

Delivering a sustainable and equitable heat transition: An overview of the emerging insights

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Scotland's energy transition: research and policy challenges
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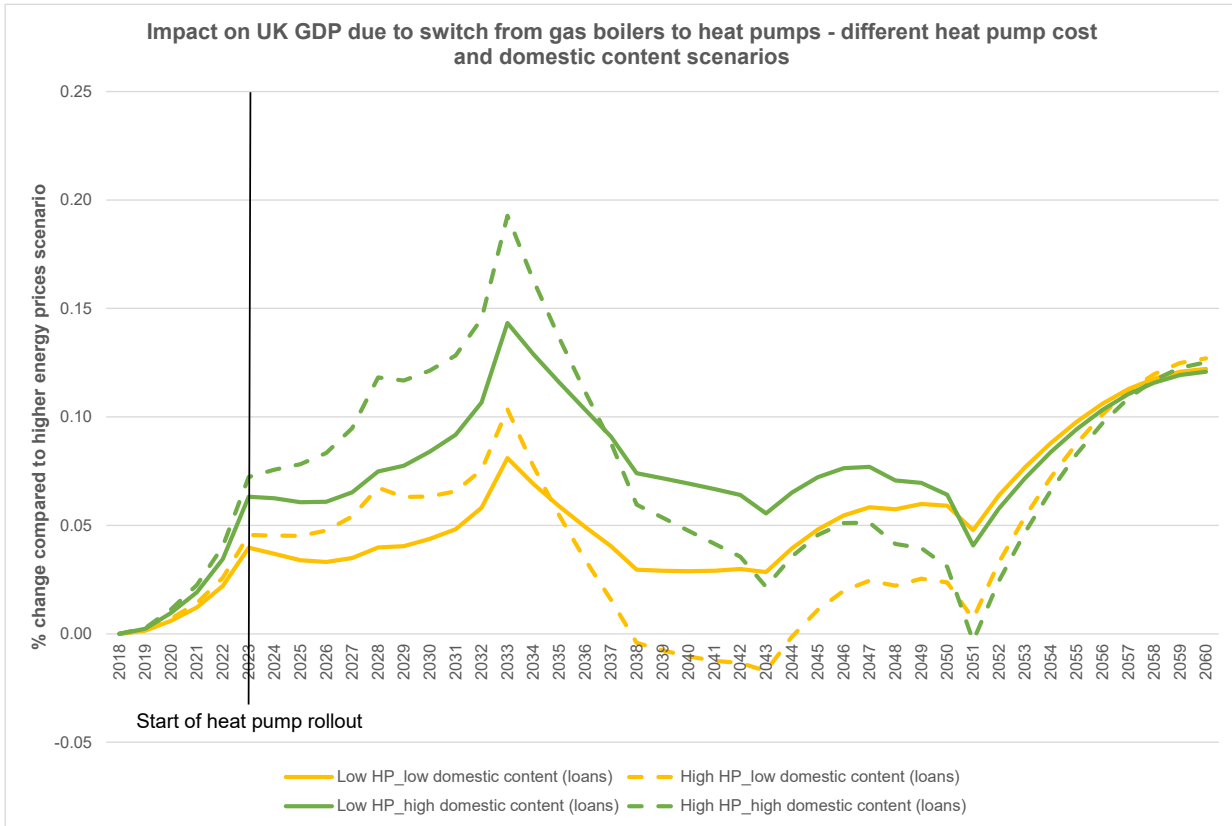
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About the project

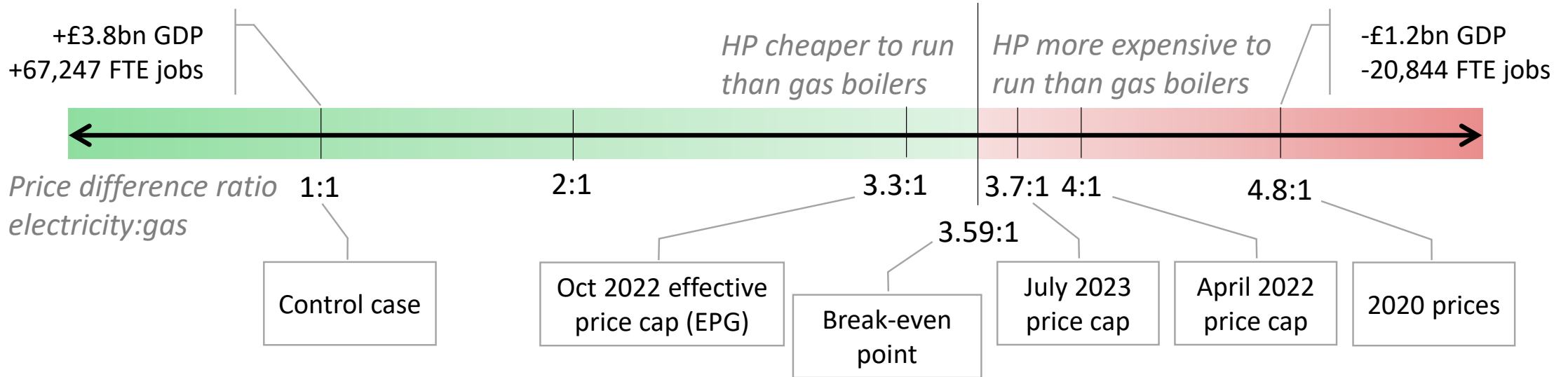
- 2-year flex fund project
- Analysing a range of scenario simulations to understand the household real income and wider economy implications of decarbonising residential heat through the deployment of heat pumps.
- Focused on scenario involving almost 50% of households using low carbon heating by 2035 and nearly all by 2050.
- Looking at:
 - Economy wide impacts of the HP rollout
 - The role of the electricity:gas price differential
 - The impacts of HP cost reductions and HP manufacturing in the UK
 - Jobs, skills and regional implications

How could the rollout of heat pumps affect the UK economy?



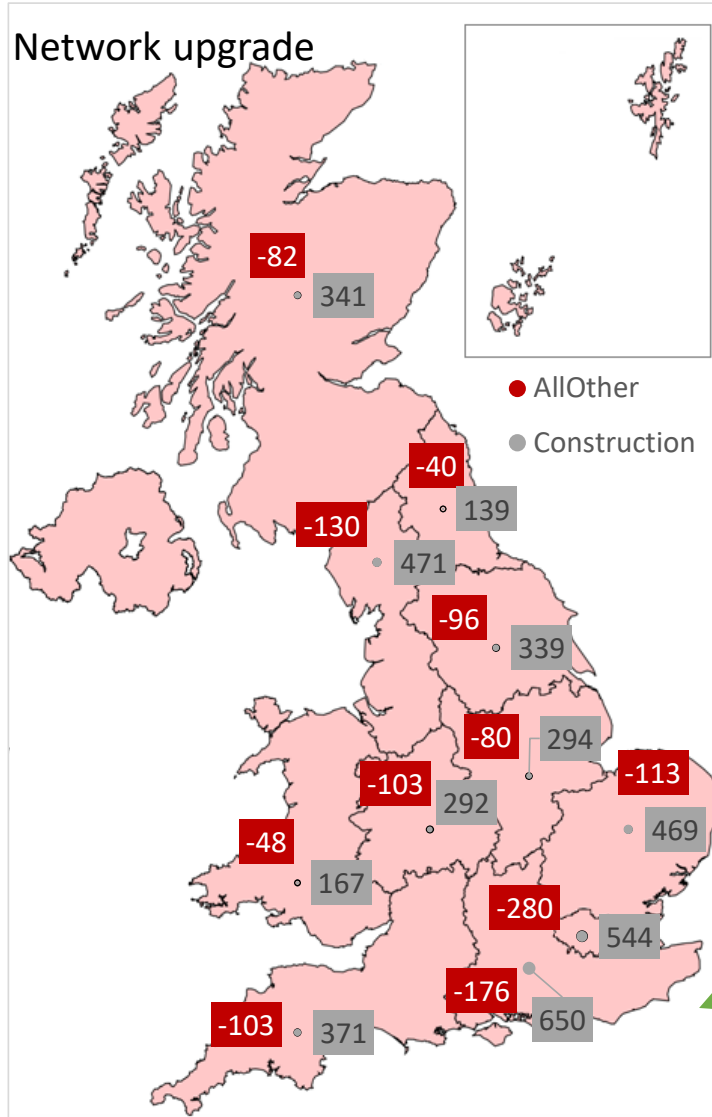
- To fully decarbonise the UK household sector we estimate that a total capacity of 81.8GW of heat pumps will be necessary
- This comes with around £21.1 billion network upgrade requirements by 2050
- Upgrading and expanding the network and installing heat pumps introduce significant demand in the economy
- Pressure on the parts of the economy that are involved in the network investment and the heat pump rollout
 - Could lead to increased labour costs across the wider economy
- Still potential for economy-wide gains driven by this activity and any potential energy bill savings due to heat pump

The importance of relative electricity and gas prices



- However, achieving energy bill savings crucially depends on the relative electricity and gas prices
- Historically, electricity has been significantly more expensive than gas – for example in 2020 electricity was around 4.8 times more expensive than gas
- This price difference makes heat pumps more expensive to run compared to gas boilers
- Eliminates the physical efficiency gains of heat pump use – negatively affects HH consumption
- For a ratio of 3.59:1 heat pumps and gas boilers have the same operating cost
 - For COP of 2.52
- For a higher COP the break even point moves to the right

Regional employment impacts - Network upgrade activity



All jobs - Mapping economic model results, based on proportion of sector jobs across regions

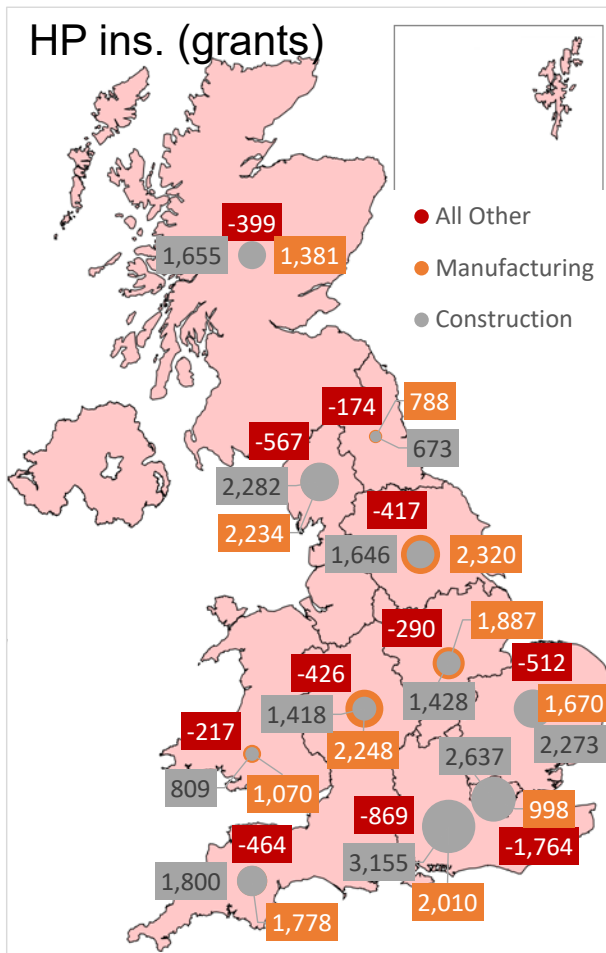
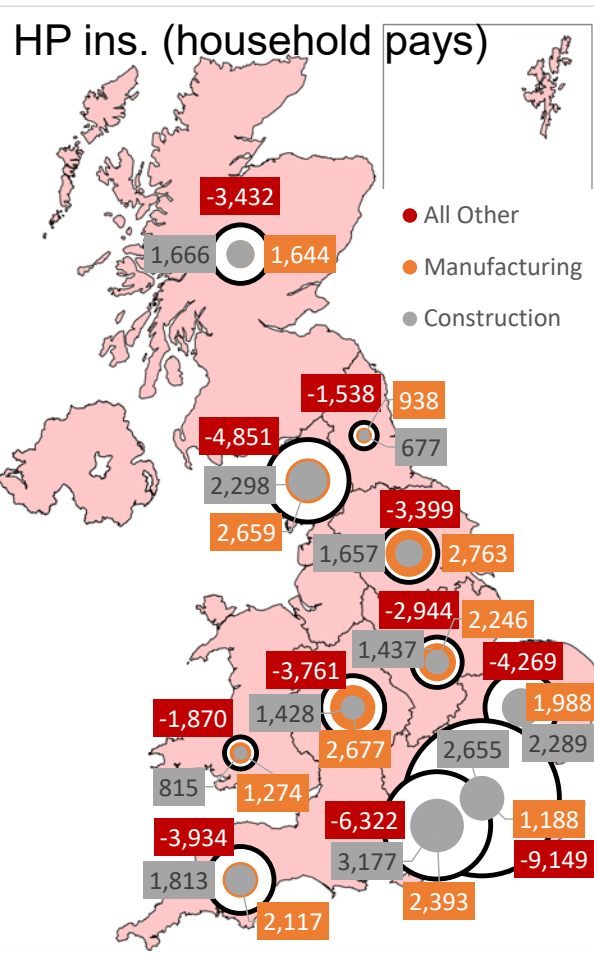
- focus on construction sector (most activity linked to that sector)
- Looking at year 2033 – peak activity year

We see large pockets of construction job creation in areas where large residential centres are located

- the construction activity on the distribution network which is denser in largely populated areas
- But also job losses in other sectors, driven by wage pressures

Regional employment impacts - Heat pump manufacturing and installation activities

All jobs on year 2033 - Mapping economic results (different repayment methods)



- New manufacturing and construction jobs across regions
- Especially in midlands and northern areas
- However:
- London hit harder when households have to cover the cost of heat pumps
 - Restrictions on household disposable income usually leads to less spending on hospitality, services, etc. some of the key sector in London (hence job losses)

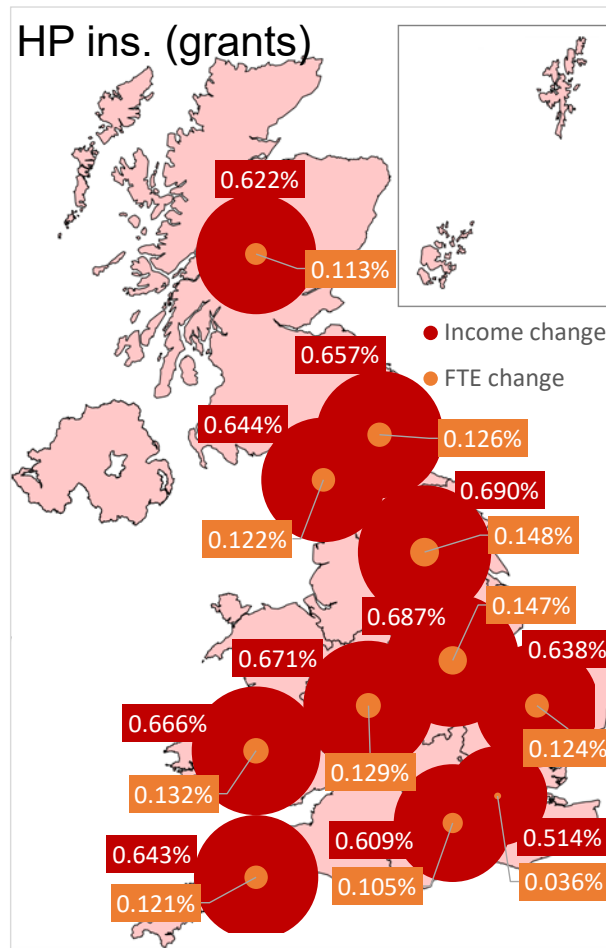
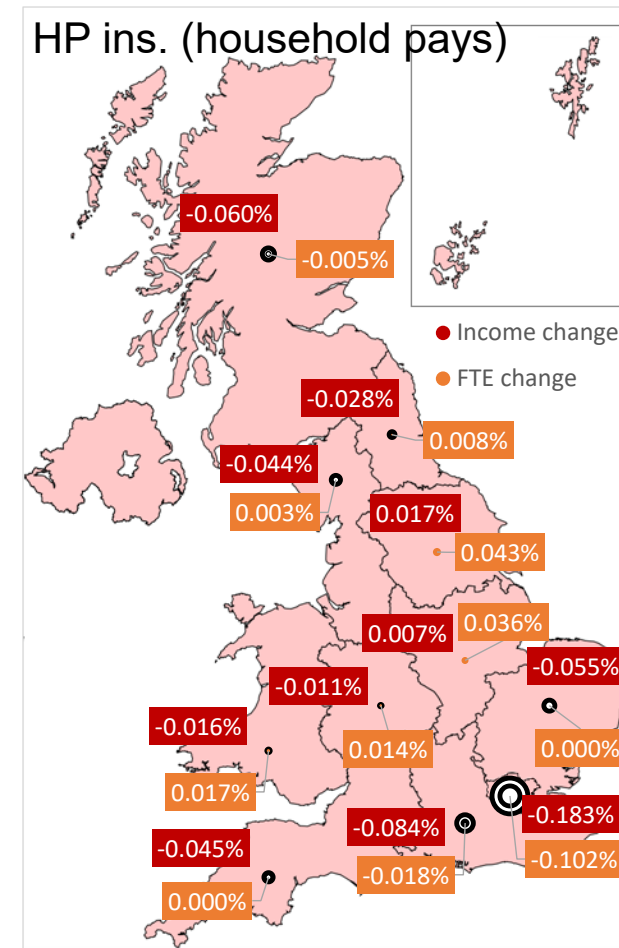
Policy implications

Key challenge: the labour requirements across regions

- *Do local economies have the necessary skilled and overall labour to meet these requirements?*
- *Where requirements exceed availability, people may have to relocate?*
- *How these jobs interact with network upgrade jobs?*

Regional impacts on quality of jobs (income changes vs FTE changes)

All jobs (year 2033) – Heat pump manufacturing and installation activity



Examples of improved job quality

- linked to wider increase in nominal wages
- increased employment in sectors that typically offer higher wages (e.g. manufacturing)

But impact on household disposable income matters

- E.g. under Grants, the broader economic gains leads to a more than proportional increase of income from employment.
- If households have to cover the costs, the reduction of disposable income affects sectors offering higher wages than construction.

Conclusions and policy implications

- Deployment of heat pumps = potential for growth and to ease the negative pressures from other changes to the UK economy
- The expected outcomes depend on the relative electricity-gas prices, whether reduction on installation costs are achieved, and how the cost of heat pumps is covered
 - A strong domestic supply chain can help enhance the potential economy-wide gains
- Our results show that there will be large pockets of construction and manufacturing job creation in higher population density regions.
 - However, these activities will drive job relocation and displacement.
- The demand for skilled labour is also likely to increase labour costs, putting pressure on wages.
 - Negatively affecting employment in many labour-intensive industries (e.g., finance, consultancies, hospitality etc.)

Further reading

- Turner, K., Katris, A., Calvillo, C., Stewart, J. and Zhou, L. (2023) Unlocking the benefits of Heat Pumps: The Role of Electricity and Gas Prices. Available at: <https://strathprints.strath.ac.uk/85812/>
- Corbett, H., Katris, A., Calvillo, C., and Speirs, J. (2023) Briefing note: Unlocking the benefits of the low-carbon heat transition. Available at: <https://doi.org/10.17868/strath.00086820>
- Calvillo, C., Katris, A., Alabi, O., Stewart, J., Zhou, L. and Turner, K. (2023) Technology pathways, efficiency gains and price implications of decarbonising residential heat. Available at: <https://doi.org/10.1016/j.esr.2023.101113>
- Katris, A., Turner, K., Calvillo, C. and Zhou, L. (2024) The importance of heat pump cost reduction and domestic supply chain development in the presence of persisting energy price shocks. Available at: <https://doi.org/10.1016/j.esr.2024.101518>
- Calvillo, Christian, Katris, Antonios, Zhou, Long and Turner, Karen, Jobs, Skills and Regional Implications of the Low Carbon Residential Heat Transition in the UK. Available at SSRN: <http://dx.doi.org/10.2139/ssrn.4837627>



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Thank you!

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