



# SAP's Progress to Zero Carbon

HBF Technical Conference 2010

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Technical Manager  
National Energy Services



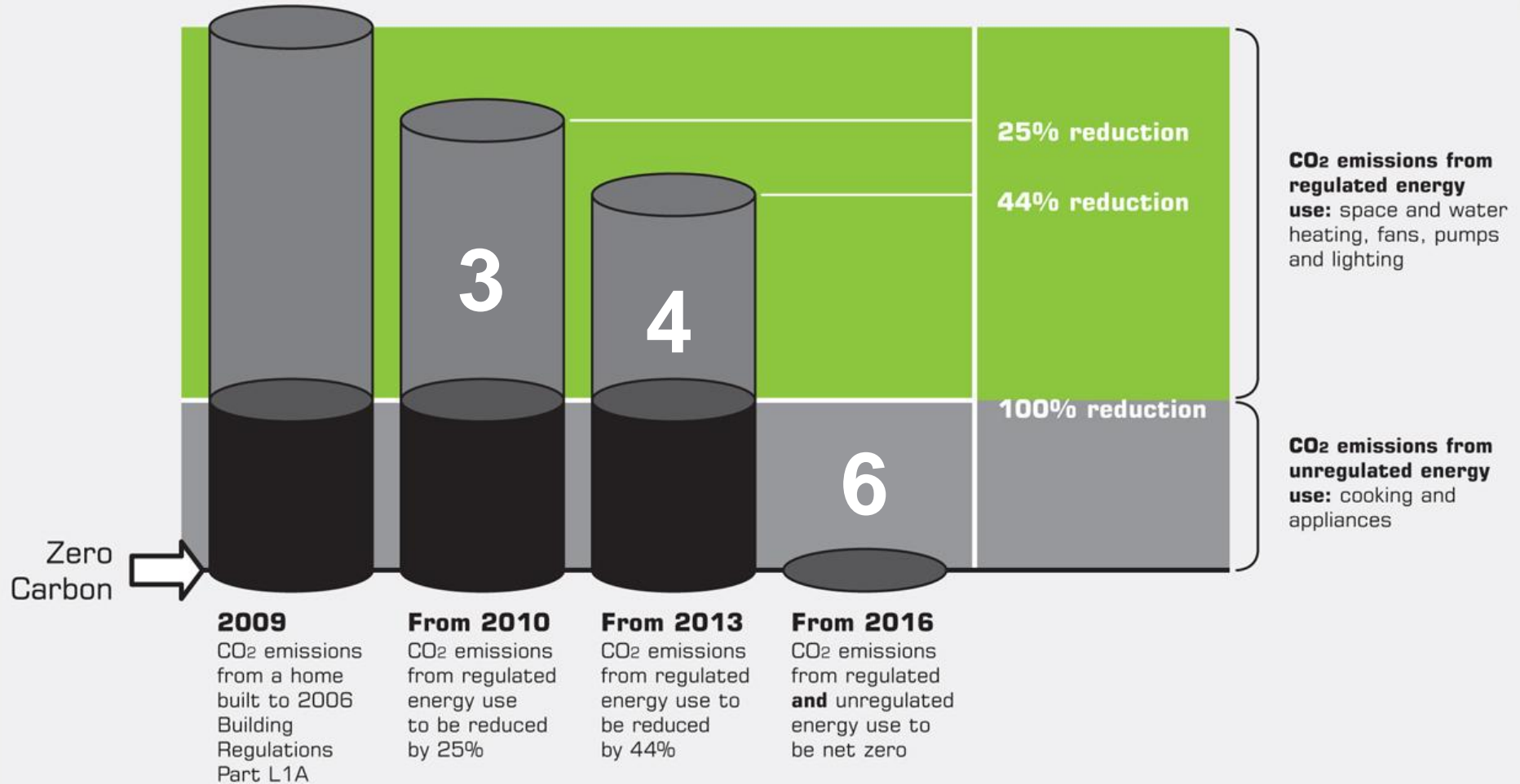


**NES**

# **National Energy Services**

- **NHER – first energy rating scheme**
- **3,000 Energy Assessors**
- **Building Regulations Submissions**
- **Energy Performance Certificates**
- **Produce > 50% of newbuild EPCs**
- **Providers of energy software, training and consultancy**

# The context .....





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## Questions to address..

- **What is zero carbon?**



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- **What is zero carbon?**
- **Is SAP up to the job?**



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- **Do we build what is assumed in SAP / DER ?**



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## **Questions to address..**

- **What is zero carbon?**
- **Is SAP up to the job?**
- **Do we build what is assumed in SAP / DER ?**
- **What can we expect to 2013?**

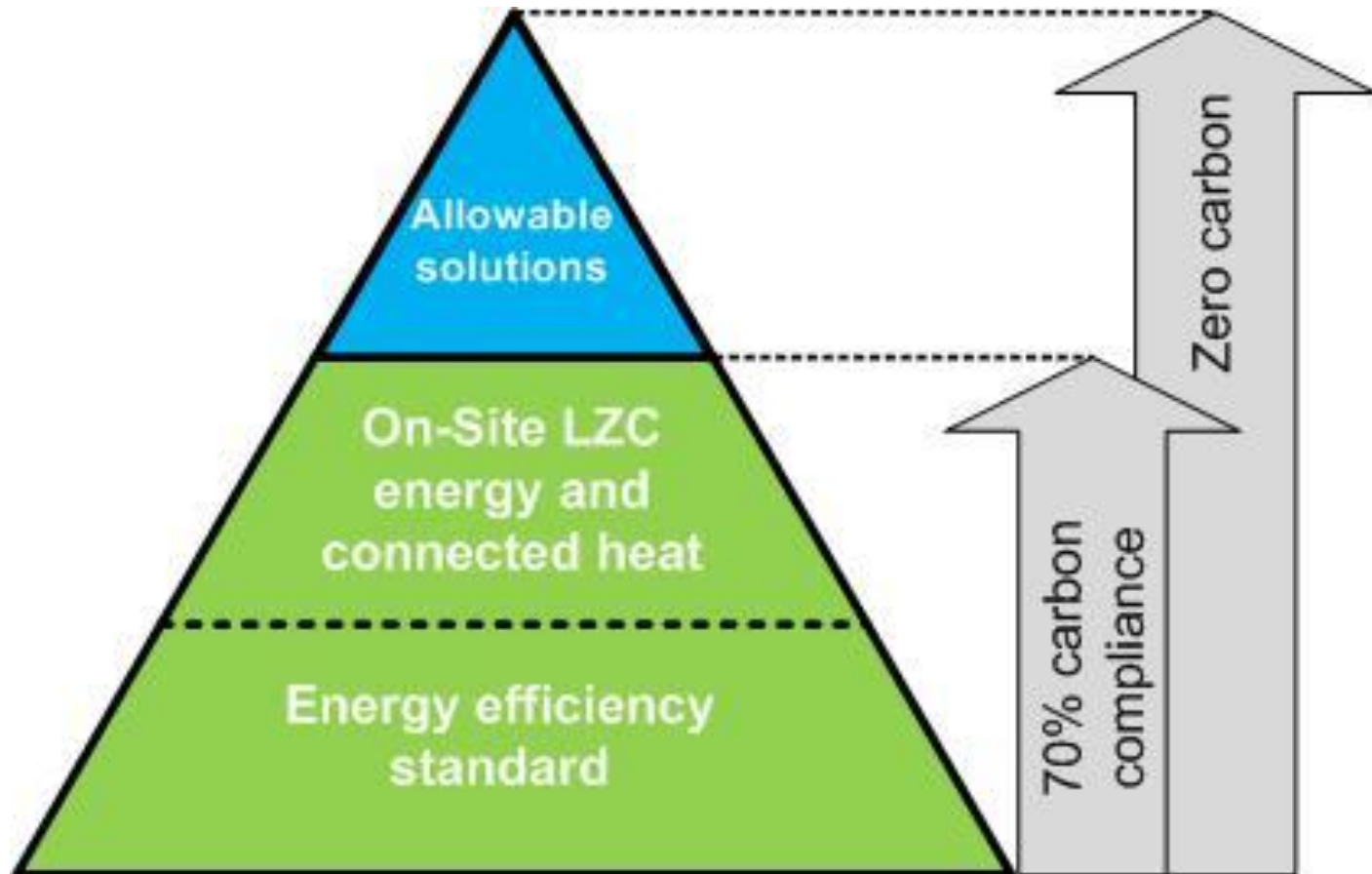


# What is Zero Carbon?

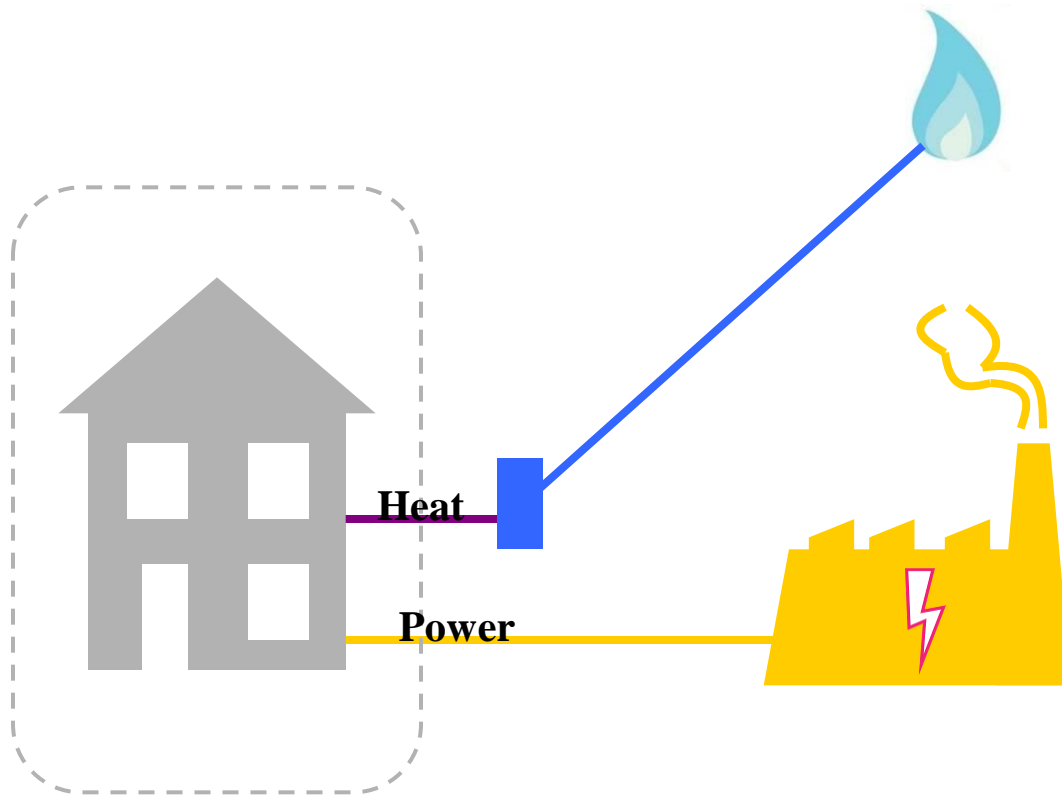




# What is Zero Carbon?



# Fabric Energy Efficiency

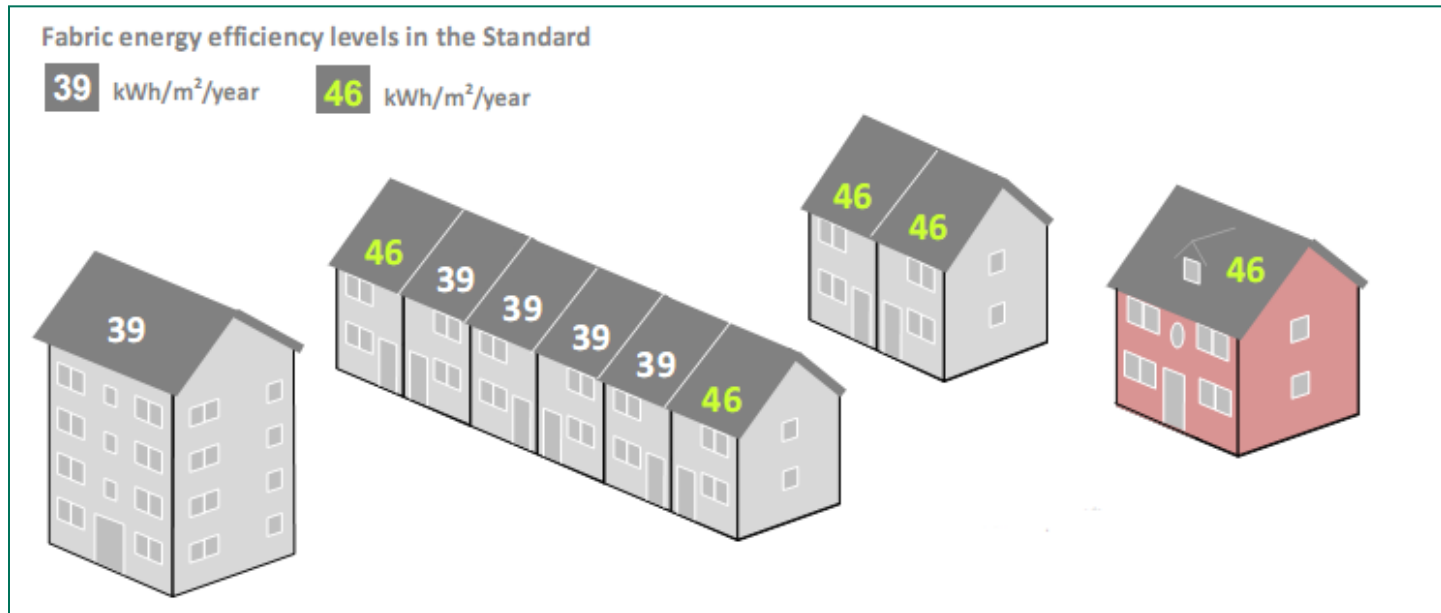


## Energy Efficiency Standard

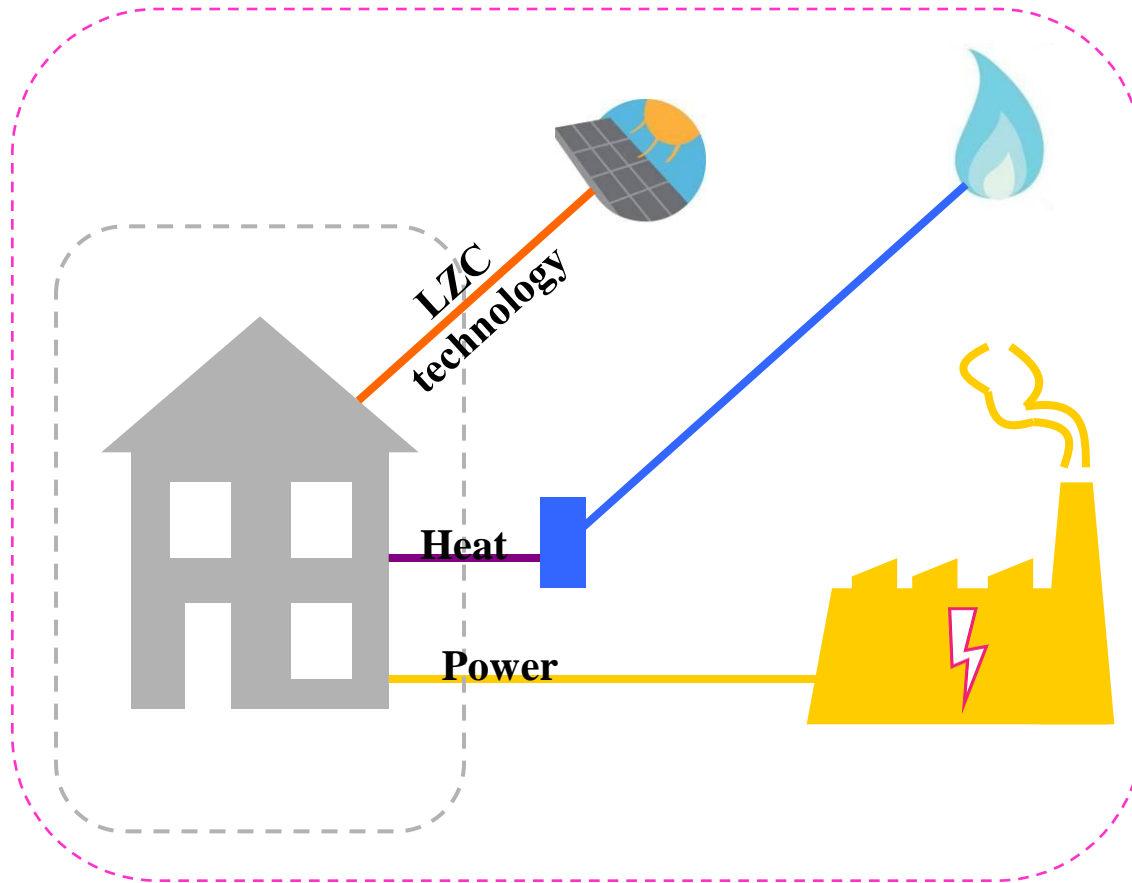
- Building fabric U-values
- Thermal bridging
- Air permeability
- Thermal mass
- Solar, metabolic, lighting & appliance gains



# Fabric Energy Efficiency Standard



# Carbon Compliance



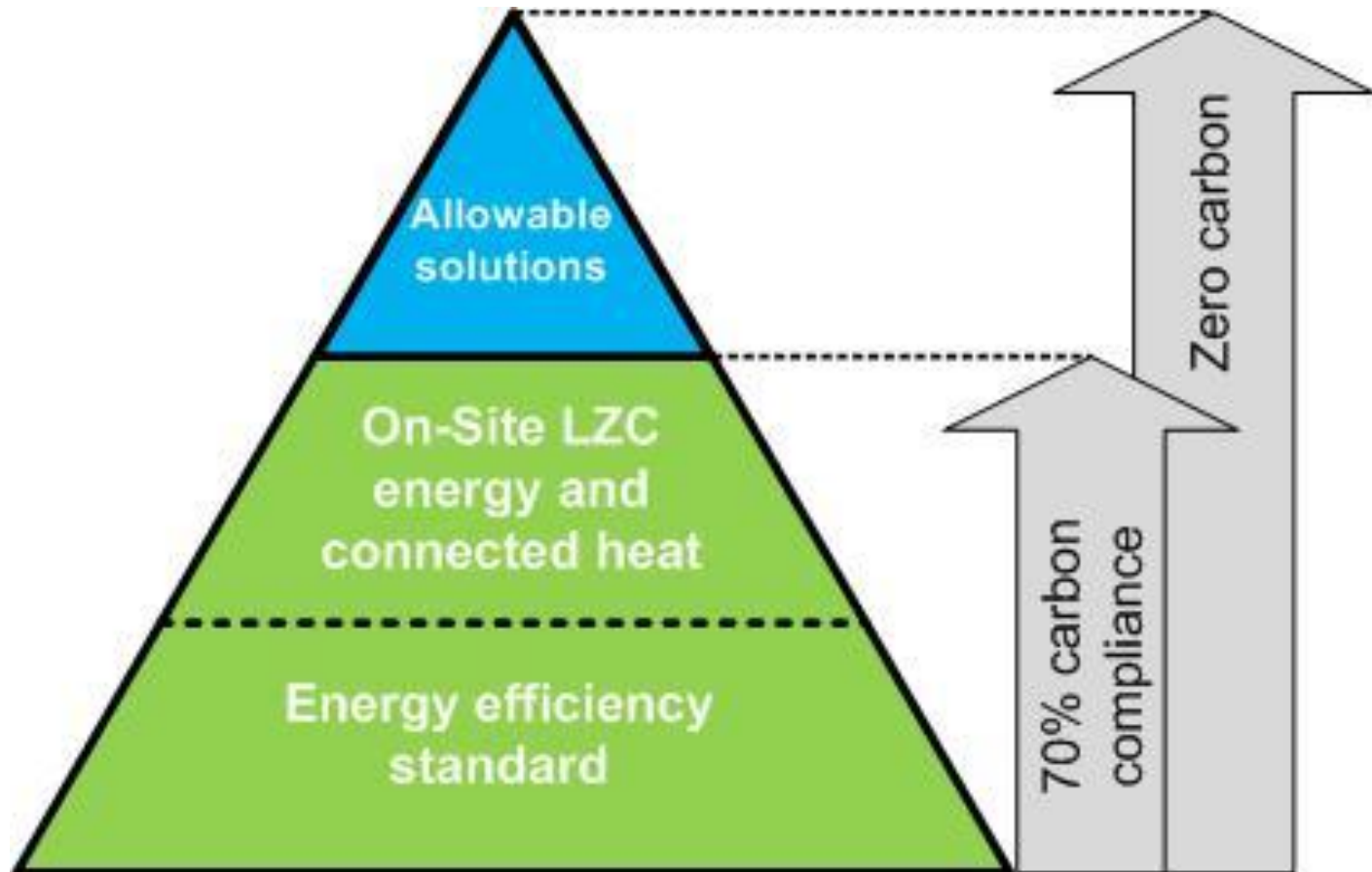
## Energy Efficiency Standard

- Building fabric U-values
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- Air permeability
- Thermal mass
- Solar, metabolic, lighting & appliance gains

## Carbon Compliance Standard

- Heating / cooling appliances (boilers, etc)
- Mechanical ventilation
- Hot water
- Active controls
- Fixed lighting
- All LZC technologies

# What is Zero Carbon?





# Is SAP up to the job?





# Is SAP up to the job?





# Aspects of SAP

- 1. Energy / carbon calculation**
- 2. Compliance target**
- 3. SAP / DER / TER Process**





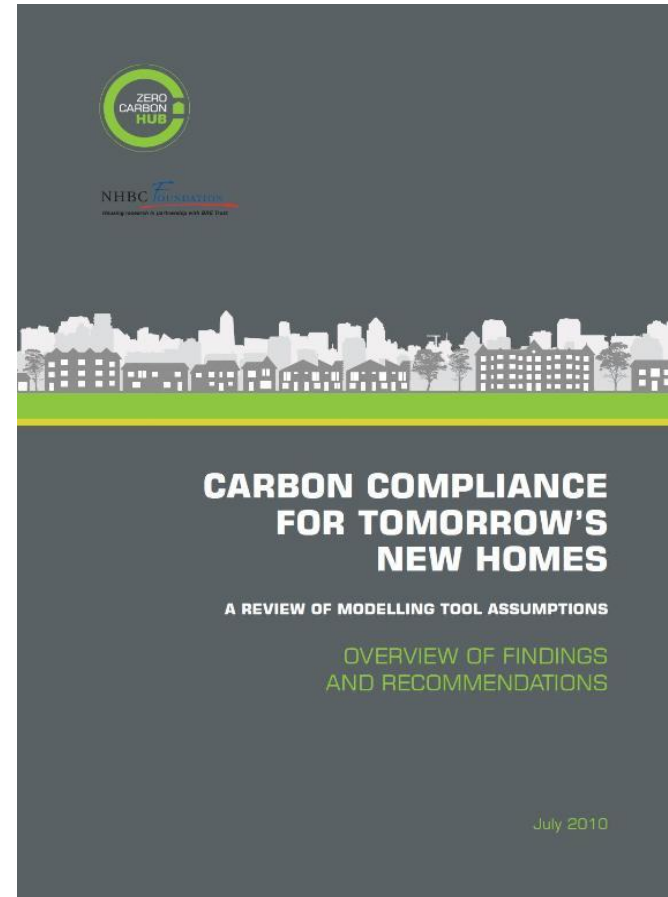
**Is the SAP calculation up  
to the job?**





# SAP Calculation

**Draws from work  
done by Zero Carbon  
Hub working group on  
'Compliance Tools'**





# SAP Calculation

- **Hot water**



# SAP Calculation

- **Hot water**
- **Summer Overheating**



# SAP Calculation

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- **Air Quality**



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- **Speed of integrating new technology**



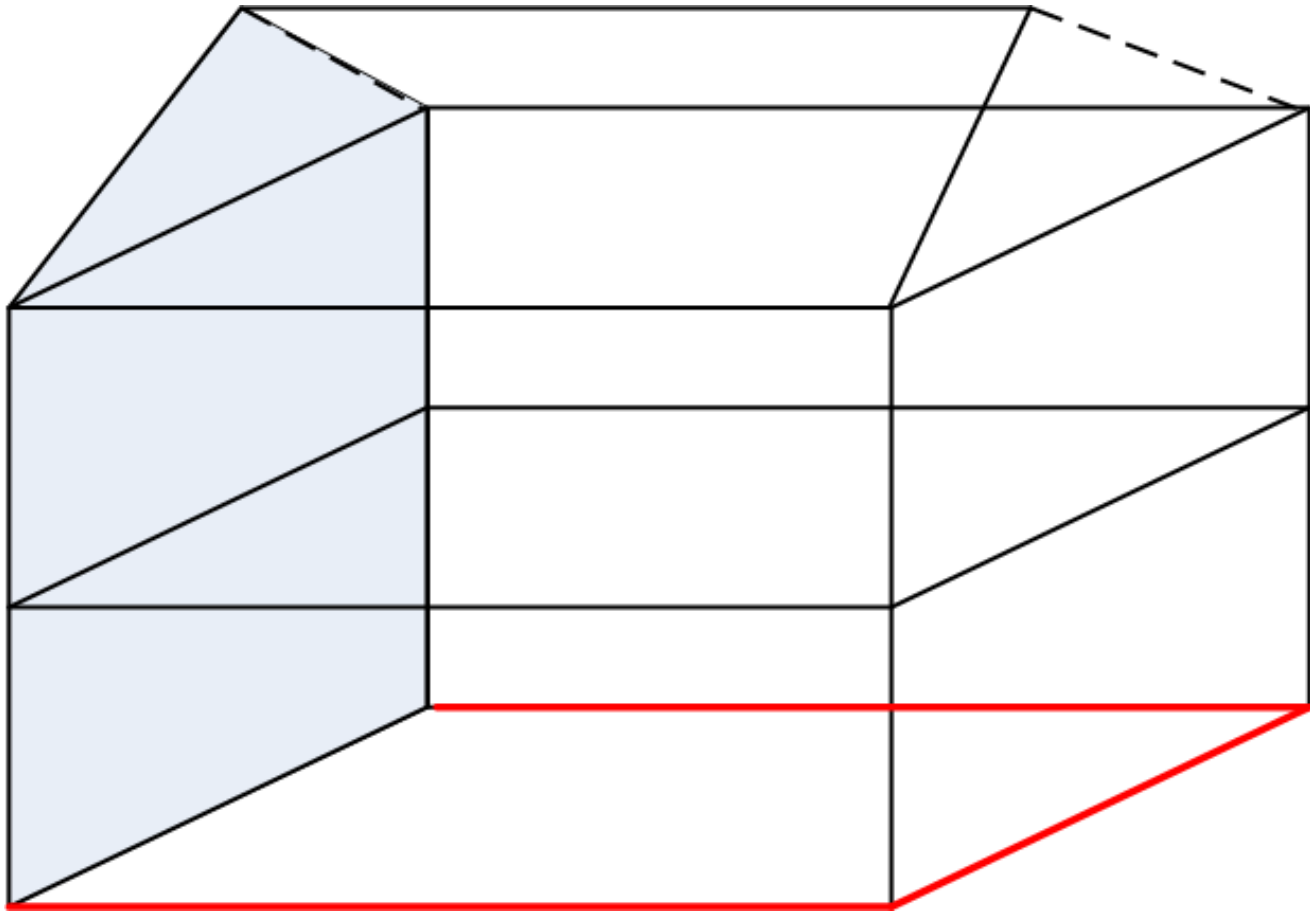
# SAP Calculation

- **Hot water**
- **Summer Overheating**
- **Air Quality**
- **Insensitivity to region**
- **Speed of integrating new technology**
- **.....Thermal bridging**



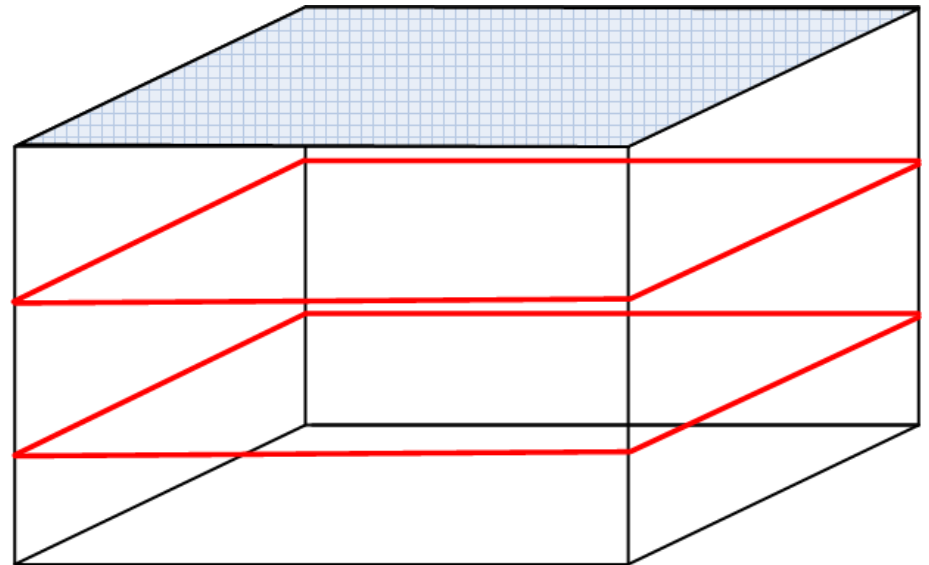


# Thermal Bridging



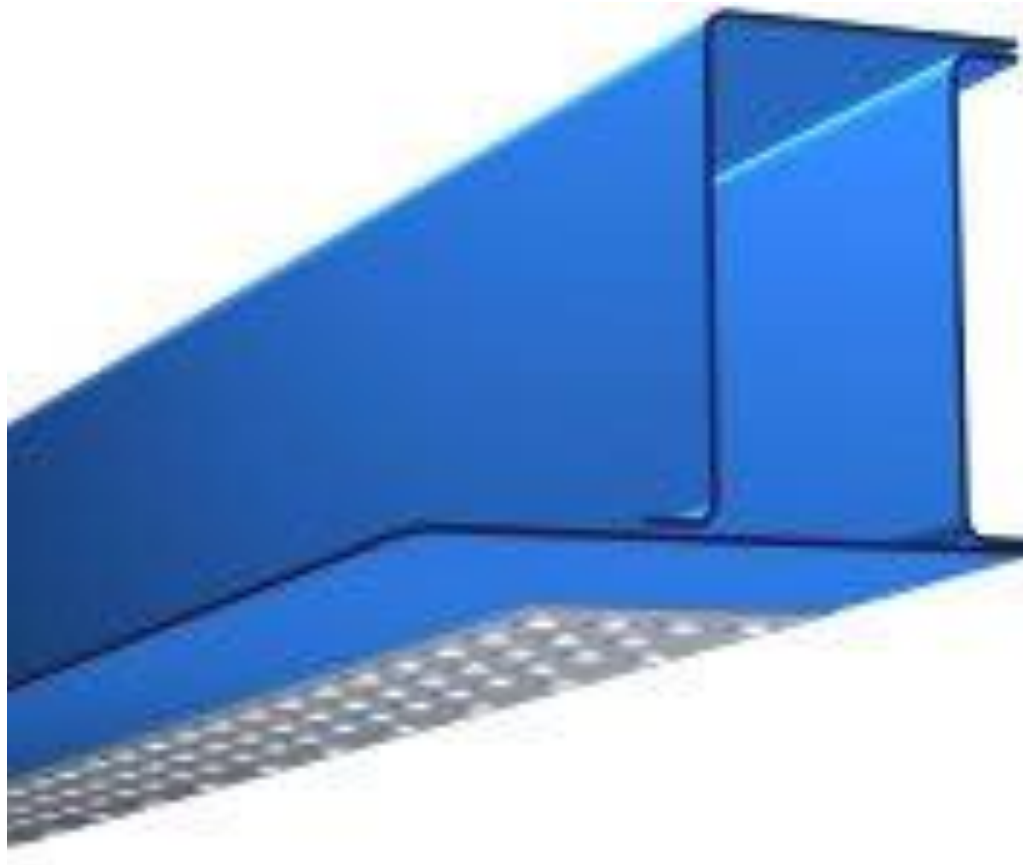


# Thermal Bridging





# Thermal Bridging



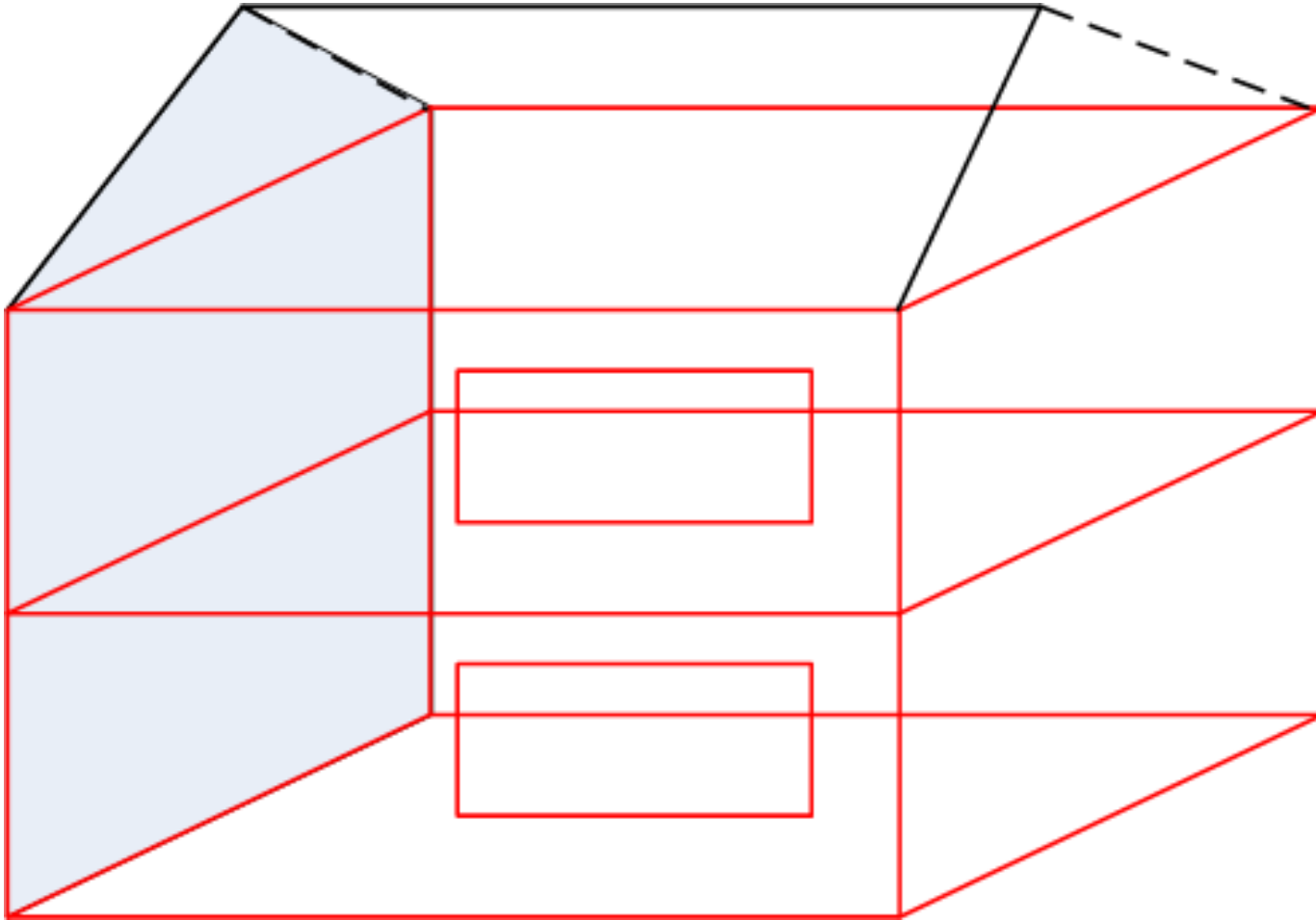


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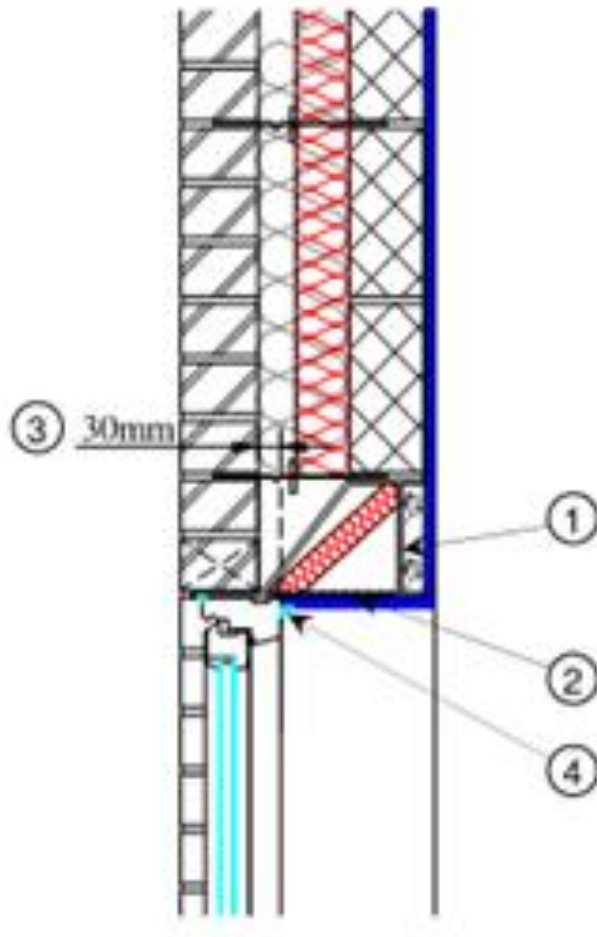
# Thermal Bridging





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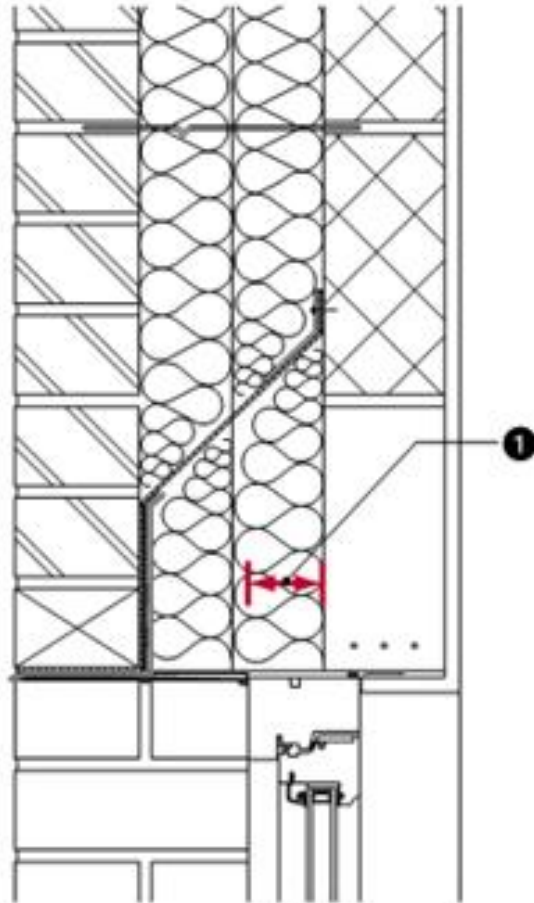
# ACD for Perforated Steel Lintel



psi = 0.500



# ECD for Lintel

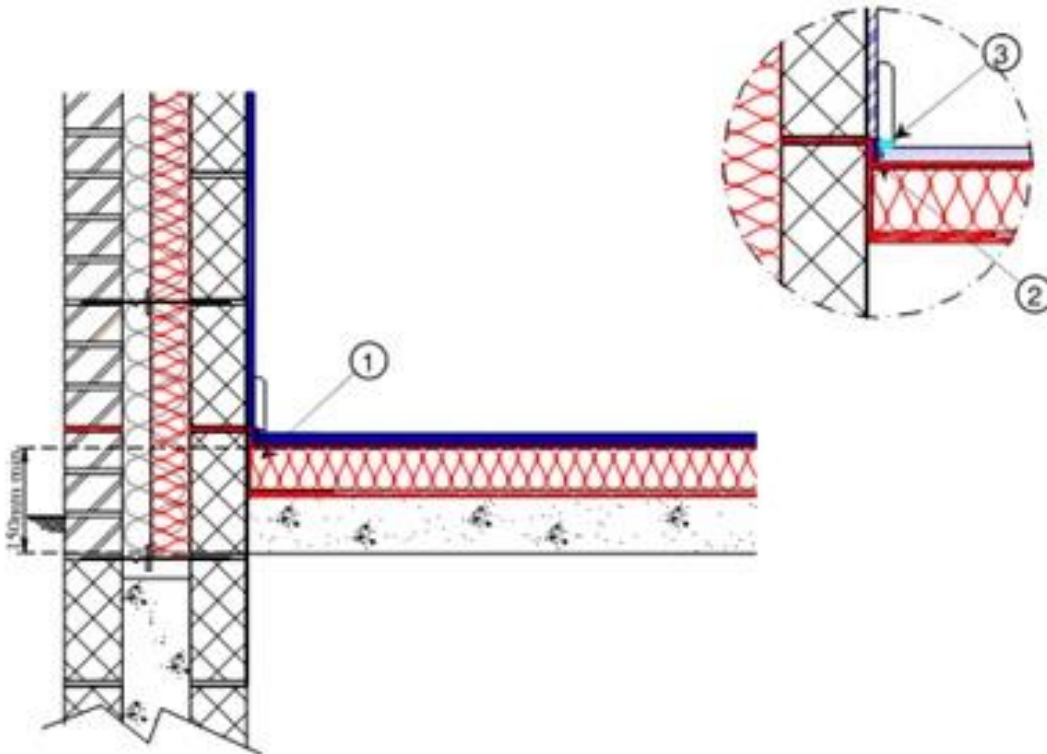


$$\text{psi} = 0.010$$



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# ACD for Ground Floor



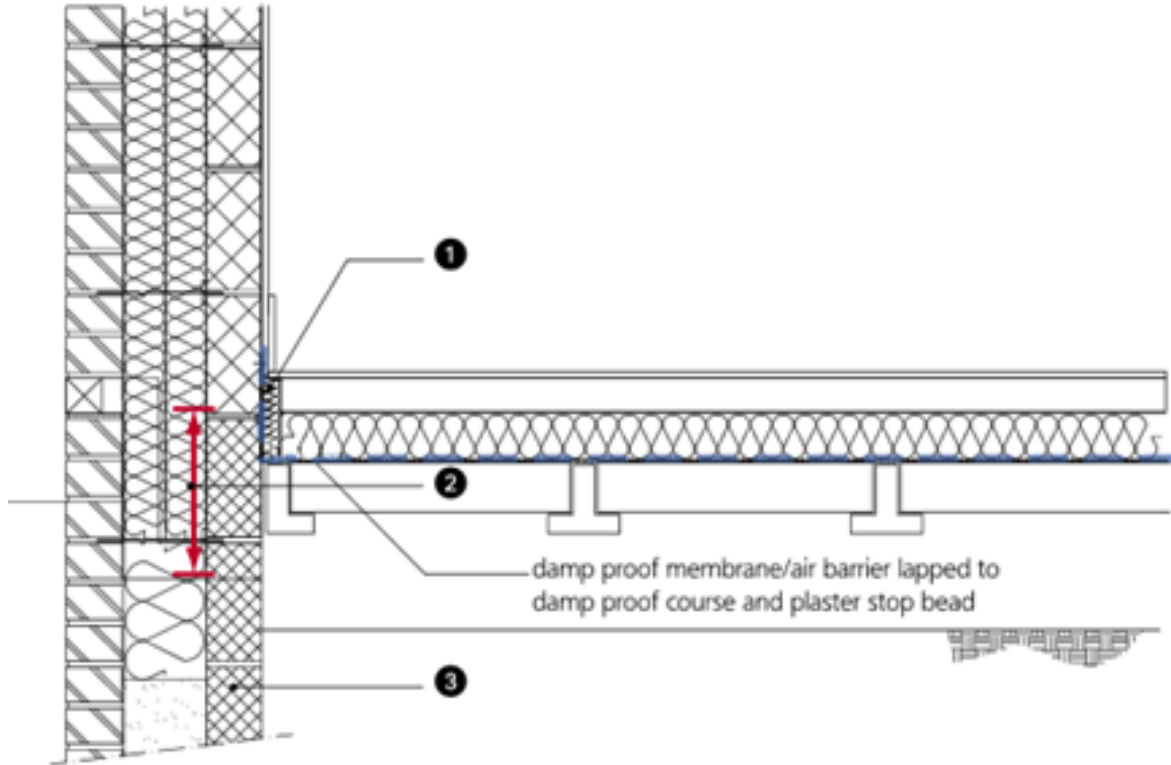
$$\text{psi} = 0.160$$





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# ECD for Ground Floor



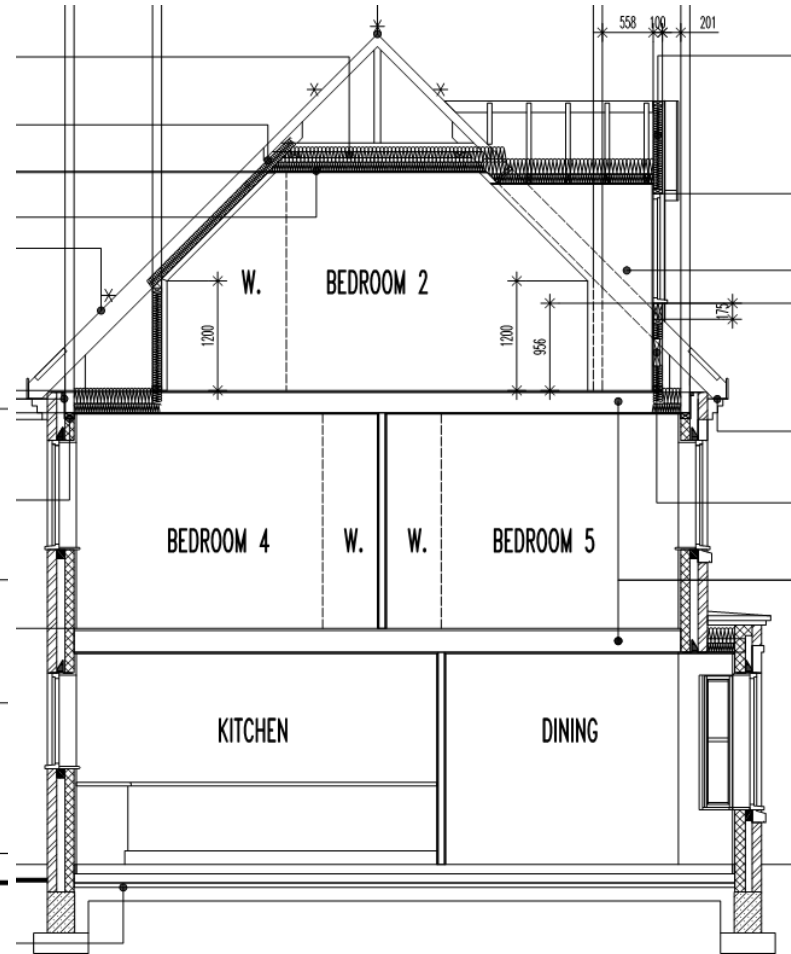
$$\text{psi} = 0.067$$



# A real house ....



FRONT ELEVATION.



SECTION A-A.

FOUNDATIONS ARE INDICATIVE ONLY AND STRUCTURAL ENGINEERS DETAILS SHOULD BE READ IN CONJUNCTION WITH THIS DRAWING.



# **NES** Tackling thermal bridges

**Calculate  
psi values  
for a poor  
design**

**Improve  
junctions and  
calculate  
their psi  
values**

**Design  
thermal  
bridges  
out**



# Improving the SAP calculation

- **Continual refinement e.g. hot water, making heating sensitive to location**
- **Full inclusion of thermal bridging**

**But also .....**

- **Summer overheating / air quality**



# Is TER up to the job?





# NES Compliance Target

**The TER is:**

- **Harder to meet in certain dwelling types**



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**The TER is:**

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- **Discourages efficient built forms i.e. small surface to volume ratio**



**NES**

# **Compliance Target**

**The TER is:**

- **Harder to meet in certain dwelling types**
- **Discourages efficient built forms i.e. small surface to volume ratio**

**Likely to be replaced by:**

- **Kg CO<sub>2</sub> / m<sup>2</sup> / year (carbon)**
- **Kwh / m<sup>2</sup>/ year (energy)**





# Can the SAP / DER process be improved?





# Process Issues

- **Would all SAP Assessors produce the same DER / SAP for a given design / as built submission?**



## Process Issues

- **Would all SAP Assessors produce the same DER / SAP for a given design / as built submission?**
- **Does the information provided to the SAP Assessor reflect what actually happens on site?**



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# Process Solutions

- **Use professional SAP Assessors – OCDEAs for design and as built**
- **Conventions to help ensure consistent data entry**
- **Tighter quality assurance by CLG**



**Are we building what  
SAP assumes we are?**

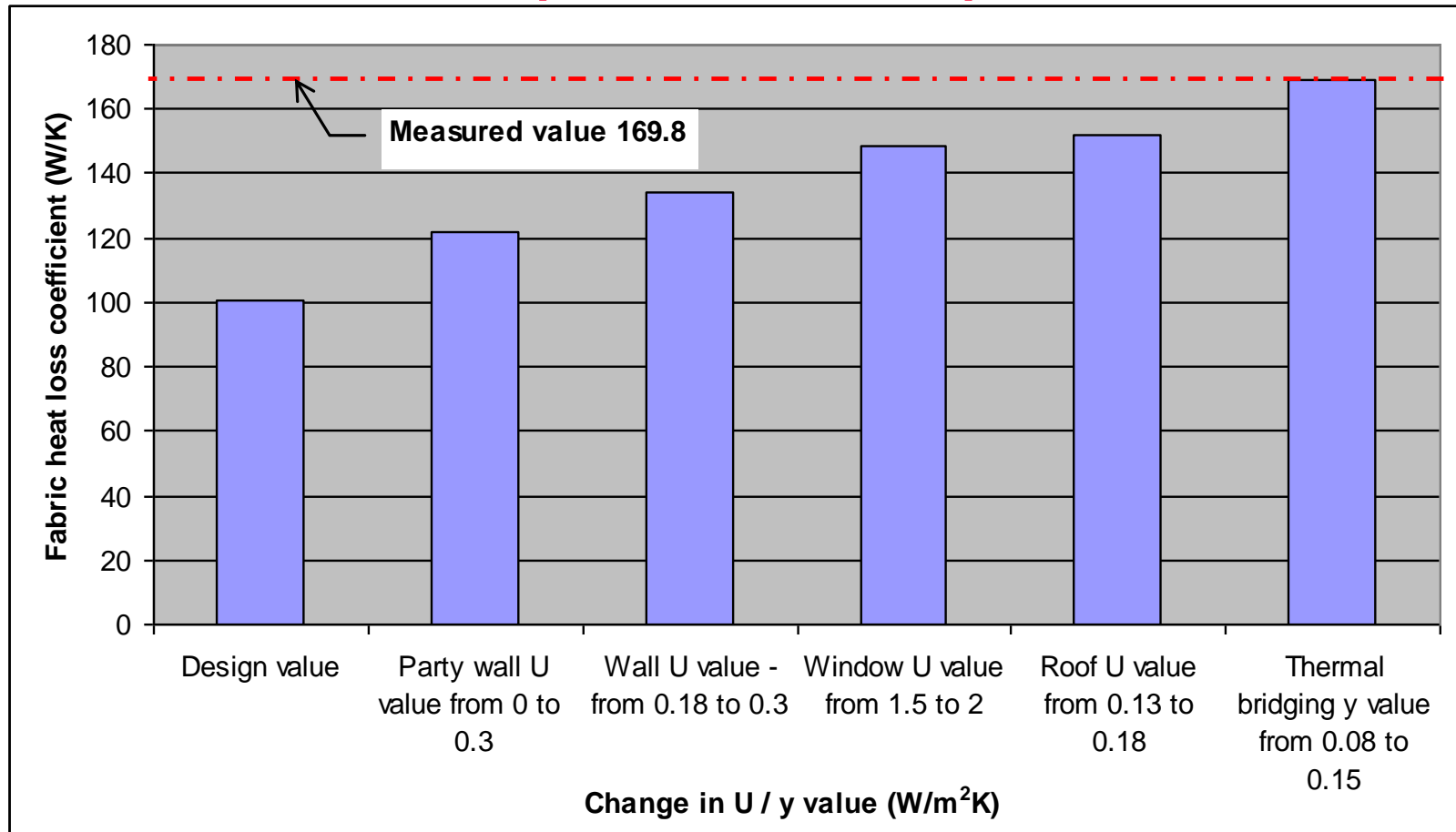




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# From theory to practice

## Research by Leeds Metropolitan University (Malcolm Bell)





# What to expect to 2013?





# NES **What to expect to 2013?**

- **Minimum Fabric energy efficiency**





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- **Minimum Carbon Compliance**



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- **Clearer SAP conventions**



## **What to expect to 2013?**

- **Minimum Fabric energy efficiency**
- **Minimum Carbon Compliance**
- **Allowable Solutions**
- **Tougher thermal bridging standards**
- **Clearer SAP conventions**
- **Tougher quality assurance checks**



## To find out more

1. See information in NES pack
2. Buy NHER Plan Assessor 5 and explore
3. On Line NHER CPD package
4. Customised NHER training courses
5. NES web site: [www.nesltd.co.uk](http://www.nesltd.co.uk)

**Thank you for listening!**