energy saving trust

It’s time to decarbonise

How can you use housing stock property and energy data to inform your retrofit strategies?

Jamie Browne, Gordon Watts & Sean Lemon

03.10.23

The challenge

UK: 17-25%

Climate Stripes, University of Reading 2018

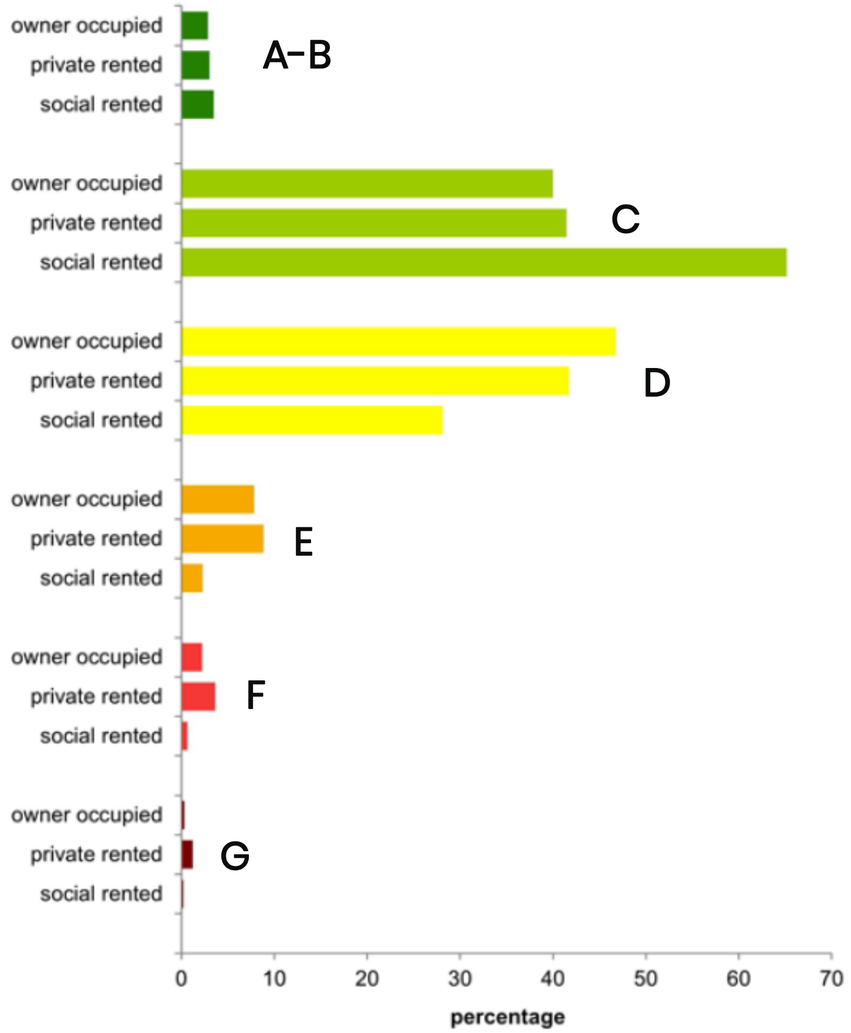
All social homes to achieve:

- Minimum EPC C by 2030
- NZC Performance by 2050

Where are we now?

Energy efficiency rating bands for occupied dwellings, by tenure, 2021

English Housing Survey 2021 to 2022 – Gov.UK



74%
Gas Central Heating

Census 2021, ONS

Planning a retrofit campaign

How will we pay for this?

Do our customers understand and want this?

What technical solution do we back?

How will we maintain this?

Which homes do we tackle first?

How do we get the biggest bang for our buck?

What retrofit do we need to do?

Who will do the work?

GOOD DATA & INSIGHT!

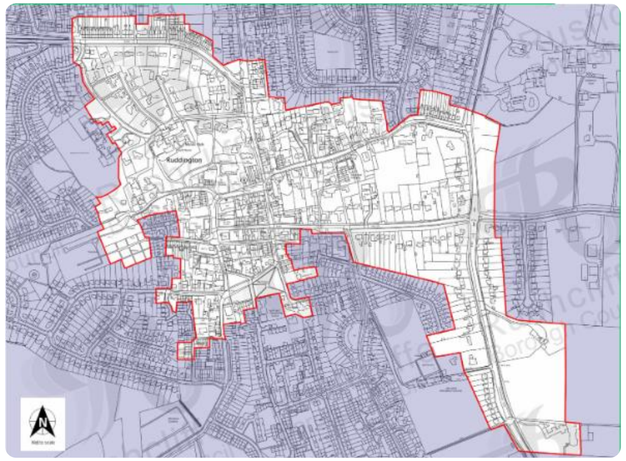
Will energy bills be affordable for our customers?

What's your average SAP rating?

OpenRent.co.uk 2022

Unknown

Data integration



Data modelling

Questions:

- What are my archetypes?
- Where are my clusters, and where should I start?
- What measures are required to hit target?
- How do I futureproof for the next step?
- How much carbon will I save?
- How much will it cost?
- What impact will it have on customer fuel bills?

“But every property is different isn’t it?”

Overcoming the data challenge

Overcoming the data challenge

Overcoming the data challenge

Phase 1 – Build an evidence base

- Collect relevant datasets:
  - Building and energy efficiency data
  - Socio-demographic data
- Develop a housing stock database or asset management system
- Conduct baseline study to understand current conditions
- Benchmark your stock against regional and national trends

Overcoming the data challenge

Phase 2 – Explore scenarios

- Translate policy objectives into retrofit scenarios
- Use housing stock data and energy modelling software to:
  - Recommend property improvements
  - Estimate potential costs/savings and impact on efficiency
  - Evaluate effectiveness of achieving your targets
- Compare impacts of different scenarios over time

Overcoming the data challenge

Phase 3 – Create a plan

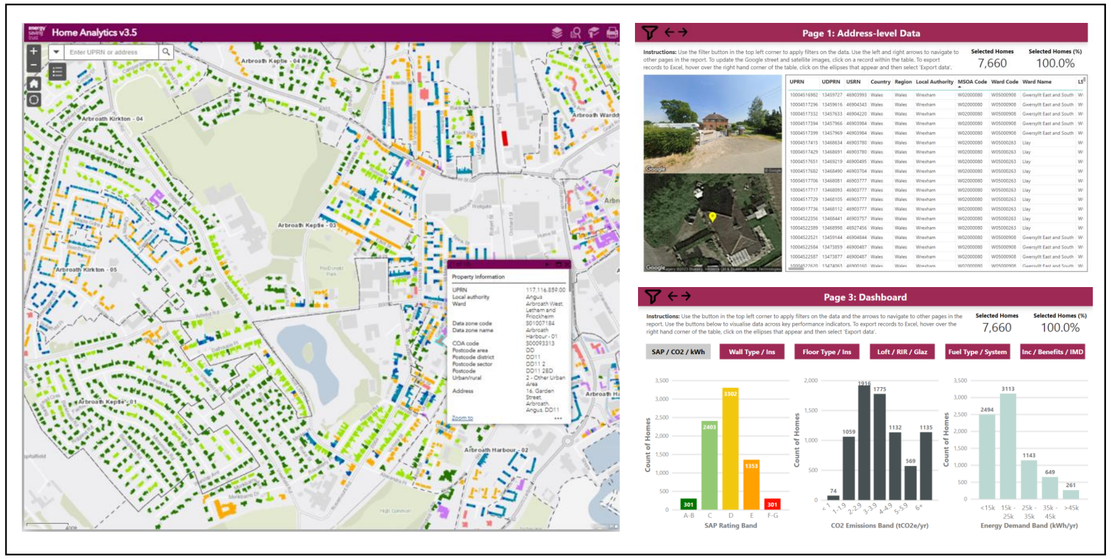
- Use evidence base and scenario analysis to inform local plans and strategies (eg net zero, fuel poverty, Local Area Energy Plans)
- Insight from retrofit modelling can help identify:
  - Priority areas to target
  - Jobs and skills needed to deliver the retrofit work
  - Relevant funding models to finance the work

Our solutions

Build an evidence base

Home Analytics

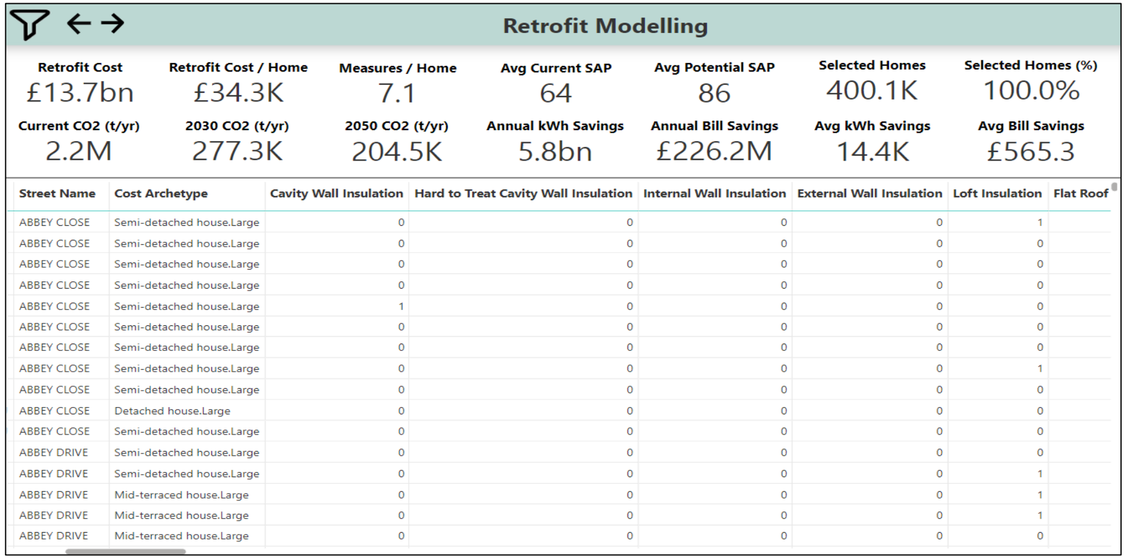
- Address-level housing stock database that covers all homes in Great Britain



Explore scenarios

Portfolio Energy Assessment Tool (PEAT)

- Energy modelling tool that simulates retrofit scenarios for portfolios/areas of properties



Retrofit Modelling

Retrofit Cost	Retrofit Cost / Home	Measures / Home	Avg Current SAP	Avg Potential SAP	Selected Homes	Selected Homes (%)
£13.7bn	£34.3K	7.1	64	86	400.1K	100.0%
Current CO2 (t/yr)	**2030 CO2 (t/yr)**	**2050 CO2 (t/yr)**	**Annual kWh Savings**	**Annual Bill Savings**	**Avg kWh Savings**	**Avg Bill Savings**
2.2M	277.3K	204.5K	5.8bn	£226.2M	14.4K	£565.3

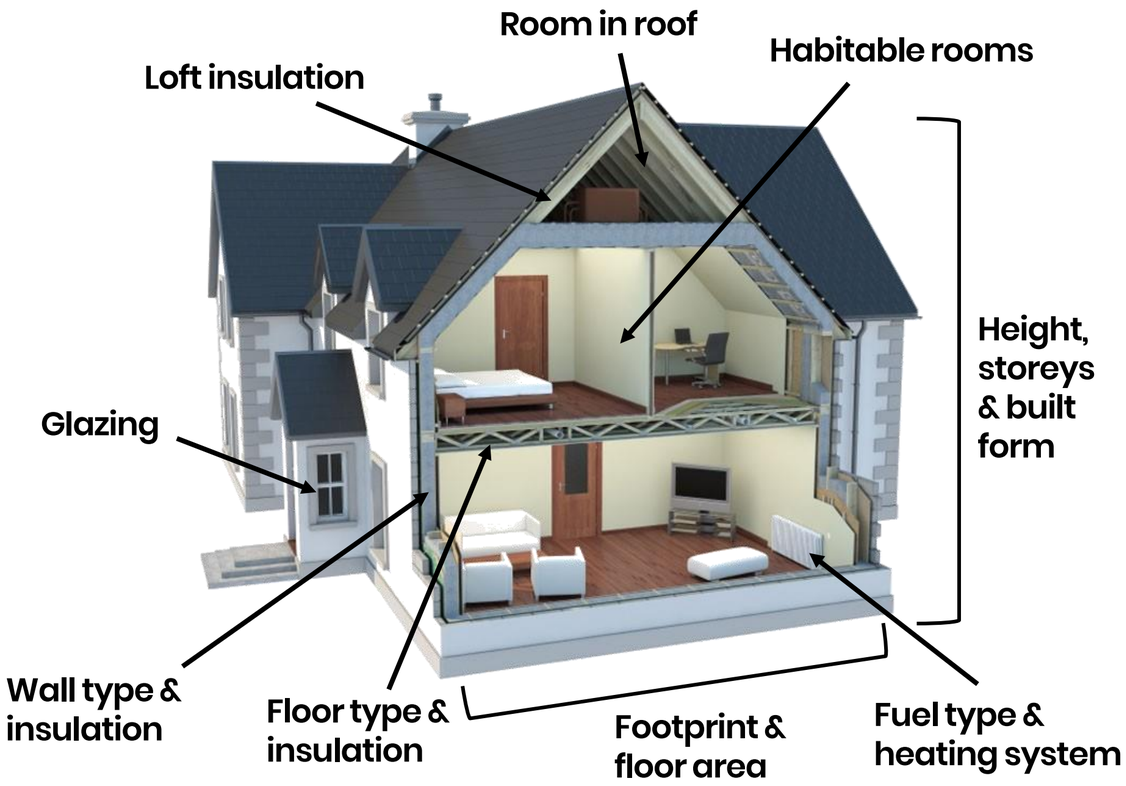
Street Name	Cost Archetype	Cavity Wall Insulation	Hard to Treat Cavity Wall Insulation	Internal Wall Insulation	External Wall Insulation	Loft Insulation	Flat Roof
ABBEY CLOSE	Semi-detached house.Large	0	0	0	0	1	
ABBEY CLOSE	Semi-detached house.Large	0	0	0	0	0	
ABBEY CLOSE	Semi-detached house.Large	0	0	0	0	0	
ABBEY CLOSE	Semi-detached house.Large	0	0	0	0	0	
ABBEY CLOSE	Semi-detached house.Large	1	0	0	0	0	
ABBEY CLOSE	Semi-detached house.Large	0	0	0	0	0	
ABBEY CLOSE	Semi-detached house.Large	0	0	0	0	0	
ABBEY CLOSE	Semi-detached house.Large	0	0	0	0	1	
ABBEY CLOSE	Semi-detached house.Large	0	0	0	0	0	
ABBEY CLOSE	Detached house.Large	0	0	0	0	0	
ABBEY CLOSE	Semi-detached house.Large	0	0	0	0	0	
ABBEY DRIVE	Semi-detached house.Large	0	0	0	0	0	
ABBEY DRIVE	Semi-detached house.Large	0	0	0	0	1	
ABBEY DRIVE	Mid-terraced house.Large	0	0	0	0	1	
ABBEY DRIVE	Mid-terraced house.Large	0	0	0	0	1	
ABBEY DRIVE	Mid-terraced house.Large	0	0	0	0	0	

Home Analytics

Build an evidence base

What data does it include?

- Contains over 95 variables:
  - UPRN, address & geographical IDs
  - Property attributes
  - Energy efficiency measures
  - Renewable suitability flags
  - SAP characteristics
  - Socio-economic indicators

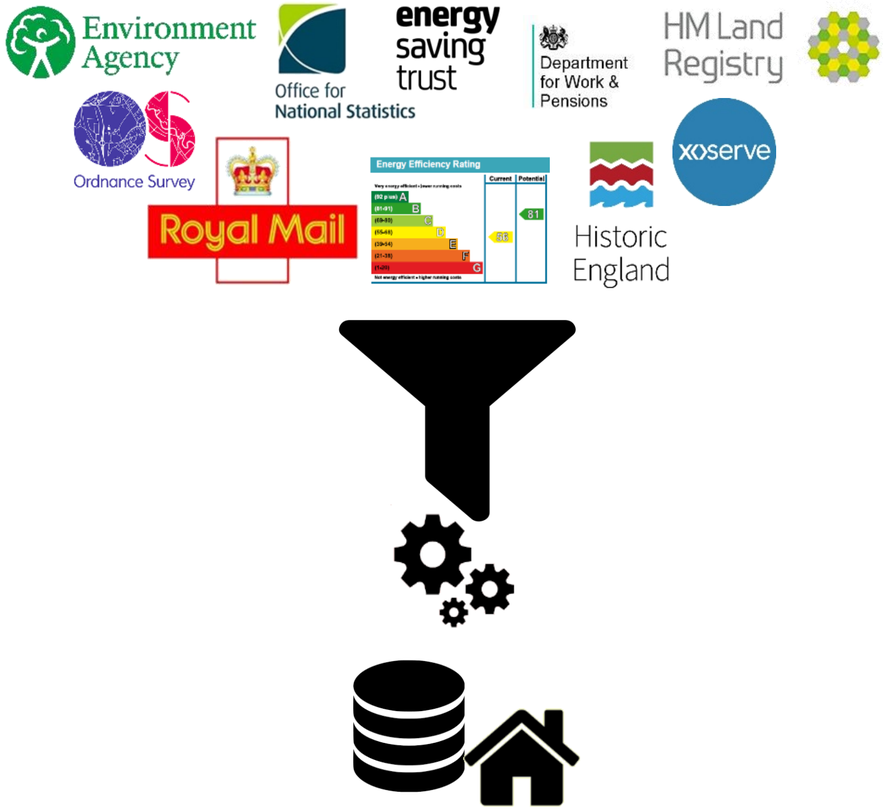


Home Analytics

Build an evidence base

Where does the data come from?

- Over 17 unique data providers
- Joined together using UPRN or other geographical codes
- Prioritisation logic considers data currency, trust, representativeness and coverage
- Gaps in EPCs are filled using statistical, spatial and derived models
- Meta data provided to help guide users

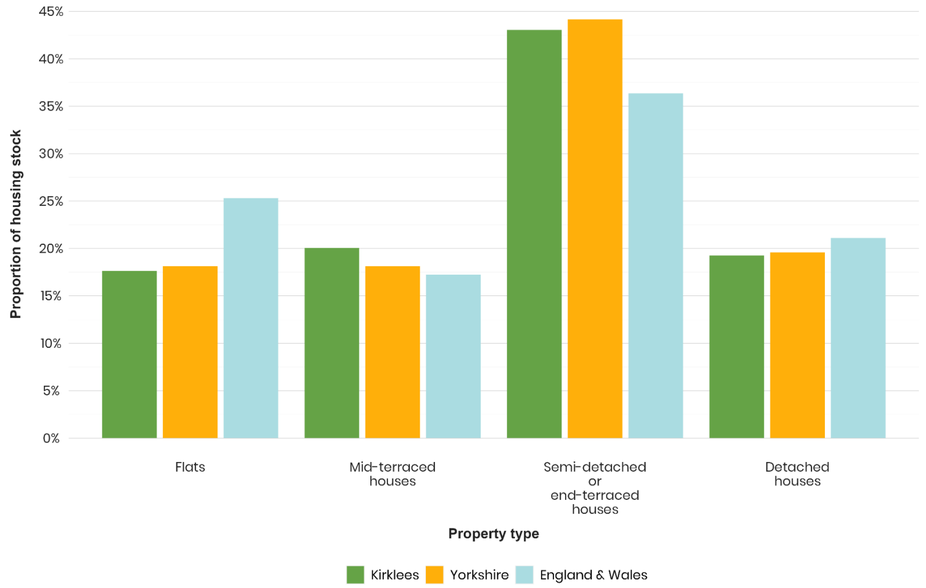


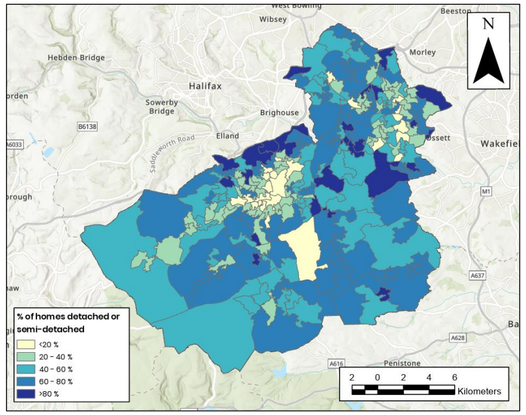
Home Analytics

Build an evidence base

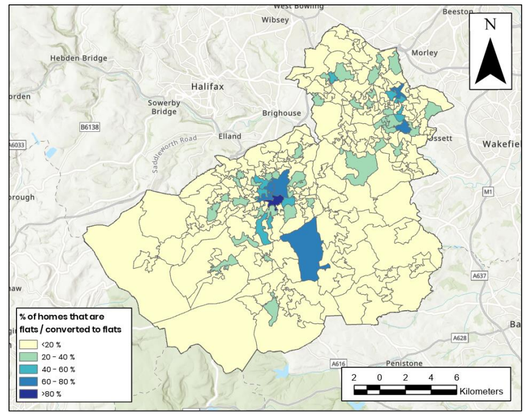
How is it used?

- Available as a data license in several formats (CSV, geodatabase, Power BI dashboard)
- Stock overview report
  - Benchmarks housing stock against regional/national trends
  - Identifies ‘blind spots’ and gaps in EPC data
  - Identifies local opportunities and challenges for retrofit / decarbonisation
- API integration into digital advice tools to enhance the user journey





Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS



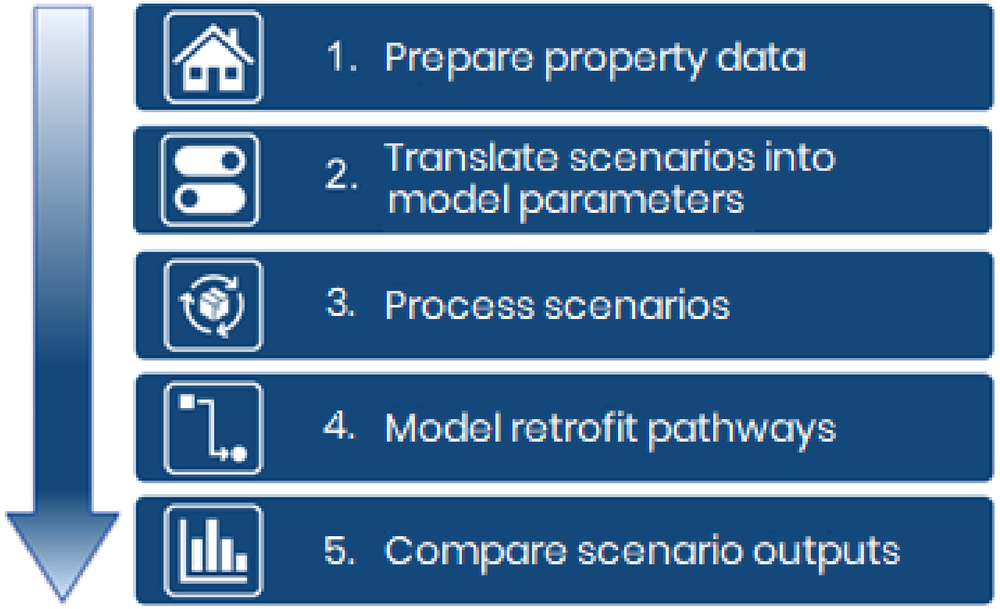
Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS

Portfolio Energy Analysis Tool (PEAT)

Explore scenarios

How does it work?

- Maps Home Analytics data to SAP inputs and uses calculation engine to recommend improvements for each property
- Models scenarios based on relevant targets:
  - SAP score
  - CO_2 emissions ($t/CO_2e/year$)
  - Heat demand ($kWh/m^2/year$)
- Parameters and inputs can be customised to tailor scenario to client needs

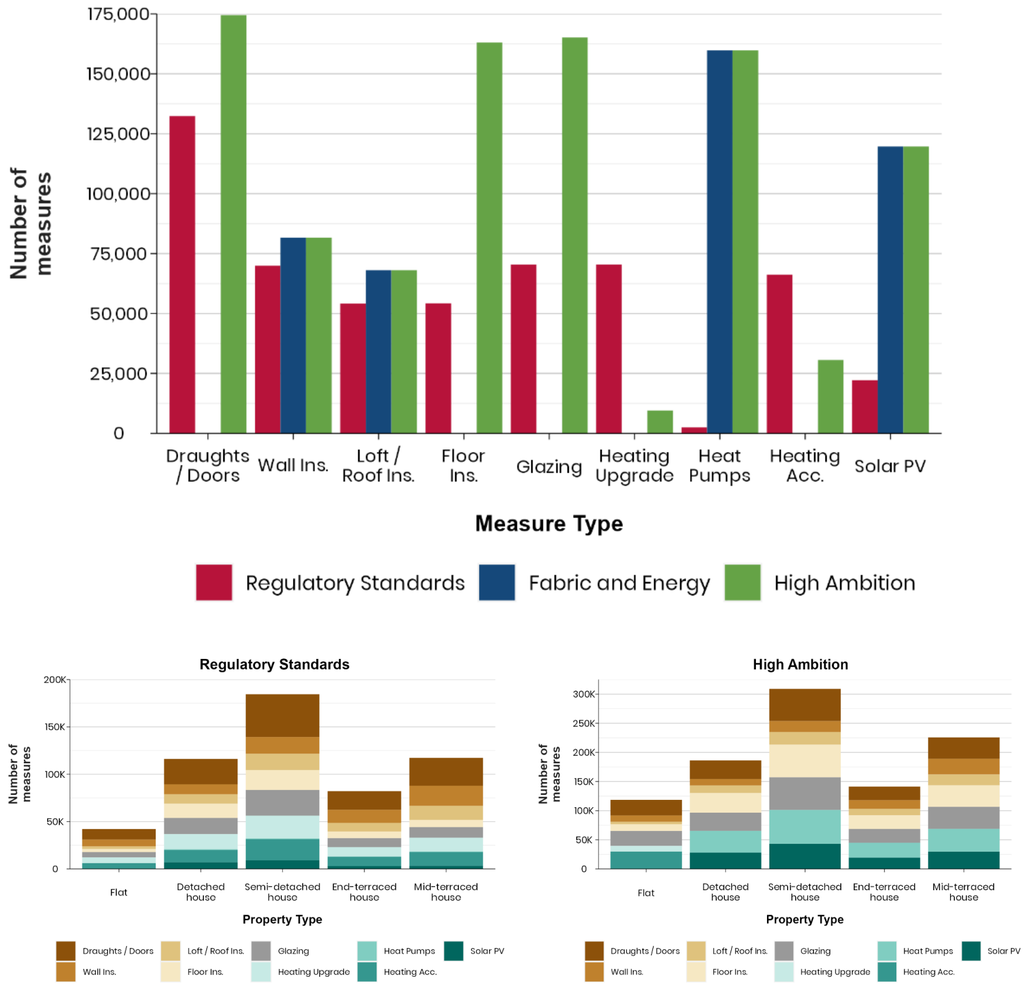


PEAT

Explore scenarios

What insight does it offer?

- Provides an ordered list of recommended measures at the property-level
- Key outputs include:
  - Measure costs
  - Savings (kWh, CO_2, fuel bills)
  - EPC score improvements
- Capable of modelling portfolios or areas with hundreds of thousands of properties
- Outputs can be plotted over time to simulate temporal impact of achieving targets

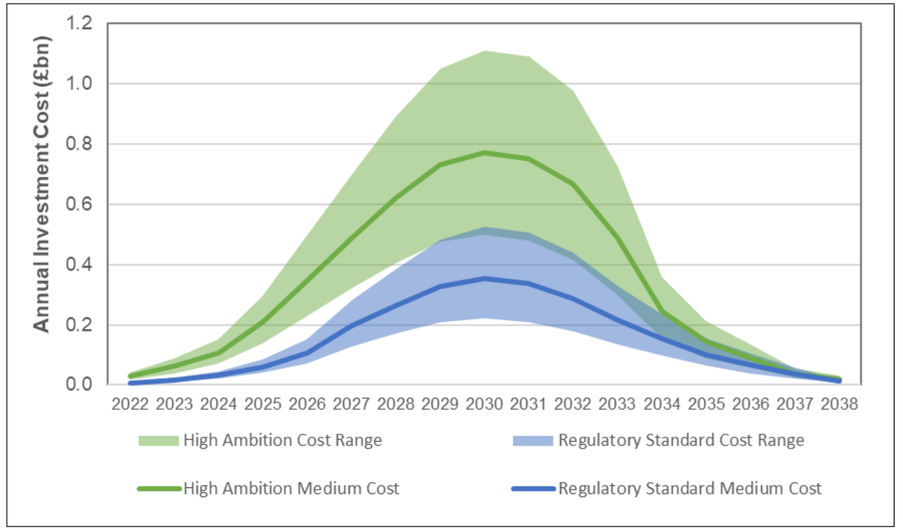


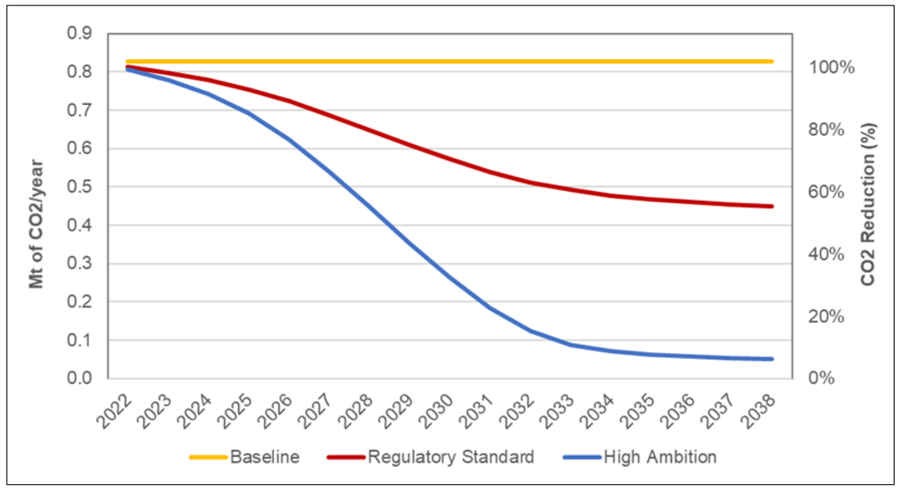
PEAT

Explore scenarios

How is it used?

- We host workshops with clients to scope out the scenarios and model parameters
- We process the scenarios in PEAT
- Provide the outputs of the model in various formats (Excel, Power BI)
- Deliver a PEAT report which:
  - Summarises the methodology
  - Compares the scenarios outputs
  - Forecasts costs / savings over time
  - Recommends a course of action





Overcoming the data challenge

Home Analytics

PEAT

- **Net zero plan**
- **Retrofit pipeline**
- **Job / skill assessment**
- **LAEP**
- **Advice service delivery models**

Case Study


17.2M
Total homes in England and Wales rated SAP D–G
2050
Net Zero target date
617K
Required rate of improvement, per year


17.2M
Total homes in England and Wales rated SAP D–G
2035
Net Zero target date
1.3M
Required rate of improvement, per year


Broadland
District Council


DACORUM
BOROUGH
COUNCIL


WIRRAL


Southend-on-Sea
City Council


Devon
County Council

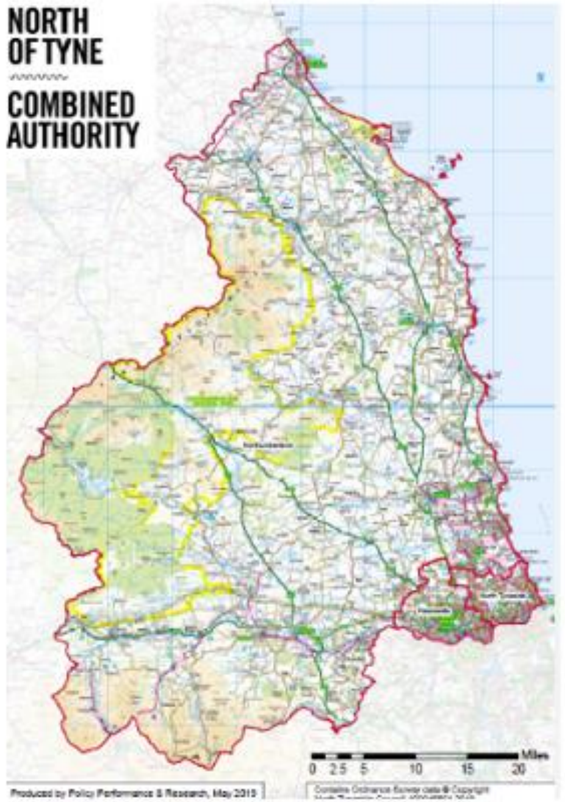
Average costs of upgrades, per home...

Average costs of upgrades, per home...

£23,300

Case Study

NORTH
OF TYNE
COMBINED
AUTHORITY



Targets

100,000 NEW GREEN JOBS CREATED

RETROFIT **100,000** HOMES

ACHIEVE NET ZERO BY **2030**

Starting point

- Profiling NTCA housing stock, using Home Analytics. 67,000 archetypes were created.

- **Scenario creation; BAU and Net Zero pathways.**

- Optimal packages of retrofit measures were identified for each archetype, estimating **anticipated investment cost**, **carbon savings** and **SAP uplifts** across the region.

Challenges Identified

80,000 homes will need to be retrofitted per year by 2027 – 10 times the current rate.

The cost of achieving Net Zero will require an estimated £13bn in funding

Electrifying heat through the mass deployment of heat pumps will not enable the NTCA to achieve Net Zero by 2030

Opportunities

10.2 jobs are supported for every £1m spent on retrofitting (above BAU)

Peak labour requirements to achieve net zero by 2050 will reach 10k FTE jobs in 2036

A net zero retrofit approach can deliver significant energy efficiency gains, improving the NTCA stock from an average of SAP band D to a high B.

Recommended actions

- Adopt a fabric first approach to retrofits
- Consider a blend of council-led and regional retrofit programmes
- Identify the most common types of multi-owner mixed use buildings

Target owner occupied homes, which account for 70% of the investment required

Explore and test a range of funding models at as large a scale as possible

Direct investment towards the skill areas that will most be in demand over the next decade


Measure
Plan
Act

energy saving trust

Poll

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Q&A

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Thank you