Exeter City Council

CONSTRUCTING EXCELLENCE in the built environment

The Challenges and Opportunities

SURROUNDING OUR NEED TO BUILD MORE AND BETTER HOMES

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3. Passivhaus Basics
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Need for Better Homes - Context

Health

Fuel Poverty

Climate Change

Comfort

Quality Assured

Cost Effective

Next Generation of Council Homes

1st Generation Passivhaus

Next Generation of Council Homes

1st Generation Passivhaus

Next Generation of Council Homes

2nd Generation Passivhaus

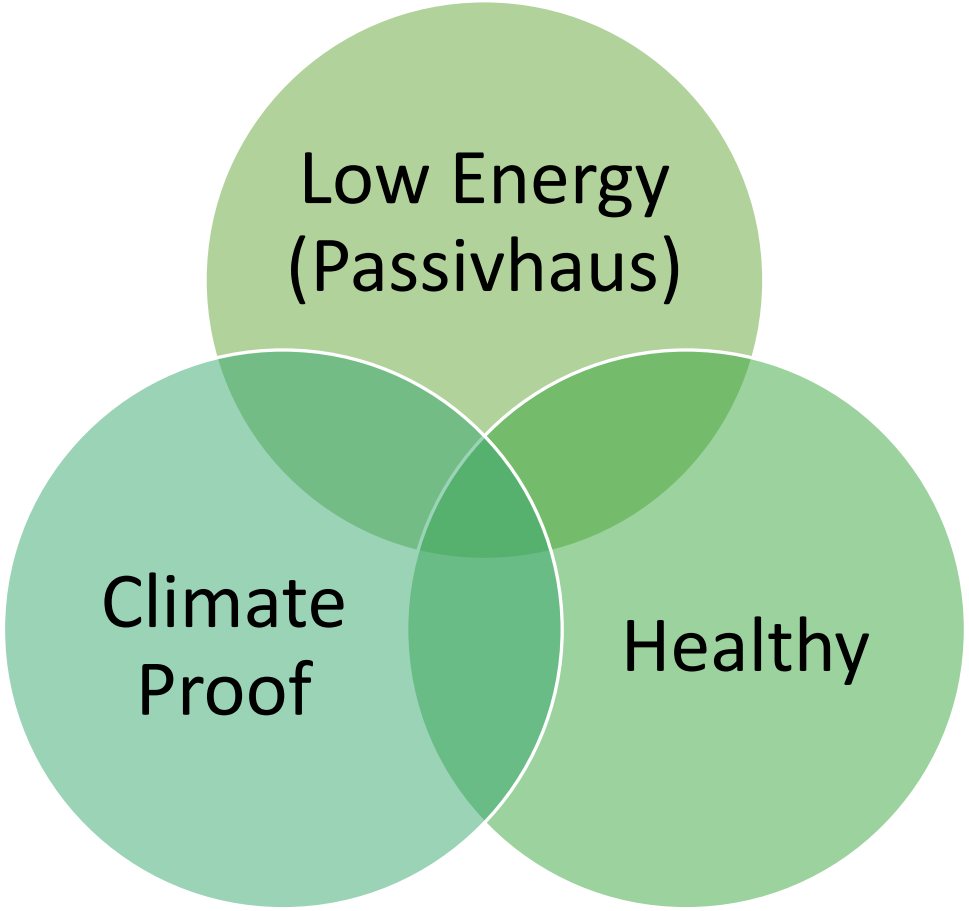
Next Generation of Council Homes

3rd Generation Passivhaus

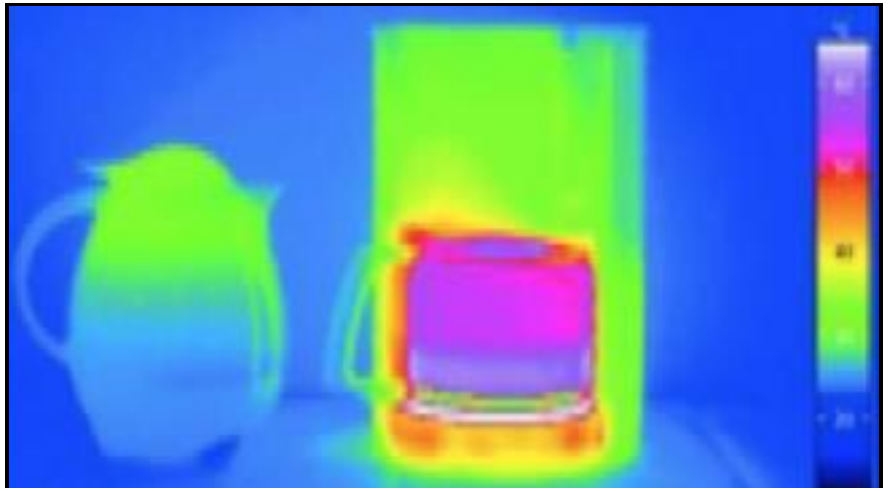
Next Generation of Council Homes

4th Generation Passivhaus

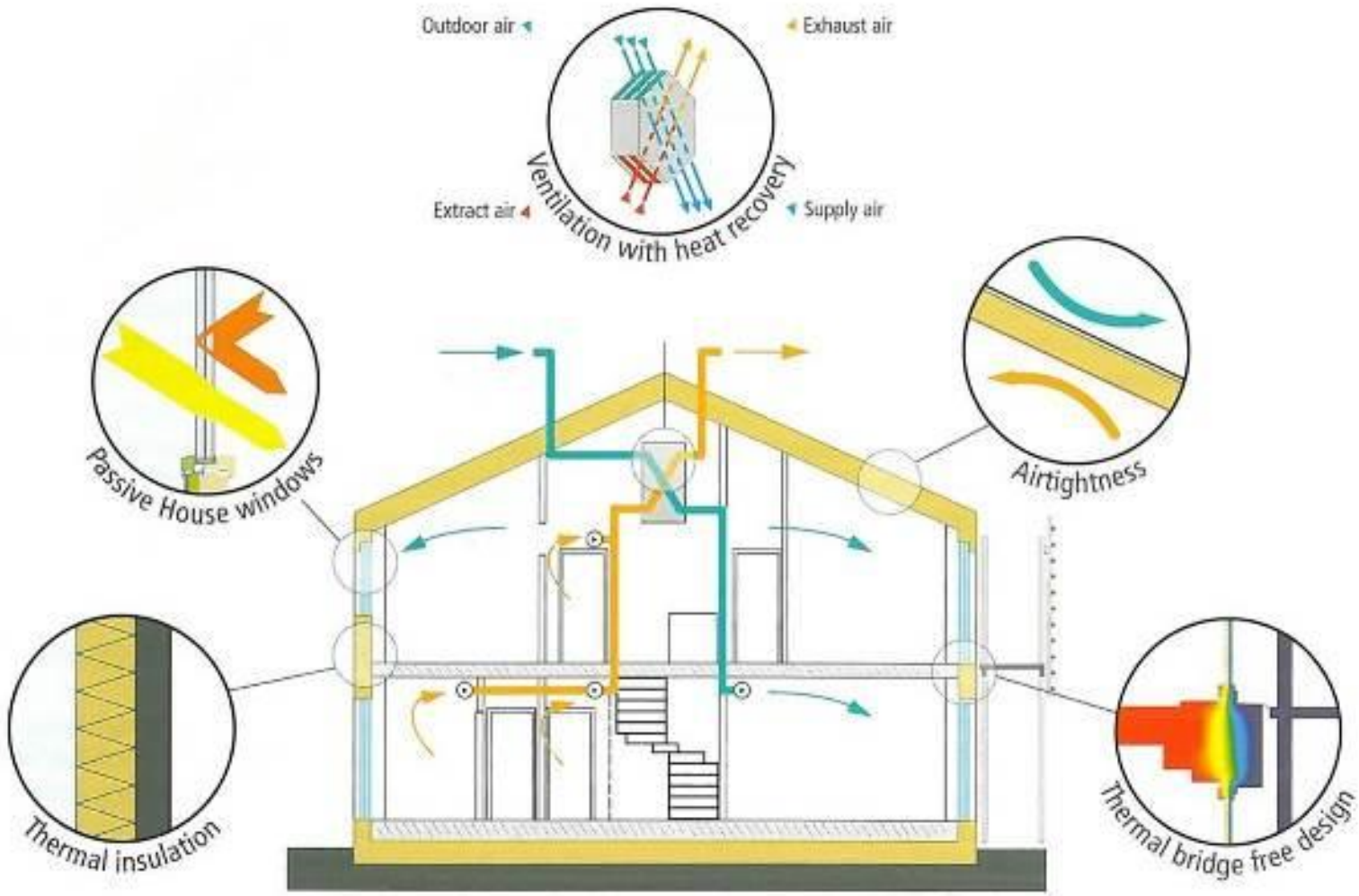
Environmental Factors



Passivhaus Basics



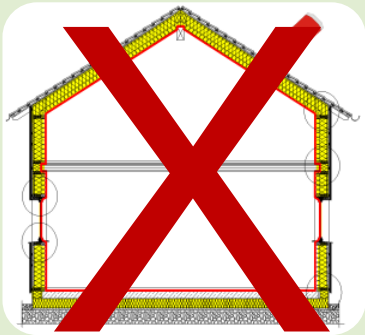
Low Energy – Passivhaus Five Key Principles



Low Energy – Passivhaus Five Myth-busters

You can’t open the windows

A passivhaus overheats in the summer



A passivhaus is airtight and unhealthy

The ventilation system is costly to run and is noisy

You have to live differently

Passivhaus – Efficient & Versatile

Sustainable
- 90% less energy

Affordable
- Zero build premium
- Lifecycle cost benefits

Comfortable
- High levels of thermal comfort
- Surface temperature >17°C

Versatile
- Performance based, no particular method of construction
- Adapted for climate
- New build or retro fit

Quality Assured
- No performance gap
- Stringent quality control

Healthy Design – Why bother?

World health organisation advice:

Some agents still used in general UK construction have been classified by the WHO as ‘carcinogenic’ (1) or ‘potentially carcinogenic’ (2b)

Agent	WHO Group
Formaldehyde	1
Benzene	1
Asbestos	1
Polychlorinated biphenyls	1
Magnetic fields (extremely low energy	2B

Since the mid 1970’s in the UK the incidence rates for all cancers combined have increased by 23% in males and 43% in females.
(Cancer Research UK, 2014)

Most VOCs typically found in modern paints, glues and timber treatments are in the same category as tobacco smoke (WHO Group 1)

Passivhaus = Healthy Homes

CONVENTIONAL BUILD

- Highly processed, complex construction materials (reduce cost & increase speed)
- Hygroscopic?
- Well ventilated?

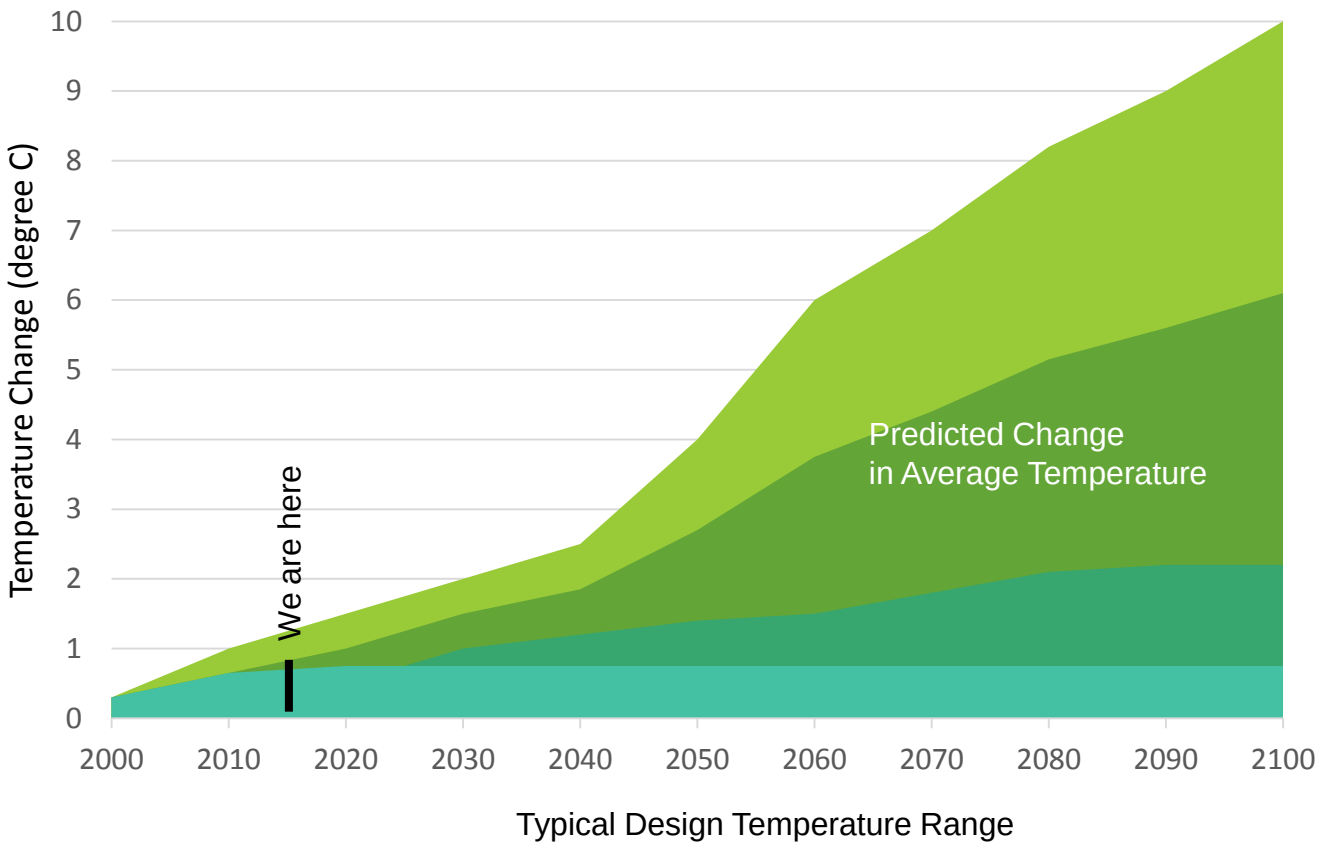
PASSIVHAUS

- Natural construction materials
- Low VOCs
- Breathable
- Well ventilated

Passivhaus & Building Biology

- Maximise natural daylight
- Optimise acoustic performance
- Themal comfort
- Good quality ventilation
- Use of low embodied energy and non-toxic natural materials
- Vapour permeable & hygroscopic construction
- Reduction in man-made EMRs
- Healthy Materials by selection

Climate-proof Homes



- Wetter winters
- Drier summers
- Increased temperature (4-6 degrees)
- Use of weather data
- Climate change strategies

Business Case for Healthy, Climate-proof Passivhaus Homes

- Zero or little capital cost uplift
- High specification components = reduced lifecycle costs & reduced maintenance costs
- Energy saving costs of up to 90% = reduced revenue costs & eradication of fuel poverty
- Energy savings provide headroom for mortgage borrowing and/or rent increases
- Low energy & healthy homes = more marketable
- Low energy & healthy homes = reduced burden on the NHS
- Healthy home = happy occupants

Conclusions

- ✗ Passivhaus homes cannot solve housing shortage
- ✓ Guaranteed better homes
- ✓ Healthy
- ✓ Climate proof
- ✓ High performing
- ✓ Cost effective
- ✓ Any design or style

Any questions?

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