

Challenges in large scale Passivhaus planning and design

Peter Warm, WARM: Low Energy Building Practice

Our Experience



What does large scale mean?

- Professional UK quality (ie finish more important than operation)
 - Contractor looks at cost not building quality
 - Sub contractors regularly go bankrupt
 - Everyone says they can do it before they have heard what “it” is and price to win work
 - Nobody can say that they don’t know how
 - Overall poor communication compared to small scale builders
- = an issue with Build Quality

So make it easy for them!

Successful large scale design

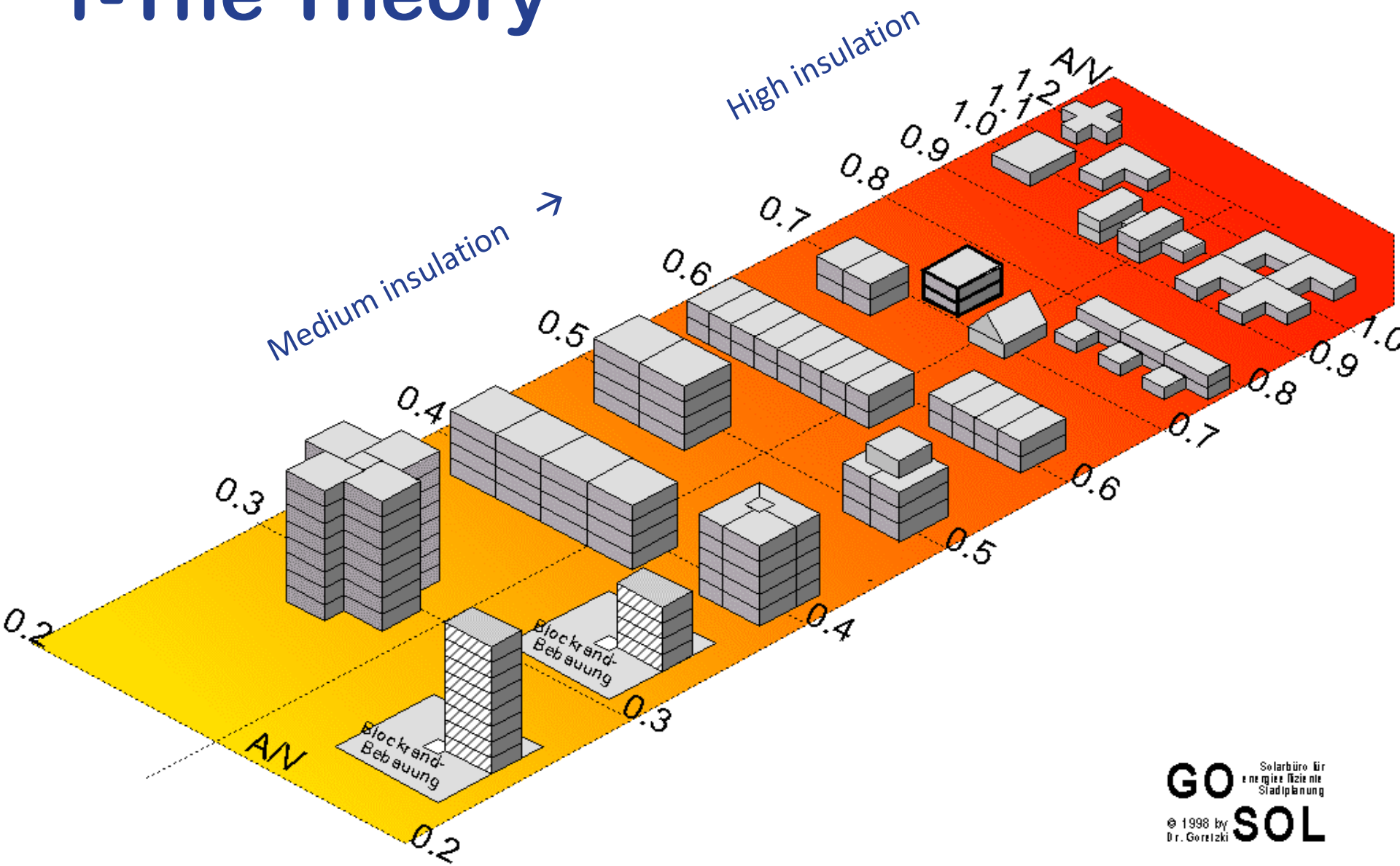
- Building A – designed and certified within budget
- Building B – required ~10% cost overrun and 18 months rectification work to reach certification.
- Building A designers had done training before design; Building B was designed before Passivhaus was a requirement.

Do your homework before the design!

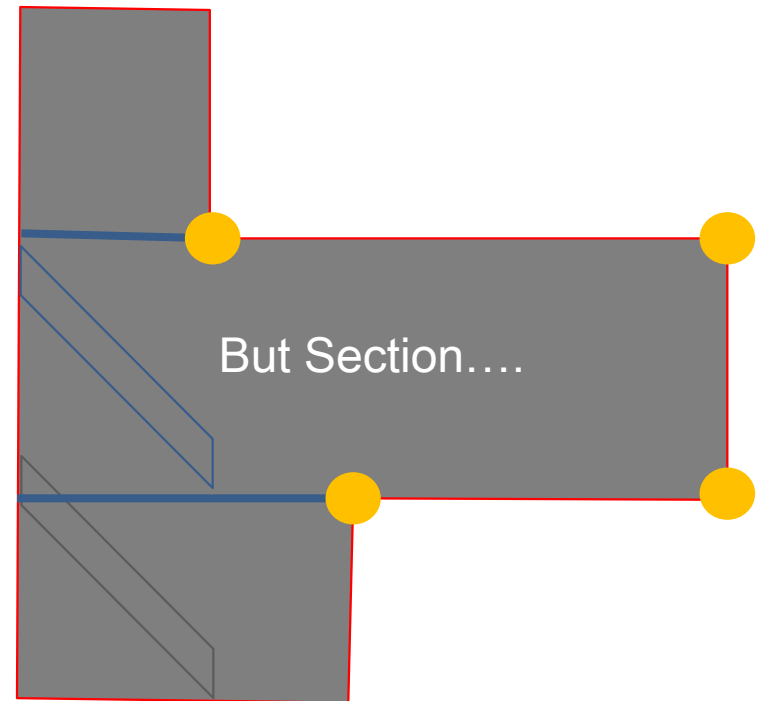
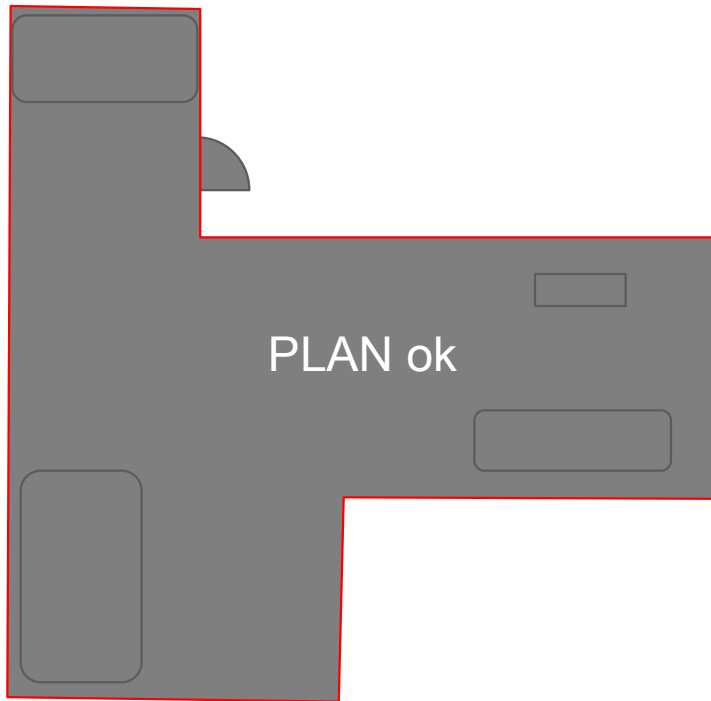
Large Scale Mistakes

- Architectural
 - Massing
 - Fenestration
- Services
 - Ventilation
 - Distribution Losses

Massing: 1-The Theory



Massing: 2-Vertical Dis-continuities



Massing: 3-Vertical Dis-continuities



Green: floor below

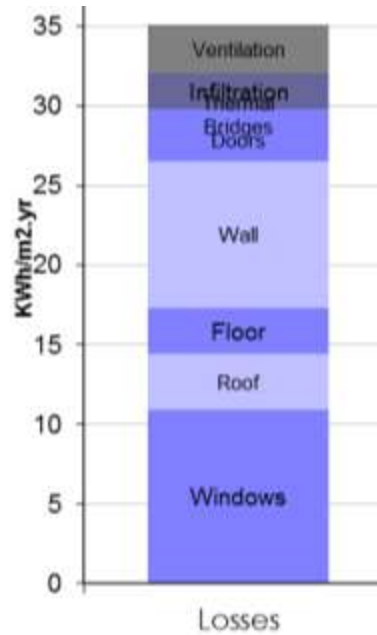
Blue: top floor

Shape destroys easy Passivhaus!

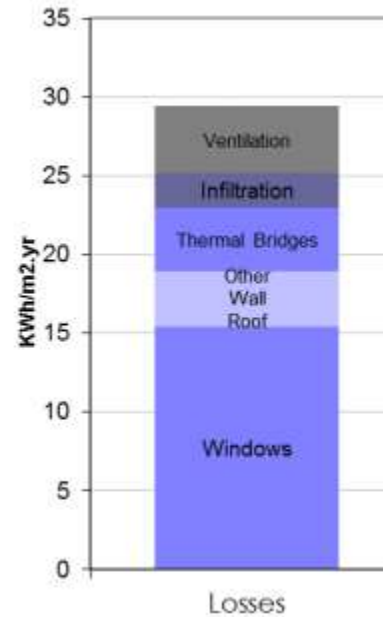
Fenestration

1. Dominates energy balance
2. Size for daylight not heating demand!
 - Saint-Gobain Multi-Comfort Certification Criteria
3. Large building Shading

Building energy balance



Small Building



Large Building



Don't overglaze— use daylight criteria!

Shading: large buildings

An aerial photograph of a dense urban area, likely a city center, showing a high concentration of large, multi-story buildings. The buildings are packed closely together, with some featuring flat roofs and others with more complex architectural designs. The surrounding area includes streets, smaller structures, and patches of greenery. A white text box is overlaid on the image, containing text about shading and insulation.

Winter shading high – extra insulation.
Summer shading low – overheating risk.

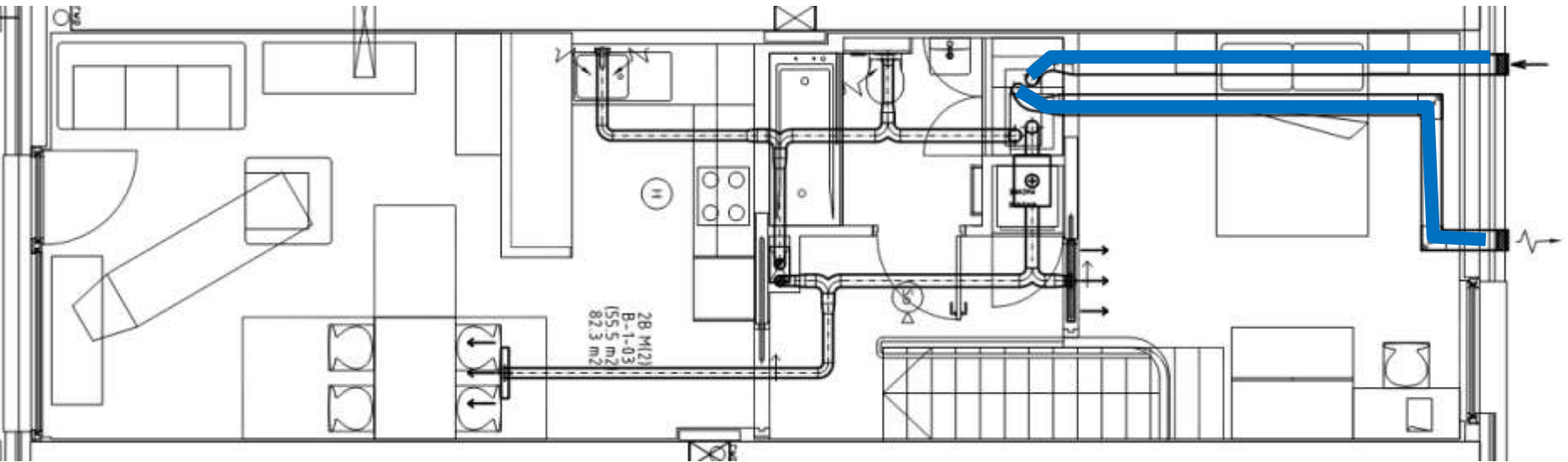
Services

Has the design allowed for:

1. Ventilation
2. Distribution losses

Early input crucial for large buildings

Services: Ventilation



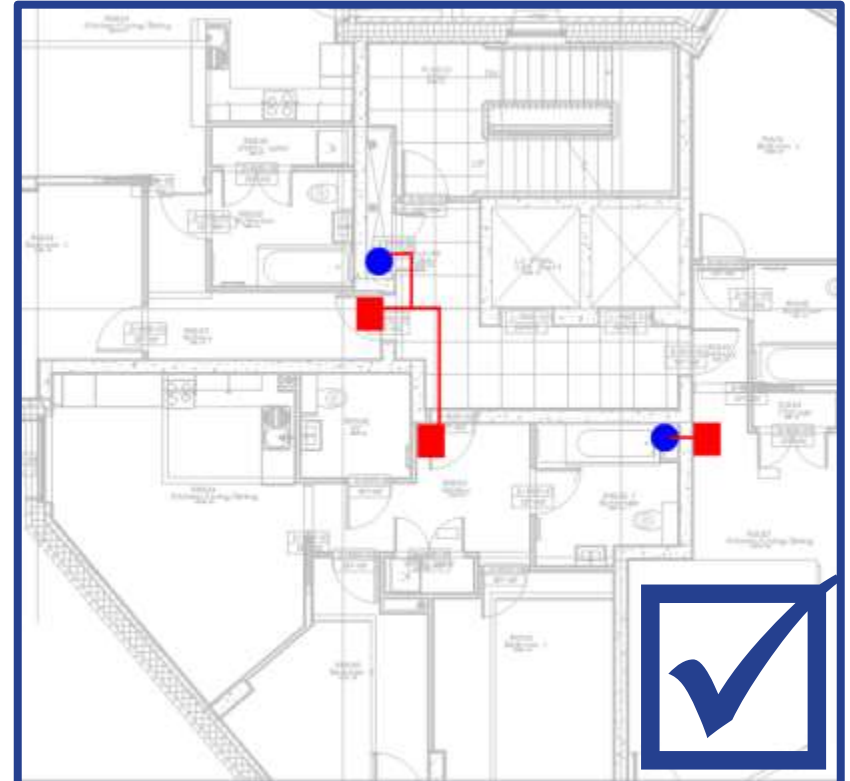
Small buildings: good to design at an early stage

Large buildings: essential, so to avoid this type of poor design

Central Ventilation works

 **WARM:**
Low Energy
Building Practice





Primary energy and overheating!

Distribution Losses

As well as reducing pipe lengths, requires care over all aspects:

- Heat Interface Units with low losses (e.g. SUV)
- Selection of water temperatures
- Pipe diameters, insulation types and thicknesses (pre-insulated?)
- Run hours of system
- Consider electric space heating...

Non-standard solution optimal!

Large Building Summary

- Understand PH constraints before you design!!!!
 - Massing
 - Is the *thermal* envelope really a simple shape?
 - Fenestration
 - Focus of design – dominates PHPP, but use daylight criteria to size
 - Ventilation
 - Consider Central systems, early design input anyway
 - Distribution Losses
 - Impact on Primary energy and Overheating – early design
- Talk to us if you want to know more.



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AECB Passivhaus Designer Course

Venue: Centre for Efficient and Renewable Energy in Buildings (CEREB)
at London South Bank University

Week 1:

Week 2:

Exam: 4th Dec.

Who are the trainers: This course is taught by leaders in the UK Passivhaus development. They are the experts who are actually successfully designing/ building Passivhaus in UK.



www.aecb.net/carbonlite

**PHT Special Offer:
Full Course 20% Off
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