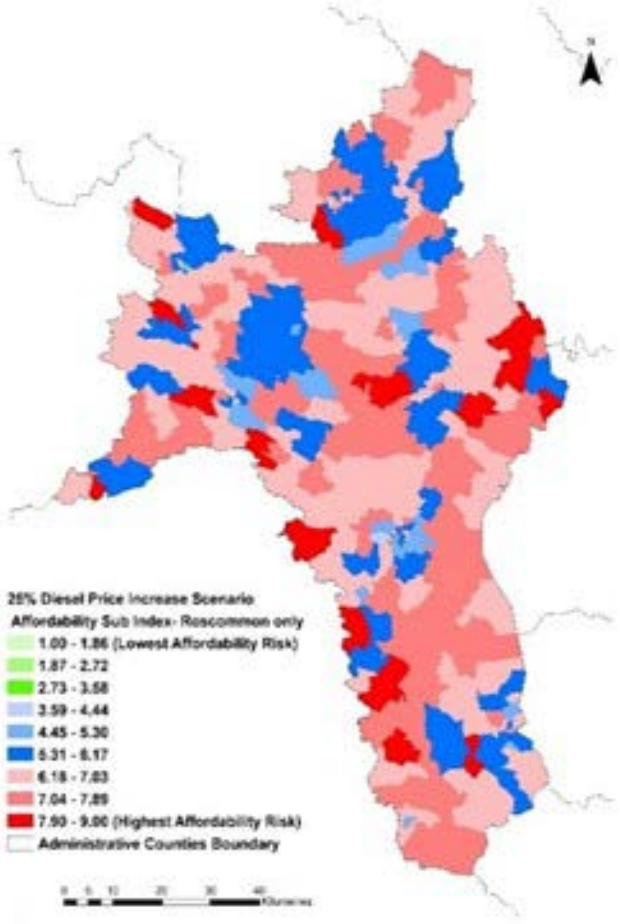
National TPRI Composite

Policy Support with TPRI

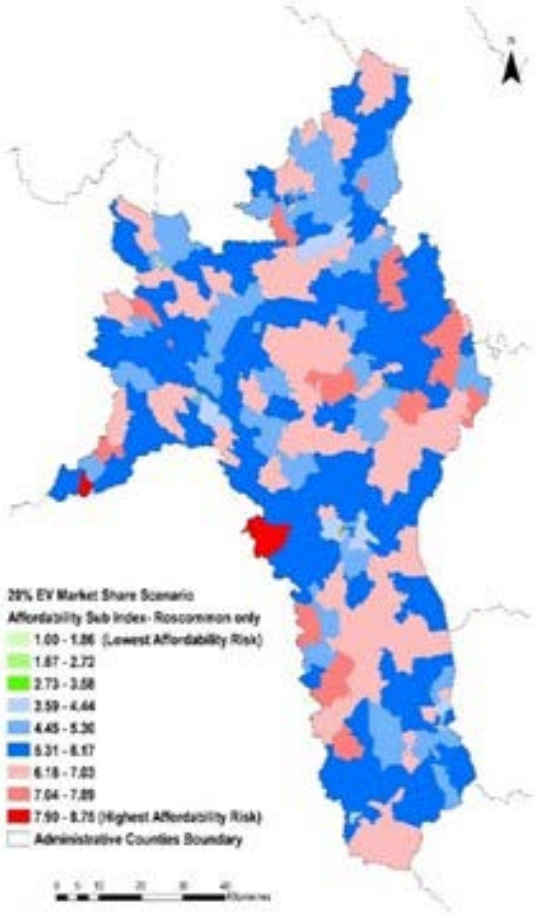
Impacts of changes are not equal across the country – measure and monitor



T – Affordability



T – Affordability
20% Increase in Diesel Prices



T – Affordability
Increased EV consumer uptake

THANK YOU

EnvEcon

Decision Support

And Thank you Rob

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