Tenement success story

All Energy I Dcarbonise Conference
Built Environment Decarbonisation

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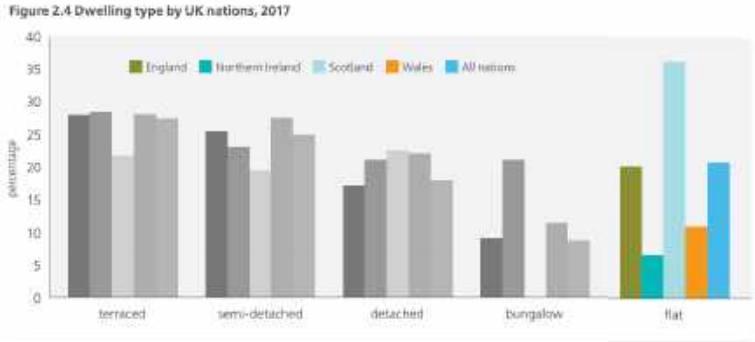
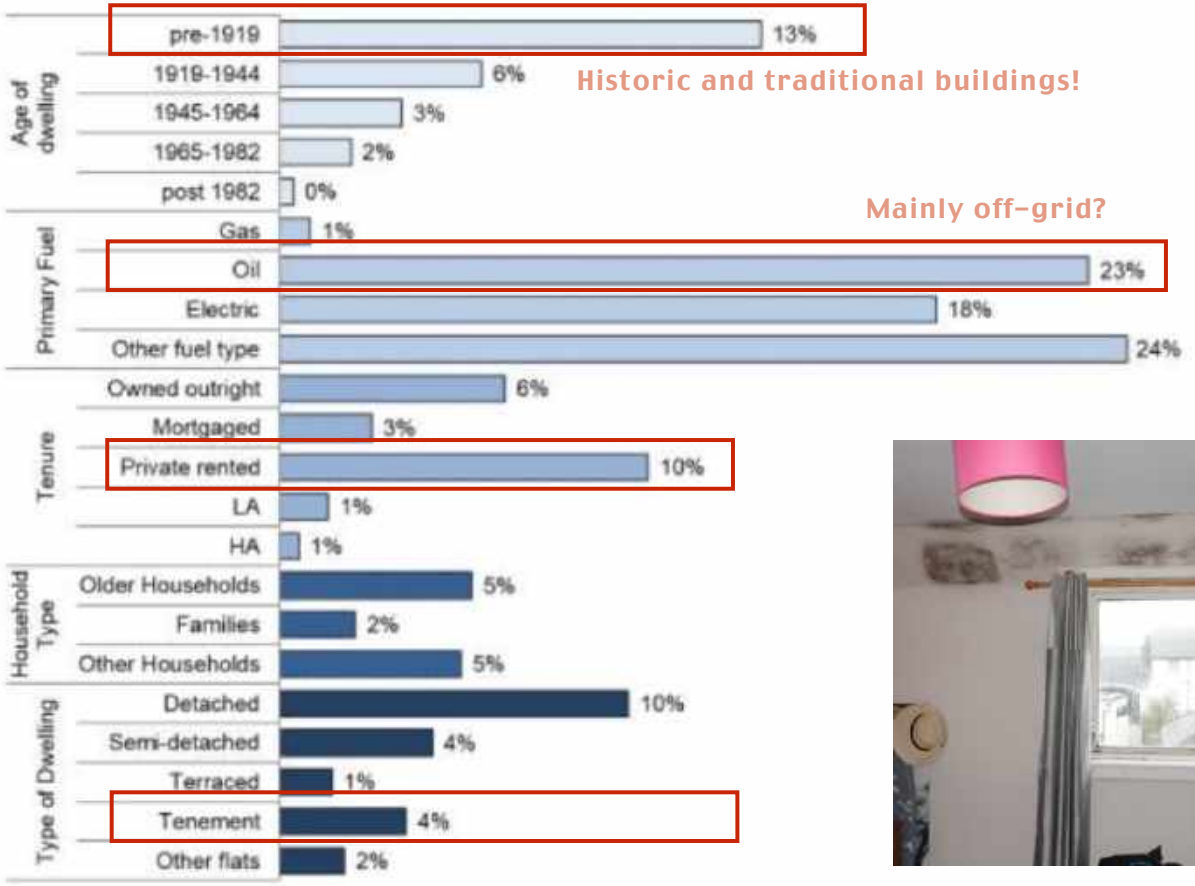
11 May 2022

1. Context

Housing stock in Scotland



Proportion of Homes in Band F or G by Dwelling Age, Primary Fuel, Tenure and Dwelling Type



Historic and traditional buildings!

Mainly off-grid?

+ 35% flats

Detached, semi-detached and tenements have the lowest EPC rating

Source: SG Scottish house condition survey/ 2019 key findings

Performance gap issues/ recently retrofitted property. Source/ Credit: JGA

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1. Context

Deep Retrofit & Net Zero Targets

- Deep retrofit strategies (PAS 2035, Enerphit, AECB Carbon Lite, etc) are required to decarbonise properties and meet the Governments CO2e red targets IN PRACTICE.
- **Heat pumps required lower flow temperatures. If heat demand isn't reduced before installing low carbon technologies, energy bills can increase!**
- Key strategies for a successful Retrofit and decarbonisation of properties include:
  - 1. Fabric First Approach: reduction of space heating demand as far as possible. This is a key aspect for tenements!
  - 2. Remove fossil fuel heat sources and replace with low carbon options.
  - 3. Generate renewable energy on site if feasible. Limited options for tenements!

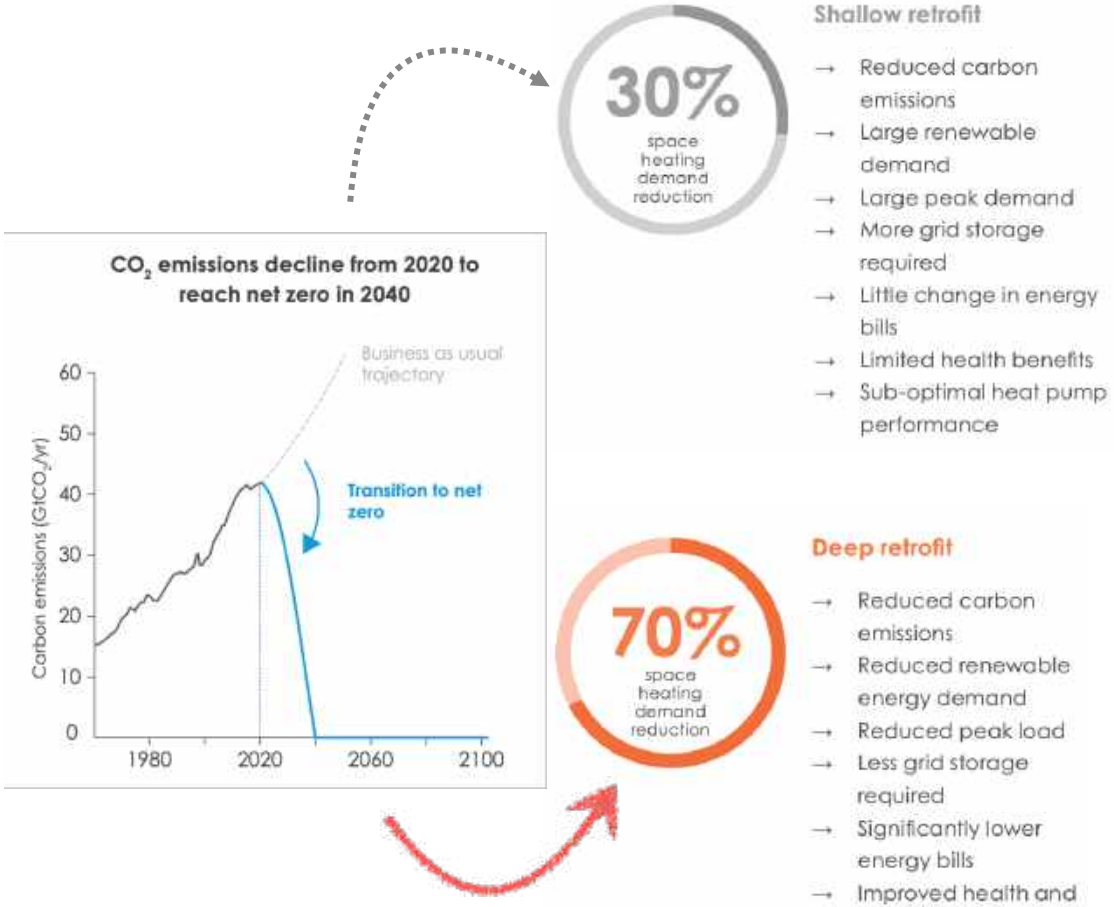

Figure 1.12 - Comparison of percentage of energy demand reductions and associated co-benefits from shallow and deep retrofits.

Source: Leti Guide/ Retrofit

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2. Challenges and Opportunities

Target 1 to 2

Challenges & Opportunities when retrofitting tenements

- **Opportunities**
  - Huge impact on CO2e red, fuel poverty mitigation, etc… if retrofit is done correctly! We have to implement robust retrofit strategies (PH, AECB, PAS 2035) to minimise performance gap issues.
  - Great opportunity to develop a Scottish/ Glasgow Retrofit Standard for Tenements!?
  - Good/ OK form factor when comparing to other archetypes, i.e. detached houses
  - Existing property factor schemes could be used to implement further maintenance and energy efficiency measures (Tenement Toolbox!!)
  - Some closes fully or mostly owned by Local Authorities & HA
  - LocoHomes, People Power Retrofit schemes for private owned properties

Source: Leti Guide/ Retrofit

Image credit: John Gilbert Architects

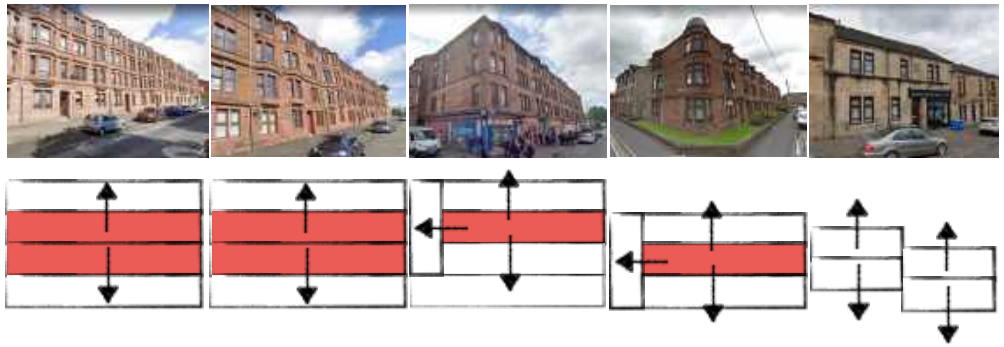

Image credit: John Gilbert Architects

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2. Challenges and Opportunities

Challenges & Opportunities when retrofitting tenements

- **Challenges**
  - Building form/ archetype might limit the design or installation of active systems, mainly due to space restrictions
  - Renewable energy, internal space and 'roof area to floor area ratio' are limited, when compared to other building forms and archetypes.
    - plus some services require external units, which might be restricted by planning conditions!
    - **fabric improvement works are key for tenements!**
  - Mixed tenure might limit retrofit works
  - Industry: lack of knowledge and skills (one size doesn't fit all!)
  - RdSAP does not allow to model building accurately or model the whole block which limits the retrofit design strategies (i.e. JGA proposed PH for Niddrie Road)

107 Niddrie Rd, rear elevation (blonde sandstone)

107 Niddrie Rd, front elevation (red sandstone)

Images credit: John Gilbert Architects

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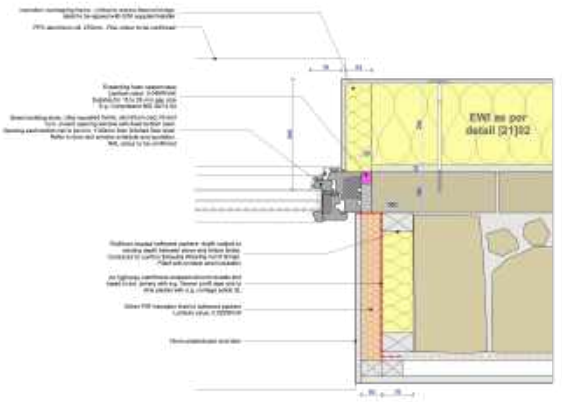
3. Heat Pump Ready

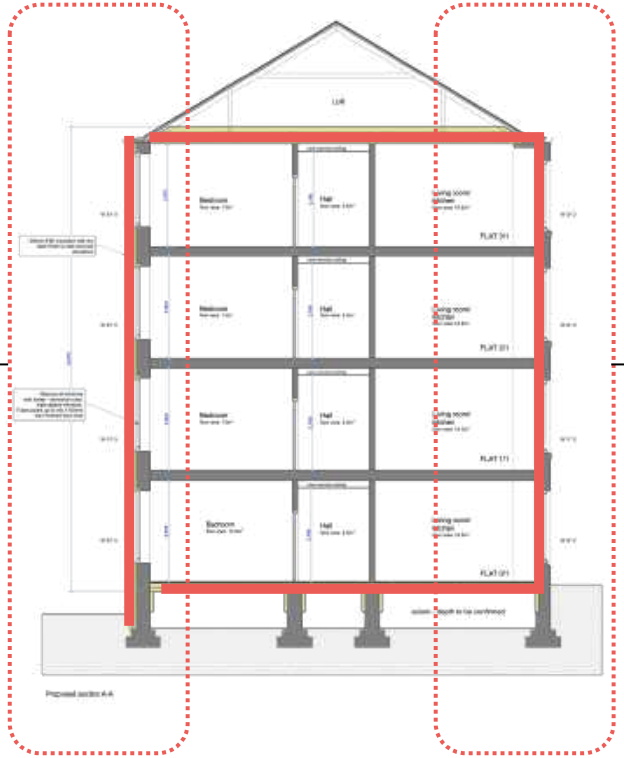
Niddrie Road Enerphit: John Gilbert Architects

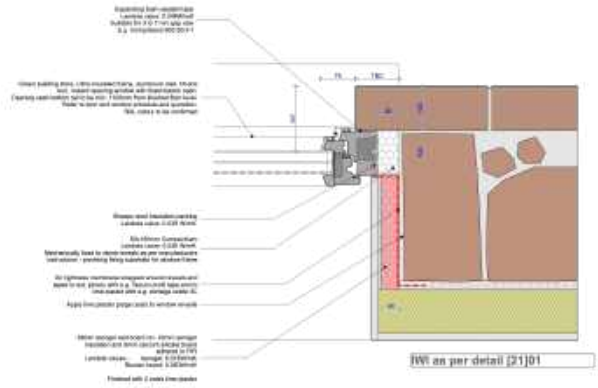
Fabric First Approach

- First question; is the building heat pump ready?
- Closing the gaps: detailed design, POE, modelling
- Holistic approach
- IWI/ EWI feasible? hhybrid approach?
- Natural materials where possible

One size doesn't fit all!







EWI IWI

Images credit: John Gilbert Architects

3. Heat Pump Ready

Fabric First Approach

- 100% EWI best option if there aren't any planning restrictions
- POE & bespoke solutions
- External vs internal works
    - First stage: external works to meet EESSH2
    - Second stage: internal works once property becomes void or opportunity arises

North elevation/ Proposed close doors

North elevation/ Proposed close doors

Refurbished block for Ayrshire Housing, Rowan Road, Girvan,

POE/ thermographic survey where possible

Rowan Road pre-retrofit. Image credit: John Gilbert Architects

4. Suitable Active Systems

Active Systems

- Solar thermal, PV, biofuel boilers and communal heating are generally discarded due to location, planning and/ or space restrictions. Should all low carbon technologies be a permitted development?
- Biofuel boilers & CHP generally not feasible for residential/ tenement buildings
- Options for tenement buildings?
  - ASHP. GF and 1 floor only? Compact ASHP better for tenements!
  - GSHP. most efficient pumps currently, but individual systems are not always applicable for tenements.
  - Hybrid designs: direct electric panels and compact ASHP. Requires a more efficient fabric! Not always feasible (i.e. historic buildings)
  - Heat Networks?
- Ventilation system (it's not only about energy!!): decentralised vs centralised systems.
- Waste Water Heat Recovery (WWHRS), saves energy from waste shower water, are suitable for tenements but require full refurb.
- Smart controls: quick wins!

Heat Pumps

ASHP

GSHP

Solar Thermal

Biofuel Boilers & CHP

Heat Networks

Source/ Credit: EPR Architects: Sustainable Design Guide

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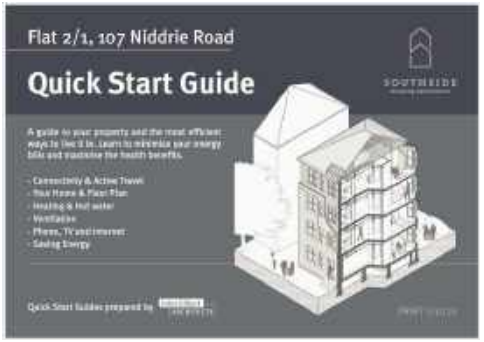
5. People

Human Factor: Quick Wins?



Engaging in our own feedback loops / CPD

POE: Greater Understanding

occupy

procure

Guidance on Briefing

Improved Handover

Engaging with tenants/ residents at concept design stage

build

design

Better Supervision / Inspection

Better documentation for Contractors

Design and specify ‘user-friendly’ systems

Contractor Training / Toolbox talks

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Thank you!

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