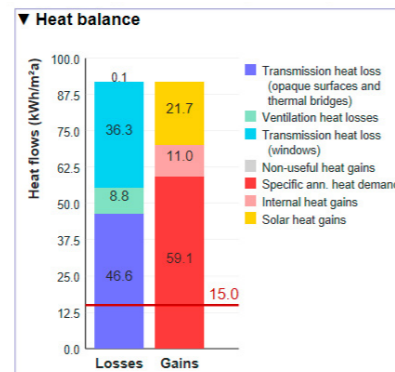
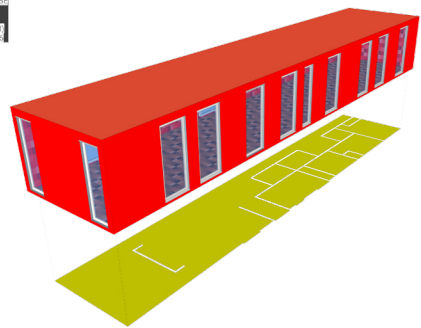


TEMPORARY DEMO LICENSE
Climate: PHPP-Standard
59.1 kWh/m²a
TFA: 148 m² (User-defined)
Heat Loss Form Factor: 4.26



Project overview

TEMPORARY DEMO LICENSE

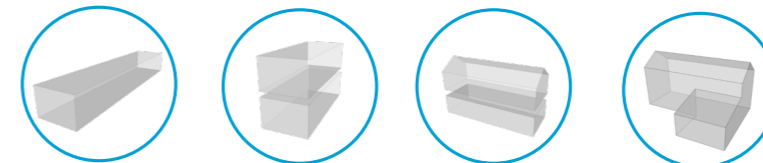
| | |
|--------------------------------------|-----------------------|
| Climate | PHPP-Standard |
| Annual heat demand (Q _h) | 59.1 kWh/m²a |
| Treated Floor Area (TFA) | 148 m² (User-defined) |
| Thermal envelope area | 631 m² |
| Heat Loss Form Factor | 4.26 |
| Projected building footprint | -- m² |
| Number of windows | 15 |
| Number of thermal surfaces | 6 |
| Number of thermal bridges | None defined |

Thermal envelope checks
The thermal envelope appears to be complete!

Render mode: Render by Area Group

Assemblies (user-defined)

| ID | Assembly name | Total thickness (m) | U-value (W/m²K) | Internal insulation? |
|------|-----------------------------|---------------------|-----------------|--------------------------|
| 03ud | PH External wall | 0.5 | 0.1 | <input type="checkbox"/> |
| 04ud | PH Roof | 0.46 | 0.12 | <input type="checkbox"/> |
| 05ud | PH Floor | 0.41 | 0.22 | <input type="checkbox"/> |
| 06ud | PH Basement wall | 0.41 | 0.2 | <input type="checkbox"/> |
| 07ud | Partition wall to neighbour | 0.41 | 0.22 | <input type="checkbox"/> |
| 08ud | Wall to zone X | 0.46 | 0.15 | <input type="checkbox"/> |
| 09ud | PH External Door | 0.05 | 0.5 | <input type="checkbox"/> |



Process

Base Design:

- The design were created following the parameters provided by the instructor, which consist in a three bedroom house.
- This base attempt requires almost 60 kWh for heating requirements. The design is non-efficient keeping the heat, big loses are caused by the opaque surfaces.



in partnership with



HOUSE-S

PASSIVHAUS ASSESSMENT

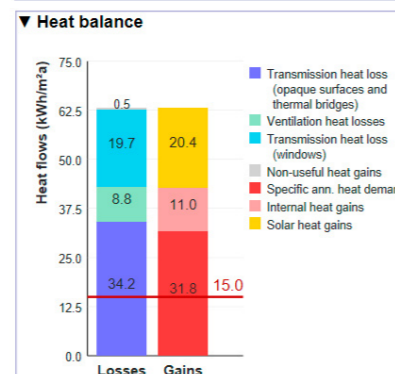
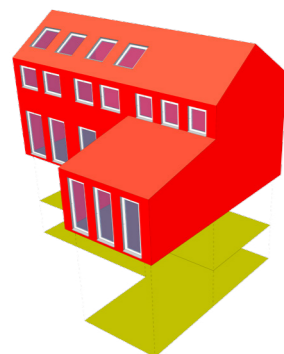
THE UNIVERSITY OF SHEFFIELD

Design & development:

- The base design were proportioned by the lecturer of the module ARC6842 Sustainable Design Project 2.
- The design can increase or reduce the square meters area, however it should maintain the same architecture spaces.



TEMPORARY DEMO LICENSE
Climate: PHPP-Standard
31.8 kWh/m²a
TFA: 154 m² (User-defined)
Heat Loss Form Factor: 3.02



Project overview

TEMPORARY DEMO LICENSE

| | |
|--------------------------------------|-----------------------|
| Climate | PHPP-Standard |
| Annual heat demand (Q _h) | 31.8 kWh/m²a |
| Treated Floor Area (TFA) | 154 m² (User-defined) |
| Thermal envelope area | 465 m² |
| Heat Loss Form Factor | 3.02 |
| Projected building footprint | -- m² |
| Number of windows | 18 |
| Number of thermal surfaces | 11 |
| Number of thermal bridges | None defined |

Thermal envelope checks
The thermal envelope appears to be complete!

Render mode: Render by Area Group

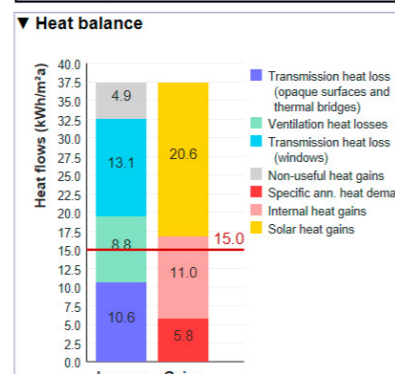
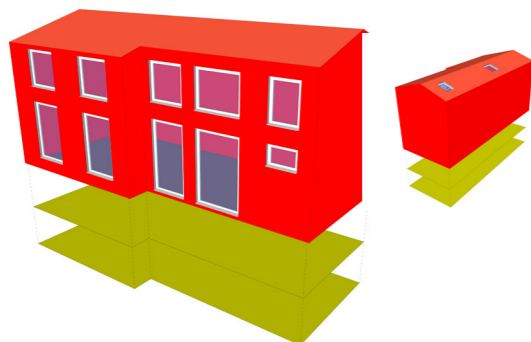
Assemblies (user-defined)

| ID | Assembly name | Total thickness (m) | U-value (W/m²K) | Internal insulation? |
|------|-----------------------------|---------------------|-----------------|--------------------------|
| 03ud | PH External wall | 0.46 | 0.15 | <input type="checkbox"/> |
| 04ud | PH Roof | 0.46 | 0.15 | <input type="checkbox"/> |
| 05ud | PH Floor | 0.41 | 0.25 | <input type="checkbox"/> |
| 06ud | PH Basement wall | 0.41 | 0.25 | <input type="checkbox"/> |
| 07ud | Partition wall to neighbour | 0.41 | 0.25 | <input type="checkbox"/> |
| 08ud | Wall to zone X | 0.46 | 0.15 | <input type="checkbox"/> |
| 09ud | PH External Door | 0.05 | 0.5 | <input type="checkbox"/> |

First Option:

- The orientation was rotated 90 ° to have the larger facade along the south.
- The plant was compacted in two storeys.
- All the opening were face south to increase the solar heat gains.
- Even though are important reduction in the space heat requirements losses are still high.

TEMPORARY DEMO LICENSE
Climate: PHPP-Standard
5.8 kWh/m²a
TFA: 164 m² (User-defined)
Heat Loss Form Factor: 2.61



Project overview

TEMPORARY DEMO LICENSE

| | |
|--------------------------------------|-----------------------|
| Climate | PHPP-Standard |
| Annual heat demand (Q _h) | 5.8 kWh/m²a |
| Treated Floor Area (TFA) | 164 m² (User-defined) |
| Thermal envelope area | 426 m² |
| Heat Loss Form Factor | 2.61 |
| Projected building footprint | -- m² |
| Number of windows | 14 |
| Number of thermal surfaces | 9 |
| Number of thermal bridges | None defined |

Thermal envelope checks
The thermal envelope appears to be complete!

Render mode: Render by Area Group

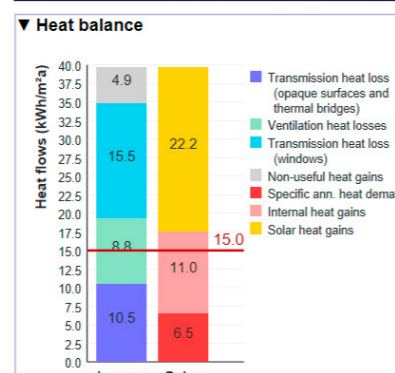
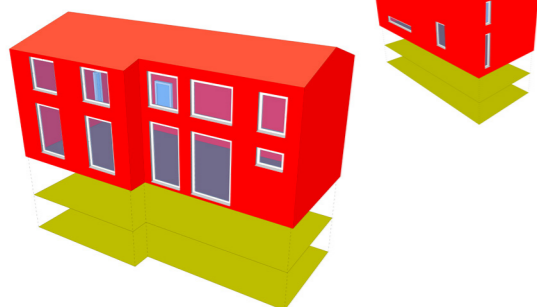
Assemblies (user-defined)

| ID | Assembly name | Total thickness (m) | U-value (W/m²K) | Internal insulation? |
|------|-----------------------------|---------------------|-----------------|--------------------------|
| 03ud | PH External wall | 0.46 | 0.1 | <input type="checkbox"/> |
| 04ud | PH Roof | 0.46 | 0.11 | <input type="checkbox"/> |
| 05ud | PH Floor | 0.41 | 0.22 | <input type="checkbox"/> |
| 06ud | PH Basement wall | 0.41 | 0.2 | <input type="checkbox"/> |
| 07ud | Partition wall to neighbour | 0.41 | 0.22 | <input type="checkbox"/> |
| 08ud | Wall to zone X | 0.46 | 0.15 | <input type="checkbox"/> |
| 09ud | PH External Door | 0.05 | 0.5 | <input type="checkbox"/> |

Second Option:

- The heat demand were significant reduced cutting off the roof area facing south.
- It was studied the co-relation between the heat gains in the south facade and the loses in the north.
- However, this approaches increased the non-useful heat gains.

TEMPORARY DEMO LICENSE
Climate: PHPP-Standard
6.5 kWh/m²a
TFA: 164 m² (User-defined)
Heat Loss Form Factor: 2.61



Project overview

TEMPORARY DEMO LICENSE

| | |
|--------------------------------------|-----------------------|
| Climate | PHPP-Standard |
| Annual heat demand (Q _h) | 6.5 kWh/m²a |
| Treated Floor Area (TFA) | 164 m² (User-defined) |
| Thermal envelope area | 426 m² |
| Heat Loss Form Factor | 2.61 |
| Projected building footprint | -- m² |
| Number of windows | 16 |
| Number of thermal surfaces | 9 |
| Number of thermal bridges | None defined |

Thermal envelope checks
The thermal envelope appears to be complete!

Render mode: Render by Area Group

Assemblies (user-defined)

| ID | Assembly name | Total thickness (m) | U-value (W/m²K) | Internal insulation? |
|------|-----------------------------|---------------------|-----------------|--------------------------|
| 03ud | PH External wall | 0.46 | 0.1 | <input type="checkbox"/> |
| 04ud | PH Roof | 0.46 | 0.11 | <input type="checkbox"/> |
| 05ud | PH Floor | 0.41 | 0.22 | <input type="checkbox"/> |
| 06ud | PH Basement wall | 0.41 | 0.2 | <input type="checkbox"/> |
| 07ud | Partition wall to neighbour | 0.41 | 0.22 | <input type="checkbox"/> |
| 08ud | Wall to zone X | 0.46 | 0.15 | <input type="checkbox"/> |
| 09ud | PH External Door | 0.05 | 0.5 | <input type="checkbox"/> |

Final Approach:

- In order to enhance the daylight of interior spaces different windows were located in the north and west facades.
- Although the annual heat demand it is increased to 6.5 kWh/m², the optimal use of windows allows to increase the experience of the user.