

# Passivhaus Housing – Cost Research Project with the Passivhaus Trust: An Overview

# AECOM & Passivhaus Experience

- Cost consultancy services on several UK residential Passivhaus projects as well as overseas (Qatar);
- Hastoe Housing Association: Wimbish & Ditchingham. Broadland Housing Association: Fulmodeston;
- Further 4 Passivhaus projects on site / 7 in the pipeline;
- Identified a need for Passivhaus development cost data.



**Ditchingham, Norfolk**  
*Image courtesy of Hastoe Housing Association*



**Wimbish, Essex**  
*Image courtesy of Mark Baigent*

# The Project: Developing a Standard Cost Comparator

Why?

- There's no data out there!
- Figures quoted within the industry but what do they include / exclude?
- No 'Benchmark' cost exists
- Industry wants to know what it costs
- Proof of Financial feasibility to encourage Developers

# Methodology

- AECOM & PHT / Partners have developed a Cost Template, based on industry templates but 'draws out' key Passivhaus elements & includes detailed guide on what is to be included in each cost element. Affordable housing sector specific.
- Includes Project Information sheet to set project context and allow identification of contextual bias e.g. first project 'bought' by contractor.
- Pilot study of three projects – now complete.
- Study now to be expanded to increase data sample and allow further conclusions to be drawn.
- Further research opportunities following further data / results being obtained.

# Analysis & Publication

- Cost Analysis expertise within AECOM (tender price analyses).
- Aim to answer the following:
  - *What are the overall per m2 / per dwelling costs?*
  - *What does each construction element cost?*
  - *What do the elements specific to Passivhaus cost?*

Also investigate:

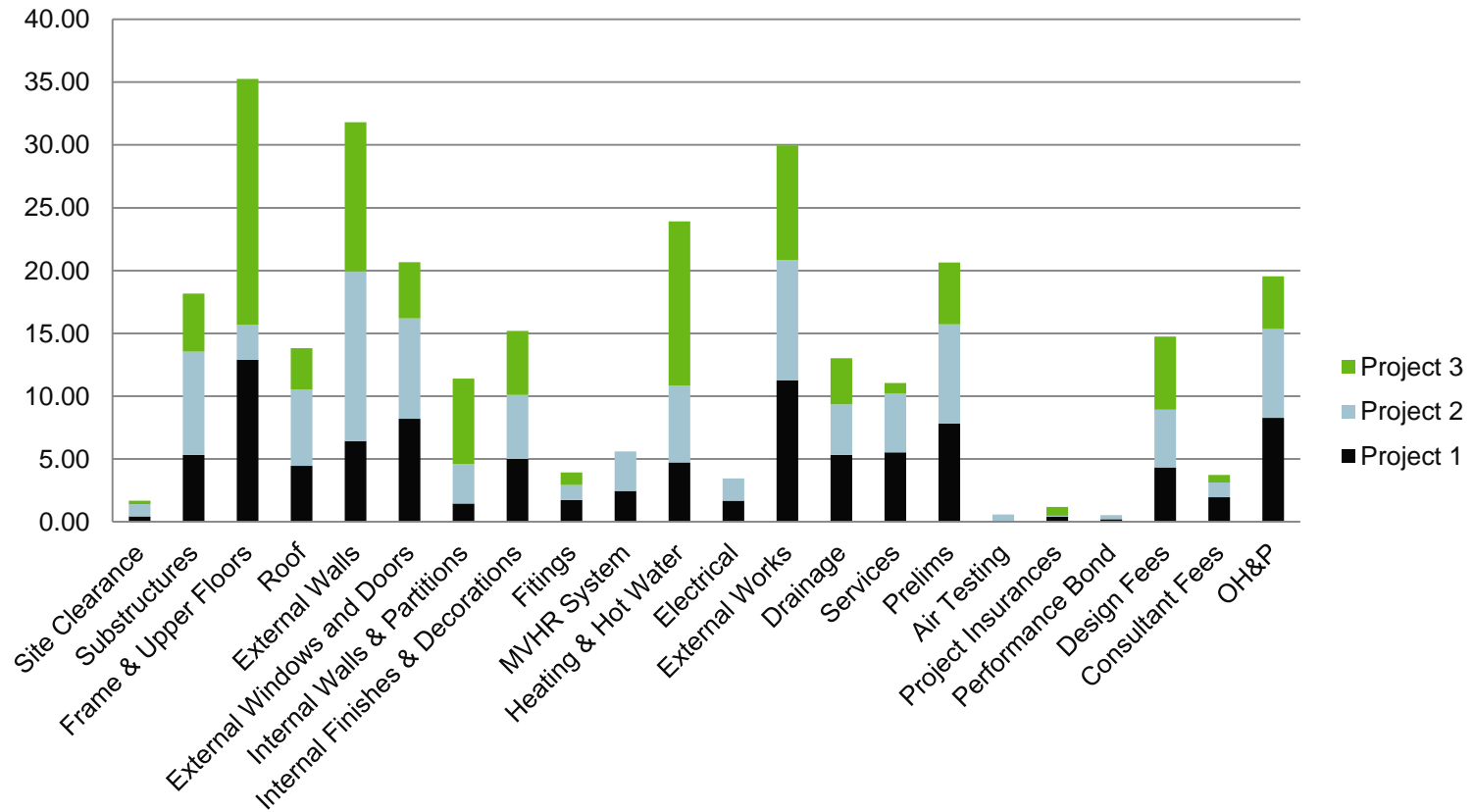
- *How do costs compare to non-Passivhaus developments? – AECOM has extensive cost database for comparison.*
- *Does size / procurement route / method of PH assessment affect costs?*

# Pilot Study: Results - Overview

	Project 1	Project 2	Project 3
Nr of Dwellings	4	14	20
Procurement Route	Negotiated D&B	Single Stage D&B	Negotiated D&B
Sustainability Accreditations	Passivhaus & Code 3	Passivhaus & Code 4	Passivhaus & Code 4
Construction Method	Timber frame	Blockwork & External Insulation	Timber Frame
Tender Base Date	March 2012	January 2013	January 2011
Cost per m2 (Comparable)	£1,690	£1,666	£1,450

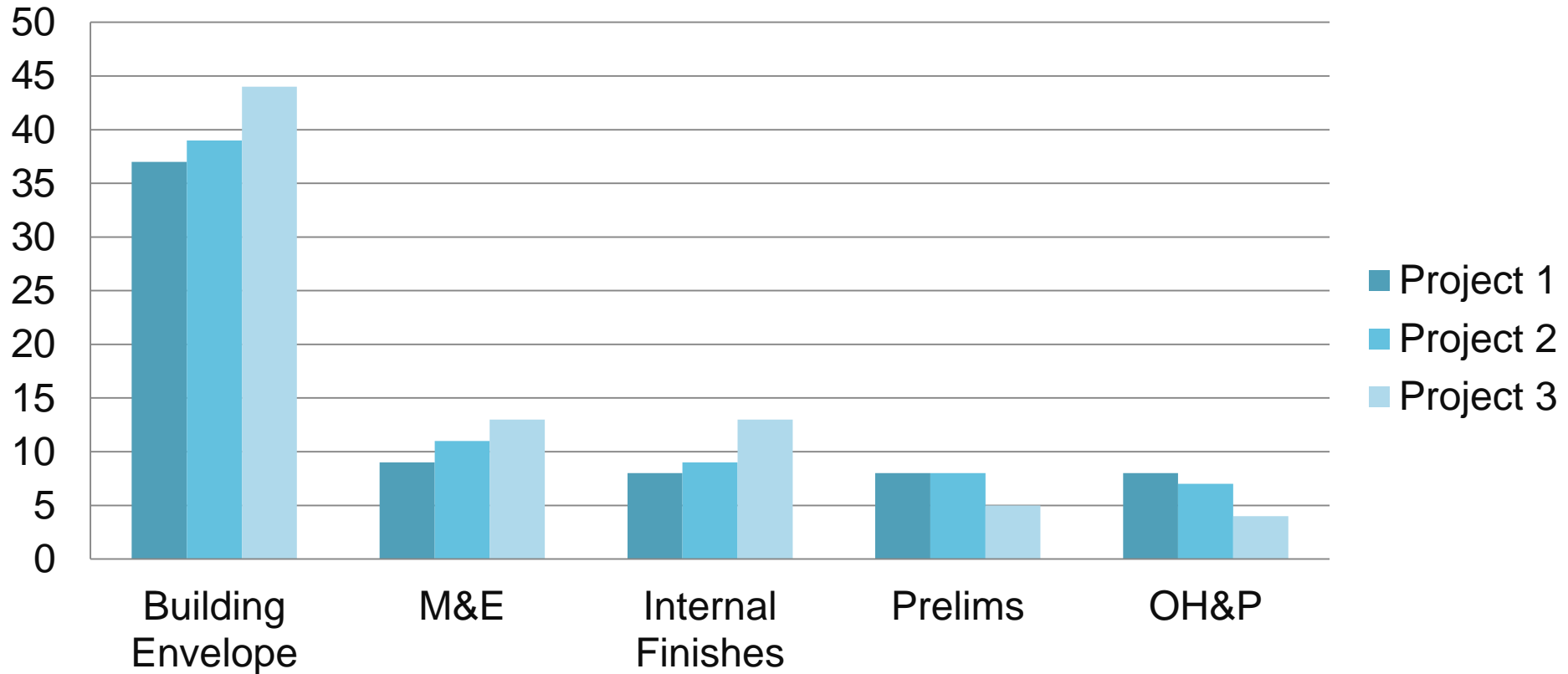
# Pilot Study: Results - Overview

## Elemental Comparison (% of Total Build Cost)



# Pilot Study: Results - Overview

## Dwelling Components Comparison (% of Build Cost)



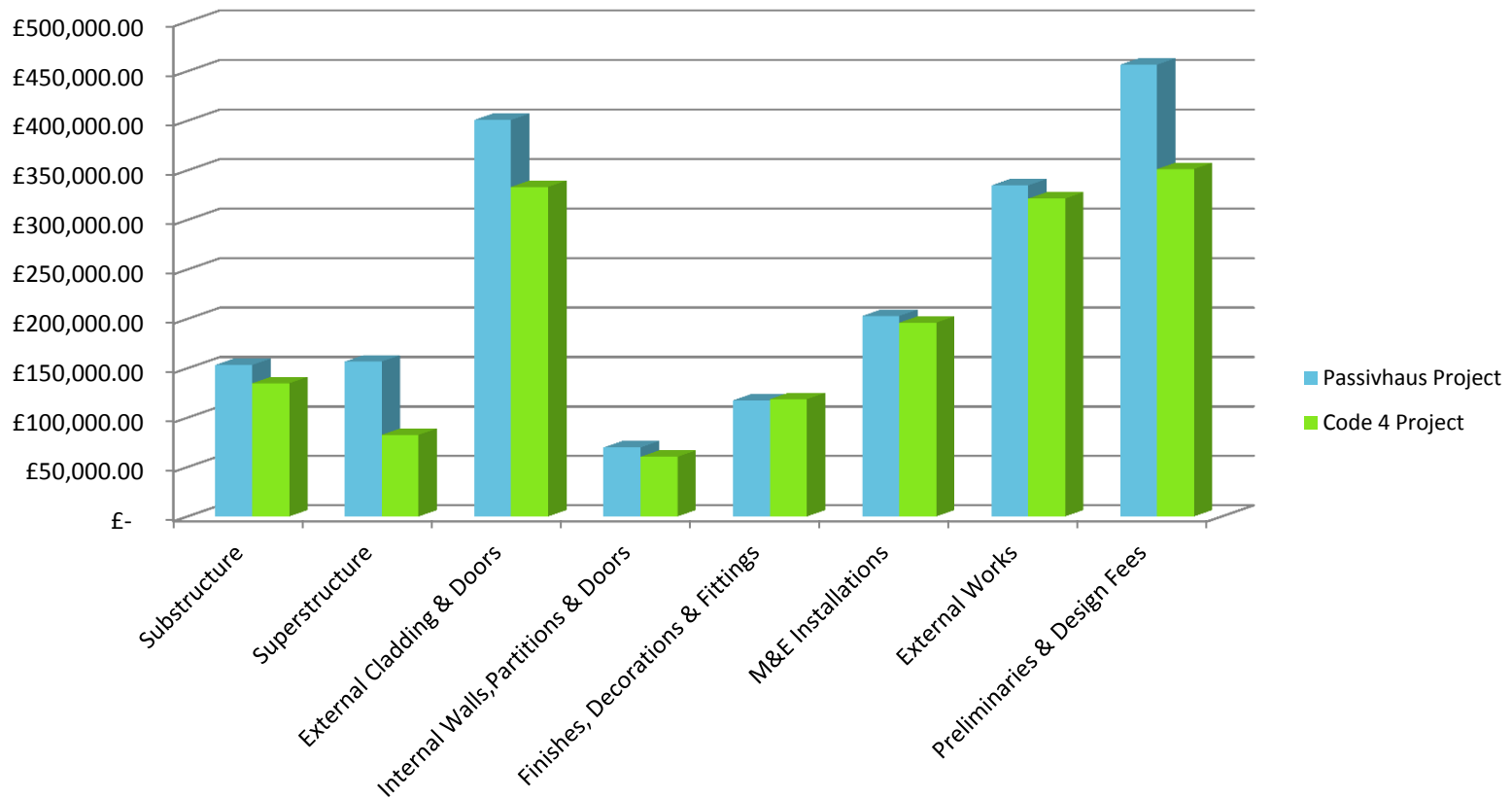


# Key Findings & Observations

- Key dwelling components showing similar cost allocations – could suggest a pattern.
- Both timber frame projects are more cost effective based on a m2 rate – could suggest more economic build method (but very small sample).
- Project 3 appears to be a bit of an anomaly – lower build rate than Project 1 yet achieved Code 4. Possibly a loss leader? Evaluation questions suggest so.
- External influences at the time of Project 3 tender – economy / contractors willing to take on greater risk.
- Extra over costs for Passivhaus range from 5 – 22%.

# Pilot Study: Results - Overview

## Passivhaus compared to Code 4



# Compared to Code 4: Key Findings & Observations

- 48% cost increase in superstructure costs for Passivhaus project.
- 23% cost increase in preliminaries and design fees for Passivhaus project.
- 17% cost increase in external walls, windows and doors for Passivhaus project.
- 15% increase in substructure costs for Passivhaus project.
- 3% increase in M&E installations for Passivhaus project (note that Passivhaus project does achieve Code 4 also).
- Overall 17% increase in total build cost for 'Passivhaus and Code 4' project over 'Code 4 only' project.

# Outcome of Pilot Study & Next Steps

Lessons learnt for future data collection:

- Difficulty obtaining level of breakdown required due to D&B contracts, historic nature of projects – will simplify moving forwards.
- Requirement to obtain PHPP summary to inform project contexts.
- Projects completed to date may have skewed data due to ‘loss leader’ situations.
- Need to include template for future tenders to allow a cost database to be built up.
- Standardised Cost Comparator

# How will the research help the UK housing industry?

- Will provide an indication of what developing to Passivhaus standards costs, based on larger data sample than previously experienced.
- May encourage those who had not considered Passivhaus development before to target the standard on future projects: *“I would like to build to Passivhaus but I have no idea what it will cost me”*.
- ‘Opens the door’ for further research into how costs could be reduced: once we know what the key ‘drivers’ are and what they typically cost, we can look at ways of reducing costs without affecting the standard.
- Similarly research into what the payback period is, demonstrating the long term benefits of Passivhaus development.
- Allows general promotion of Passivhaus through industry-wide publications.

# Questions?