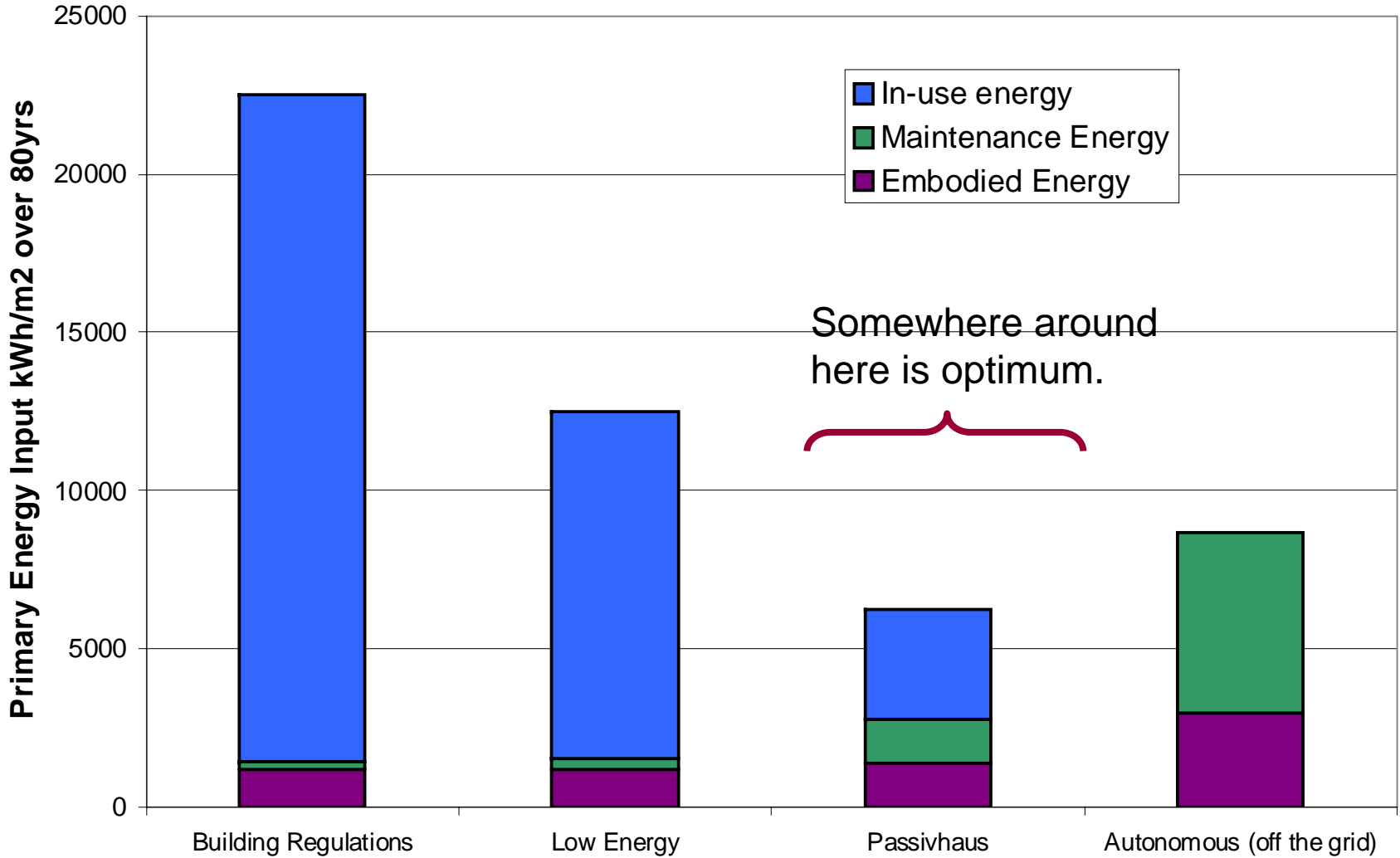

What is the Passivhaus standard and how it is applied to schools

sally johns MEng CEng MIMechE

● WARM: Low Energy Building Practice

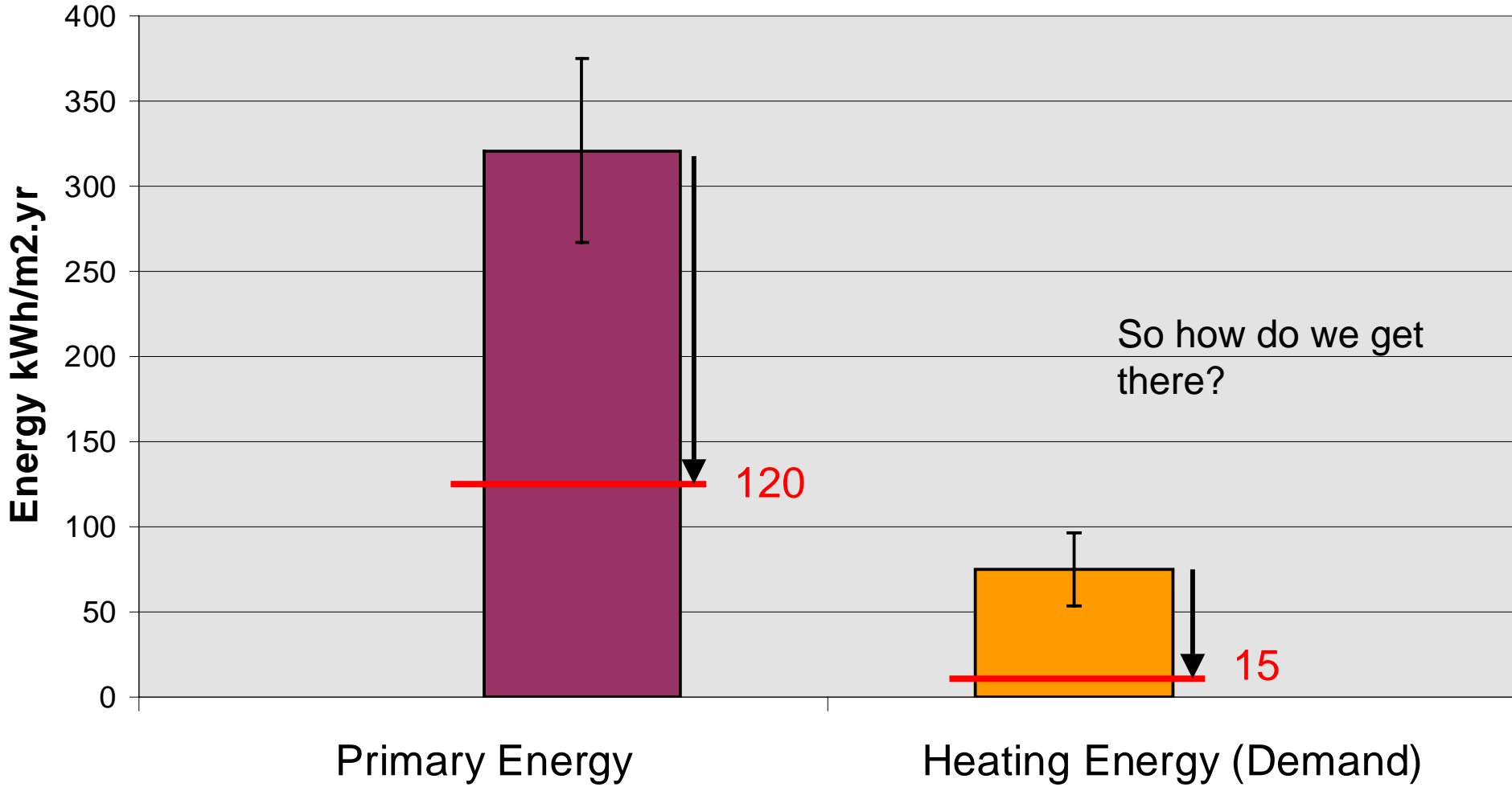
Life Cycle Energy Analysis



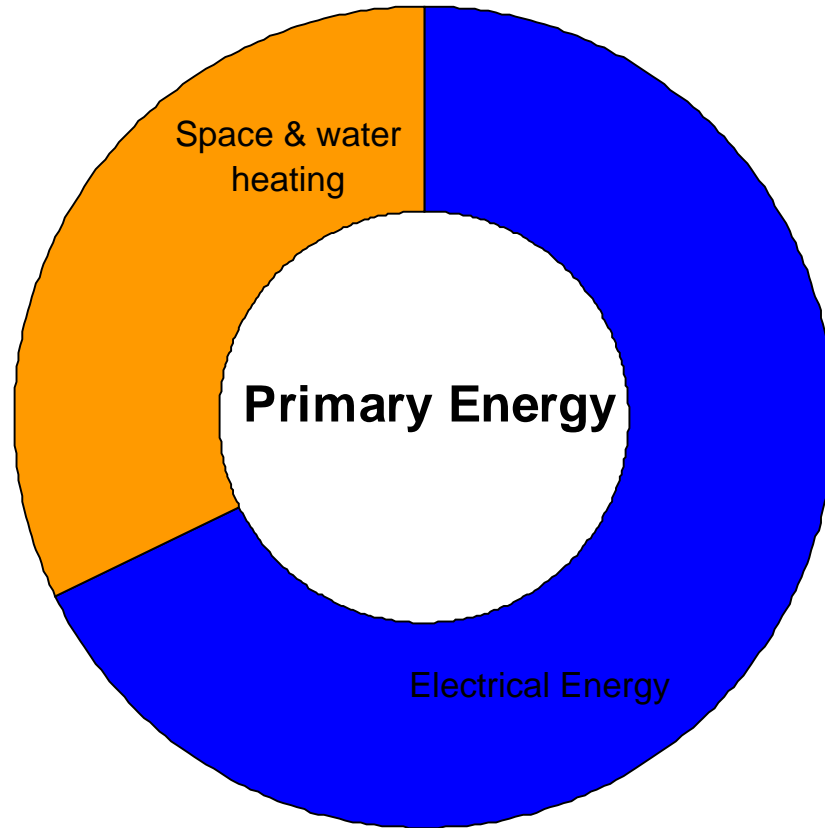
Passivhaus requirements

Primary Energy	120kWh/m ² yr	Energy
Heating	15kWh/m ² K	Energy
Air-tightness	0.6ach @ 50Pa	Energy & Comfort
Surface temp (windows)	>17degC	Comfort
Overhtg	Max 10% >25degC	Comfort
Vent	~0.3 ach	Comfort

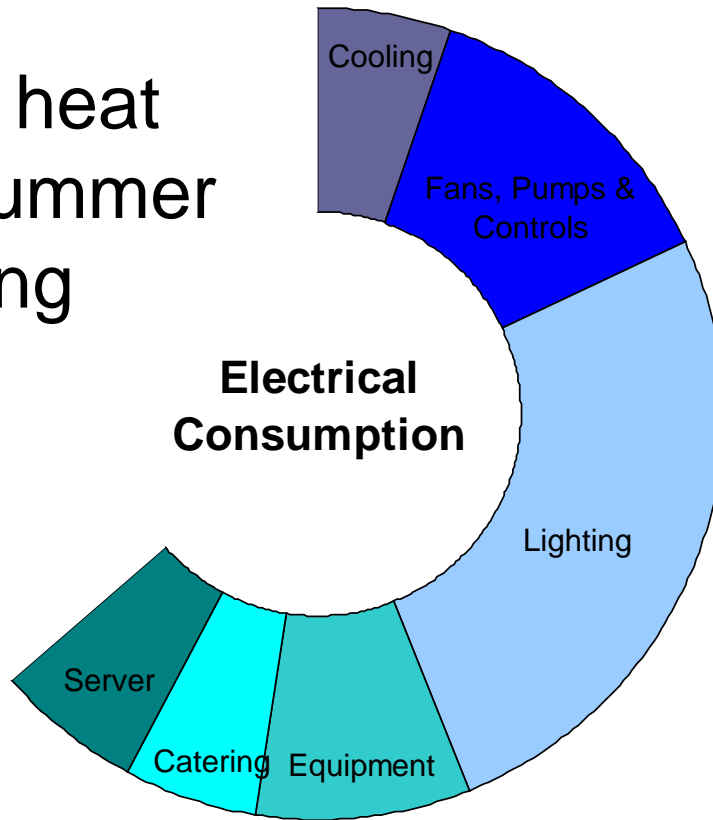
10 New UK Secondary Schools



So how do we get there?

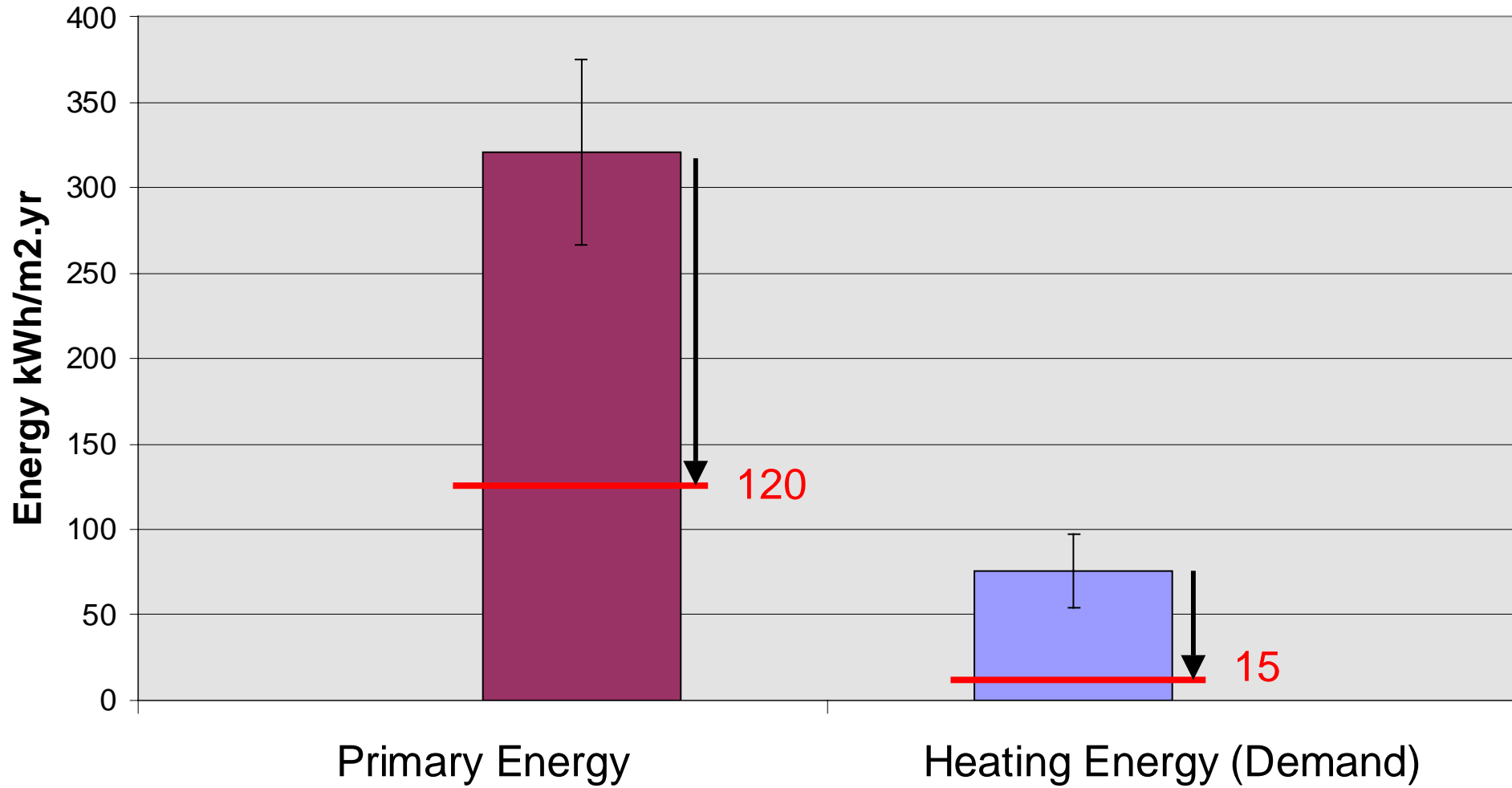


All add to heat gains = summer overheating



- Low energy
- Control

10 New UK Secondary Schools

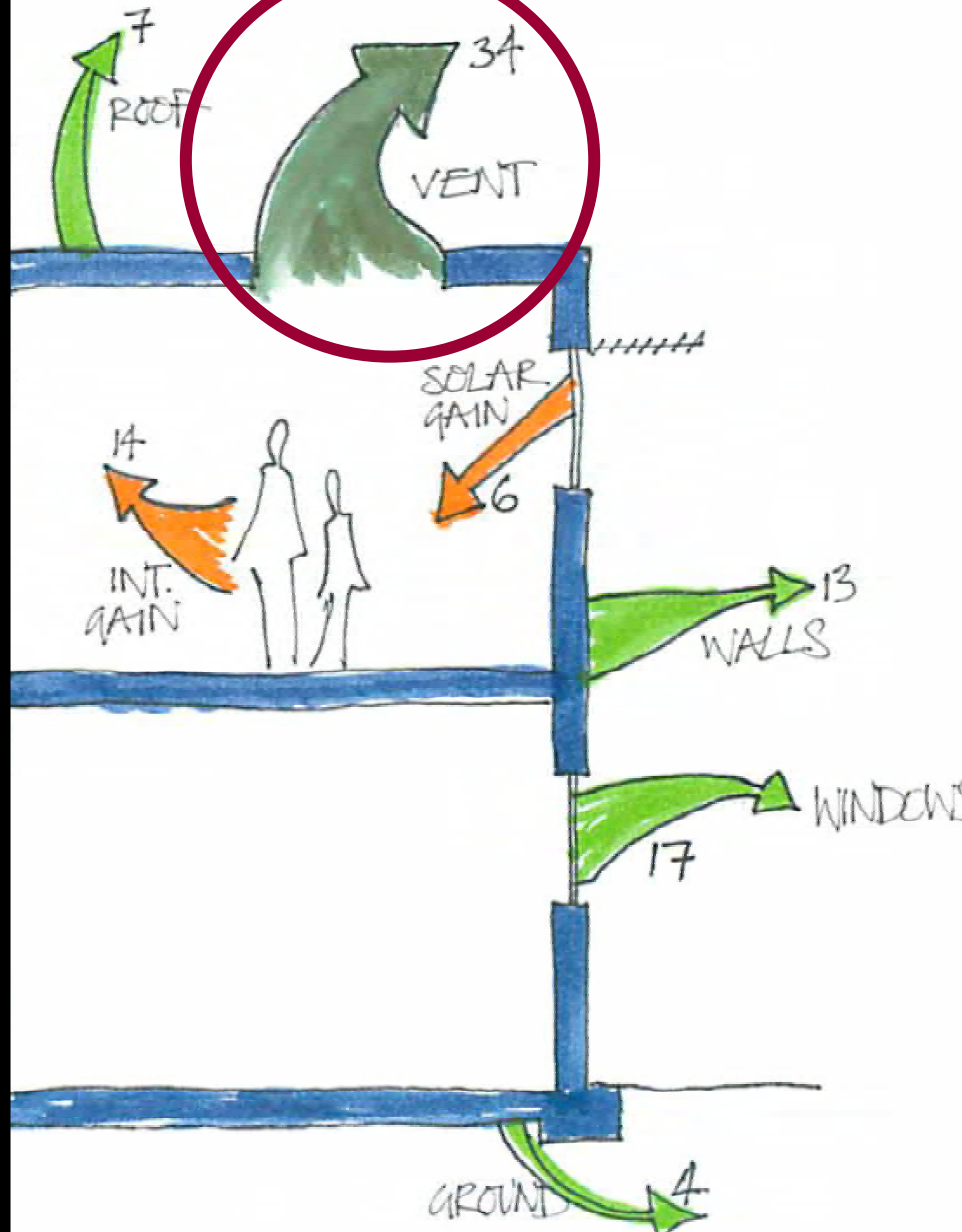


Comfort

- Air temperature
- Radiant temperature
- Air movement
- Humidity

- Air quality

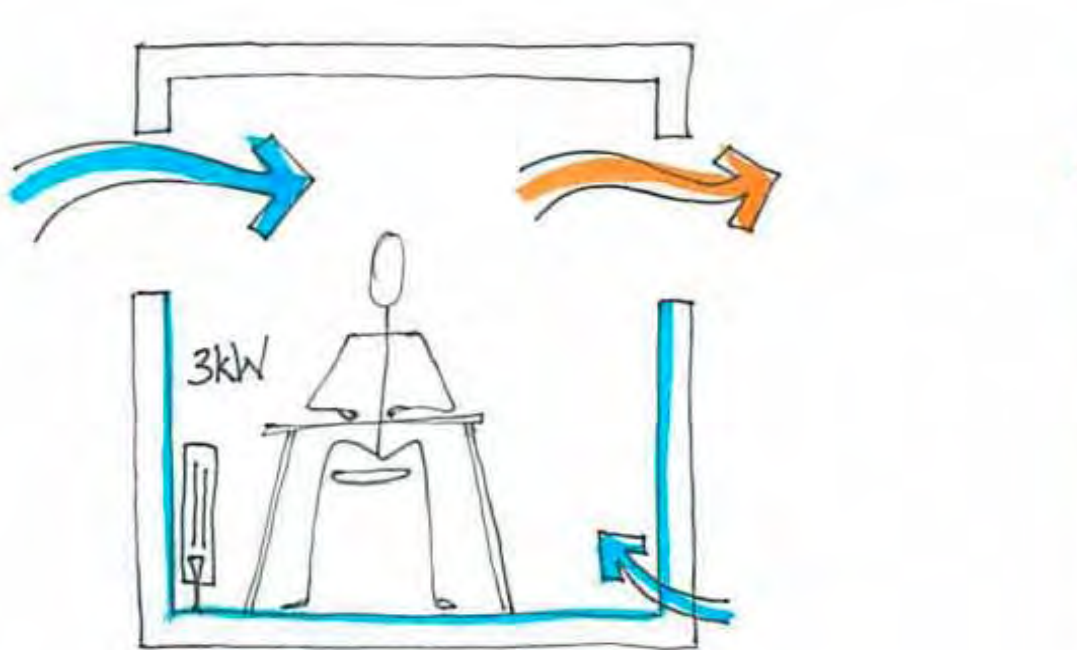
Building Regs



Ventilation design

Good air quality

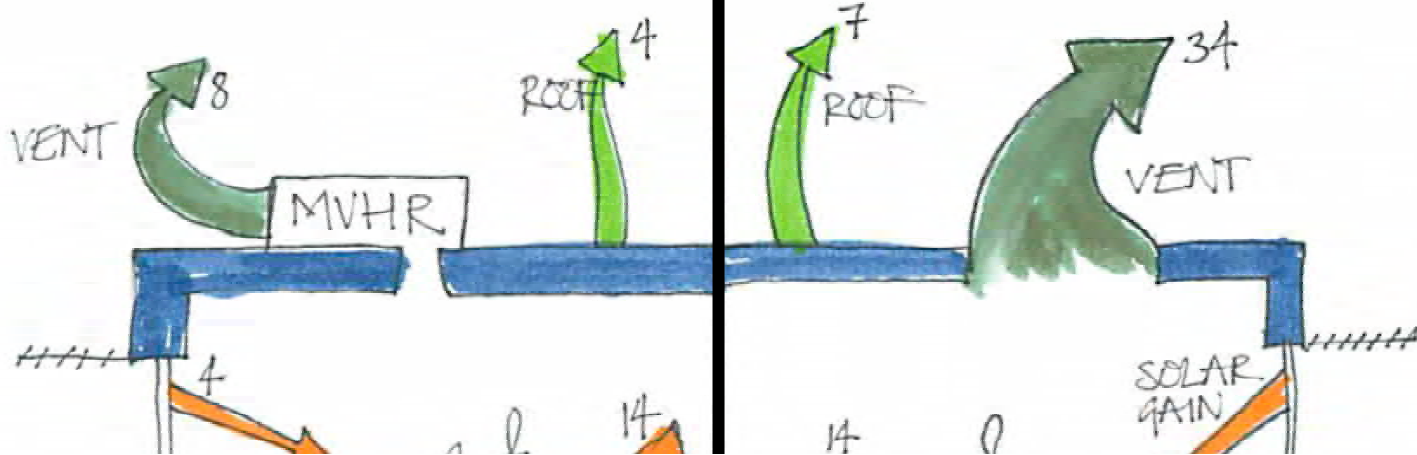
Feels draughty & cold



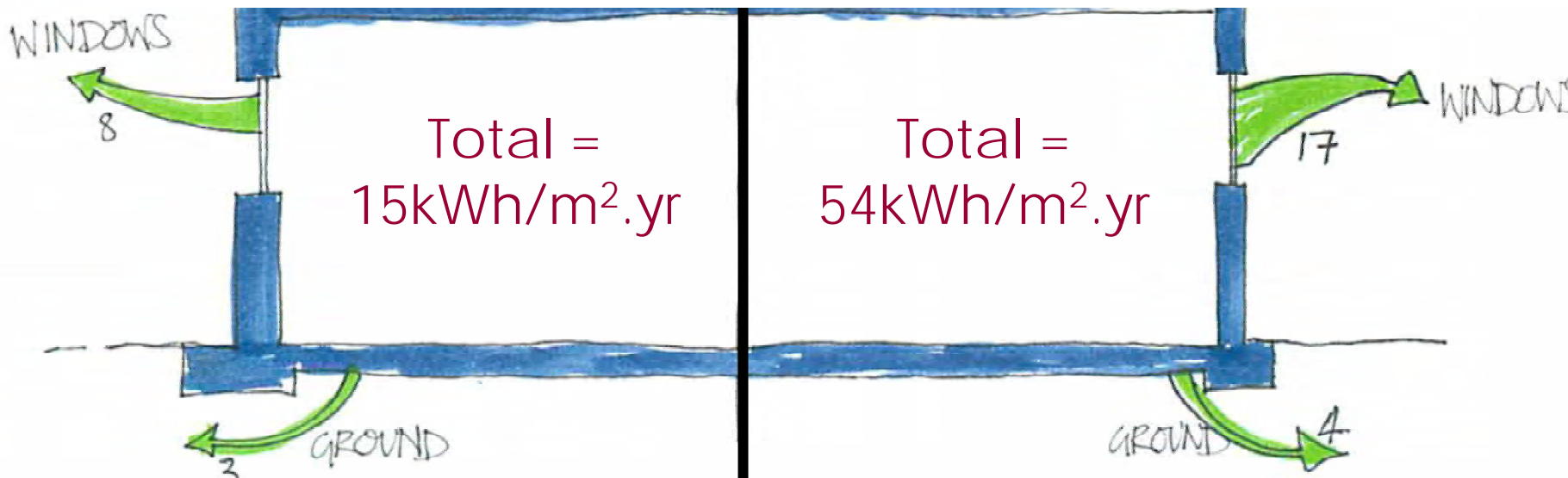
Lots of Heating Energy

Passivhaus

Building Regs

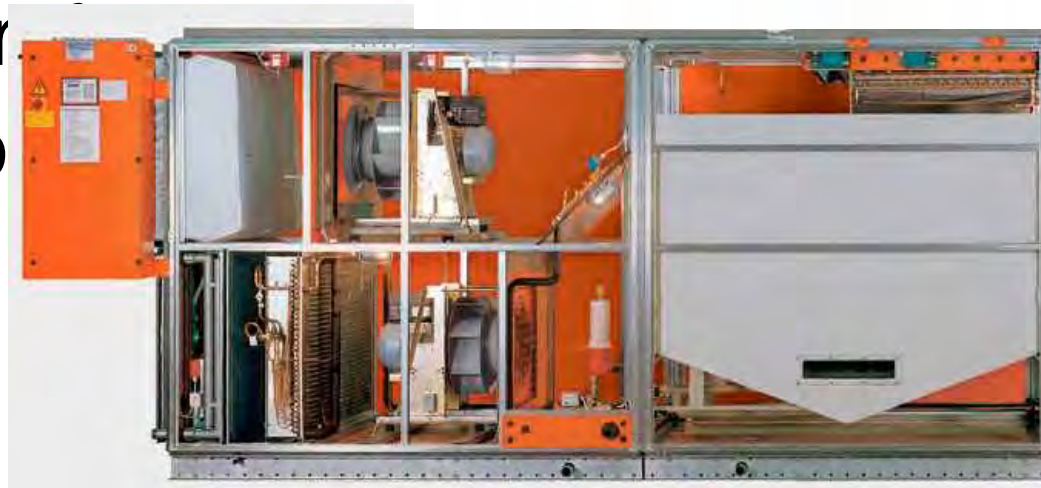
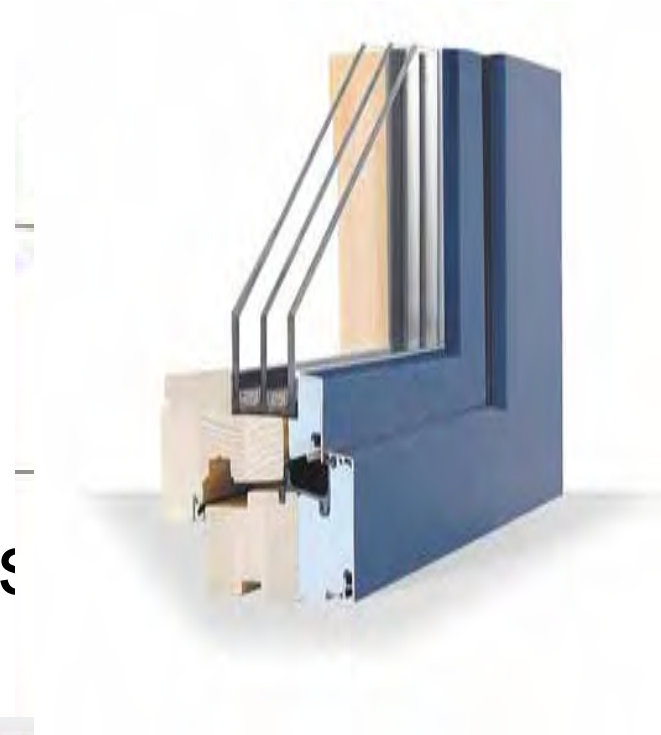


But, we've tried this, what's different?



Yes, but better...

- Attention to details!
- Ventilation – easy to double energy use through poor control
- Glazing spec critical – effects daylight, solar gain, thermal performance & comfort
- Insulation – tea cosy (as possible)





Grundschule Riedberg





Aufkirchen Montessori School



Conclusion

- Passivhaus Standard represents higher comfort & low energy use
 - i.e. Better quality buildings.

