

# Passivhaus: The Building Blocks for Integrated Well Being – explanation on how Passivhaus design buildings improve wellbeing through providing thermal/ acoustic comfort and improved air quality

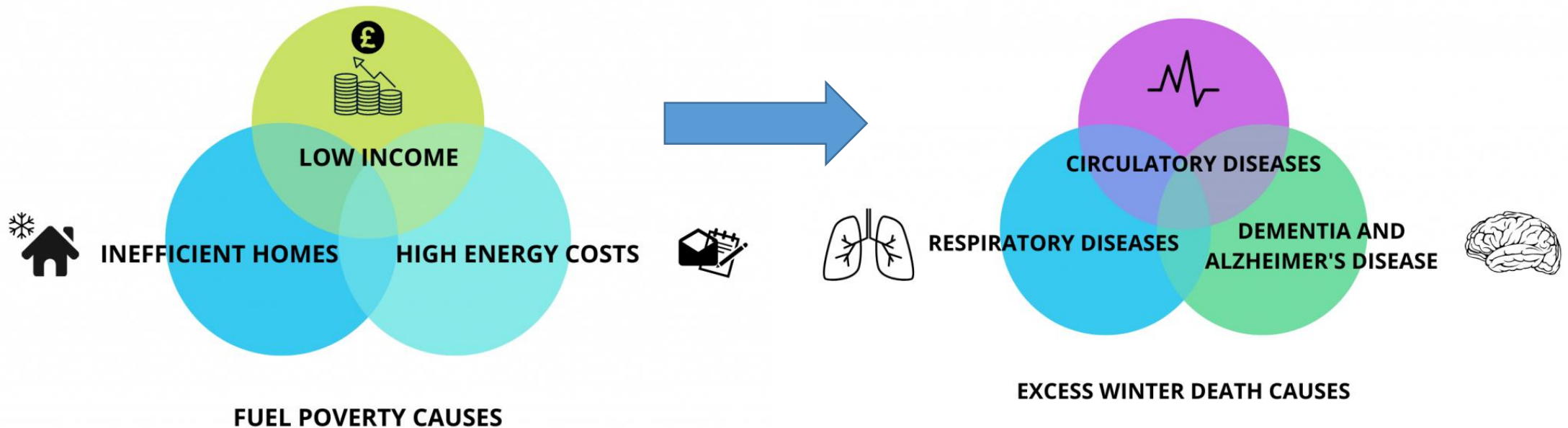
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# We need to build better



Source: Portsmouth Council

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It was estimated in 2020, 13.2% of people in England were living in fuel poverty. source: National Statistics.

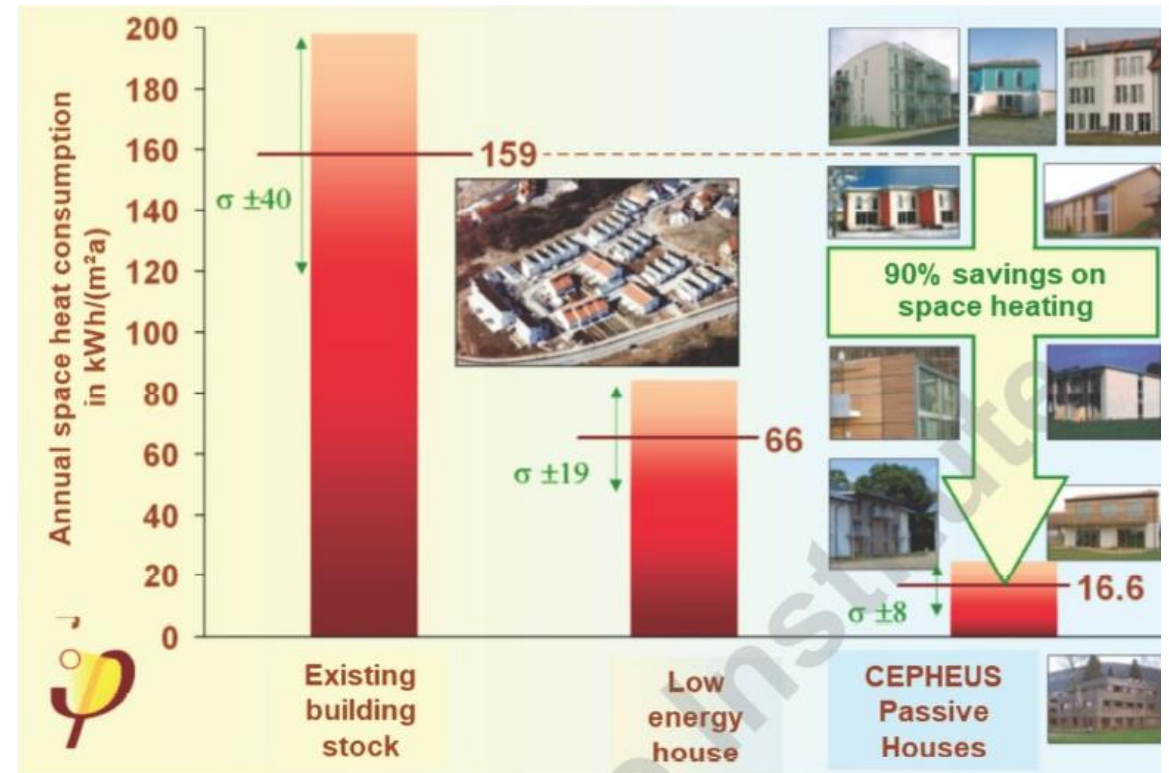
BRE report 2021 finds poor housing is costing NHS £1.4bn a year. Source: BRE Group.

# Passive House - Heating Demand

**Low heating demand:** Space heating demand of less than 15kWh/m<sup>2</sup>/yr.

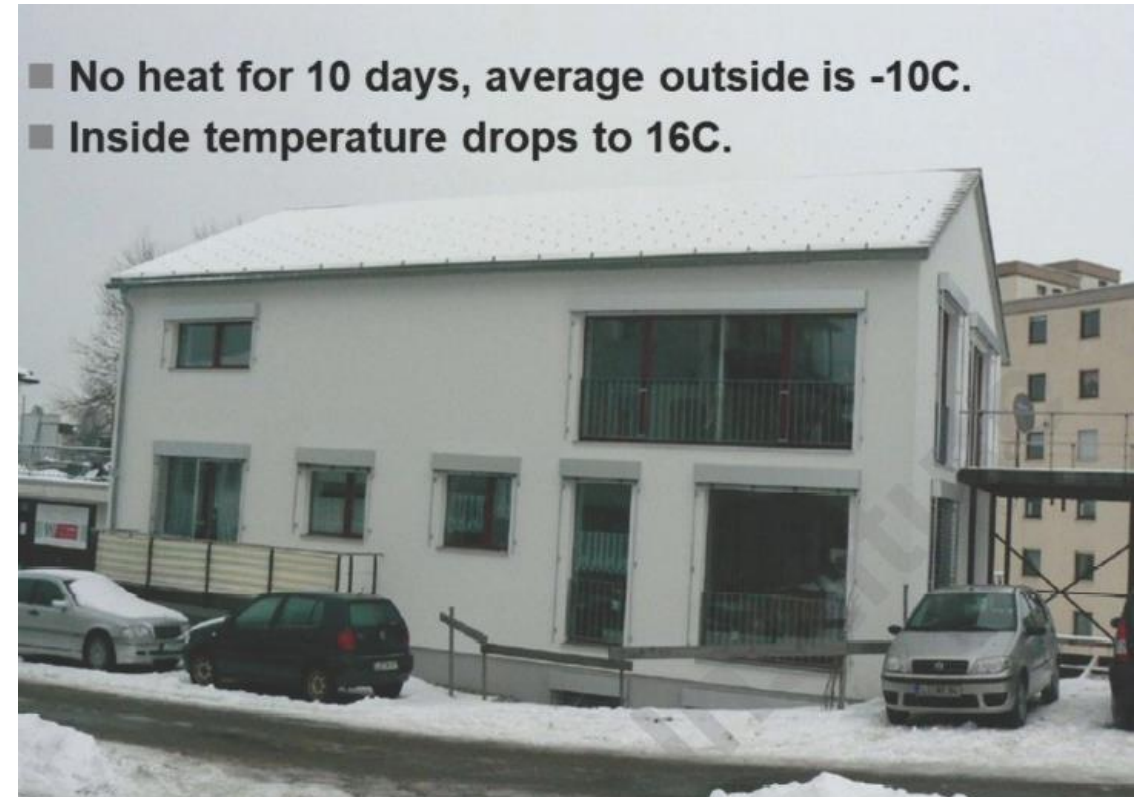
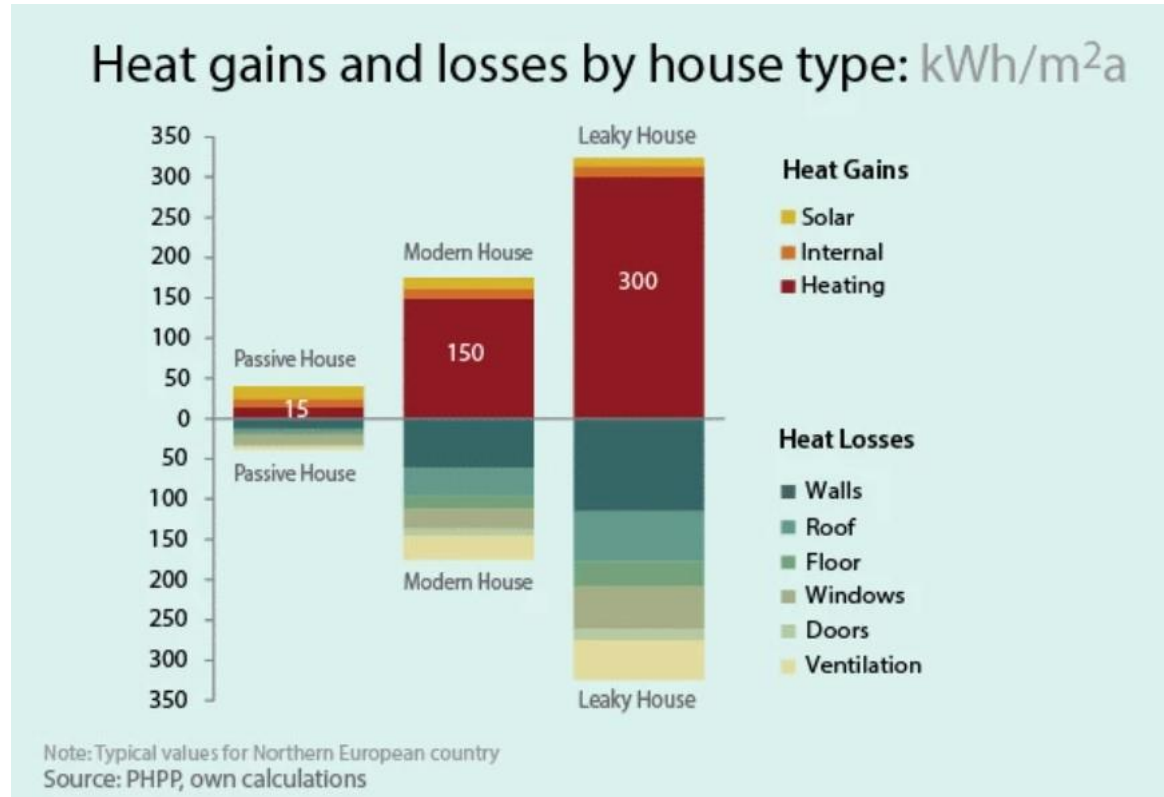
This means a Passive House uses 90% less energy to heat than an average home, and 75% less than the average new build.

Beyond the Classic Passive House criteria, Passive House Plus and Premium utilise renewable energy to generate electricity and omit heating bills altogether.



Source: Passive House Institute

# Gains and Losses – Example



Source: Passive House Institute

# Thermal Comfort – Windows

Even in extreme weather, façade surfaces are close to room temperature, there is minimal temperature change, minimal drafts, and no condensation.

L1A 2016 U-Value 2 W/m<sup>2</sup>K

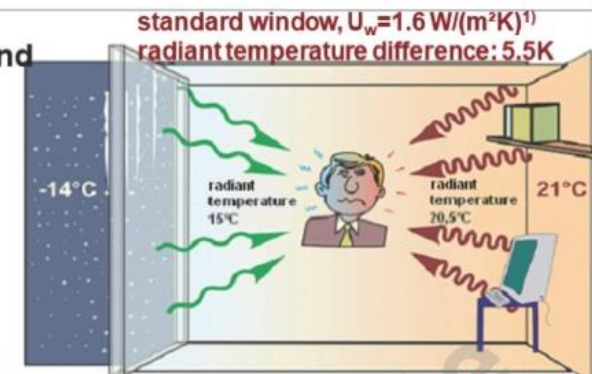
L1A 2022 (June) U-Value 1.2 W/m<sup>2</sup>K.

Passive House U-Value 0.8 W/m<sup>2</sup>K.

## Windows for comfort – avoid radiant temperature problem!

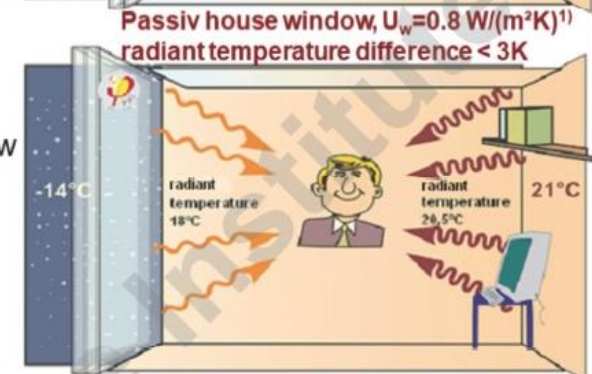
### Room with standard window and double low-e glazing

- Low surface temperature of window
- Radiation temperature asymmetry too high
- Radiator below the window is necessary



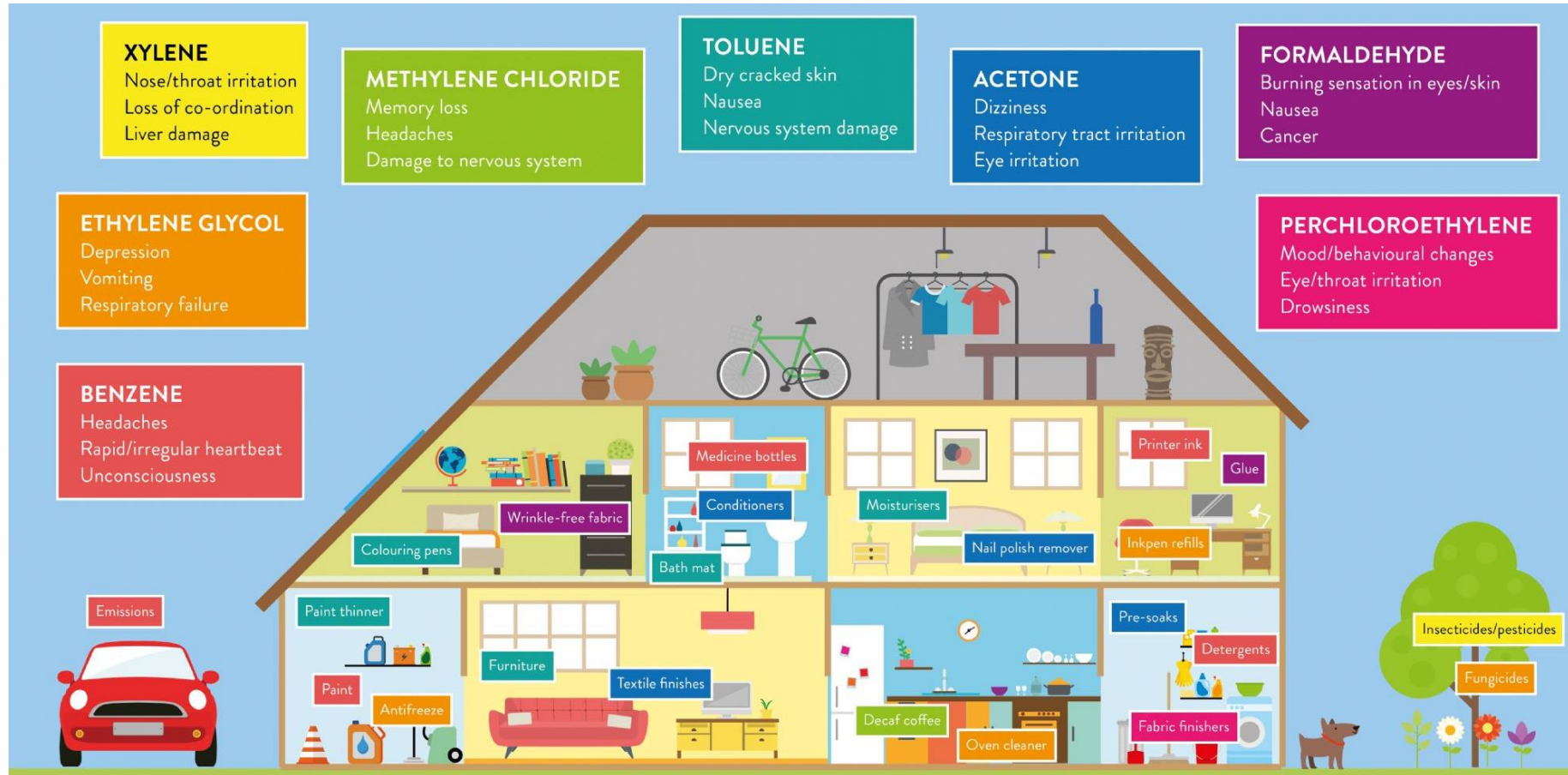
### Room with Passive House window and triple-glazing

- Surface temperature of window high
- Radiation temperature asymmetry small enough
- Radiator not necessary for comfort



Source: Passive House Institute

# Sick Building Syndrome



VOC - volatile organic compounds.  
Source: The Woolroom

# Ventilation

## Conventional Heating

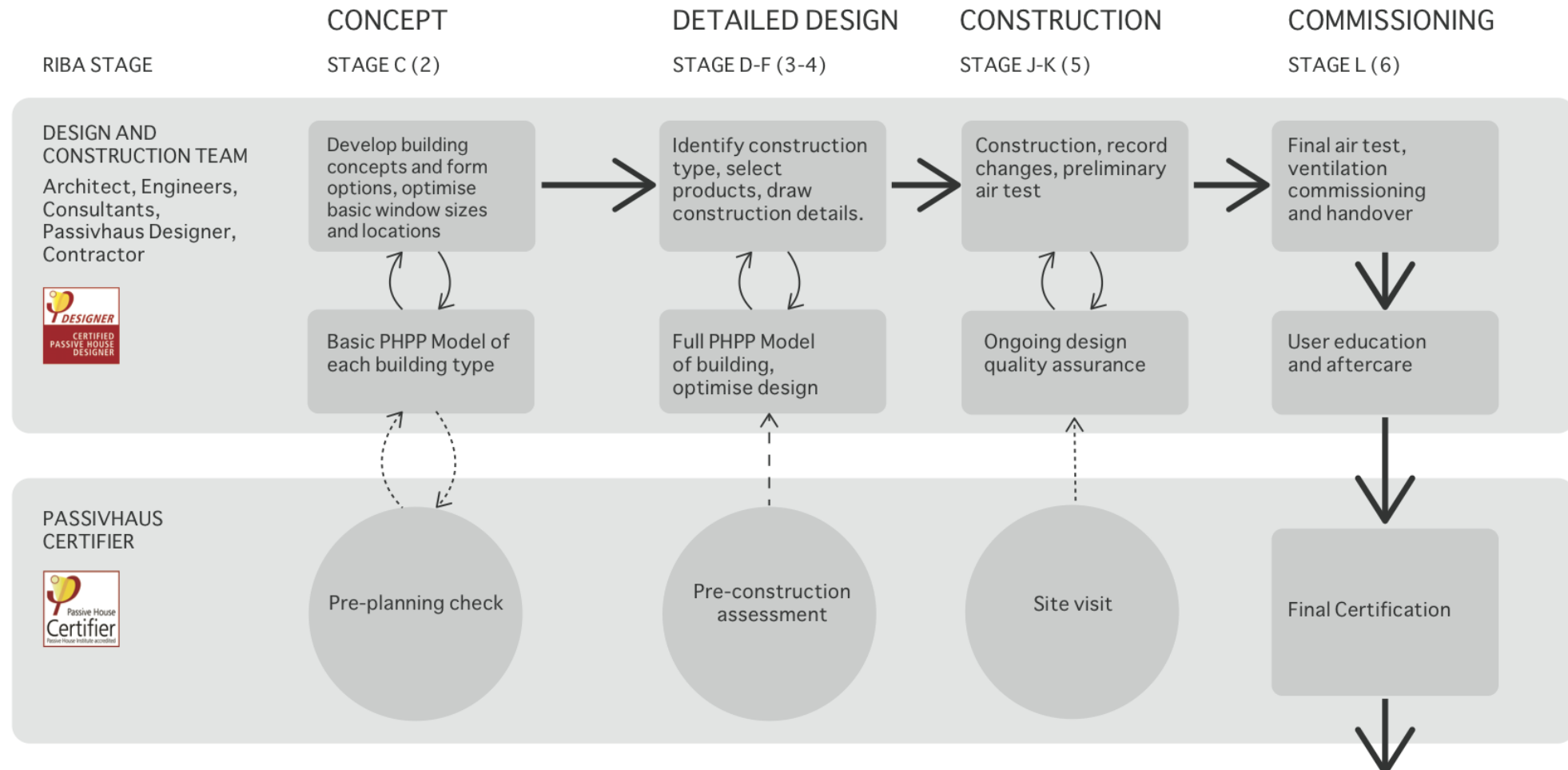
- Expensive
- Circulation often inadequate and unreliable.
- More difficult to control.
- Poor air quality.
- Linked to asthma, respiratory problems.
- Condensation, mould growth, potentially chronic damp and arthritis.
- Building damage and repair costs.

## MVHR

(Mechanical Ventilation with Heat recovery)

- Excellent, filtered indoor air quality.
- Air is continuously replaced and managed.
- Acoustic comfort.
- Acoustic attenuators are whisper quiet.
- Windows can be closed to limit road noise.
- Typically, 75-92% heat recovery, recovered heat energy is 8 to 15 times the electrical energy consumed.

# Passive House Certification



Source: Etude Passivhaus Certification



# Why Passive House?

- Qualified Passive House Designer.
- Buildings designed with the PHPP Passive House Planning Package.
- Quality assured process, what's designed is what you get.
- Location, Orientation, Solar Shading.
- Heat gain and loss calculations.
- Building shape & the exposed surface area.
- Thermal bridges.
- Catch mistakes early.
- **Build better, healthier buildings.**



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