

# Demanding more?: UK progress and challenges on demand-side policies

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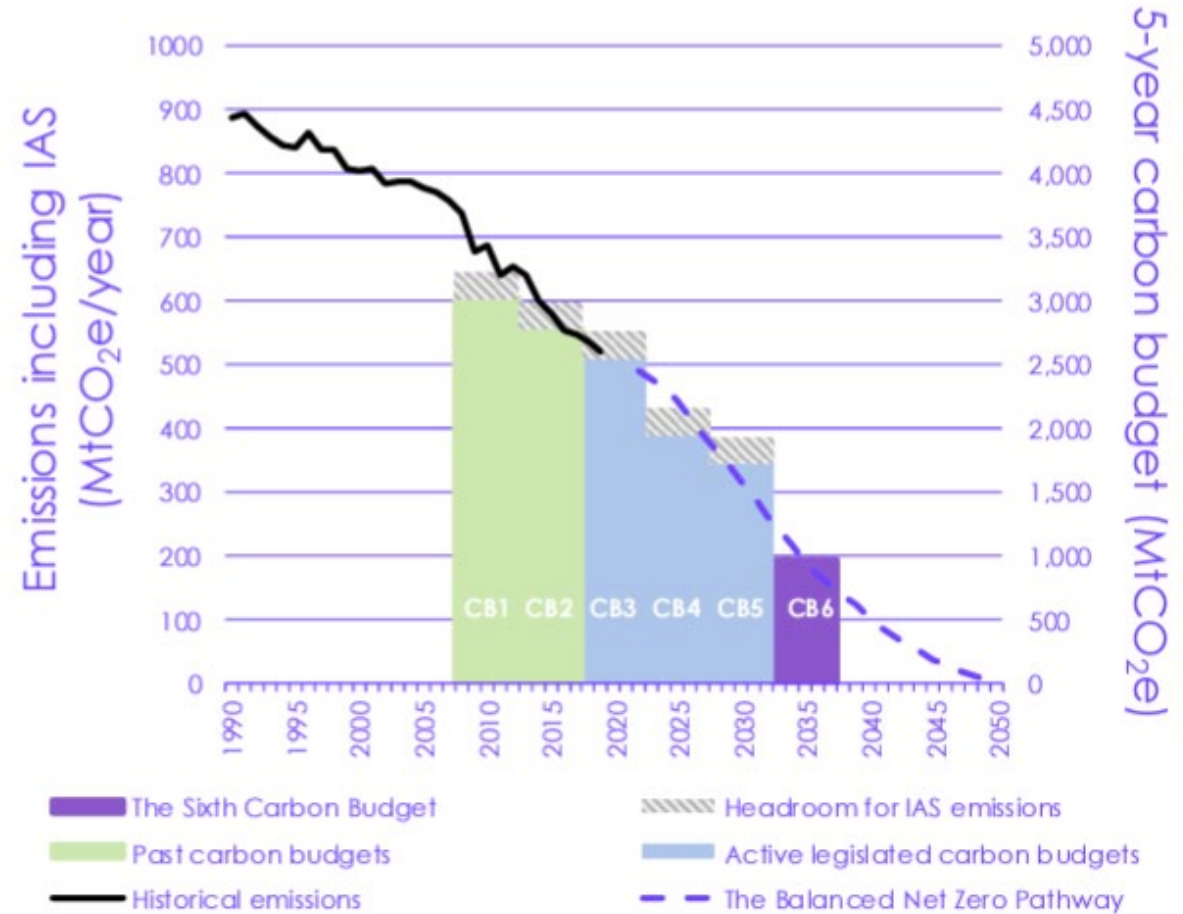
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# UK context

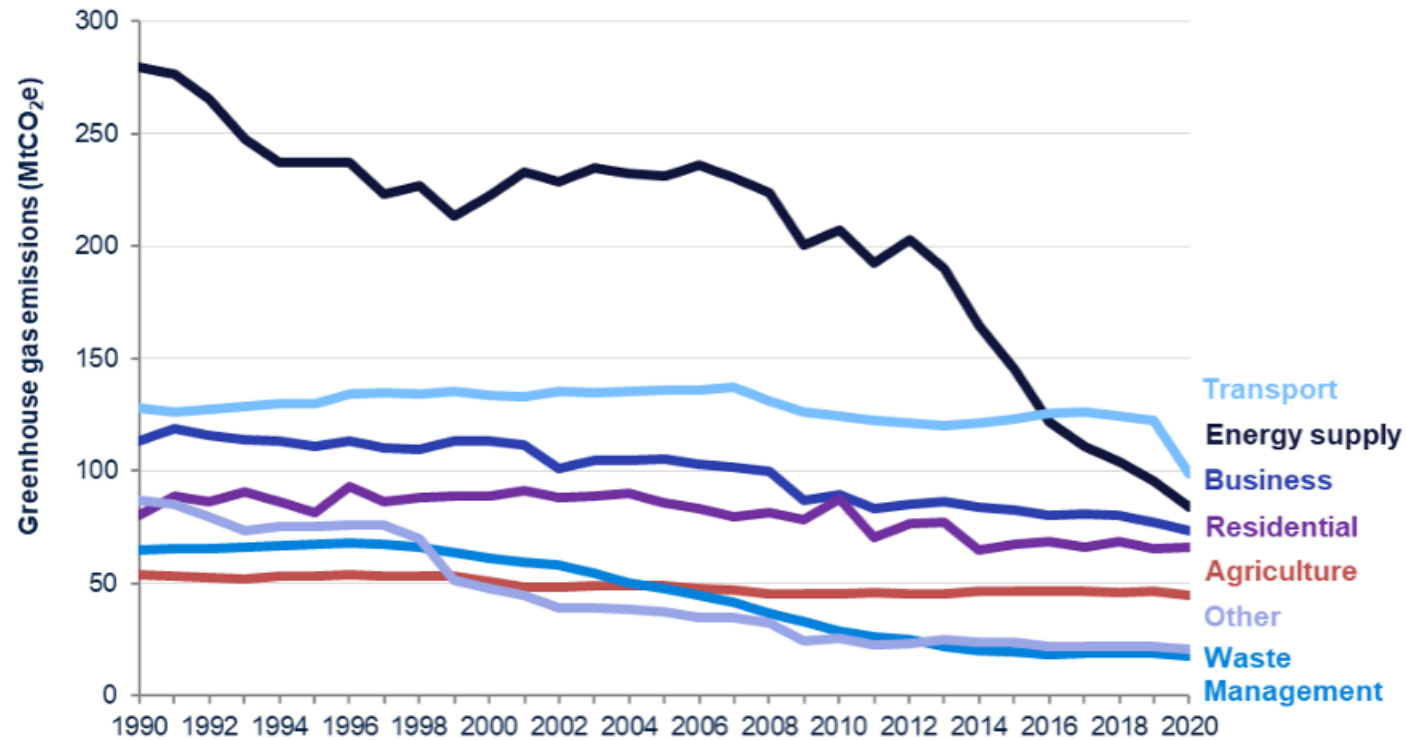
- Ambitious net zero targets, significant progress but delivery challenges for future carbon budgets
- Ongoing energy price crisis



Source: BEIS (2020) *Provisional UK greenhouse gas emissions national statistics 2019*; CCC analysis  
Notes: Emissions shown include emissions from international aviation and shipping (IAS) and on an AR5 basis, including peatlands. Adjustments for IAS emissions to carbon budgets 1-3 based on historical IAS emissions data; adjustments to carbon budgets 4-5 based on IAS emissions under the Balanced Net Zero Pathway.

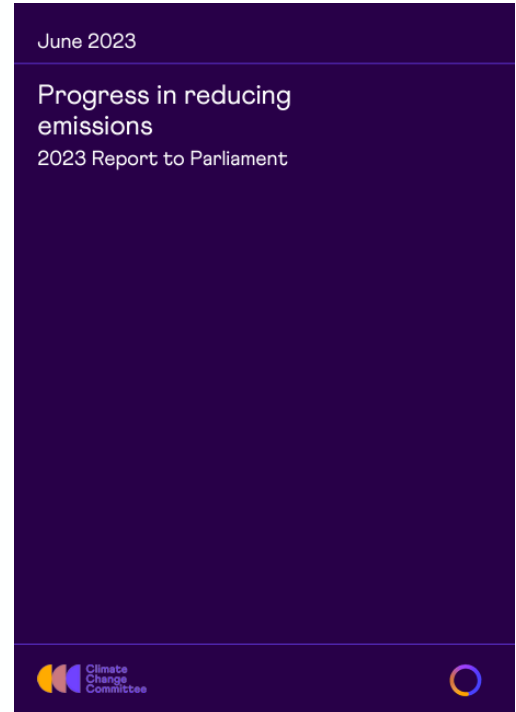
# Good progress on electricity – less so in other sectors

Figure 6: Territorial UK greenhouse gas emissions by NC sector, 1990-2020 (MtCO<sub>2</sub>e)



Source: Table 1.2, Final UK greenhouse gas emissions national statistics 1990-2020 Excel data tables

Note: Other includes Public, Industrial Processes and the Land Use, Land Use Change and Forestry (LULUCF) sectors.



Climate Change Committee (2022) *Progress in reducing emissions: 2022 Report to Parliament*. <https://www.theccc.org.uk/publication/2022-progress-report-to-parliament/>

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<https://assets.publishing.service.gov.uk/media/61f7fb418fa8f5389450212e/2020-final-greenhouse-gas-emissions-statistical-release.pdf>

# The importance of the demand side in achieving targets

- CREDS Positive Low Energy Demand project modelled possible future energy demand scenarios
  - without energy demand reduction the UK will not achieve the 2035 target (78% below 1990 levels) or net zero 2050.
  - changes required in the way we live, move and consume.
  - without demand reduction - targets will be more expensive and risky (larger energy system and Carbon Dioxide Removal (CDR) technologies)
  - demand can be reduced with living standards maintained
  - co-benefits can be significant - air quality, warmer homes, healthier diets and increased opportunities for exercise.

<https://low-energy.creds.ac.uk/the-report/>



# A broader approach to the demand side: flexibility

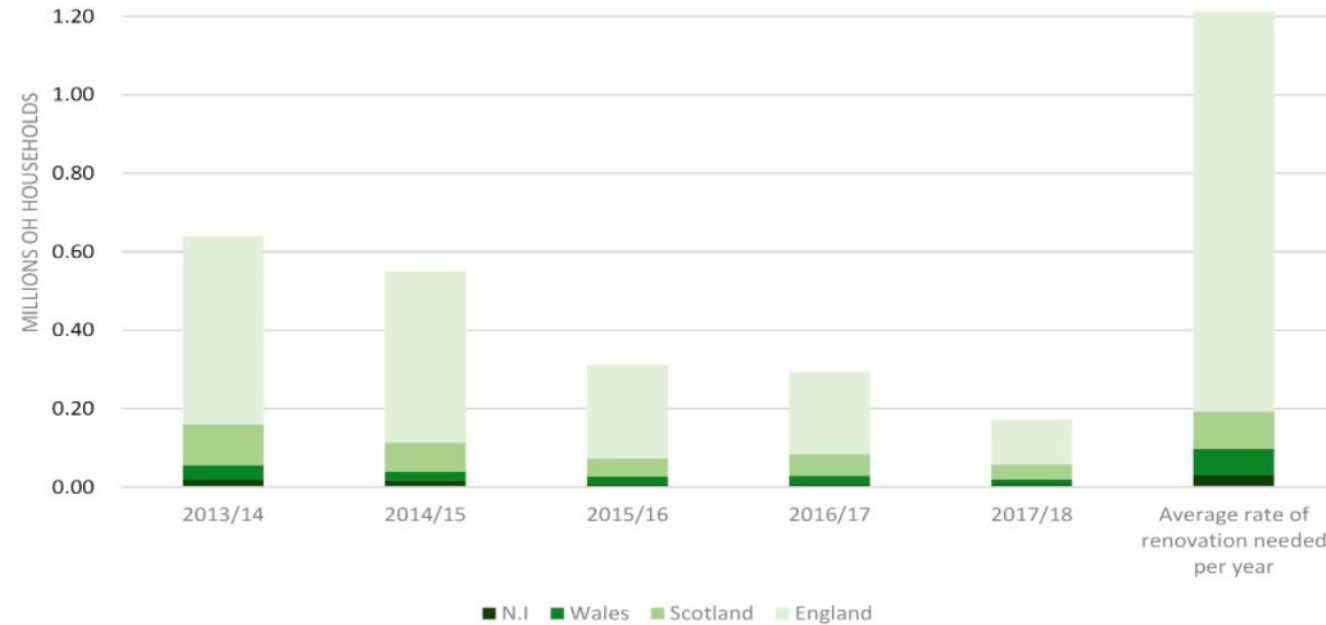
- Decentralised energy system assets:
  - Electric vehicles in the UK predicted to increase from ~1 million to 11 million by 2030
  - Goal to deploy 600,000 electric heat pumps per year by 2028.
- Demand projected to increase by 50% by 2035
- Need for flexibility to manage variable renewable supply
- Shift from supply side flex to demand side flex

"modifying generation and/or consumption patterns in reaction to an external signal (such as a change in price) to provide a service within the energy system".



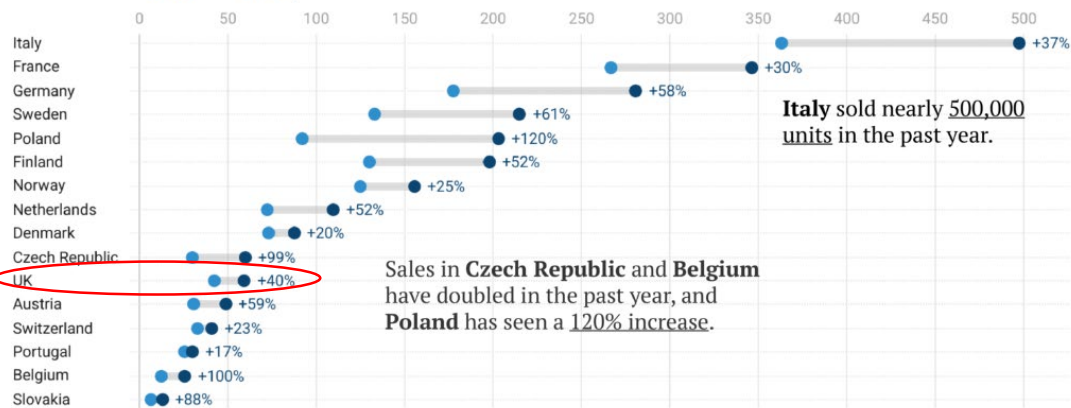
# But slow progress across the demand side...

- UK has some of the least efficient houses in Europe
- Significant drop in installs since 2012
- Range of policies to support heat electrification
- Early days on demand side flexibility



## Heat pump sales in Europe have increased 38% in the past year

Total sales for 2021 and 2022, thousands



Created with Datawrapper

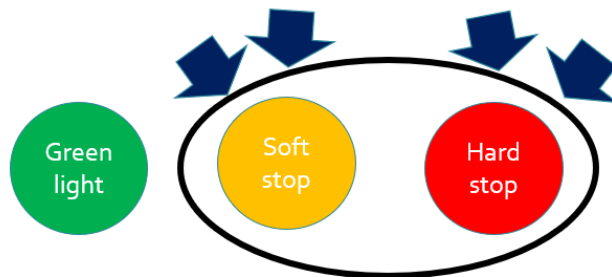
Source: Various national sources and EHPA. Chart: Carbon Brief

Number of UK homes improved by energy efficiency under a Government programme, compared to the rate to meet 2035 EPC band C target. Source: BEIS Select Committee (2019)

# Barriers to enabling flexible, distributed energy systems

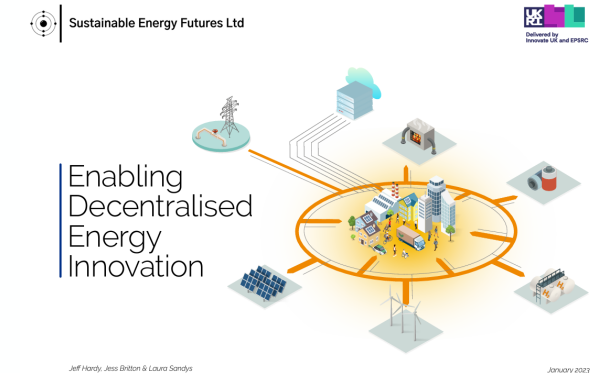
## Five barrier themes

- 1 Value of DE
- 2 Market rules
- 3 Limited innovation
- 4 Demand-side lacking
- 5 Overarching strategy



But an active innovation phase:

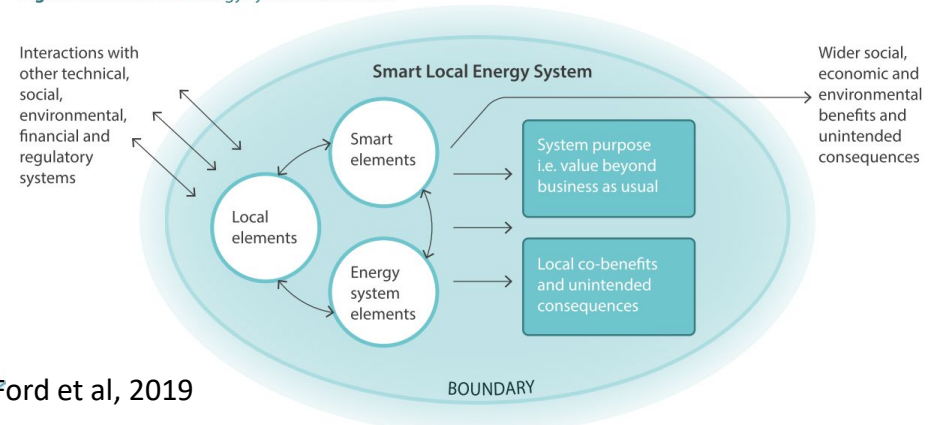
- National Grid ESO 'demand flexibility service' trials
- Distribution network flexibility markets
- Local Energy Market trials
- [Flexibility Innovation Programme](#) - £65m



# Integrated local and regional energy systems: key to enabling the demand side?

- Solutions are likely to look different in different locations (housing types/quality, existing infrastructure, demographics, local choice)
- Place-based approaches to net-zero can unlock system and wider benefits - £108bn of savings for an investment of £58bn (PwC for UKRI, 2022).
- Locally integrated systems for heat, power, mobility.
  - optimising use of distributed electricity generation and storage, combined with demand reduction and flexibility.

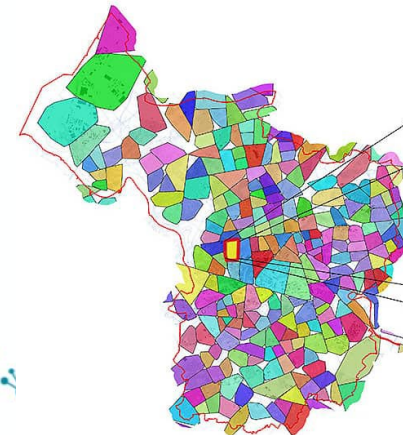
Figure 1: Smart local energy system framework



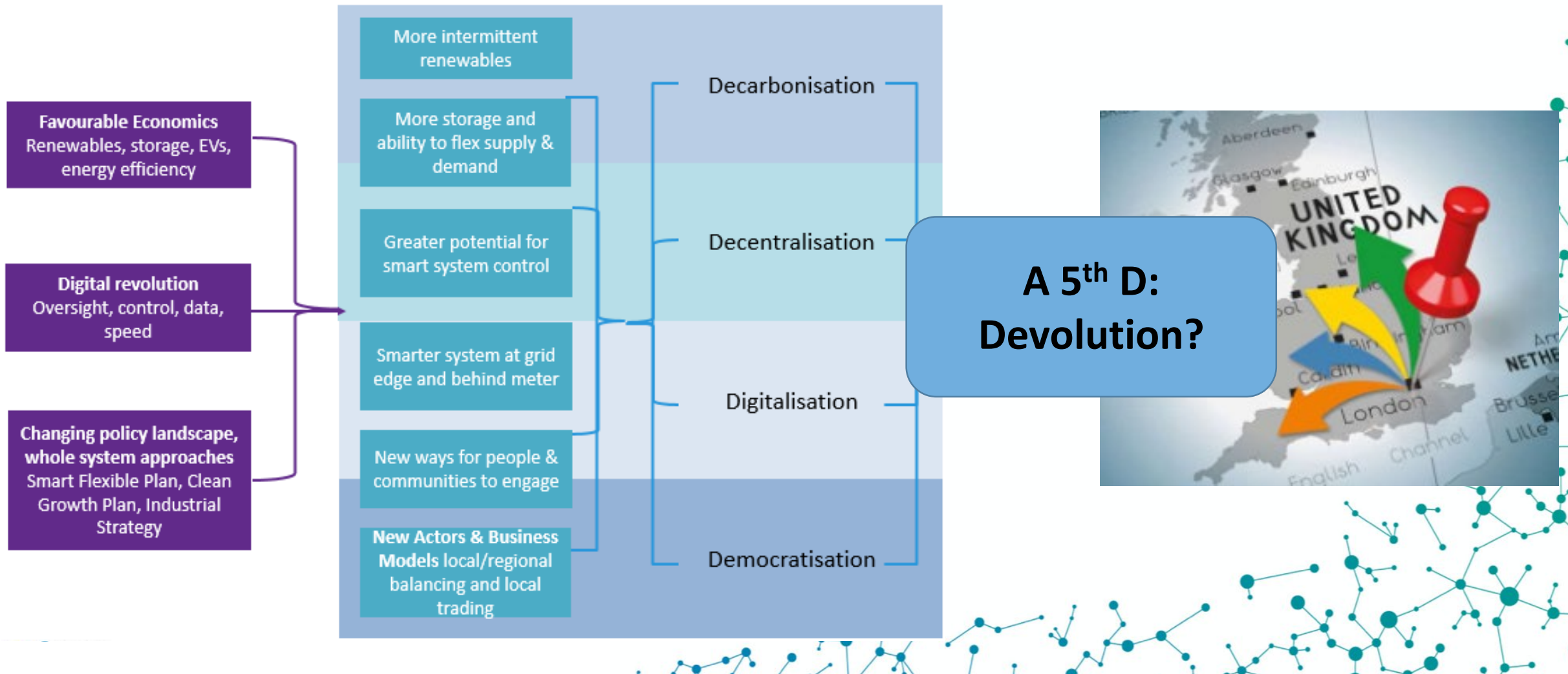


# Emerging UK activity on LRES

- Local and regional energy planning (common data and methodologies)
- Heat Zoning
- Improving access to flexibility markets for a range of actors
- Regional Energy Strategic Planner role announced
- Embedding requires – clear roles and responsibilities, policies, coordination across scales, data



# Momentum towards more decentralised energy systems: 4Ds to 5Ds



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