

How can emerging technologies be integrated into domestic housing in Wales to accelerate progress towards net zero by 2050?

Introduction

Wales aims to reach nett zero by the year 2050, with the construction industry acting as a crucial part to achieve this goal.

This project will explore how emerging technologies such as, PV panels, ASHP, MVHR, Heat Pumps and other nett zero construction methods can be integrated into domestic housing.

Moreover, consider challenges, for example skill gaps, supply chain limitations and cost implications.

Objectives

- Analyse the current carbon emission profile of domestic housing in Wales
- Examine emerging low carbon technologies suitable for Welsh homes
- Compare Wales’s approach with leading international examples

Outcome

The research is expected to identify patterns in adopting retrofit technologies, showing reduced energy costs and carbon emissions.

It will highlight improved coordination and efficiency of retrofit programmes across Wales. In which the findings will look at practical recommendations to support growth of integrating retrofit technology within domestic housing while demonstrating reasonable solutions.

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References:

*ORP Retrofit CASE STUDY – PV and battery systems. (2025). Available at: <https://www.gov.wales/sites/default/files/publications/2025-09/orp-pv-battery%20systems.pdf>, Streefkerk, R. (2019). Qualitative vs. quantitative research: differences, examples & methods. Available at: <https://www.scribbr.com/methodology/qualitative-quantitative-research/>, **Figure 1 - Olivia (2024).What is Retrofit & Why is it Important? - Building Energy Experts. [online] Building Energy Experts. Available at: <https://buildingenergyexperts.co.uk/resources/what-is-retrofit/>. Aaron Griffiths - Research Proposal Assignment. ACBA 5024.

Literature Review

Current Heating in Wales

- Domestic Housing = 97 - 98% use fossil fuel-based systems
- Mains gas use 71 - 72%
- 7.8% use oil
- Only 1.1% use renewable heating systems

This evidence shows a strong need for retrofit solutions to support Net Zero.

ORP Retrofit CASE STUDY – PV and battery systems. (2025)*

Key Policies & Legislation

- **Energy Generation Wales (2017):** Transition to renewable energy and Net Zero targets
- **Future Wales 2040:** National plan prioritising sustainable development and decarbonisation
- **Net Zero Skills Wales (2024):** Develops workforce skills for low-carbon economy
- **Low Carbon Economy Report (2017):** Recommends carbon budgets and early investment
- **RICS Retrofit Standard (2024):** Promotes whole-house, fabric-first approach
- **Optimised Retrofit Programme (ORP):** Funds large-scale social housing decarbonisation

Research Design and Methodology

- Combining qualitative and quantitative research
- Survey method is chosen to gather data from a wide range of stakeholders
- Structured questionnaire to be used as primary data collection tool
- Mainly closed-ended questions for consistency
- Questions to be designed to assess costs, performance, and usability
- Advantages and disadvantages to be looked at for a non bias review

Data Collection & Analysis

- Distributed via email with reminders to increase response rates
- Qualitative data analysed using thematic coding to identify key themes
- Identifies patterns, trends, and insights relevant to objectives

Interviews

- As a local authority employee, interviews will be conducted with the in-house decarbonisation team to identify upcoming projects and planned retrofit technologies.
- The annual business plan will also be reviewed to assess programmes, timelines, and investment priorities. Which gives a key insight of delivering retrofit projects.

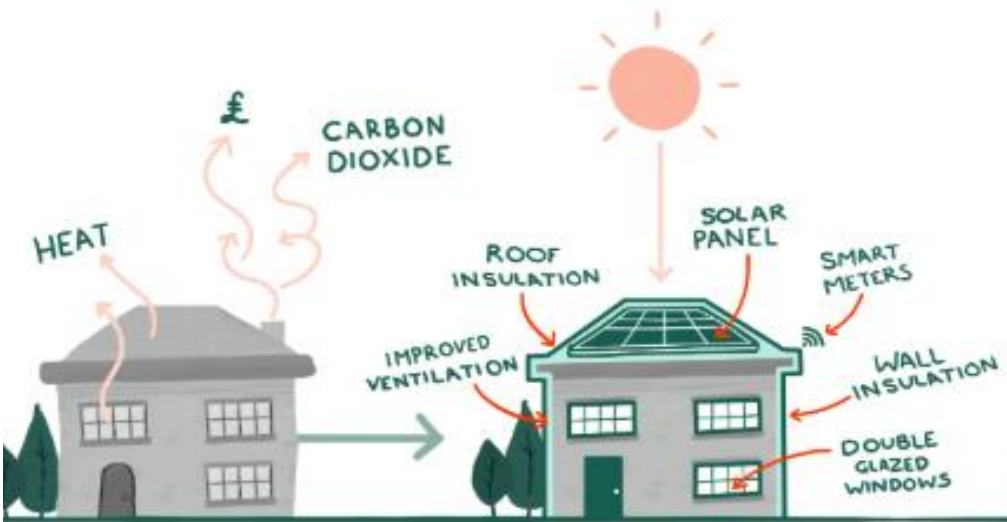


**Figure 1