Building the Evidence Base for a Just Residential Energy Transition



The Journey so far in SEAI's Distributional Analysis of Residential Retrofit

ODYSSEE–MURE Conference | SEAI | 2026

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A Shared Challenge Across Member States

EU policy increasingly connects the pace of building renovation with its social distribution.

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National renovation planning increasingly requires attention to worst-performing buildings, energy poverty and the wider residential stock.

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Member States need evidence to target support and monitor whether vulnerable households benefit.

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How can existing programme, building-stock and socioeconomic data show who is reached, who faces barriers, and who benefits?

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From Total Retrofit Activity to Distributional Understanding

The starting point is how much activity is occurring. The next question is how that activity and its benefits are distributed.

~ 550,000 SEAI Grants

for Improvements to Home Energy Efficiency

~ €2 billion

in public funding for Improvements to Home Energy Efficiency

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01

REACH

Where is retrofit activity occurring, and which communities are being reached?

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Which households and dwelling types can participate in the transition?

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How do housing quality and realised energy use vary across households?

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OUTCOMES

How do housing quality and realised energy use vary across households?

The aim is to build a more complete account of who participates, who benefits, and where barriers may remain.

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No Single Dataset Answers the Distributional Question

Our approach adds analytical depth in stages, while being explicit about what each stage can and cannot show.

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How much activity has been supported?

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Small Area Mapping

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Who has access and what conditions do they experience?

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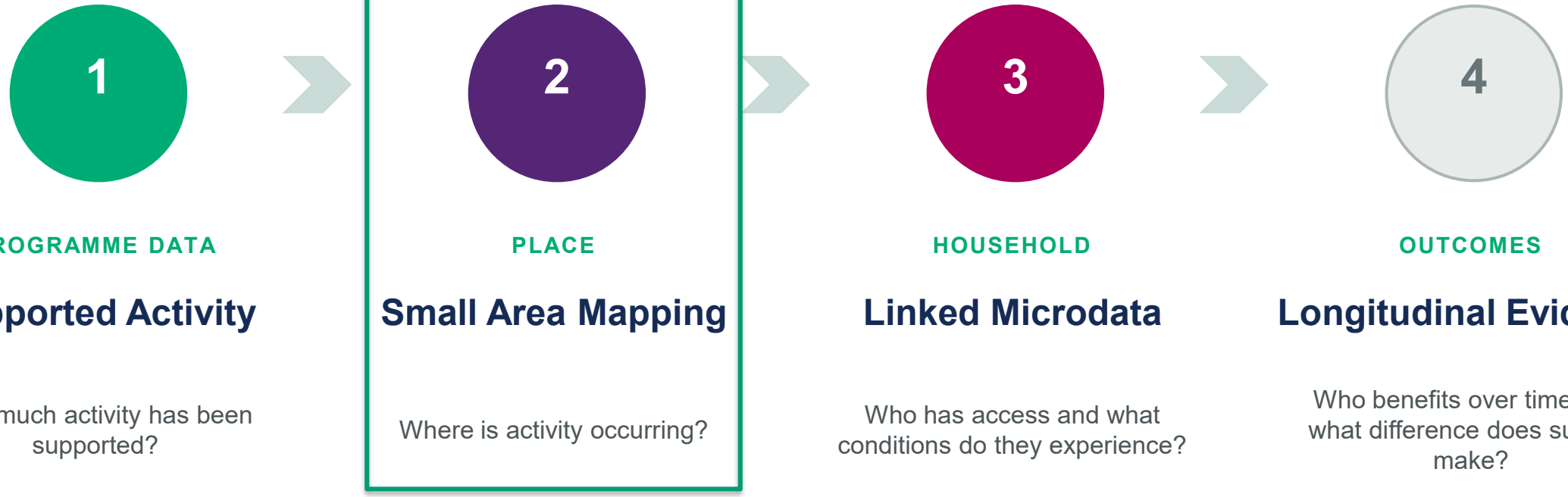
Longitudinal Evidence

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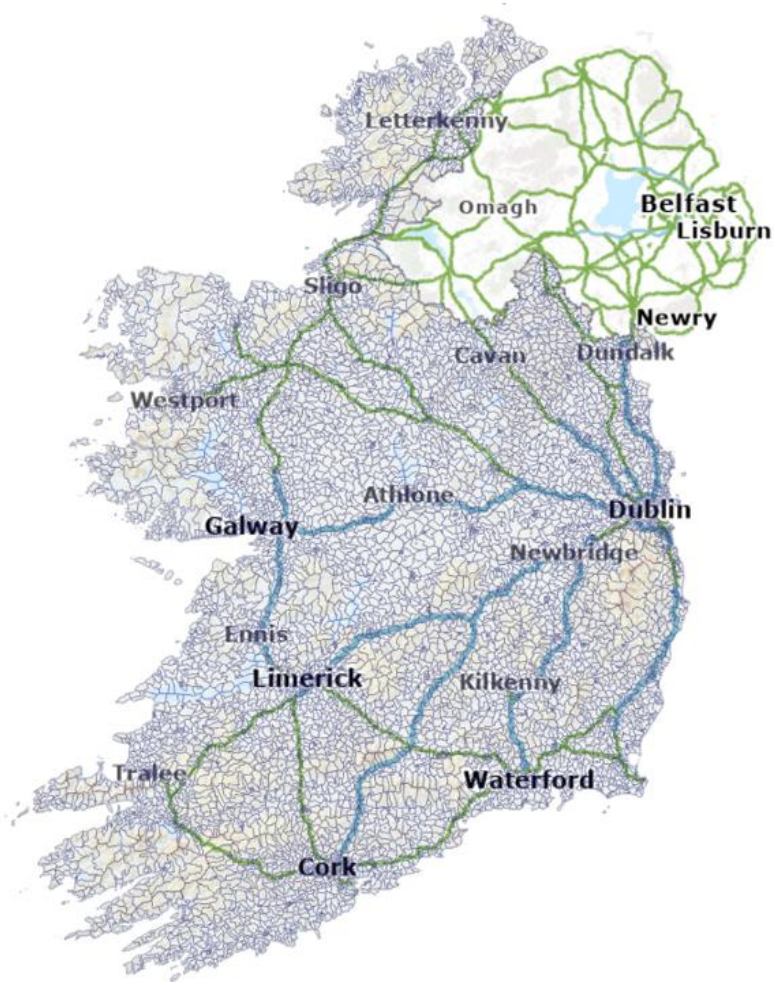
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Small Area Mapping

1 Country



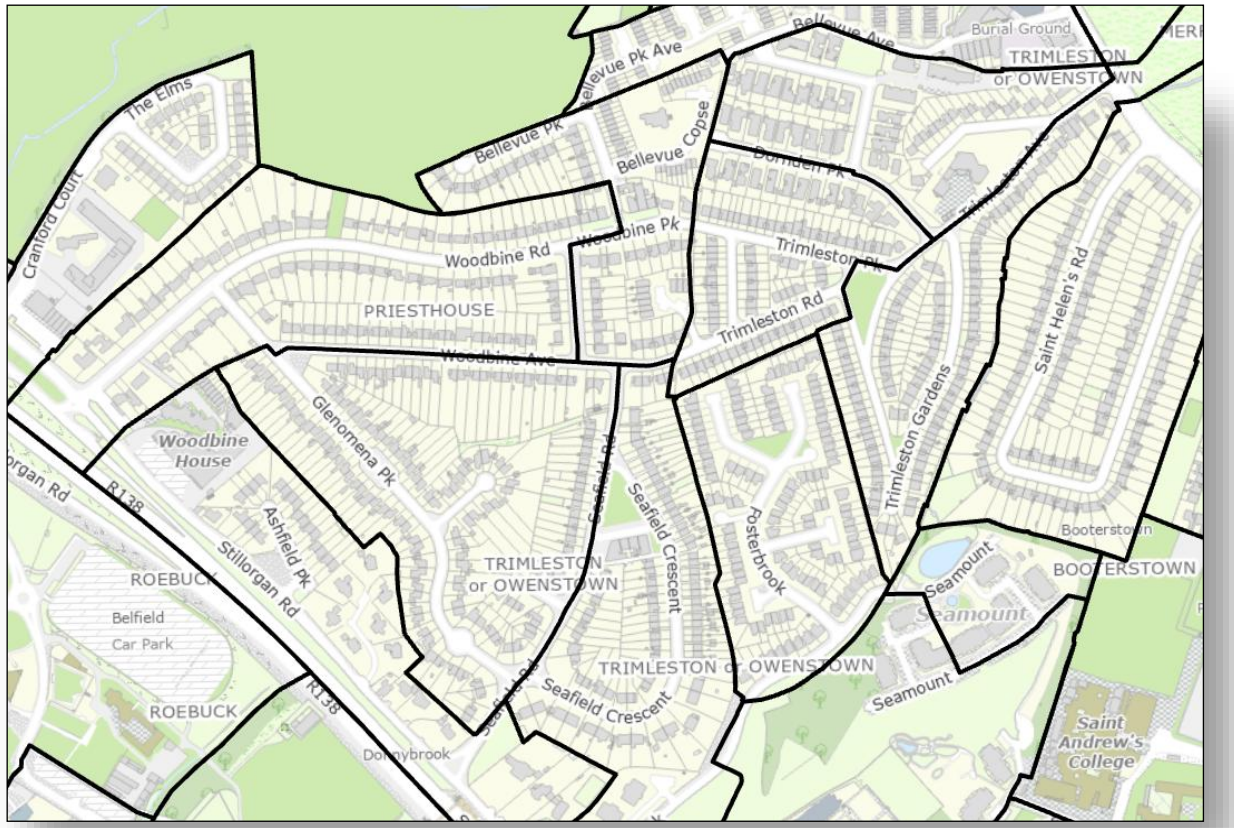
18,919 Census Small Areas



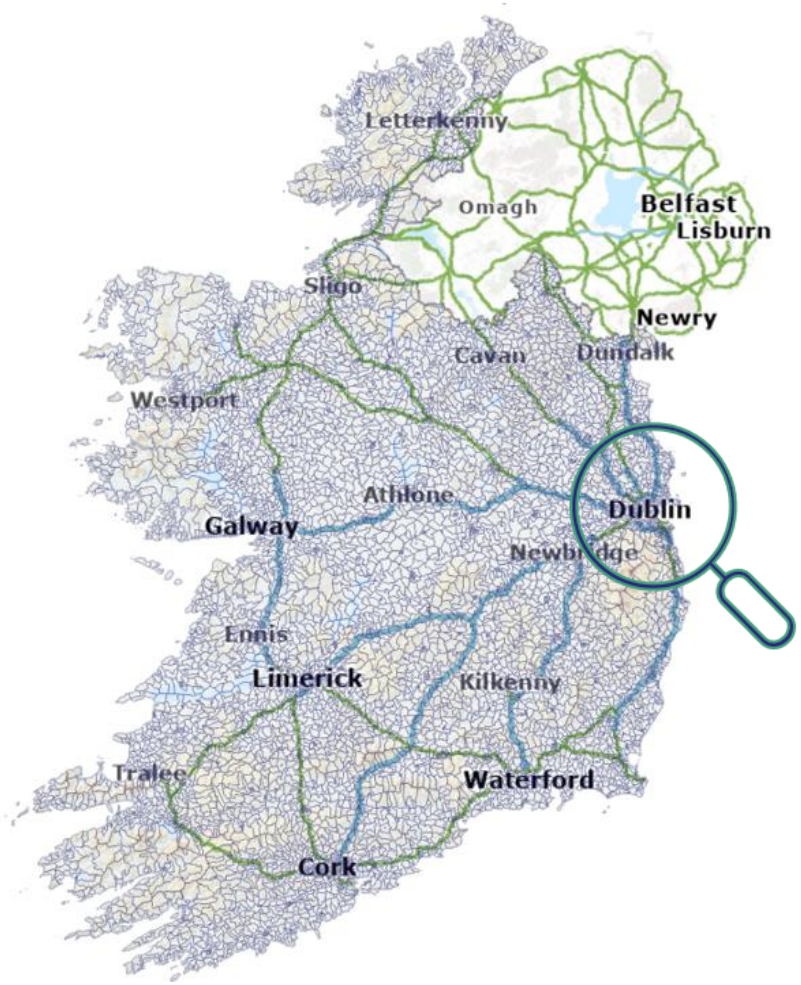
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Small Area Mapping

An Phríomh-Oifig Staidrimh Central Statistics Office

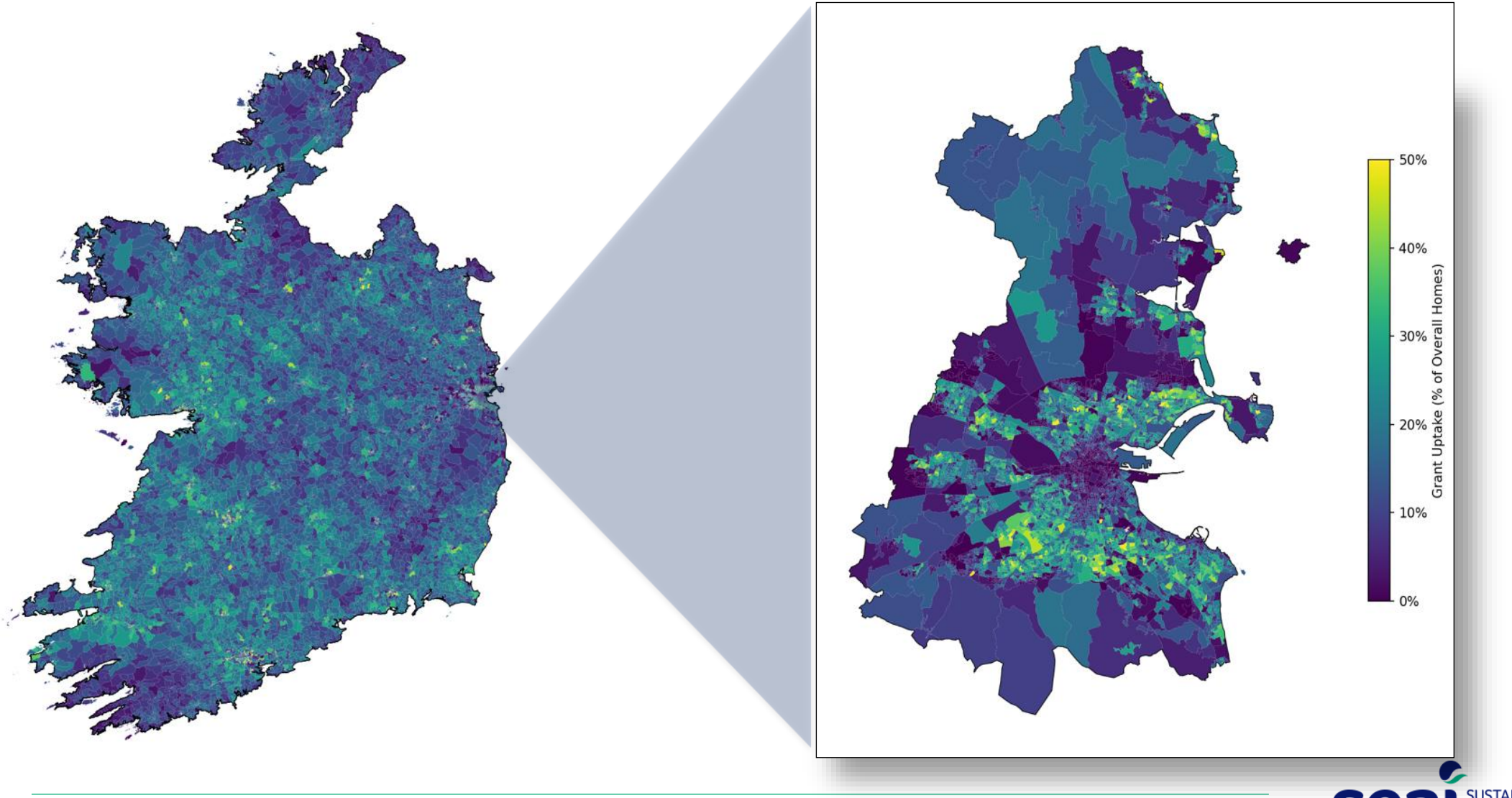


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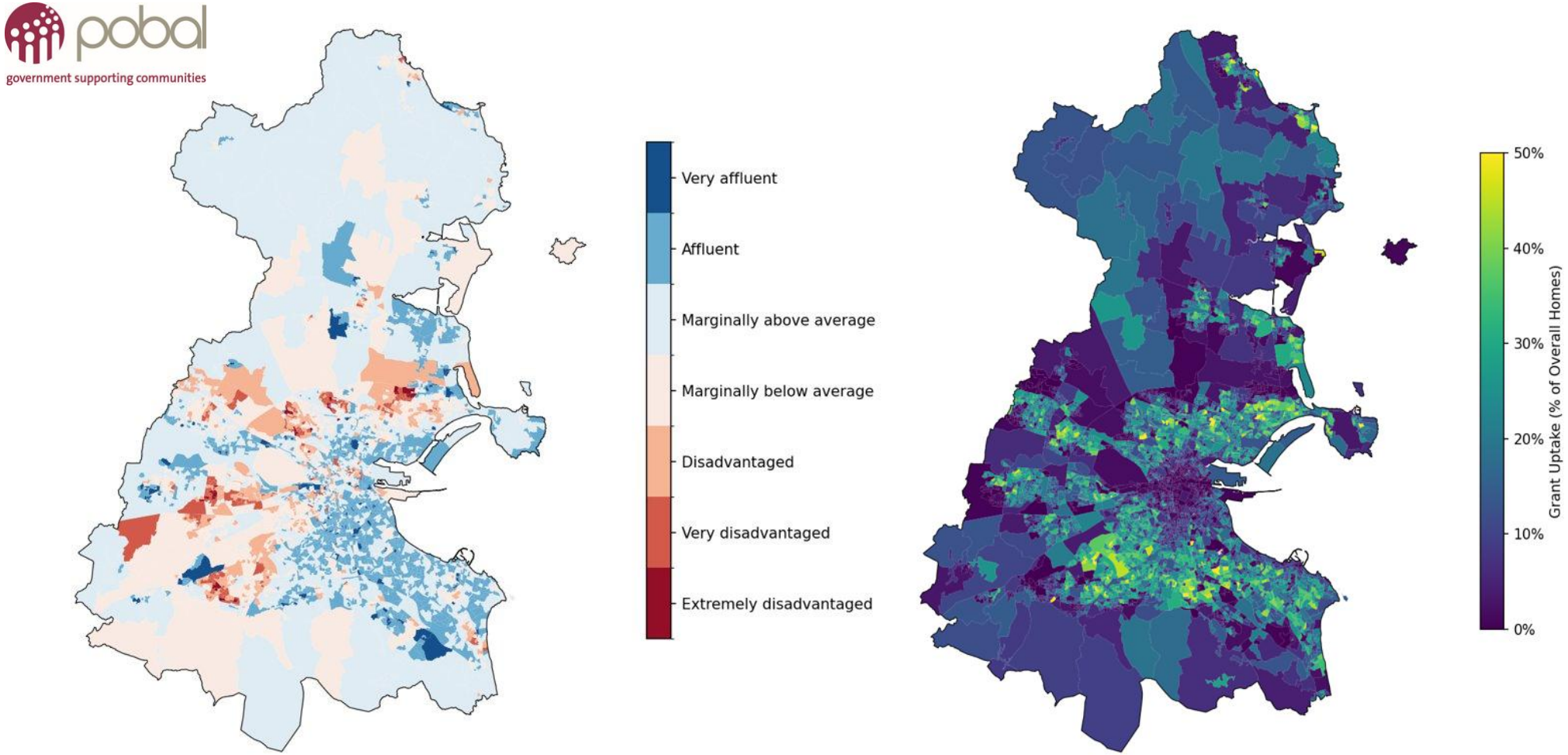
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Spatial Distribution of SEAI Grants

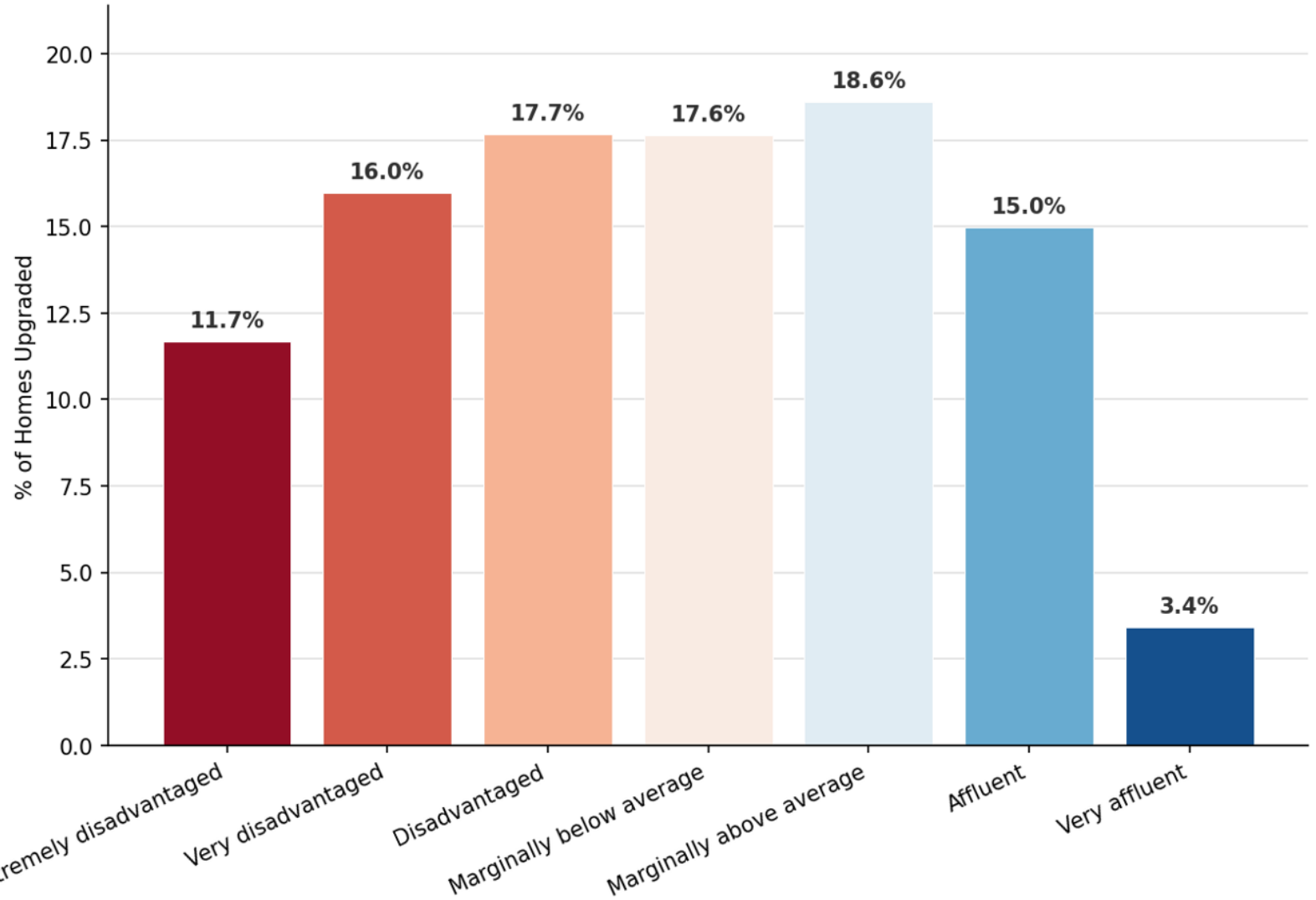


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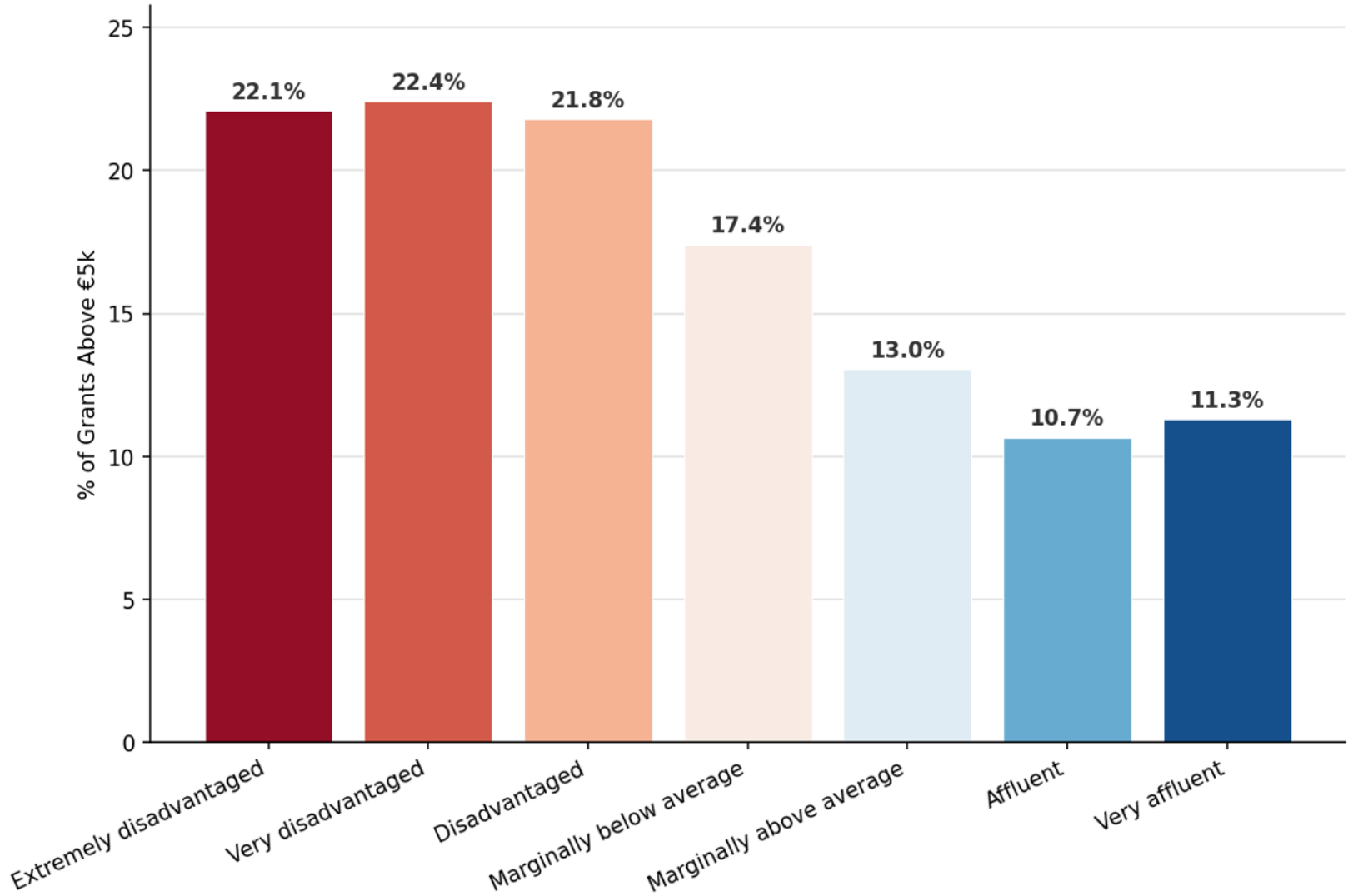
Spatial Distribution of SEAI Grants



National % of Grant Funded Retrofits by Small Area Deprivation Category



National % of Grants Above €5,000 by Small Area Deprivation Category



Two Primary Pathways for Retrofit

Fully Funded Upgrades

Available to vulnerable households and households in energy poverty

100% of project costs grant-funded

Complete suite of measures

Partially Funded Upgrades

Available to all homeowners

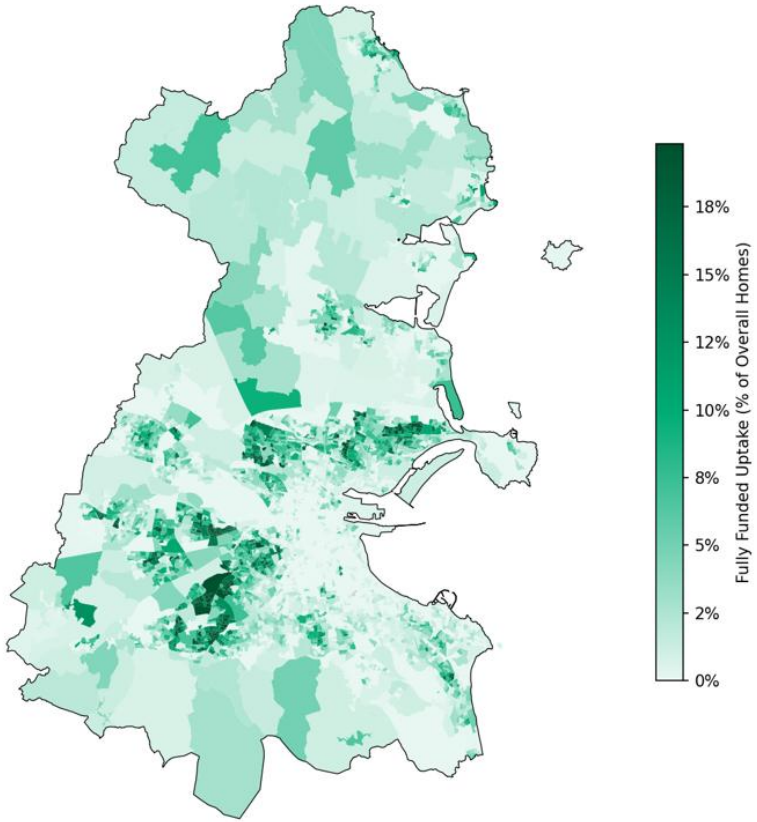
Project costs partly grant-funded

Homeowner chooses individual measures

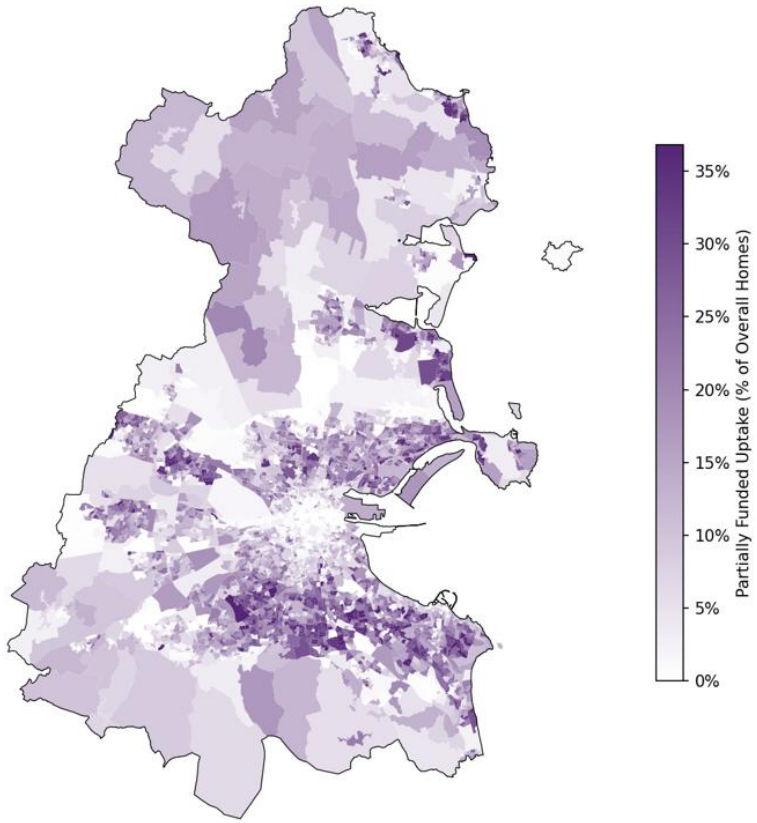
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Two Primary Pathways for Retrofit

Fully Funded Upgrades



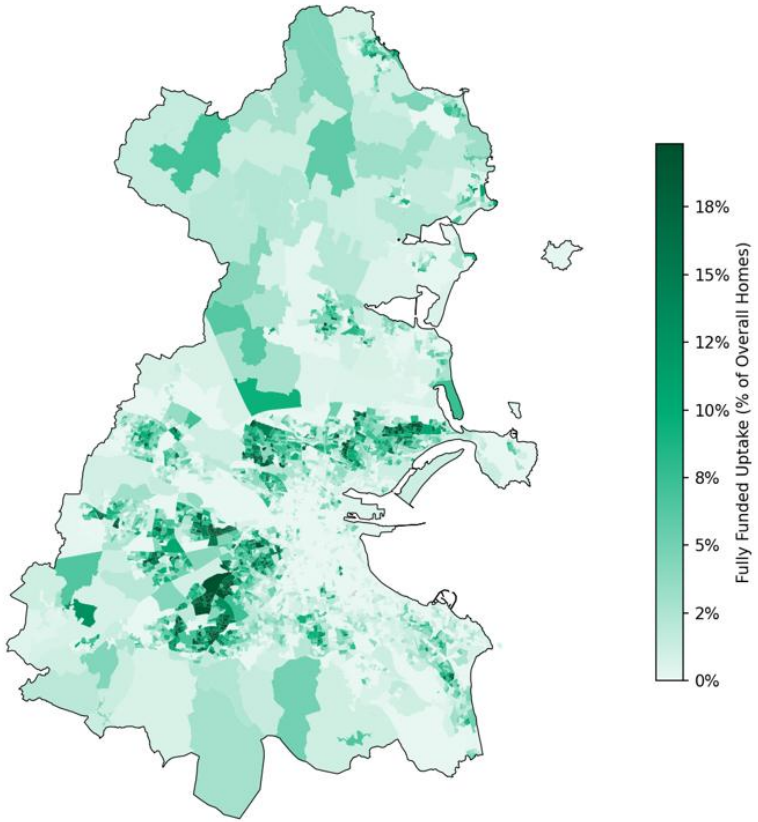
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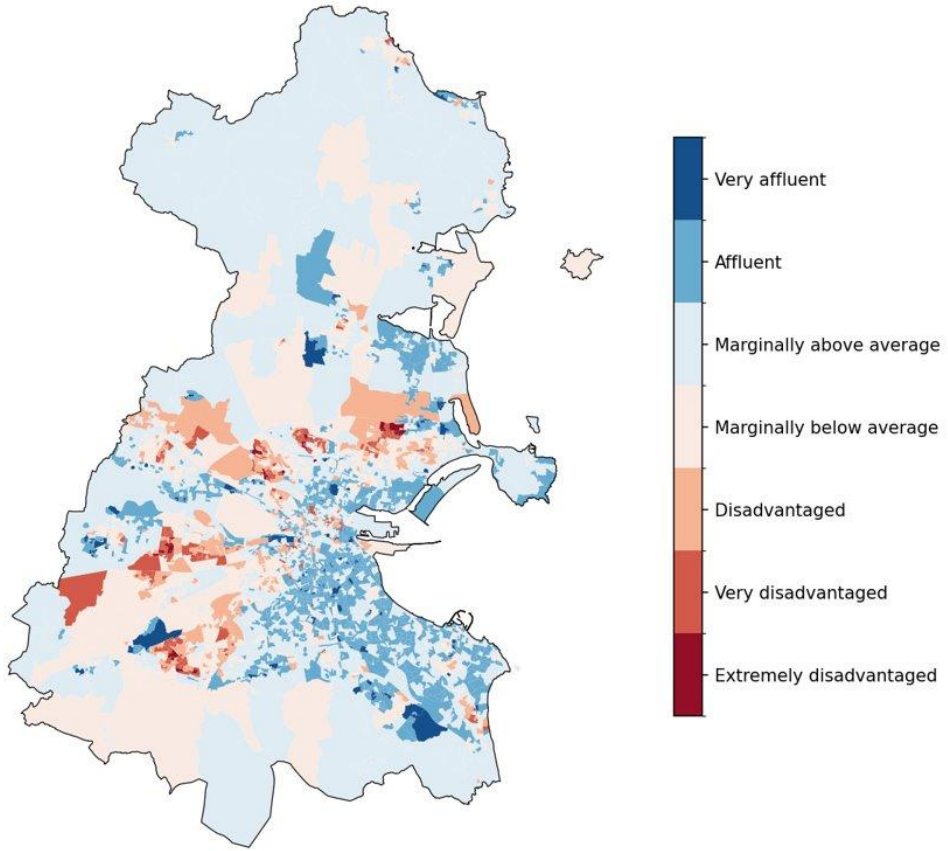


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Two Primary Pathways for Retrofit

Fully Funded Upgrades





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Community ≠ Household



Affluent Community



Disadvantaged Community

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Community ≠ Household



Affluent Community

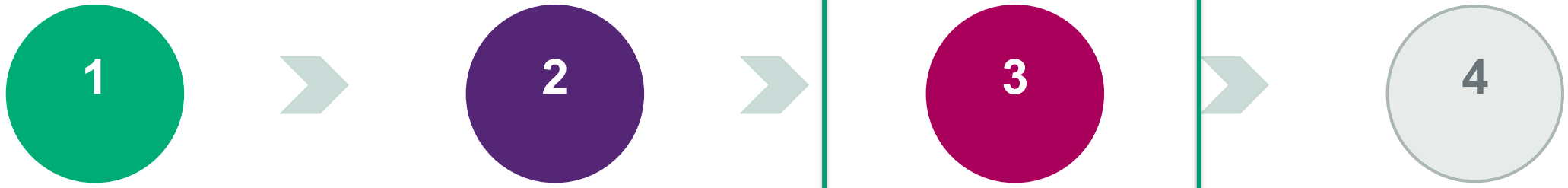


Disadvantaged Community

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How much activity has been supported?

PLACE

Small Area Mapping

Where is activity occurring?

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Linked Microdata

Who has access and what conditions do they experience?

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Longitudinal Evidence

Who benefits over time, and what difference does support make?

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Assessing a Just Transition Using Linked Microdata

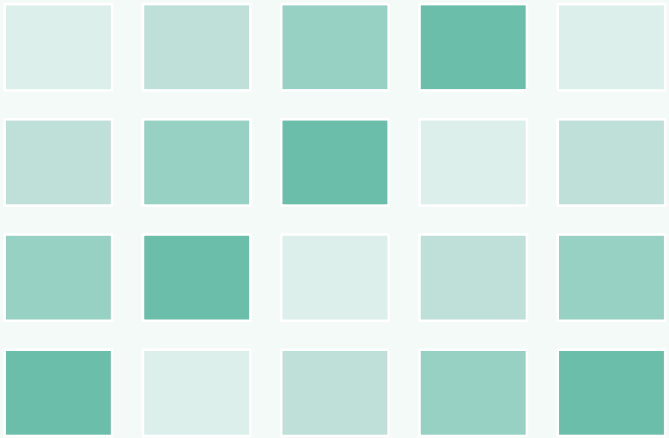


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From the characteristics of places to the circumstances of households

Household-level linkage allows us to look within areas and connect socioeconomic circumstances, dwelling characteristics and energy use.

PLACE-LEVEL VIEW



Area-level deprivation and grant coverage

HOUSEHOLD-LEVEL VIEW

- Tenure
- Social class
- Health
- Household composition
- Dwelling
- Energy use

Variation that area averages cannot reveal

This is an increase in analytical resolution, not a replacement for spatial evidence.

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Collaboration between SEAI and the CSO

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EPC and programme data

+

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data linkage, secure access, and sociodemographic data

1 DATA SOURCES

EPC
Dwelling energy performance

GRANTS
Supported interventions

ELECTRICITY
Metered consumption

GAS
Metered consumption

CENSUS
Household and sociodemographic characteristics

2 LINKED EVIDENCE

HOUSEHOLD

- Household circumstances
- Dwelling characteristics
- Energy consumption
- Programme participation

3 SECURE RESOURCES

Governed access and disclosure controls

4 ANALYSIS ENABLED

DISTRIBUTION	Just transition and grant reach
EFFECTIVENESS	Outcomes of supported upgrades
BEHAVIOUR	Fuel switching Retrofitting
RESPONSIVENESS	Price elasticity

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Dataset: 2022 cross-sectional residential profile

Linking household circumstances, dwelling performance and metered energy use for 90,000 residential properties:

CENSUS 2022

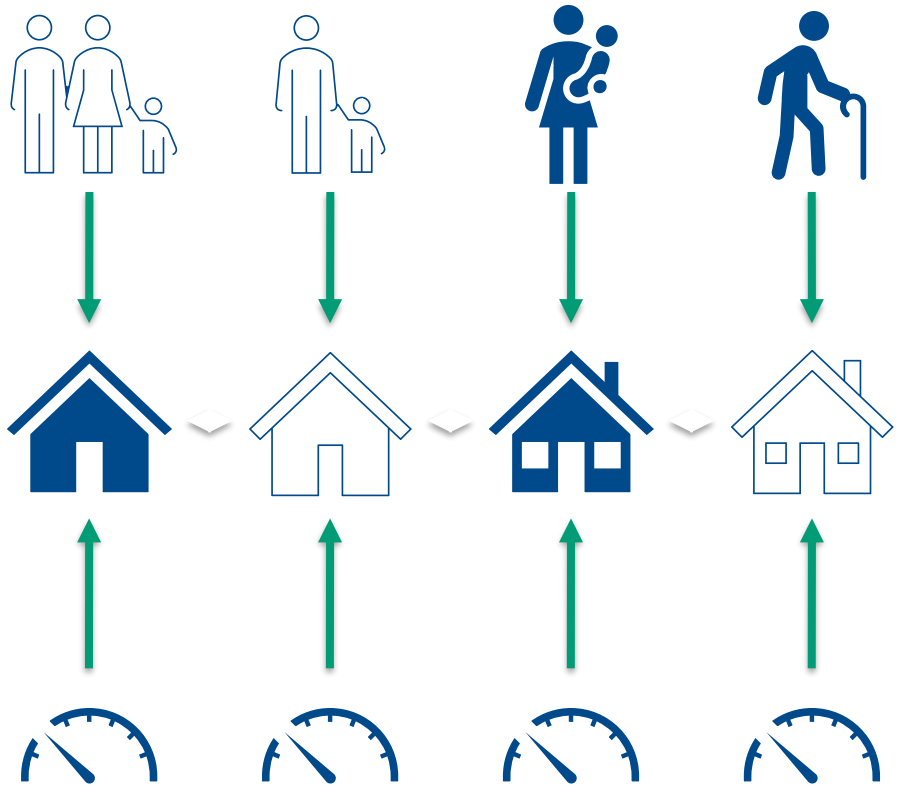
Sociodemographic circumstances, tenure, health, and household composition

EPC RECORDS

Energy performance, dwelling characteristics and low-carbon technologies

METERED DATA

Actual electricity and gas consumption during 2022



Three questions for a just residential transition

1

ACCESS

Who has access to heat pumps, solar PV and solar thermal, and how does access vary across households and dwellings?

Participation in the transition

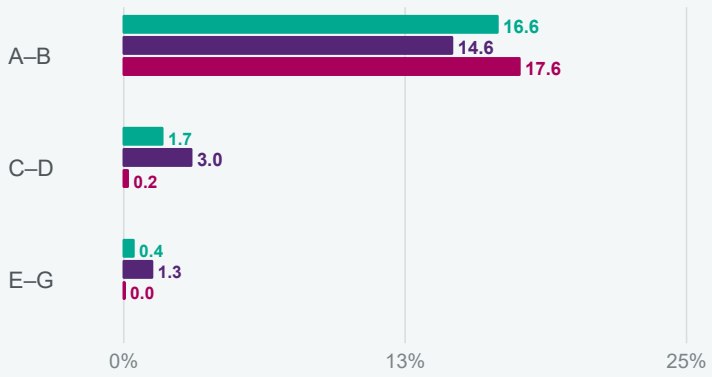
The analysis identifies distributional patterns and adjusted associations. It does not estimate causal programme effects.

Access: Technology prevalence varies markedly across the stock

Share of dwellings with each technology

Solar PV Solar thermal Heat pump

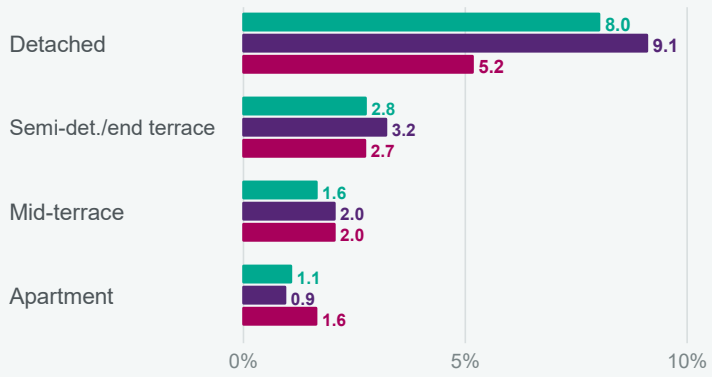
EPC band



Strong concentration in A–B dwellings

All three technologies are heavily concentrated in A–B dwellings. EPC is partly related to technology presence, so this is a descriptive association.

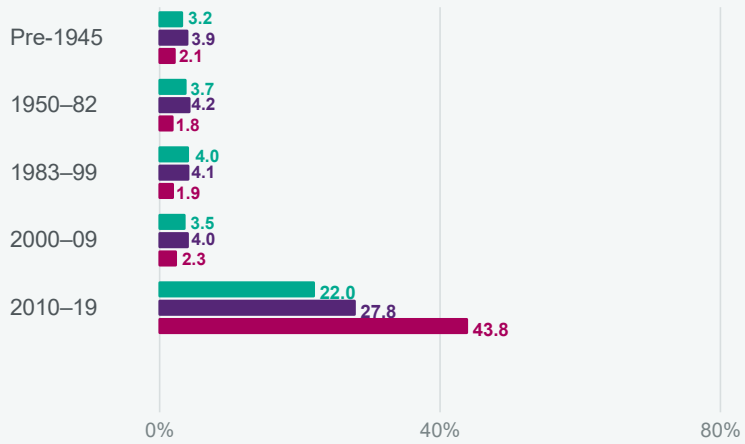
Dwelling type



Detached dwellings have the highest prevalence

The gradient is strongest for the solar technologies. Roof area, dwelling size and ownership constraints are plausible explanations.

Year of construction



Newer dwellings show distinct technology profiles

Heat pumps are strongly concentrated in dwellings built in 2010–19. Solar PV and solar thermal are also much more common in this cohort than in older dwellings.

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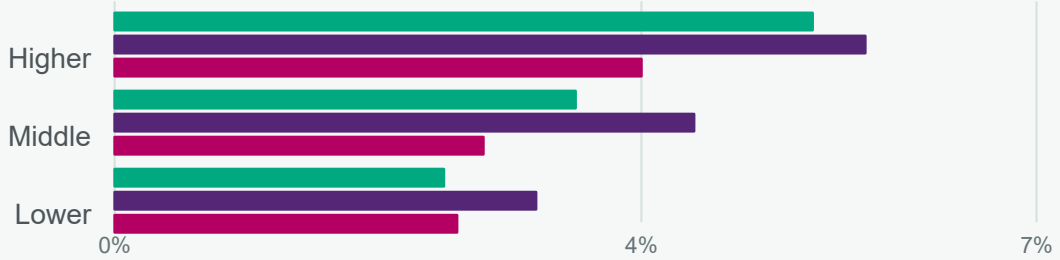
Access: Technology prevalence varies markedly across groups



Tenure



Social class of reference person



1 Dwelling characteristics are central

Heat pumps and solar technologies are concentrated in newer, better-rated homes.

2 Private renter adoption is limited

Private rentals have the lowest shares across the three technologies.

3 Patterns differ by technology

Local-authority homes have a higher heat-pump share, but lower solar shares.

4 A social-class gradient exists

Technology prevalence generally falls from higher to lower social-class groups.

Differences in technology access by tenure and social class persist after adjustment for other household, dwelling and regional characteristics.

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Current limitations of the household-level analysis

1

Associations are not programme impacts

The analysis is cross-sectional. It does not establish causal effects, additionality or changes over time, and SEAI grant participation is not linked to the data.

2

Household energy use is only partly observed

The data does not cover all fuels, including kerosene solid fuel use. Electricity end uses also cannot be identified directly.

3

2022 was an unusual energy year

Relatively mild weather and exceptionally high gas prices may both have reduced heating demand, affecting comparisons based on metered gas consumption.

These limitations define what can be concluded from the current analysis and motivate the next phase of evidence development.

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Future resources will provide richer longitudinal evidence

Moving from a cross-sectional snapshot towards tracking participation, energy use and outcomes over time.

EPC + SEAI grants + Census + Electricity + Gas LONGITUDINAL LINKAGE

Follow households and dwellings over time

Link repeated observations across EPC, grant participation, Census and metered consumption data.

Increase temporal and dwelling detail

Use monthly electricity and gas data together with more granular dwelling characteristics from EPC records.

Analyse participation and outcomes

Examine how programme participation, energy use and housing outcomes evolve for different households and cohorts.

A stronger evidence chain connecting programme participation, dwelling characteristics and energy outcomes, and a better basis for analysing how the transition affects different households and cohorts.

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From measuring activity to understanding distribution

We are continuously improving our understanding by using the best available evidence, while being clear about what each source can and cannot tell us.



GRANTS

How much supported activity is taking place?



PLACES

Which communities are being reached?



HOUSEHOLDS

Who can participate, and what conditions do they experience?



OUTCOMES

Who ultimately benefits, and in what ways?

The shared EU challenge: Show not only progress towards targets, but that support reaches vulnerable households and worst-performing homes, and that those households benefit.

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Thank you

ODYSSEE–MURE Conference | SEAI | 2026

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