SMARTEES: Modelling household uptake of a city-wide district heat network in Aberdeen, Scotland

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Kathryn Colley, Ruth Wilson, Tony Craig, Gary Polhill, Doug Salt, Annabel Pinker, Phoebe Somervail

Contact: Kathryn.Colley@hutton.ac.uk

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SMARTEES
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SMARTEES: Social Innovation Modelling Approaches to Realizing Transition to Energy Efficiency and Sustainability

SMARTEES is a large-scale research project involving 11 partners (academic and non-academic), studying 10 case study social innovations across Europe

Aberdeen case: **Energy efficiency schemes for fighting fuel poverty**
Social innovation: Heat network development in Aberdeen

City of Aberdeen, Scotland, UK

Aberdeen Heat network

Current status: Discrete heat networks across the city (red), serving primarily high-rise social housing blocks and public buildings.

Future plans: Create strategic links to establish a city-wide network serving residential areas of high fuel poverty, as well as businesses in the city centre (yellow)

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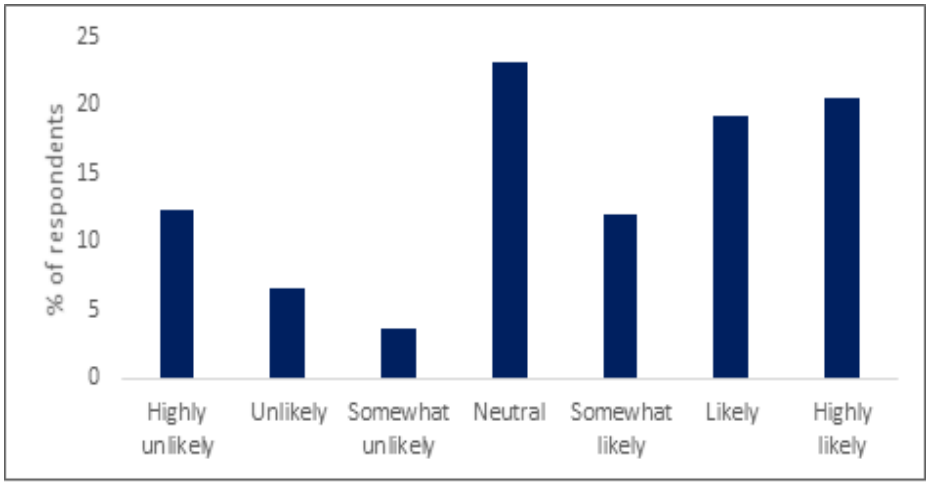
Understanding potential uptake by households

The success of the heat network expansion in future phases will rely on voluntary adoption by householders.

Householders' attitudes towards joining a district heat network were explored through a mixed-mode postal/online survey (N=838).

A logistic regression model predicted the odds of being 'highly unlikely'/'unlikely' to join (Nagelkerke R^2 = .123).

How likely are you to join a district heating scheme, if it was available in your area?



Which factors predict likelihood of adoption?

Individual and household level factors?

Sociodemographic and socioeconomic factors, household size, dwelling type, tenure, central heating type

✗ Not significant predictors

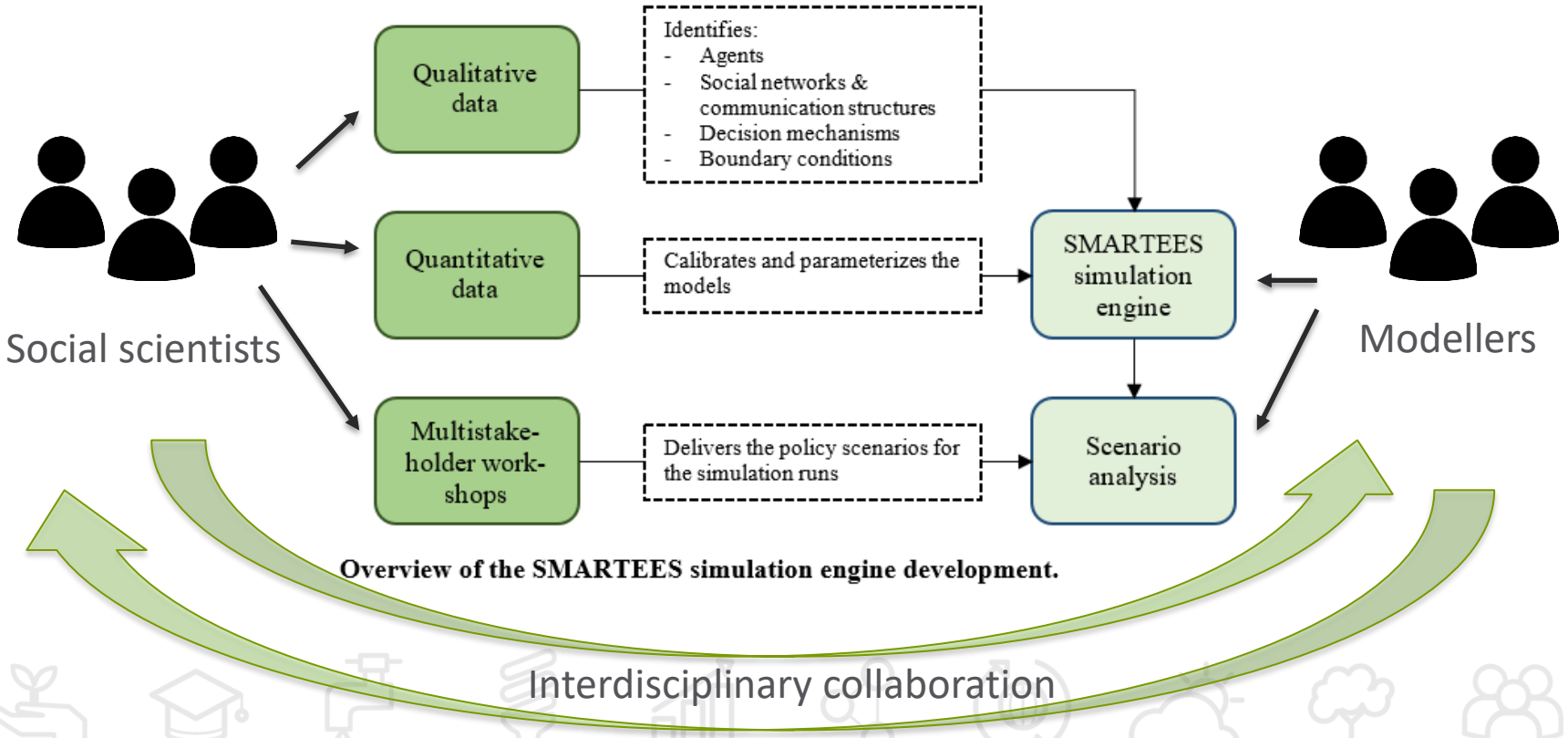
Home heating experiences?

1. '**Heating hardship**' – having difficulty heating home in an affordable way ✓ Significant at p<0.01*
2. **Problems with boiler or heating system** in past year ✓ Significant at p<0.05*

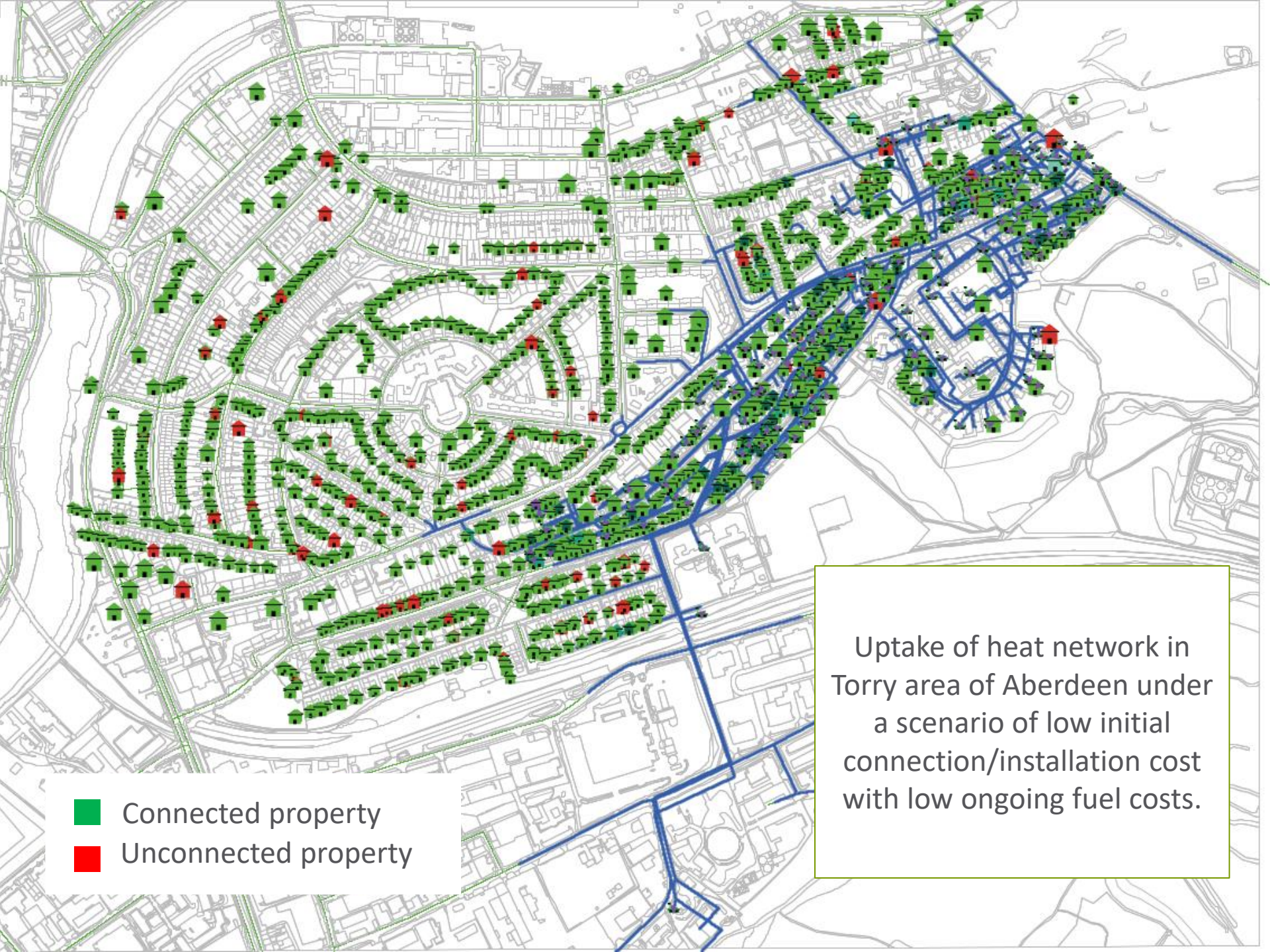
*associated with lower odds of being highly unlikely/unlikely to join

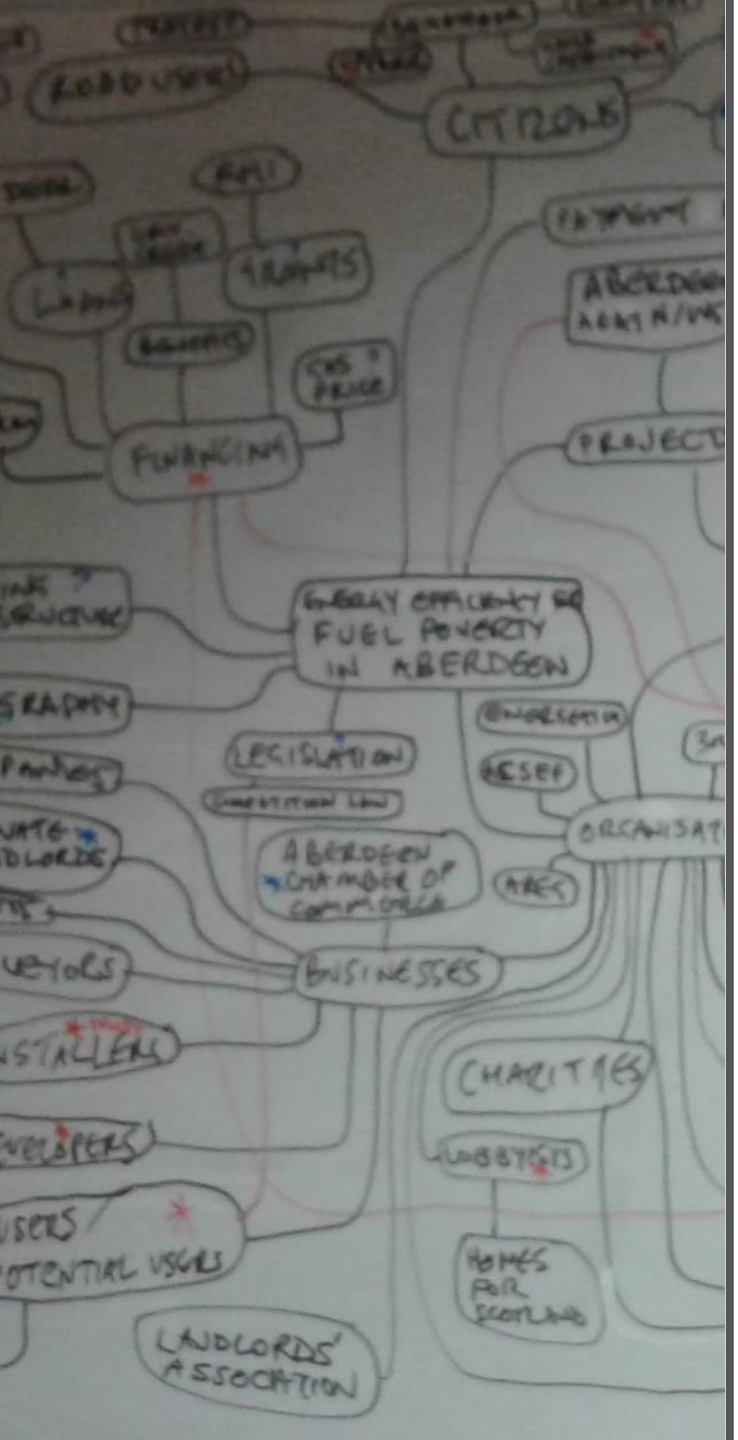
Modelling future adoption of the heat network

SMARTEES uses **agent-based modelling (ABM)** to model the socio-technical system of heat network expansion. The ABMs, grounded in the empirical data gathered throughout the project, are being used to simulate the effects of various policy scenarios over a 10-year time frame on heat network uptake and fuel poverty.



Overview of the SMARTEES simulation engine development.


Connected property
Unconnected property
Uptake of heat network in Torry area of Aberdeen under a scenario of low initial connection/installation cost with low ongoing fuel costs.



Methodological reflections

- Interdisciplinary collaboration between social and computational scientists in behavioural modelling offers potential for greater understanding of the social dimensions of adoption of low carbon technologies

- This type of inter- and trans-disciplinary (involving non-academic stakeholders) collaboration takes a great deal of time and an openness on the part of all actors to learn each other's approaches and perspectives.

- Social scientists can help to inform the theoretical and empirical bases of ABMs, and also act as a conduit between modellers and stakeholders in knowledge exchange processes to support the development of policy-relevant models of the future.

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Thank you for your interest

To discuss the project or areas of shared interest please do feel free to contact me at Kathryn.Colley@hutton.ac.uk or drop in for a chat during the timetabled poster discussion session:

Wed 10th Nov, 12.45 EST

SMARTEES local social innovation

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