Heron Haus  Port Townsend, Washington State
Passive House Specs
(Nerd Stuff)

• R-35 foam under concrete slab, 8”
• R-45 walls w/ dense pack fiberglass insulation in 2x6, & 6” foam on outside
• R-85 fiberglass in trusses
• Zehnder Comfo Air 350 HRV
• Navien Residential on Demand Propane Powered, DHW and Heating
• Zola UPVC windows, 0.15 U-value average (0.13 low and 0.19 high)
• Approx. 5000 heating degree days
• Blower door @ 50 pascals ACH 0.54
## PHPP Modeling

Specific building demands with reference to the treated floor area

<table>
<thead>
<tr>
<th></th>
<th>Treated floor area</th>
<th>Requirements</th>
<th>Fulfilled?*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Space heating</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating demand</td>
<td>4.90 kBTU/(ft²yr)</td>
<td>96% of 5.10 kBTU/(ft²yr)</td>
<td>yes</td>
</tr>
<tr>
<td>Heating load</td>
<td>3.27 BTU/(hr*ft²)</td>
<td>96% of 3.40 BTU/(hr*ft²)</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Space cooling</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall specific cooling demand</td>
<td>kBTU/(ft²yr)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cooling load</td>
<td>kBTU/(hr*ft²)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Frequency of overheating (&gt; 77 °F)</td>
<td>0.2 %</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Primary energy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating, cooling, dehumidification, DHW, auxiliary electricity, lighting, electrical appliances</td>
<td>43.8 kBTU/(ft²yr)</td>
<td>99% of 44.3 kBTU/(ft²yr)</td>
<td>yes</td>
</tr>
<tr>
<td>DHW, space heating and auxiliary electricity</td>
<td>16.5 kBTU/(ft²yr)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Specific primary energy reduction through solar electricity</td>
<td>kBTU/(ft²yr)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Airtightness</strong></td>
<td>0.5 1/h</td>
<td>0.6 1/h</td>
<td>yes</td>
</tr>
</tbody>
</table>

* empty field: data missing; * no requirement
Payback Analysis

<table>
<thead>
<tr>
<th>Cost of Home Options</th>
<th>Cost of Baseline Home</th>
<th>Upgrade to Passive House</th>
<th>Cost of Passive House</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>362,385</td>
<td>5%</td>
<td>379,885</td>
</tr>
</tbody>
</table>

| Energy Cost, Baseline Home ($ per month) | 176 |
| Annual Rate of increase in Energy Costs Projected | 2% |
| Energy Reduction from Passive House Approach (%) | 70% |

Energy savings available EACH MONTH, after covering the monthly payment related to upgrades.

Costs to Upgrade to Passive House

<table>
<thead>
<tr>
<th>Item</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in cost of framing labor</td>
<td>2,500</td>
</tr>
<tr>
<td>Increase in cost of framing materials</td>
<td>3,000</td>
</tr>
<tr>
<td>Increase in cost of window units is zero. Homeowners specified aluminum clad windows and entry doors, and Zola is price competitive with domestic pricing for non-passive doors and windows in this</td>
<td>0</td>
</tr>
<tr>
<td>Increase in cost of insulation, labor and materials</td>
<td>8,500</td>
</tr>
<tr>
<td>Cost of upgrading to whole house Heat Recovery Ventilator vs code required ventilation systems.</td>
<td>7,500</td>
</tr>
<tr>
<td>Incremental cost of heating system, compared to a typical ducted central air system, is 9k. The ducted air system would cost 12k, while the single minisplit used cost 3k. Incremental cost of minisplits in a typical home is 6k. In a typical home three delivery appliances would have been used at a cost of 9k, while the single minisplit used cost 3k. For comparision, the least incremental cost saved is 6k.</td>
<td>-6,000</td>
</tr>
<tr>
<td>Incremental cost of water heater is 2k. Electric tank water heater 1k, The Navien Residential on demand water heater 3k.</td>
<td>2,000</td>
</tr>
</tbody>
</table>

* Total Costs to Upgrade to Passive House | 17,500 |

Information Presented By: Randy Foster 360-870-2526
Foundation Detail

Shearwall per plan

P.T. 2x6 Plate W/ A.B. per shearwall schedule

Ease inside edge of foundation to protect Visqueen

Gasket @ mudsill

4" concrete slab see foundation plan

Visqueen under slab runs out over footing and exterior foam

1/2"

3"

Galv. metal flashing

Structural foam to meet ASTM D6817 Type EPS39 (under footing). See Arch. for foam thickness.

Vertical foam insulation (vertical wall). See Arch for foam thickness.

Holdown per plan

Siding see elevations

3/4 airspace/ rainscreen

Cora vent @ bottom of rainscreen

Continue Visqueen out over vertical foam

Compacted sand

0'-11"
Eave Detail

- Standing Seam Metal Roofing (Typ)
- 1/2" OSB Sheathing (Typ)
- 2x4 Lookout Sleepers @24" OC (Typ Cont. Over Entire Roof)
- Manufactured Roof Truss
- 1" Strip Venting Between Tails
- 1" Venting Space Continuous Over Ceiling Insulation
- T.O.W. Main 10' - 0"
- 5/4x3 Blocking Between Tails
- Siding See Elevations
- 3/4" Air Space/ Rain Screen
- Foam Insulation
- Sheathing Per Plan
- 2x6 Load Bearing Wall
- OSB Air Barrier (Continuous Between Roof Trusses and Wall Framing)
- Gasket @ Top of Wall
- GWB (Typ Int. Wall and Ceiling)
Solar Pathfinder & Grading
Footings for Spine and Structural Slab
Trenching and Perforations Sealing
Slab and Galvanized Flashing
Framing
Framing & HRV
Interior Sealing
Post Blower Door & Pre Foam
I am going to add more slides with construction progress...