

PASSIVHAUS CONSTRUCTION COSTS



Innovation costs associated with early Passivhaus projects are now reducing as the methodology has become more widely adopted. This study shows that the extra over costs associated with building to the Passivhaus standard in the UK has reduced over the past three years and, as of 2018, best practice was around 8% higher than comparable non-Passivhaus projects.

Image: Chester Long Court © Exeter City Council

THE LEARNING CURVE

In 2015 the Passivhaus Trust published a costs research paper identifying Passivhaus extra costs between 15% and 20%, largely associated with the innovative nature of the standard. Costs associated with early Passivhaus projects are now reducing as the methodology has become more widely adopted. New analysis suggests that there is a consistent trend of costs falling over time and, as of 2018, best practice costs were around 8% higher when set against comparable projects.

Overall, this analysis has shown that by following some key principles and leveraging prior experience, Passivhaus projects in the UK are likely to be achieved for a modest extra over cost of around 4% or less once adopted at scale.

It is also worth noting that, for this 4% uplift, the result is a far superior product in terms of running costs, carbon emissions, comfort levels and health benefits.

The new analysis examines several Passivhaus certified multi-unit residential developments of differing construction types, completed between 2014-2018, to derive typical cost premiums and identify a wide variation of extra-over costs per m². Results have been compared with the average costs of the equivalent normalised projects and other studies, such as Currie & Brown analysis for the UKCCC, to provide a robust analysis.

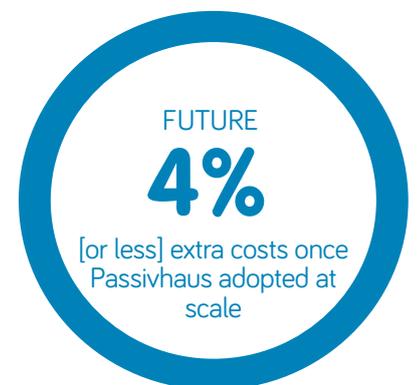
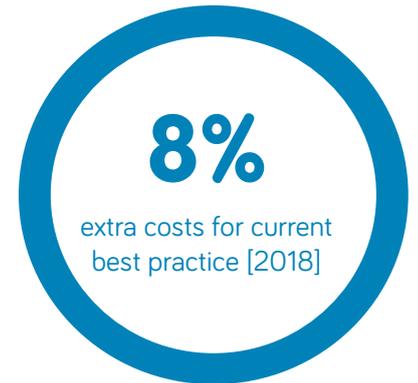
The full report & methodology will be available shortly to download here: bit.ly/PHTcostbenefit

In general, lower costs were achieved through good, simple design supported by rigorous on-site practices during the construction phase.

“Costs are still falling. Passivhaus started expensively, but that’s because we were early pioneers of the standard, the supply-chain for components was in its infancy and we lacked the experience we’ve amassed to date. We are still learning!”

Emma Osmundsen, Managing Director of Exeter City Living

Exeter City Council has been building Passivhaus projects since 2010. Now on their 4th generation of Passivhaus developments, Passivhaus build costs have reduced by 25% over 5 years. This reflects Exeter’s growing experience as a client, alongside maturing supply chains and experienced designers and contractors. As experience grows, costs fall. Passivhaus schemes are at a premium of just 9% over baseline and with many more in the pipeline, the Council hope to build upon learning and reduce costs further in the next phase of construction.



Download the full report: bit.ly/PHTcostbenefit

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KEY FINDINGS

1. QUALITY ASSURANCE

Costs of additional site supervision can be considerable (up to £80 per m²). The Passivhaus quality assurance (QA) process & certification ensures the project is built as designed and eliminates the performance gap. In comparison, the average UK home exhibits energy consumption of at least 40% more than the predicted design. Future standards and legislation will seek to close this performance gap and thus, additional QA mechanisms will need to be implemented at a national level. Therefore the 'additional' QA costs associated with Passivhaus are likely to be required for all projects in future.

Once QA is improved as standard, it will not be seen as a Passivhaus-specific over cost. In the context of other factors which result in higher build costs (high quality, high performance building products, design form, ground conditions etc), extra QA would then become a minor uplift.

“Defects and legacy are so frustrating – you lose a lot of money and tie good people down going back to sort stuff out. The (QA) sign-off process has been a good lesson and reaped rewards in our business. It has been a good learning process for us.”

Passivhaus Contractor

2. DRIVING UP SKILLS & QUALITY

One of the main concerns about improving building performance in the UK is the skills gap in design and construction. The case studies suggest skills are achievable given the right context, and that the Passivhaus methodology is a good way to embed these skills in future practice both in design & construction. Learning has passed from the Passivhaus projects to improve the quality of other non-Passivhaus builds.

“We realise now that this is not just good practice for Passivhaus, to reduce large north-facing windows, it is good practice for all our builds to minimise heat loss.”

Passivhaus Designer

3. EXPERIENCE GROWS - COSTS FALL

The geographic spread of projects across the country has not yet exposed the supply chain to the practice required, so there has only been limited skills-building, experience or learning to date. This inevitably increases costs in the short term, and will naturally decline as the market expands.

NEXT STEPS

Whilst this report concentrates on the initial capital costs of a Passivhaus development, any discussion of costs should also consider the impact on through-life costs.

Performance and reduced risks are ensured thanks to the QA process. High quality products last longer than inferior alternatives thus reducing maintenance & improving durability.

There are also broader health and wellbeing benefits which go beyond purely financial considerations. The Trust will be exploring these further in a future publication.

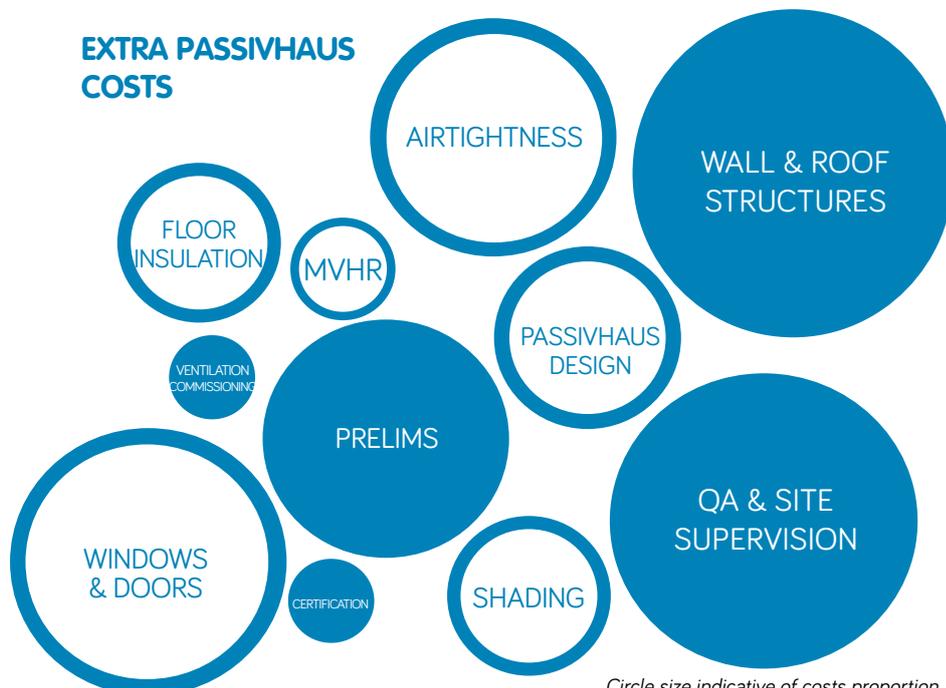
“Our oldest Passivhaus dwellings are almost 10 years old and so far, we haven't had to replace a single component. We've noticed we get low rates of anti-social behaviour on our Passivhaus developments. We looked into it and the suggestion is that the improved noise abatement with airtight and highly insulated dwellings is helpful in this regard.”

Emma Osmundsen, Managing Director of Exeter City Living Ltd

TOP 10 TO MINIMISE COSTS

- 01 Passivhaus needs to be part of the initial brief.
- 02 Employ experienced Passivhaus Designers.
- 03 Keep it simple.
- 04 Ventilation design is important.
- 05 Consider summer comfort.
- 06 Airtightness is key.
- 07 Work with a team that 'get it.'
- 08 It's more than just design.
- 09 Collaboration.
- 10 Appoint a certifier early.

EXTRA PASSIVHAUS COSTS



Circle size indicative of costs proportion