BPE DISSEMINATION EVENT
“BUILDING BETTER BUILDINGS”
8th October 2015
Glasgow School of Art

Session 3: Client, Occupants and Indoor Environment
BPE Project – Dormont Estate
Speaker – Jamie Carruthers
Dormont Park
Why Passivhaus?

- Rural
- High levels of fuel poverty
- Car dependency high
- Reliance of fossil fuels for heating

Improved energy efficiency
Dormont Park

- Completed July 2011
- 8 No. Semi-detached timber-framed houses
  - 4 No. 3-bedroom (6 person)
  - 4 No. 2-bedroom (4 person)
- Affordable rent for 30 years
  - 20 year Short Assured Tenancy (+ 10)
  - Scottish Housing Quality Standard
  - Nominations Agreement Agreement with Council over 4 houses
  - Allocations Policy
Dormont Park
Distinguishing features

• DHW entirely from renewables
  – Roof mounted solar thermal
  – Log stoves
• Built to rural vernacular
  – Dormer windows
  – Porches
  – Chimneys
• Landlord neighbour
• Poor mobile phone signal
Dormont Park
Why monitor?

DORMONT PARK PASSIVHAUS PROJECT

SCOTLAND’S LOWEST ENERGY AFFORDABLE HOMES
Dormont Park
The client perspective (1)

• Commitment
• Contractor selection
• Teamwork
• Design
  – Satellite TV signal
• Insulate all pipework and ducts
• Keep service installations simple
  – Monitoring equipment
• Go for the best MVHR
• Deliver to Certified PH Standard
• Monitor construction closely
Dormont Park
The client perspective (2)

• Manager training
• Tenant selection
• Monitor post occupancy
  – Building performance
  – Tenant comfort
  – Landlord feedback
Dormont Park
Occupier perspective (1)

• DHW
  \[\text{immersion} \Leftrightarrow \text{solar panels} \Leftrightarrow \text{log stove}\]

• Log stoves
  – technical
  – psychological

• MVHR
  – controls
  – dust
  – draughts
Dormont Park
Occupier perspective (2)

• Overheating

• Management
  – Support
  – Action

• Handover
  – Property Guides
## Dormont Park
### Summary

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Passivhaus standard</th>
<th>BPE measured performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space heating demand</td>
<td>no more than 15kWh/m²/annum</td>
<td>13.15 (average of 4 houses)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.33 (average of 3 houses)</td>
</tr>
<tr>
<td>Building heating load</td>
<td>“ “ 10W/m²</td>
<td>Not measured</td>
</tr>
<tr>
<td>Useful cooling demand</td>
<td>“ “ 15kWh/m²/annum</td>
<td>Not measured</td>
</tr>
<tr>
<td>Primary energy demand</td>
<td>“ “ 120kWh/m²/annum</td>
<td>129.68 (average of 4 houses)</td>
</tr>
<tr>
<td>Building air tightness</td>
<td>“ “ 0.6ac/h@50pa</td>
<td>100.68 (average of 3 houses)</td>
</tr>
<tr>
<td>Overheating frequency</td>
<td>“ “ 10%</td>
<td>1. 2.31 (standard)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. 1.58 (co-pressurisation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. 1.68 (standard)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Much more than 10%!</td>
</tr>
<tr>
<td>External wall U-value</td>
<td>0.095W/m²/K</td>
<td>0.12 (1 house)</td>
</tr>
<tr>
<td>Roof U-value</td>
<td>0.118W/m²/K</td>
<td>0.12 (1 house)</td>
</tr>
<tr>
<td>Ground floor U-value</td>
<td>0.111W/m²/K</td>
<td>Not measured</td>
</tr>
<tr>
<td>Windows U-value</td>
<td>0.74W/m²/K</td>
<td>Not measured</td>
</tr>
</tbody>
</table>

---

### External wall U-value
- 0.095W/m²K
- 0.118W/m²K
- Not measured

### Roof U-value
- 0.111W/m²K
- Not measured

### Ground floor U-value
- 0.74W/m²K
- Not measured
Passivhaus in Practice

“For the first time in my life I have been able to afford to buy a new cooker”

“Because we are spending so much less on fuel bills we can now afford to spend more time together as a family”

“We hadn’t had a holiday in 20 years until this year”
# Passivhaus in Practice

<table>
<thead>
<tr>
<th>Percentage Regulated Electricity</th>
<th>DA1</th>
<th>DA2</th>
<th>DB1</th>
<th>DB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Electricity</td>
<td>3025.6</td>
<td>1456.51</td>
<td>3037.81</td>
<td>3212.55</td>
</tr>
<tr>
<td>Regulated Electricity</td>
<td>3430.04</td>
<td>380.54</td>
<td>661.79</td>
<td>705.25</td>
</tr>
<tr>
<td>Percentage Regulated</td>
<td>53.13 %</td>
<td>20.71 %</td>
<td>17.89 %</td>
<td>18.00 %</td>
</tr>
</tbody>
</table>
Passivhaus in Practice
Passivhaus in Practice
Passivhaus and Health

“I always had chilblains until I moved here”

“I used to sit in front of the fire all day just to keep warm. Now I can do things outdoors that I couldn’t do before” (Crohn’s disease sufferer)

“I suffer from asthma but I haven’t had an attack in nearly 4 years”

“It’s a pleasure to come home at night after a long 12-hour shift to a warm cosy house”
Dormont Park

DORMONT PARK PASSIVHAUS PROJECT

SCOTLAND’S LOWEST ENERGY AFFORDABLE HOMES
Thank you

Jamie Carruthers, Dormont Estate, Dormont, Lockerbie, Dumfriesshire DG11 1DJ
Tel: 01387 840222
Email: jacarruthers@btconnect.com
www.dormontestate.com