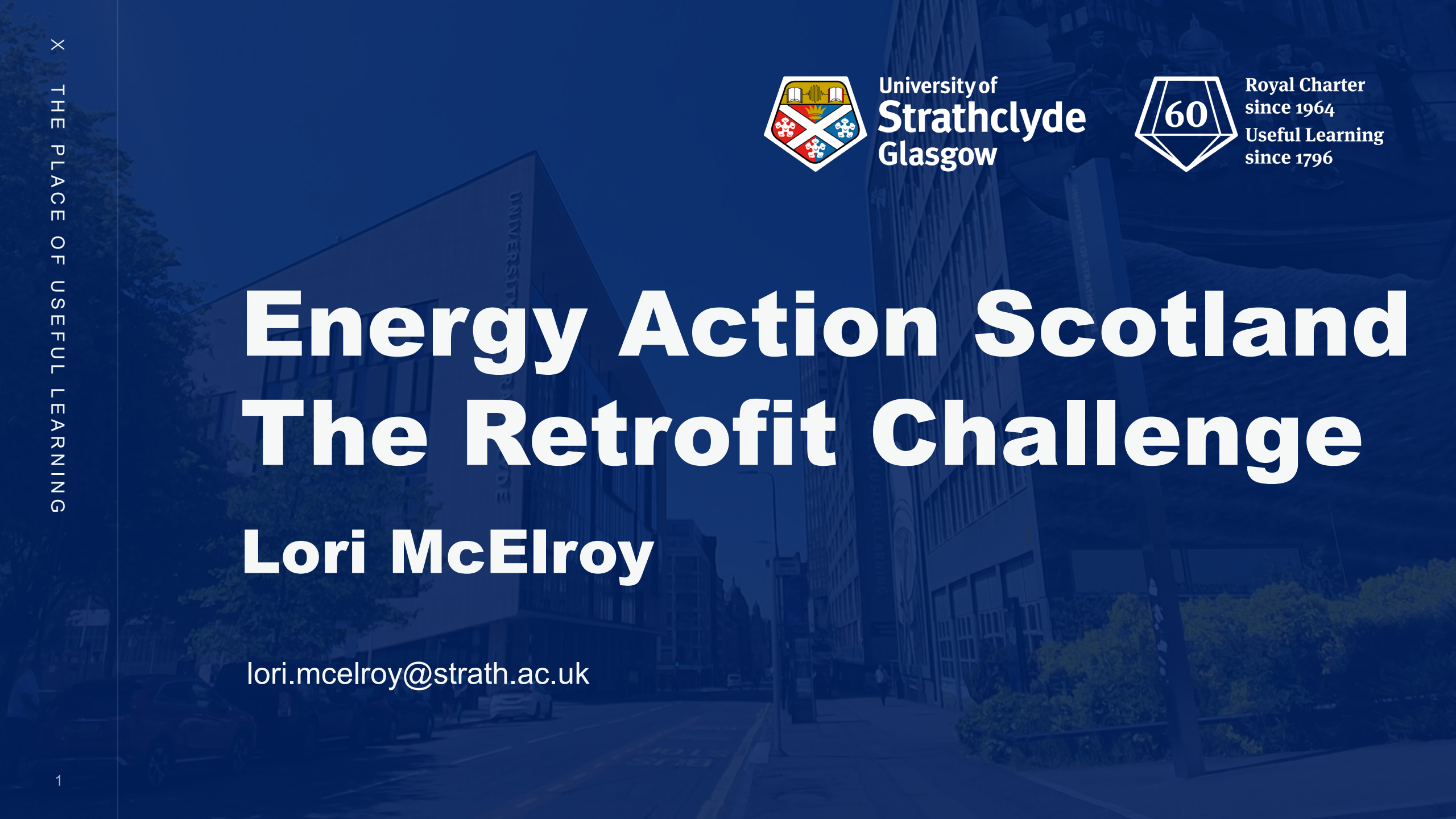

University of Strathclyde Glasgow

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Useful Learning since 1796

Energy Action Scotland The Retrofit Challenge

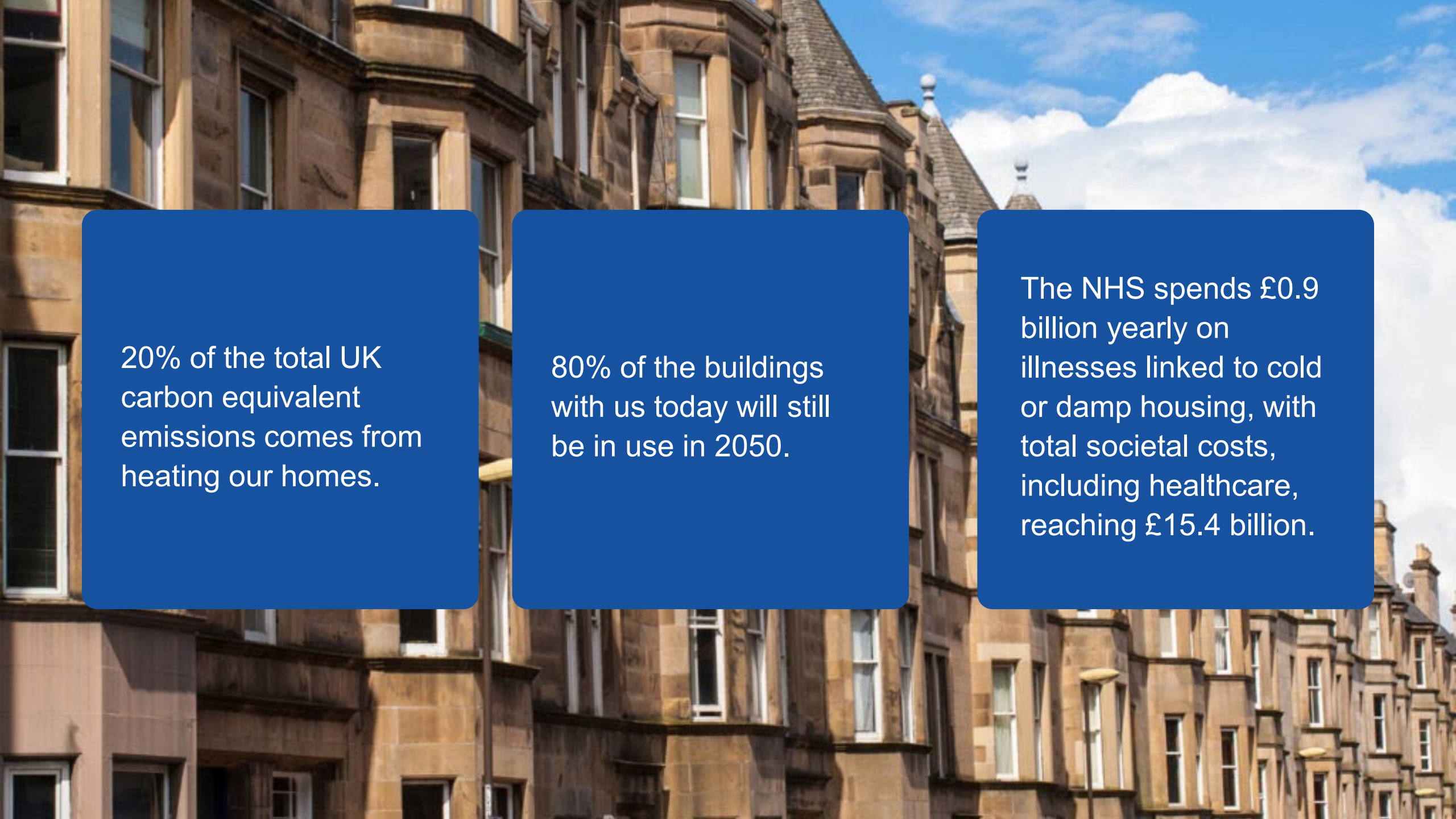
Lori McElroy

lori.mcelroy@strath.ac.uk

The Challenge - A ‘Just’ Transition

- Scotland’s buildings are net zero carbon by 2045 and this is achieved in a way that is socially and economically sustainable.
- by 2032 - 94% of non-domestic buildings’ and 80% of domestic buildings’ heat is supplied using low carbon heat technologies; and
- new EPC targets for all housing – with a drive towards EPC Band C by 2040 for all homes and EPC Band B for Social Housing by 2032 wherever possible.

Image – Helen Lucas Architects



20% of the total UK carbon equivalent emissions comes from heating our homes.

80% of the buildings with us today will still be in use in 2050.

The NHS spends £0.9 billion yearly on illnesses linked to cold or damp housing, with total societal costs, including healthcare, reaching £15.4 billion.

Over 850,000 households in Scotland in fuel poverty. The current objective is reduce this to no more than 5% by 2040.

Organisations lobbying to address this sooner – including Shelter, Citizens Advice Scotland, the Existing Homes Alliance and Energy Action Scotland.

The Challenge – Alleviating Fuel Poverty

- The investment cost of alleviating fuel poverty and meeting the target would be between £4.5 and £9.5 billion at an average cost of £35,000 per property (in Scotland alone).
- Apart from the social benefits, this would deliver carbon savings of 2.3m tonnes of CO_2 per annum and save fuel poor households an average of £245 p.a.
- Savings to the NHS of between £31 and 52 million per year by bringing the majority of homes to EPC Band C by 2025.


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

The Challenge:

How many, how deep, at what cost?

LETI's call to action to industry and policy makers

Web download
https://sdfoundation.org.uk/news/retrofit-at-scale

The Challenge – Scale of the problem

We are falling dramatically short of the home energy retrofits we need:

- almost 2 homes per minute from now to 2050 to be made net zero carbon ready (UK wide)
- greater than ten-fold increase in heat pump uptake from 55,000 to 600,000 per year
- means for addressing the third of UK households now being drawn into fuel poverty
- solutions for the housing retrofit affordability crisis

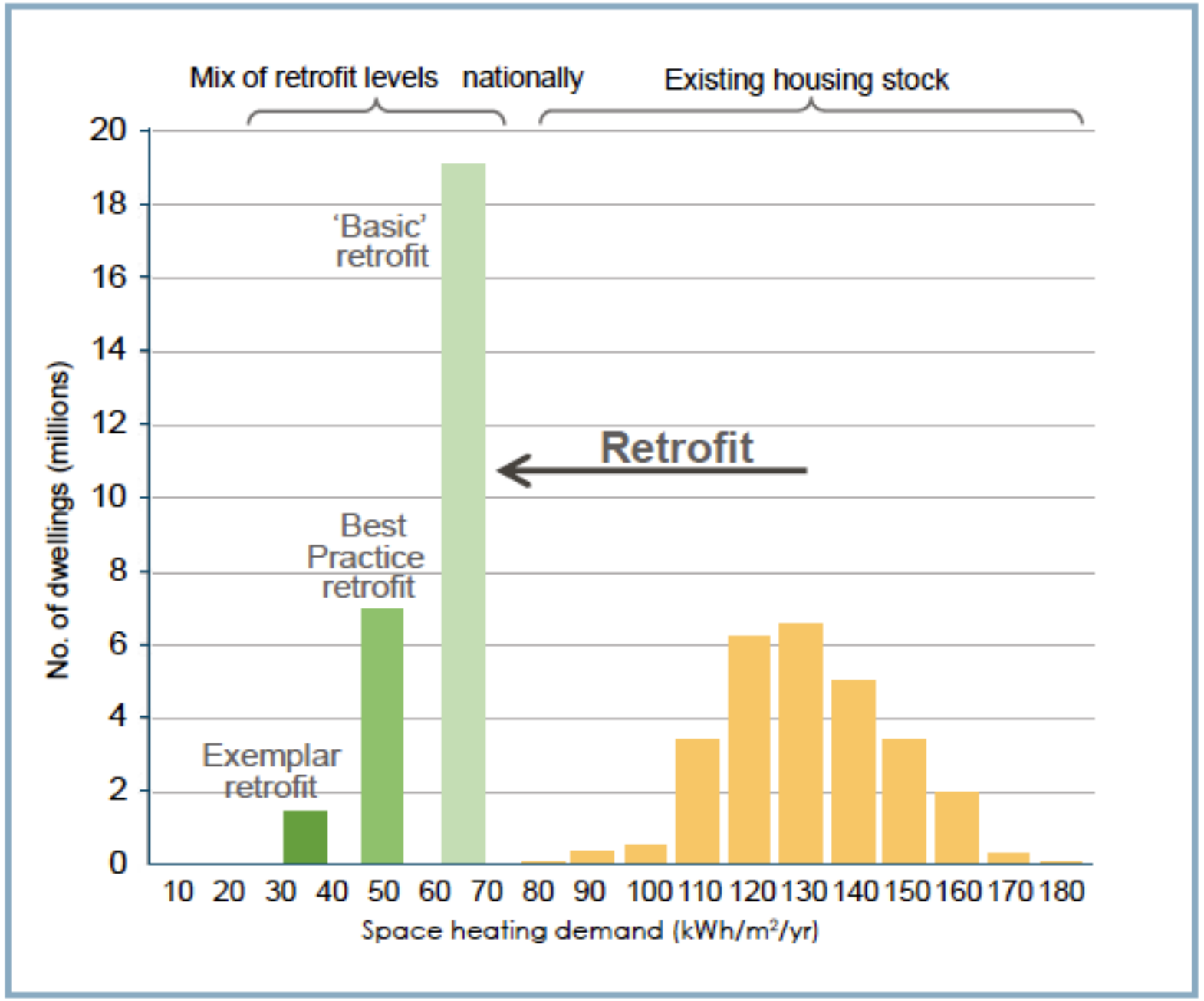


Image from LETI Retrofit-At-Scale guide

The Challenge - Cost

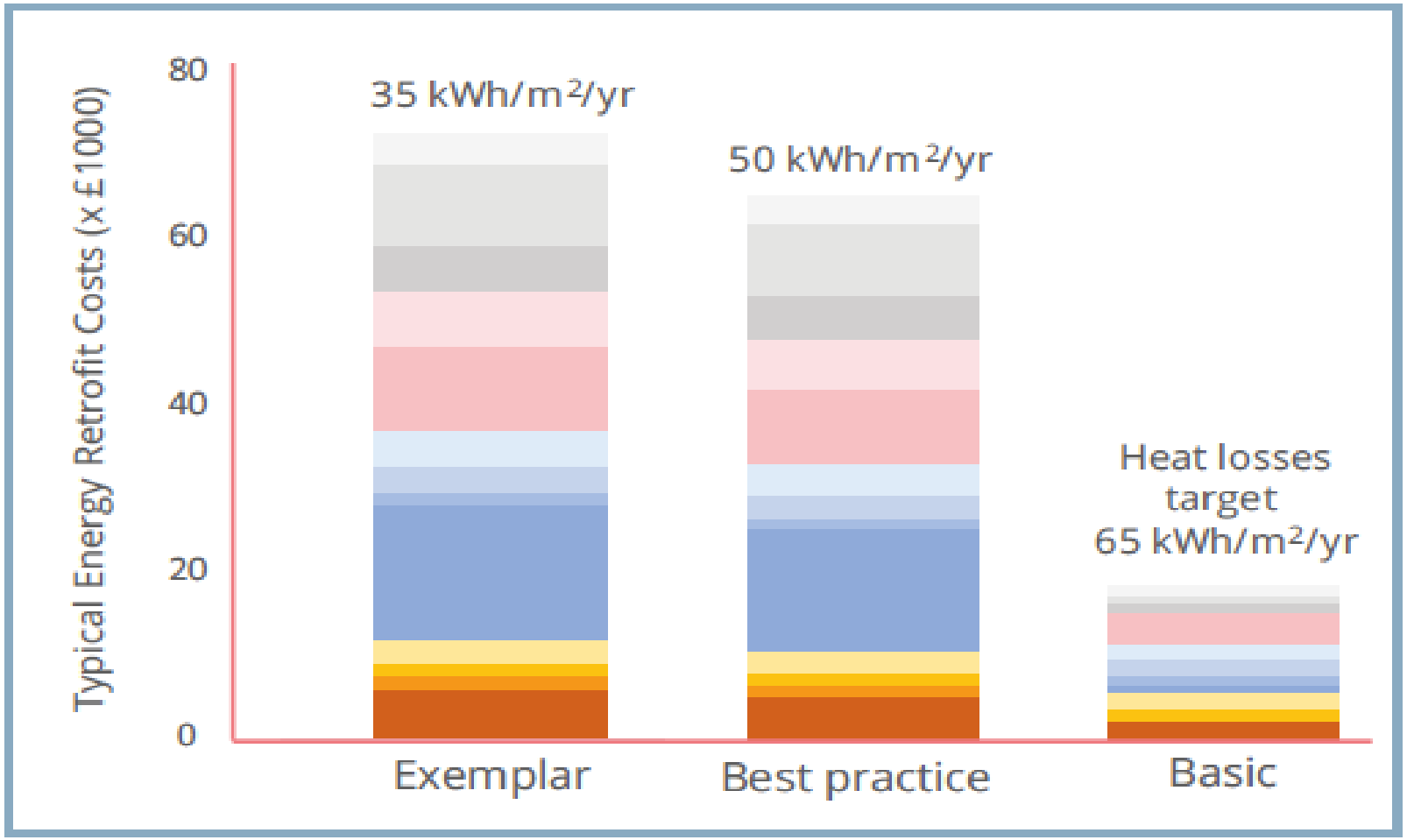


Image from LETI Retrofit-At-Scale guide

The Challenge – Blockers

- expense
- limited internal space
- building characteristics
- lack of trust in experts/ installers
- don't want to be first
- risk of disruption
- no guarantees of effectiveness
- risk of it going wrong
- no single point for advice

"I want to keep my home's existing look"

"I cannot lose any home space"

"The retrofit offer is too expensive"

"I like my internal historic character features"

"No one available to do my energy retrofit"

"Where are the alternative price points?"

"Level of disruption is simply not acceptable"

"Lack of authoritative information covering all aspects for my retrofit"

"Must not lose valued and small outdoor space"

"Why does my bedroom mould keep returning?"

"Heat pumps are noisy and not for cold weather"

"Do not what to lose loft future home expansion"

"Industry does not deliver on bills & costs"

"Final costs are always a lot higher"

Image: LETI Retrofit-At-Scale guide

The Challenge – Basic Solutions

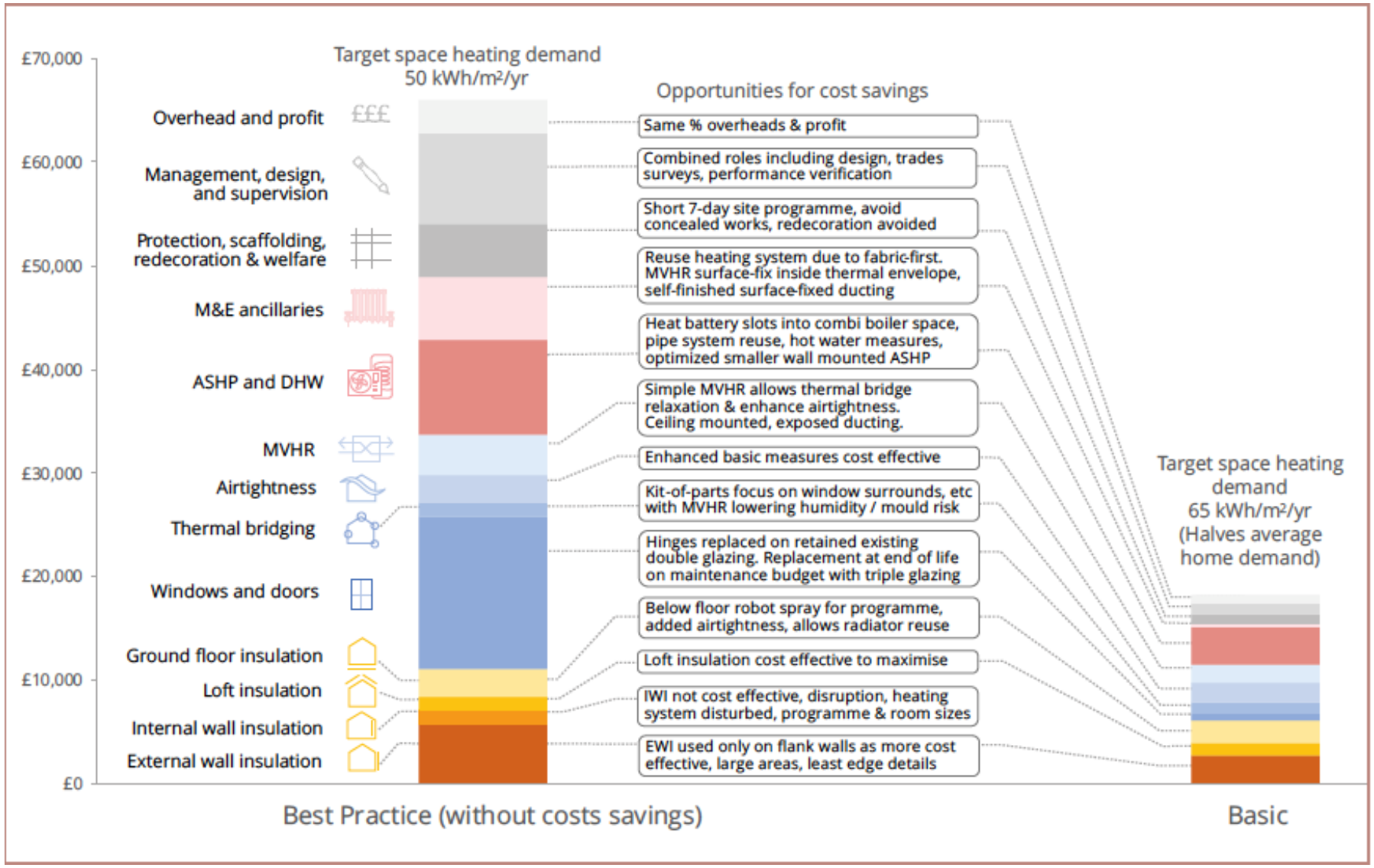


Image: LETI Retrofit-At-Scale guide

The Challenge – Basic Solutions

- bottom-up and top-down
- appropriate for 67% of homes (including most traditional stock)
- would need expert input
- reduce heat demand to 65kWh/m^2 / 50% energy saving
- capital cost 67% of predicted cost to get to net zero (1%GDP)
- 7 day turnaround – minimum disruption
- mix of fabric first and technology based solutions.

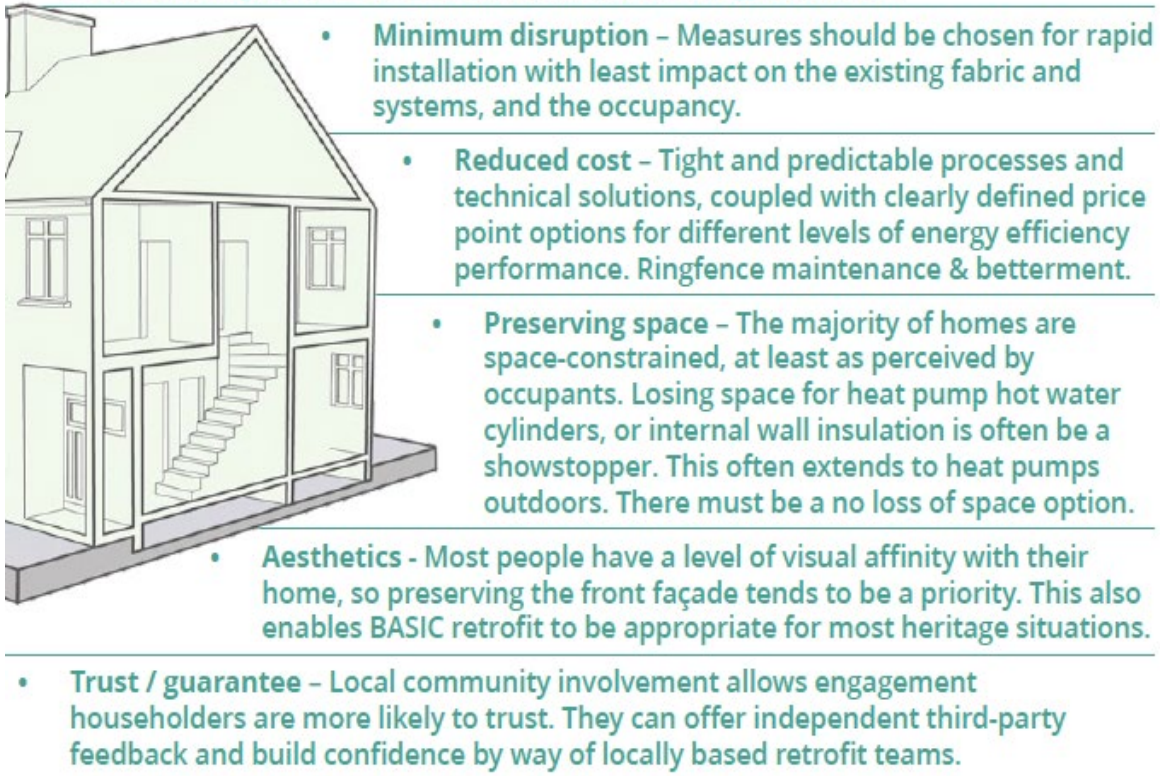


Image: LETI Retrofit-At-Scale guide

How many? How deep? At what cost?

How is Net zero carbon retrofit for net zero cost paid for?	To 2050
• Baseline of CCC retrofit costs already included in 1% GDP cost of ZC:2050 - Average per dwelling of £9k	£252 bn
• Savings in healthcare and social support due to better housing - Based on accessing 33% of savings - given other competing funding needs. Saving heat support grants (as of Oct 2019)	£85 bn
• Energy bill savings - Based on: 5yrs of energy savings generally, except 30yrs for Exemplar Retrofit as Energiesprong payment model	£79 bn
• Able-to-pay increase in asset value (effectively increases GDP) - Based on householder proportion who are mortgage free and assumed to implement Best Practice Retrofit	£218 bn
• Additional green local jobs to service expanded retrofit - Additional national tax income	£60 bn
• Reduce decarbonised peak energy storage costs savings - Based on home heating being the major part of this peak.	£91 bn
• Top-slice of wind energy generator increasing profits - Based on consumer price of energy rising while CCC projections of generating cost are expected to continue to fall	£32 bn
Total funding sources:	+ £820 bn
BASIC retrofit applied to 19 million homes:	- £343 bn
Best Practice retrofit applied to 7 million homes:	- £385 bn
Exemplar retrofit applied to 1.4 million homes:	-£91 bn
Net zero carbon retrofit for net zero cost:	**zero**

Image: LETI Retrofit-At-Scale guide

March 2023

Tenements Short Life Working Group – Energy Efficiency and Zero Emissions Heat

Final Report

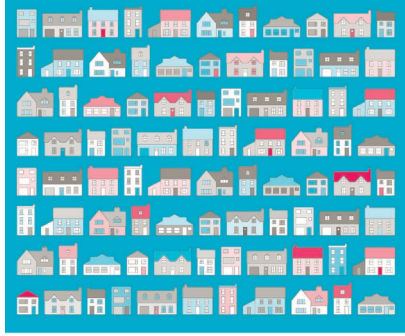
Heat in Buildings Strategy

Achieving Net Zero Emissions in Scotland's Buildings

Scottish Government
Riaghaltas na h-Alba
gov.scot

Each Home Counts

An Independent Review of Consumer Advice, Protection, Standards and Enforcement for Energy Efficiency and Renewable Energy



Dr Peter Bonfield, OBE, FREng

Department for Business, Energy & Industrial Strategy

Department for Communities and Local Government

December 2016

LETI Climate Emergency Retrofit Guide

How existing homes can be adapted to meet UK climate targets

LETI

Glasgow Region Retrofit Hub

Research and Consultation

Built Environment – Smarter Transformation

Skills Development Scotland

March 2024

December 2020

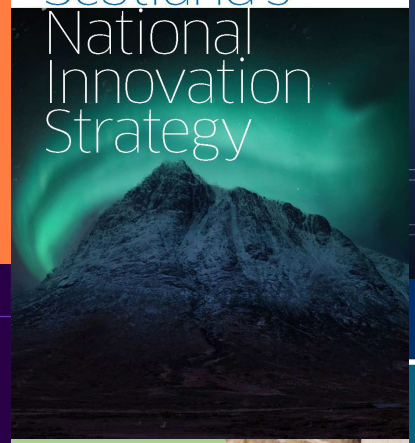
The Sixth Carbon Budget

The UK's path to Net Zero

Climate Change Committee

Scottish Government
Riaghaltas na h-Alba

Scotland's National Innovation Strategy



Energy Efficiency Market Analysis and Economic Opportunity Assessment

Prepared by:

Built Environment - Smarter Transformation on behalf of Scottish Enterprise

July 2023

Built Environment – Smarter Transformation

Scottish Enterprise

TIMES OF CRISIS, TIMES OF CHANGE

SCIENCE FOR ACCELERATING TRANSFORMATIONS TO SUSTAINABLE DEVELOPMENT

GLOBAL SUSTAINABLE DEVELOPMENT REPORT 2023

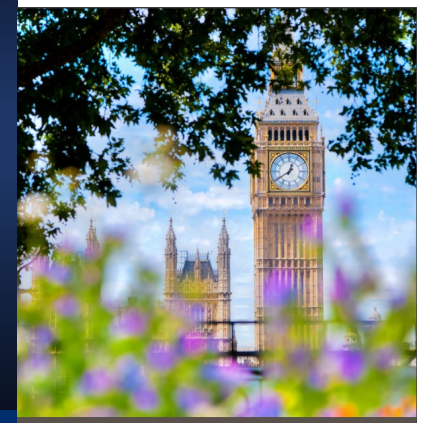
CLC Construction Leadership Council

constructionleadershipcouncil.co.uk

Greening Our Existing Homes

National retrofit strategy

A consultative document



ACCELERATING TRANSITION

CLIMATE FINANCE POLICIES TO PRIORITISE IN THE FIRST 100 DAYS

KING'S BUSINESS SCHOOL | QATAR CENTRE FOR GLOBAL BANKING & FINANCE

UNIVERSITY OF EDINBURGH Business School | Centre for Business, Climate Change & Sustainability

Scottish Government
Riaghaltas na h-Alba
gov.scot

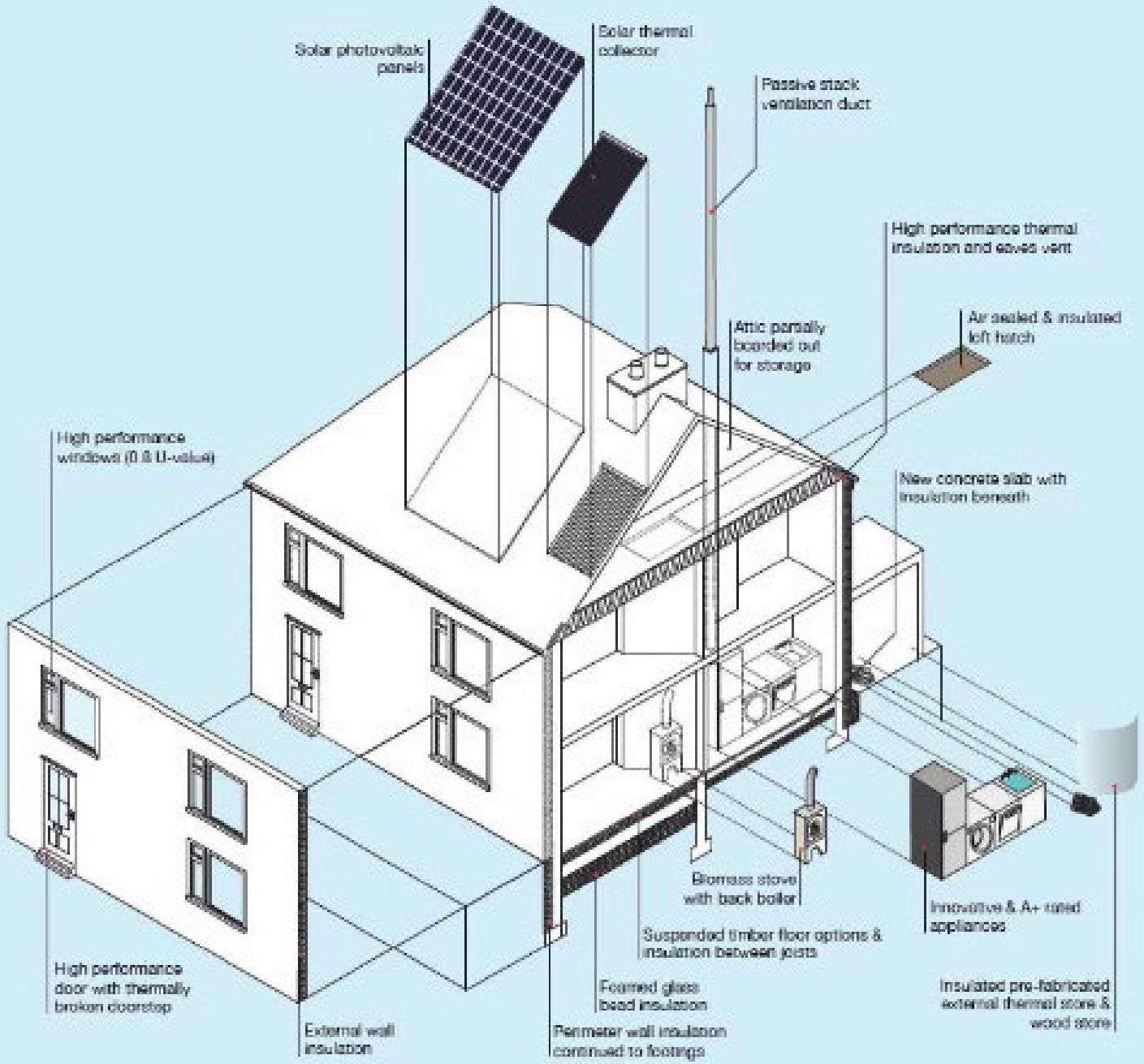
HOUSING TO 2040

Scottish Government - Setting the minimum standard HIB Consultation

- 270 mm loft insulation
- cavity wall insulation (CWI)
- draught-proofing
- heating controls
- 80 mm hot water cylinder insulation
- Suspended floor insulation.

BRE Retrofit House Ravenscraig


Image – Duncan Smith



Typical 4 in a block Technologies applied:

- Air Source Heat Pump with Radiators
- 2kW Solar PV Array and Solar Thermal panels
- Cavity Fill, Moisture Buffering Internal Insulation & Lining, Loft and loft-hatch insulation
- 6.04 q50 Air Tightness
- MVHR System
- Super Low Energy Windows & Door
- Feed in Tariff Income


Image courtesy of JGA

Scenario/ Energy Tariffs	Gas				Electricity				Overall Energy Costs
	kWh	p/kWh	Standing charge	Total Gas	kWh	p/kWh	Standing charge	Total Electricity	Total Fuel Cost
1. Pre Upgrade (2019/20 Tariff)	5332	3.8p	£ 91	£ 294	3235	17.0p	£ 73	£ 623	£ 917
2. Upgrade (2020/21 Tariff)	3171	4.0p	£ 95	£ 222	2586	21.0p	£ 91	£ 634	£ 856
3. Upgrade (2022 Tariff)	3171	7.0p	£ 99	£ 321	2586	28.0p	£ 164	£ 888	£ 1208
4. Pre Upgrade (2022 Tariff)	5332	7.0p	£ 99	£ 472	3235	28.0p	£ 164	£ 1070	£ 1542

Comparing the actual energy cost for the upgraded flat in 2020/2021 with anticipated costs for 2022
= a running cost increase of £352 overall (41%).
As the same energy use was assumed, this increase is entirely due to increasing energy prices.

Comparing the impact of the 2022 predicted tariff on pre upgrade fabric conditions, had the property not been upgraded the running cost would have increased by 68% from £917 to £1542, emphasising the importance of improving fabric performance before upgrading heating.

Martin Lewis https://www.moneysavingexpert.com/utilities/cheap-gas-and-electricity/


Photography courtesy of Duncan Smith

THE UNIVERSITY OF STRATHCLYDE

RETROFIT SCOTLAND

Issue 29
Summer 2019

APPOACHES TO RESIDENTIAL RETROFIT AROUND EUROPE

According to a new study, the only way for the UK to achieve its carbon saving goals is to establish anationwide programme to upgrade the existing housing stock. The 'Scaling Up Retrofit 2050' report by the Institution of Engineering and Technology and Nottingham Trent University highlights that, alongside environmental benefits, retrofit offer a lasting solution to tackling fuel poverty. To achieve the required goals, a great increase in the rate and level of retrofit interventions is needed. In light of this challenge we're sharing four examples of different approaches to retrofit from around Europe.

Image: Lacaton and Vassal

Read More →

Renfrewshire Retrofit - Achieving Best Value

Renfrewshire Council is working with John Gilbert Architects and the BRE in Scotland to order to develop our Home Energy Efficiency Programme Area Based Schemes, known as HEEPS ABS programmes. The work is based on 'real-life' monitoring of properties leading to guidance and support in improving and developing the Council's design and specification for external insulation programmes.

Read More →

Retrofit Scotland

Healthy buildings.

Relaunched 7 Nov 2024

University of Strathclyde Glasgow

60

Royal Charter since 1964

Useful Learning since 1796