#UKPHC18

Fareham Borough Council Passivhaus Feasibility Study

Dr Sarah Price

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Fareham BC have adopted a Passivhaus policy for Welbourne Garden City known as WEL 36

WEL36 (Part)

"Proposals for residential development shall incorporate 10% of dwellings built to Passivhaus Standard, unless it can be demonstrated to be unviable by means of a financial assessment which clearly demonstrates the maximum proportion of dwellings built to Passivhaus Standard which can be achieved."

What questions did Fareham have about Passivhaus?

1) What are the advantages and disadvantages of Passivhaus?

2) What is equivalent to Passivhaus?

3) What is the residential sales and buy-to-let market demand for specialist Passivhaus house building?

The developer

The social landlord

The private landlord

The tenant

The owner/ occupier

What did we do to answer those questions?

Whole Life Cycle Costing Analysis for:

- Building regulations
- AECB Building Standard
- Passivhaus

Interviews:

University of Bath	University
Oxford University	University
Hastoe Housing Association	Social Landlords
East Midlands Homes	Social Landlords
Exeter Council	Council/Social landlord
Norwich City Council	Council
CLC International	Developers
Lendlease	Developers
Broadland District Council	Council/Developer

What did we do to answer those questions?

Interviews with

- Council members involved in the Sarisbury scheme
- Local and national estate agents

Viability modelling for a development of 100 houses with

- No Passivhaus dwellings
- 10% Passivhaus dwellings – all affordable rent
- 10% Passivhaus dwellings - proportion affordable and market sale

Tenants love Passivhaus

They report

very low energy bills

improvements in conditions such as eczema and asthma

lovely fresh air

happiness

controls can be a bit complicated/strange

No tenants were interviewed first hand as part of this study, these are all reports from our interviewees

Benefits of Passivhaus for landlords..

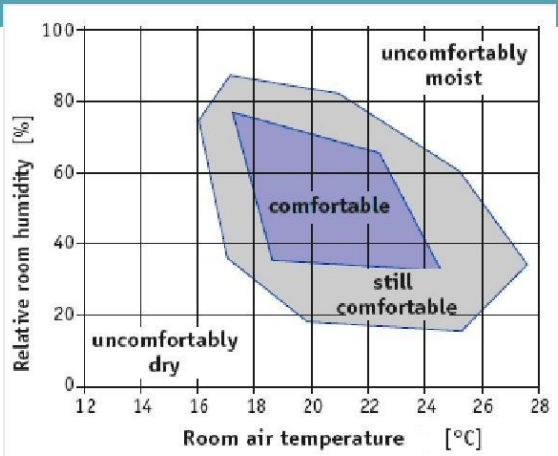
Higher standard of workmanship throughout the whole fabric of the building

- [x] EXCELLENT
- [ ] GOOD
- [ ] AVERAGE

Contractors can't cut any corner. You get what you have designed and specified;

Benefits of Passivhaus for landlords..

More climate resilience and healthier homes; Lower risk of underheating and overheating



Reduction in antisocial behaviour; Fewer complaints from tenants, excellent ambassadors for their homes;

And what they hope to see in the future…

Reduction in void times;

Continued performance over the lifetime of the building;

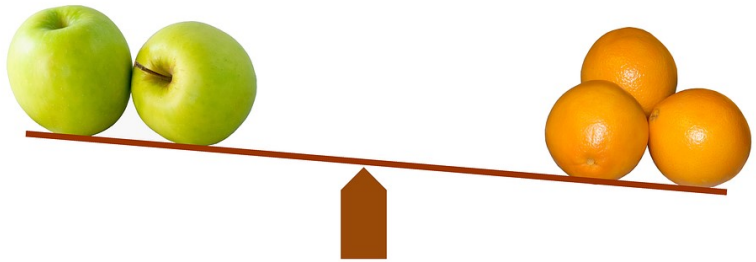
Disadvantages of Passivhaus

Passivhaus *can* work for private sale

There are only two completed private sale Passivhaus scheme that we know of
- Remedial action costs money, get air tightness right in the first place
- Excellent site management is required
- Certification is a must
- They do cost more to build – between 0 and 25%..... average = 11%
- There is very little awareness of Passivhaus in the market – Agents were questioning if it were mortgageable!

So did they sell for more??

Yes…..but……



Carrowbreck scheme – 14 market sale Passivhaus units

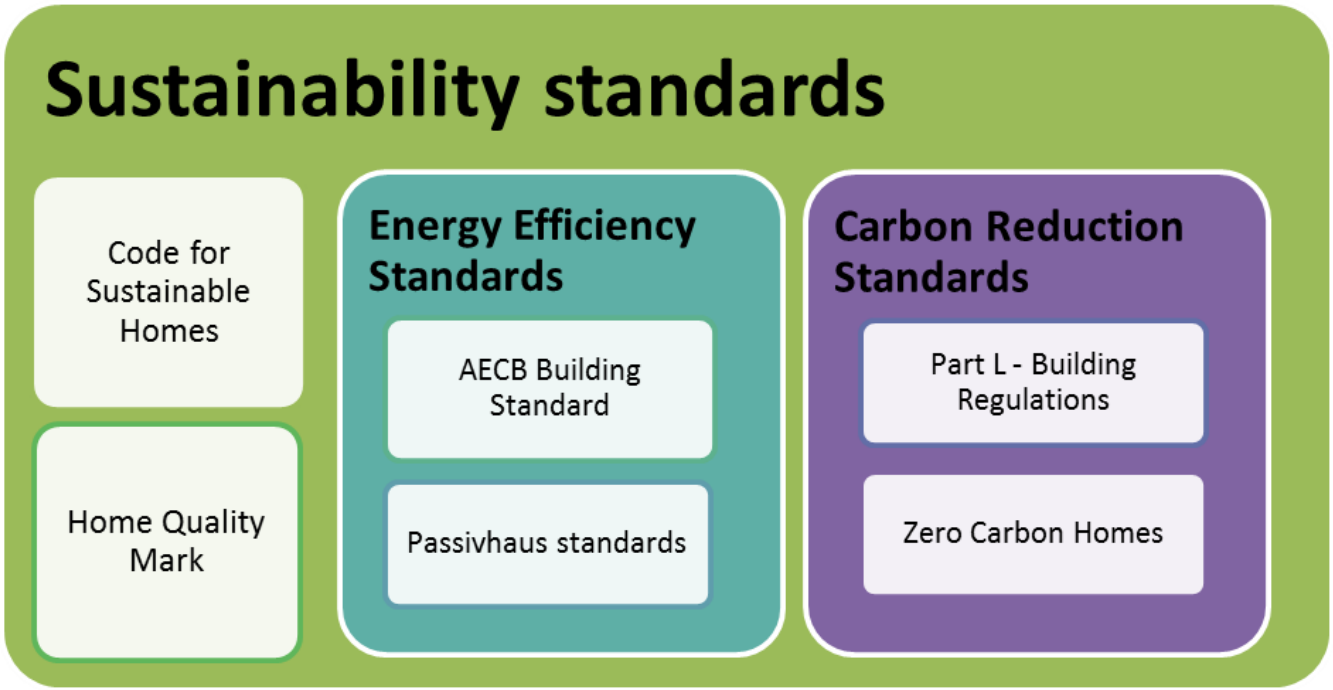
- Didn't achieve the uplift expected – but the market is more bouyant now
- It was tough to get Passivhaus across to the buyer and the selling agents
- Lots of data and feedback collected from this development – 85% of respondents would prefer to live in a Passivhaus or would only purchase a Passivhaus in the future
- Residents are applying for planning to make changes – are they sticking to Passivhaus principles?

There are more Passivhaus units coming up…

- Norwich City Council are developing Rayne Park in Norwich for both affordable housing and market sale
- 172 houses – 112 will be Passivhaus, some Code level 5
- Phase 1 Passivhaus homes are currently for sale – the show home opened in Jan 2018
- Initial feedback is that the Passivhaus homes are more desirable and have an edge on the market

What is equivalent to Passivhaus?

There is no equivalent = ❙❙❙❙❙
No idea = ❙
Fareham Council = There has to be, because we've written it in our policy!



Modelled AECB Building standard and Passivhaus

	Passivhaus	Passivhaus Institute Low Energy Building	AECB Building Standard
Space heating demand (kWh/m2 annum)	15	30	40
Primary Energy (kWh/m2 annum)	135	135	135
Air tightness (ach^{-1})	0.6	1.0	1.5

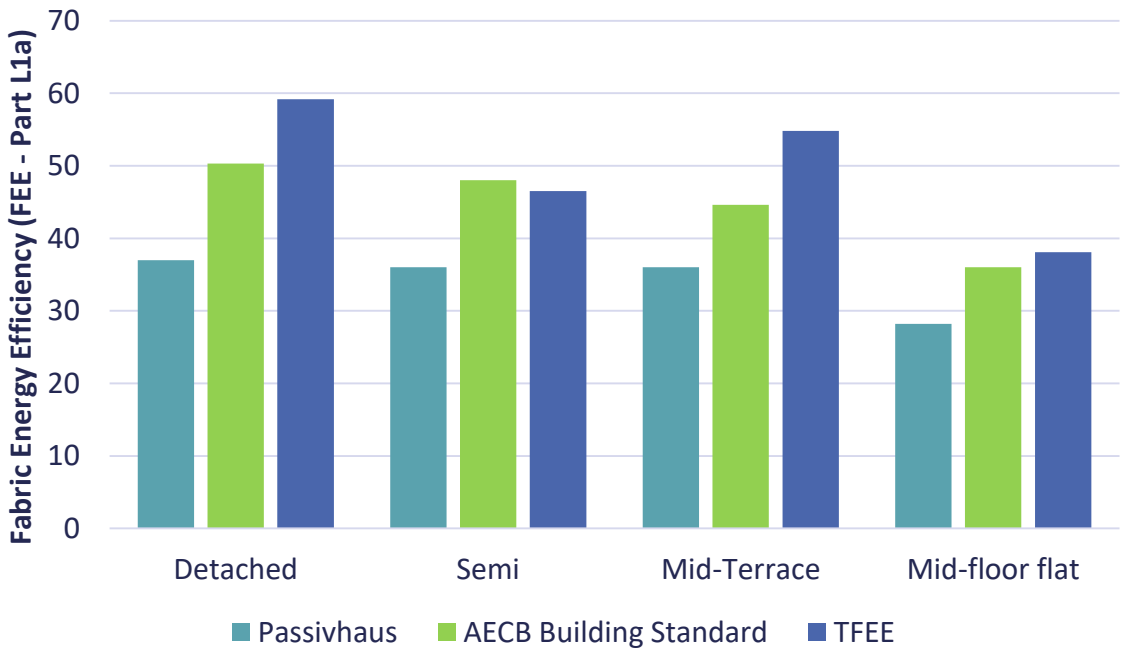
Modelled four architypes in PHPP to meet AECB & Passivhaus targets

Limit AECB U-values to building regs maximum in some cases

Model four architypes in SAP using PHPP inputs

Examine AECB & Passivhaus performance in UK Building regs

AECB and Passivhaus vs UK Building regulations

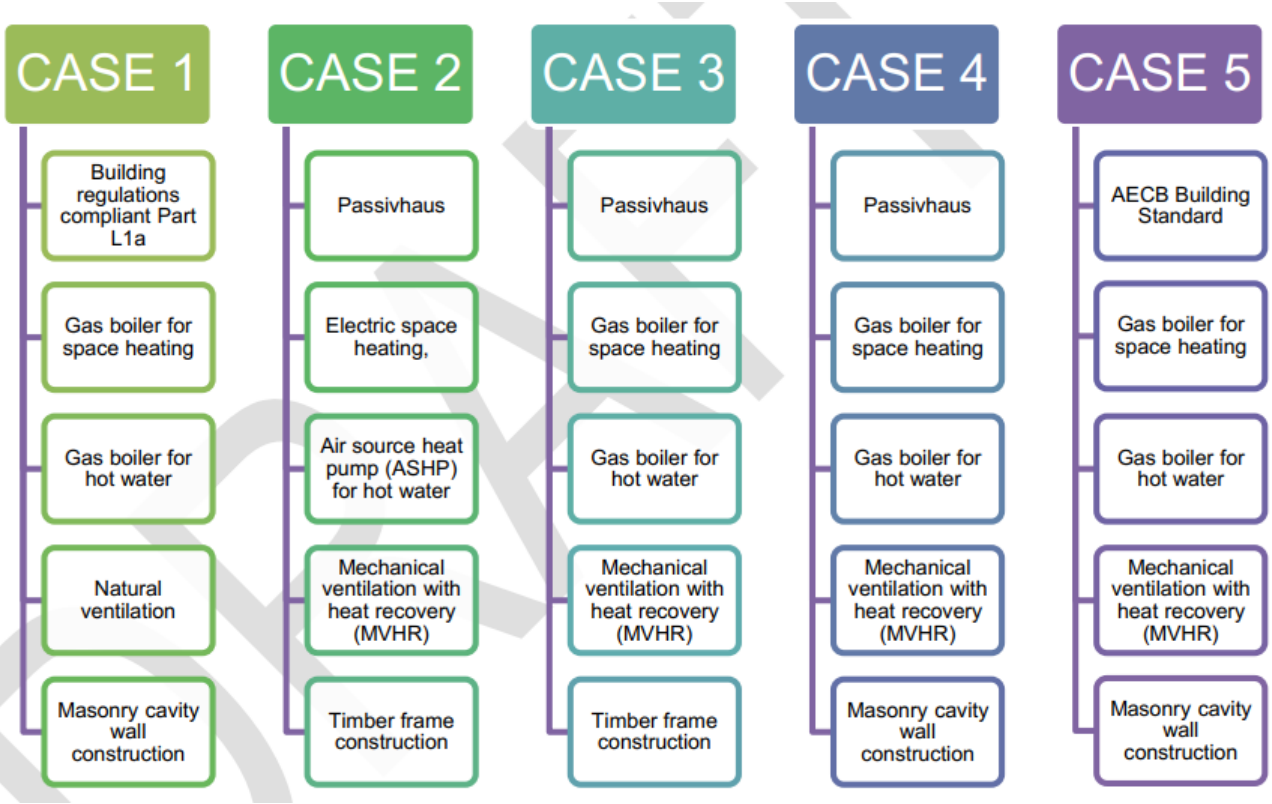


- AECB standard did not meet building regulations in 3 out of 4 cases in South of England without solar PV.
- When modelled in any other UK climate zone, they would have passed with fabric alone.

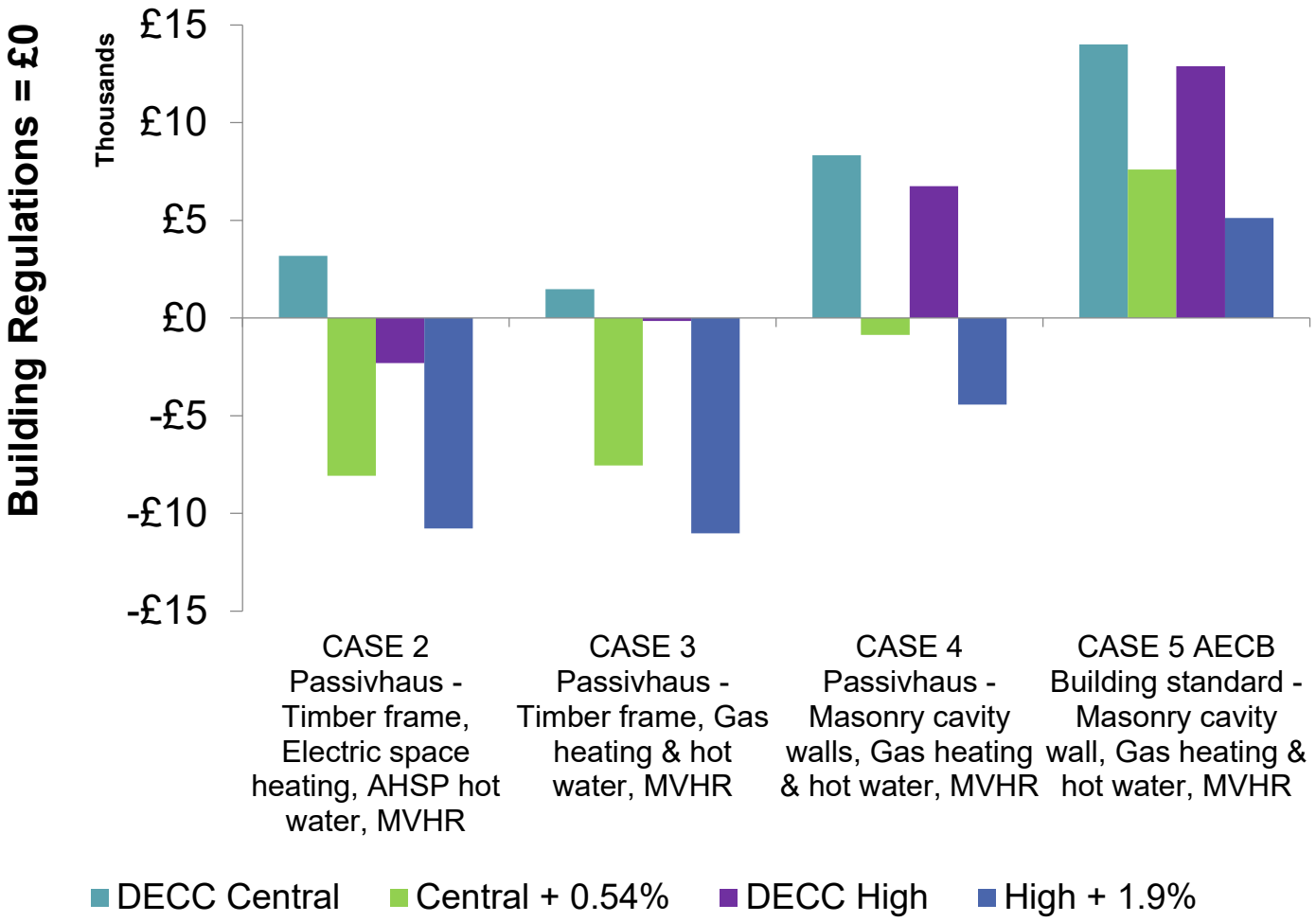
PHPP results for AECB Building standard

Detached = 40 kWh/m^{2}annum
Semi = 38 kWh/m^{2}annum
Mid-terrace = 30 kWh/m^{2}annum
Mid-floor flat = 20 kWh/m^{2}annum

Whole life costing analysis – 5 cases

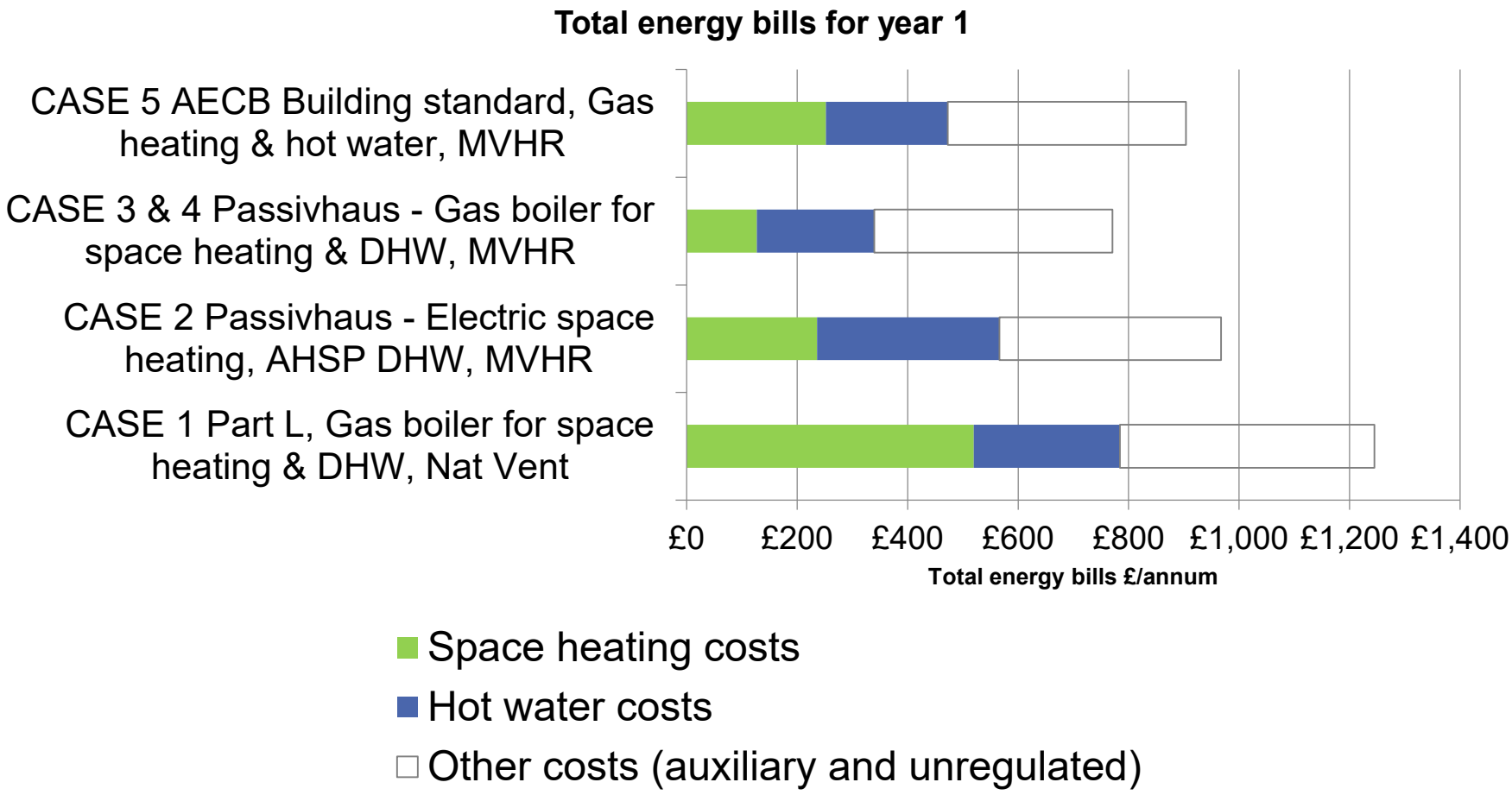


Whole life costing comparison

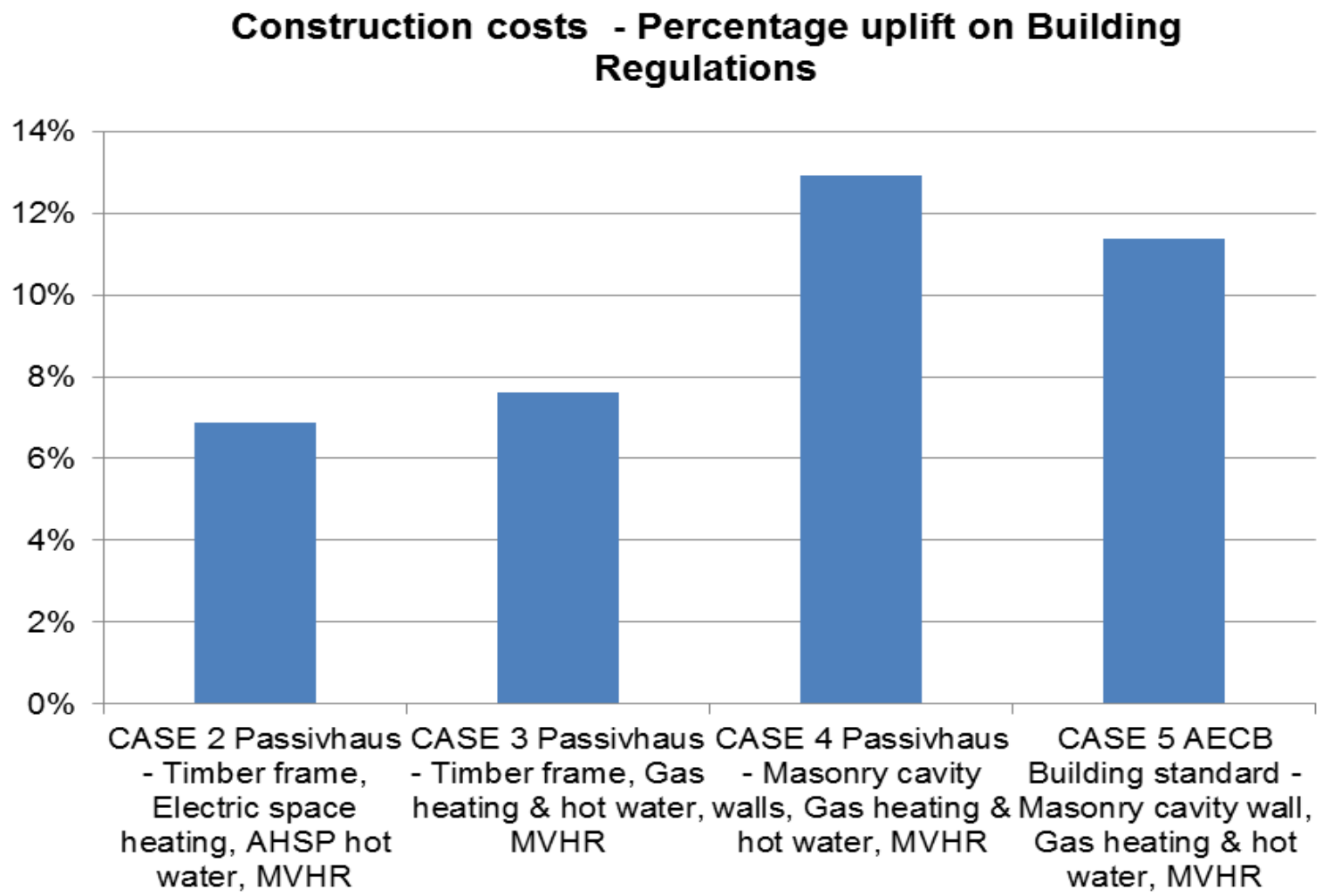


All figures are quote at their Net Present Value. Discount rate has been modelled at an average of 3% over the 100 year period. Cost inflation has been modelled at 2%.

Energy consumption comparison



Capital costs comparison



Findings and recommendations

- 10% Passivhaus has **limited impact on the financial viability** of the Welsborne development
- Increase number of Passivhaus units in each development phase
- Only use the **PHI Low energy building standard** for an alternative to Passivhaus in terraces, semis and detached properties
- There should be **no alternative** for high rise and apartment blocks
- **Sustainability standards are not equivalent to Passivhaus** as they do not guarantee the quality in workmanship
- Zero carbon homes are more likely to result in a **technologically complex** design as opposed to a fabric first approach
- All Passivhaus or PHI Low energy buildings **must be certified**
- The majority of Passivhaus dwellings should be **affordable housing** with a small proportion market sale
- **Training for contractors and developers** agents may be required
- Ensure Passivhaus dwellings have **clear non-technical guidance**
- There is value in **monitoring the performance** and use of new Passivhaus housing

ukpassivhaus conference 2018

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Thank you…

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