

The Passive House Standard



Outline

- ❑ Core promises
- ❑ Common confusions
- ❑ Compare with other standards
- ❑ Five key principles
- ❑ Key criteria
- ❑ Energy balance
- ❑ Certification

www.greenpointdesign.com.au

Green Point Design Est. 1998

Ballarat-based Sustainable Architect working Victoria-wide.
Certified Passive House Designer.

Home Passive House Getting Started Our Service Packages Our Fees Projects Gallery **Downloads** About Contact

Downloads:

Green Point Design:	Working with your Architect:	Articles and Handouts:
 Green Point Design Service Packages A,B & C.	 Australian Institute of Architects reference copy of Client and Architect Agreement.	 "Passive House" by Eric Zehring. Owner Builder magazine.
 Green Point Design Brochure.	 Australian Institute of Architects brochure: You and Your Architect.	 "Passive House Active Planet Care" by Eric Zehring. Earth Garden Magazine.
 Map to Green Point Design Office.	 Architects Registration Board of Victoria: Working With Your Architect.	 Designing Cool Houses for Summer Heat.
		 Rural Living.
		 Designing Warm Houses for Cold Winters.
		 Healthy Houses.

Green Point Design
Sustainable ● Architecture

Core promises:

COMFORTABLE

DURABLE

LOW ENERGY INPUT

COMFORTABLE

- 20-25 degrees
- 8 fresh air changes per day

DURABLE

LOW ENERGY INPUT

COMFORTABLE

- 20-25 degrees
- 8 fresh air changes per day

DURABLE

- Condensation within envelope
- Surface condensation/moisture

LOW ENERGY INPUT

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DURABLE

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LOW ENERGY INPUT

Energy budgets for:

- Heating
- Cooling
- Whole building

Passive House

Any building type

Any design aesthetic

Anywhere in the world

Common confusions

Passive House



Passive solar

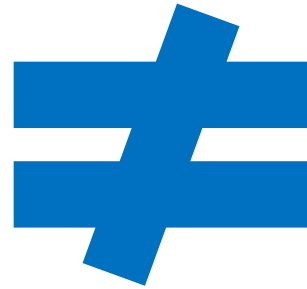
Passive House



Passive solar

Sustainable

Passive House



Green

Passive solar

Sustainable

Passive House



Green

Passive solar

Sustainable

10-star

Passive House



Green

Passive solar

Sustainable

10-star

House

Passive House



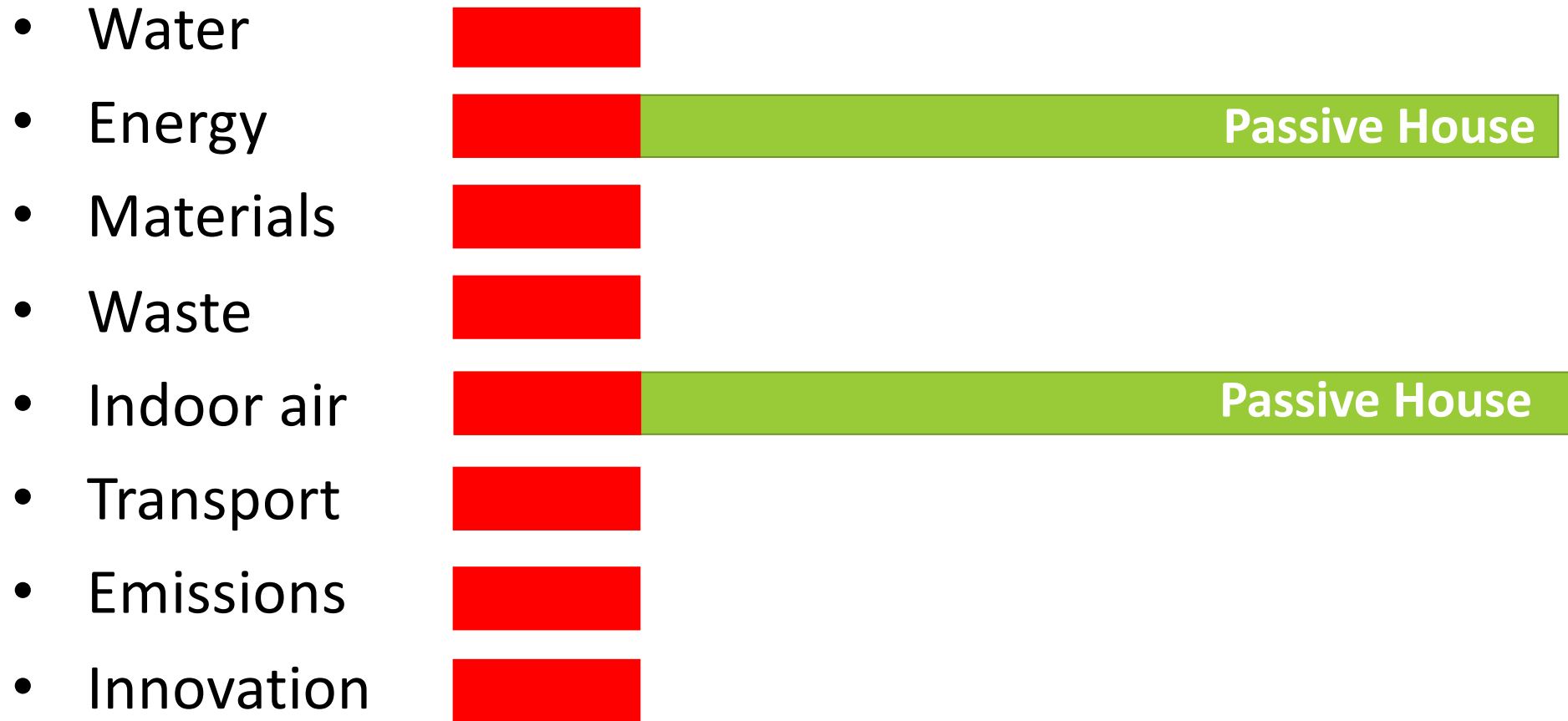
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Comparison

- LEED
- Green Star
- BREEAM
- Living building challenge
- Net zero
- NatHERS star ratings



Comparison



Compare with star rating

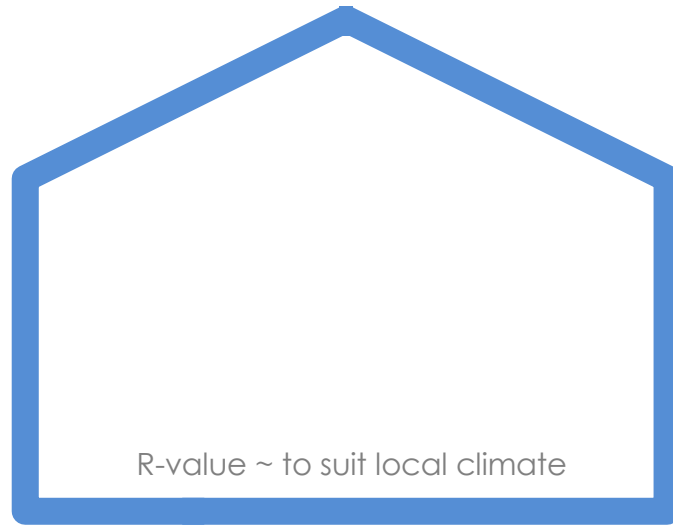


Insulation	Yes	Yes
Air tightness	Yes	No
Thermal bridges	Yes	No
Windows	Yes	Yes
Ventilation and heat recovery	Yes	No

Sort of...

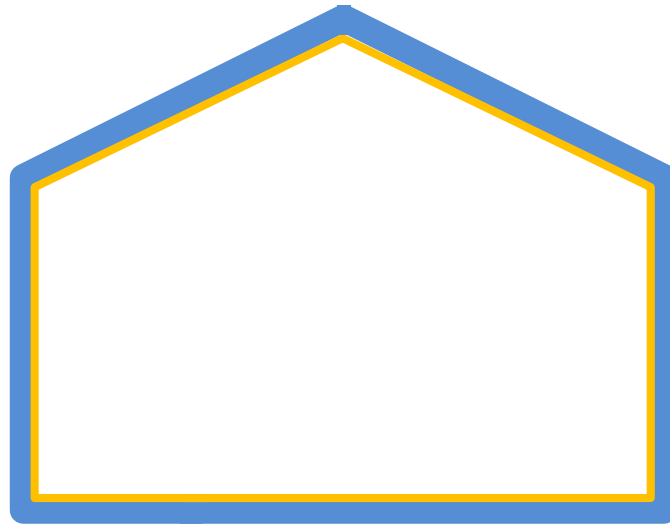
Five key principles

Five key principles



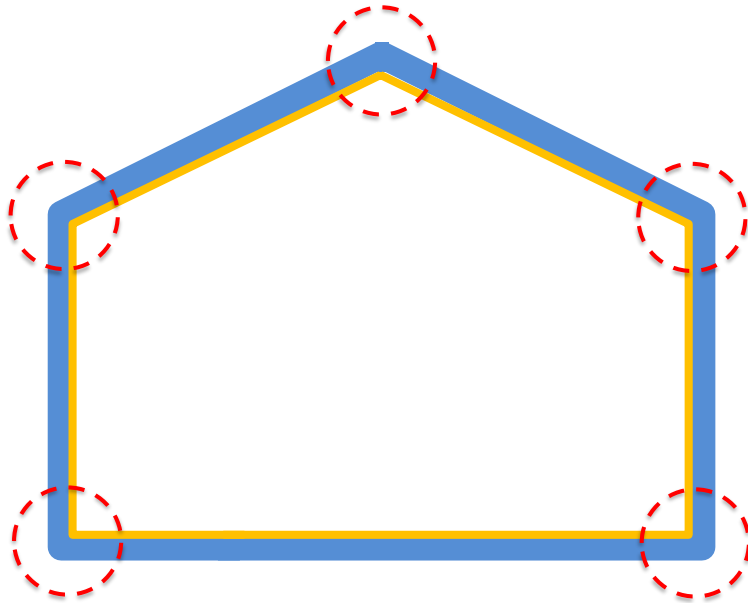
1. High level of continuous insulation

Five key principles



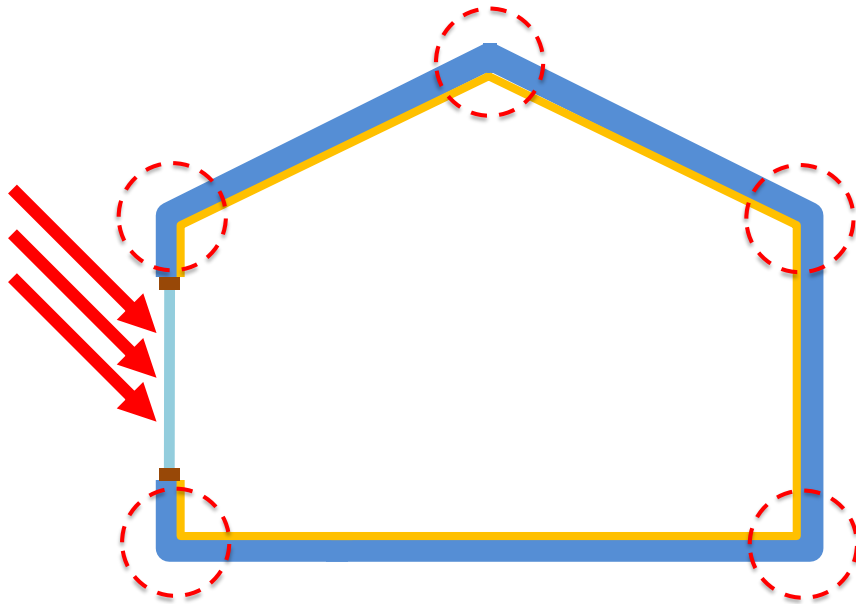
1. High level of continuous insulation
2. Air tight construction

Five key principles



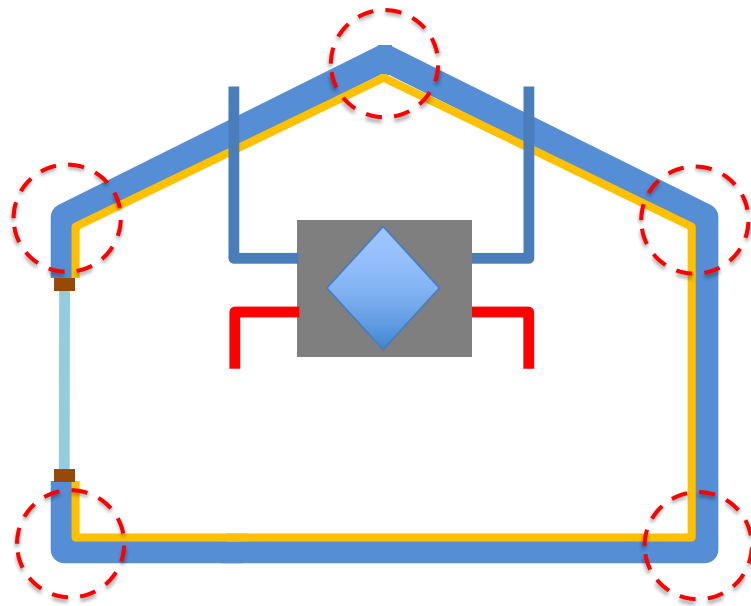
1. High level of continuous insulation
2. Air tight construction
3. Minimise thermal bridges

Five key principles



1. High level of continuous insulation
2. Air tight construction
3. Minimise thermal bridges
4. High performance glazing

Five key principles



1. High level of continuous insulation
2. Air tight construction
3. Minimise thermal bridges
4. High performance glazing
5. Mechanical ventilation with heat recovery

Key criteria

Air tightness

Blower door test

- Positive and negative test
- 50 pascals
- Note value is from pressurised test, not actual

Air tightness	Heating		Cooling		
	ACH				
0.6					

DEMAND

“Energy budget” for the entire building per year.

kWh/m².yr

Air tightness	Heating		Cooling		
	Demand		Demand		
ACH	kWh/m ² .yr		kWh/m ² .yr		
0.6	15		15		

LOAD

Peak energy requirement to maintain internal temperature range.

$$W/m^2$$

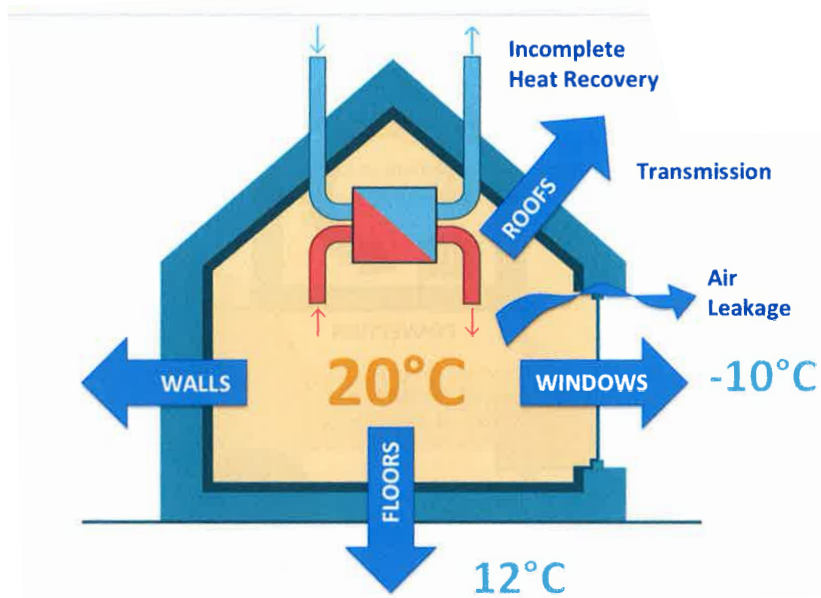
Air tightness	Heating		Cooling		
	Demand	Load	Demand	Load	
ACH	kWh/m ² .yr	W/m ²	kWh/m ² .yr	W/m ²	
0.6	15	10	15	10	

% overheating

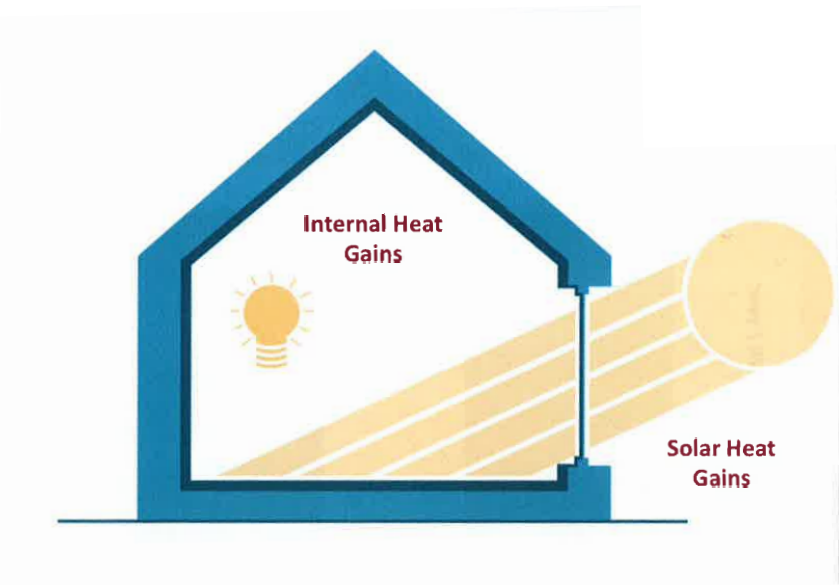
- Mechanical cooling not required
- 10% of year = 36 days
- In Australia, if mechanical cooling not included, recommend designing to value of 2-3% overheating.

Air tightness	Heating		Cooling		
	Demand	Load	Demand	Load	Overheating
ACH	kWh/m ² .yr	W/m ²	kWh/m ² .yr	W/m ²	%
0.6	15	10	15	10	10%

Energy balance

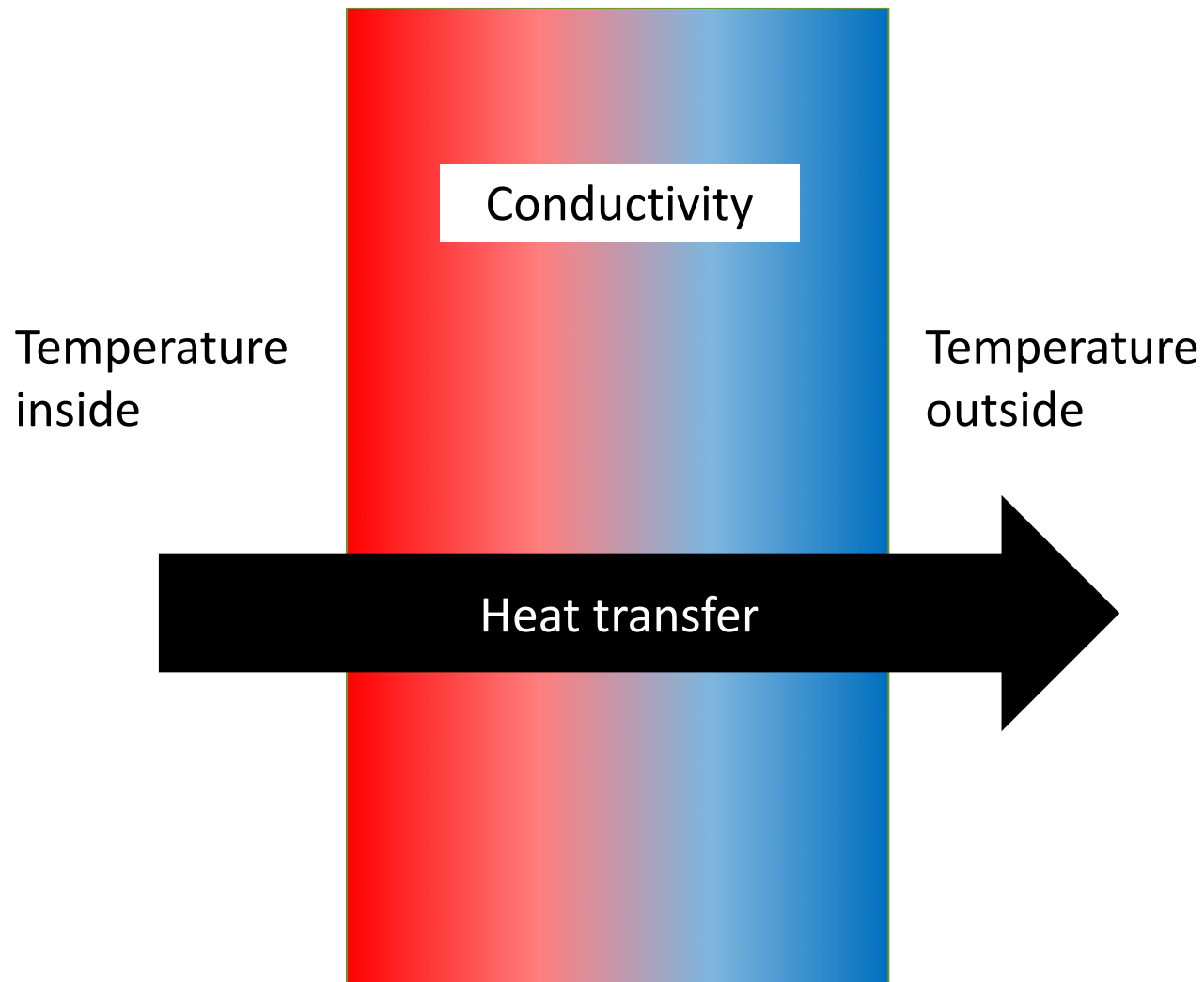


Losses

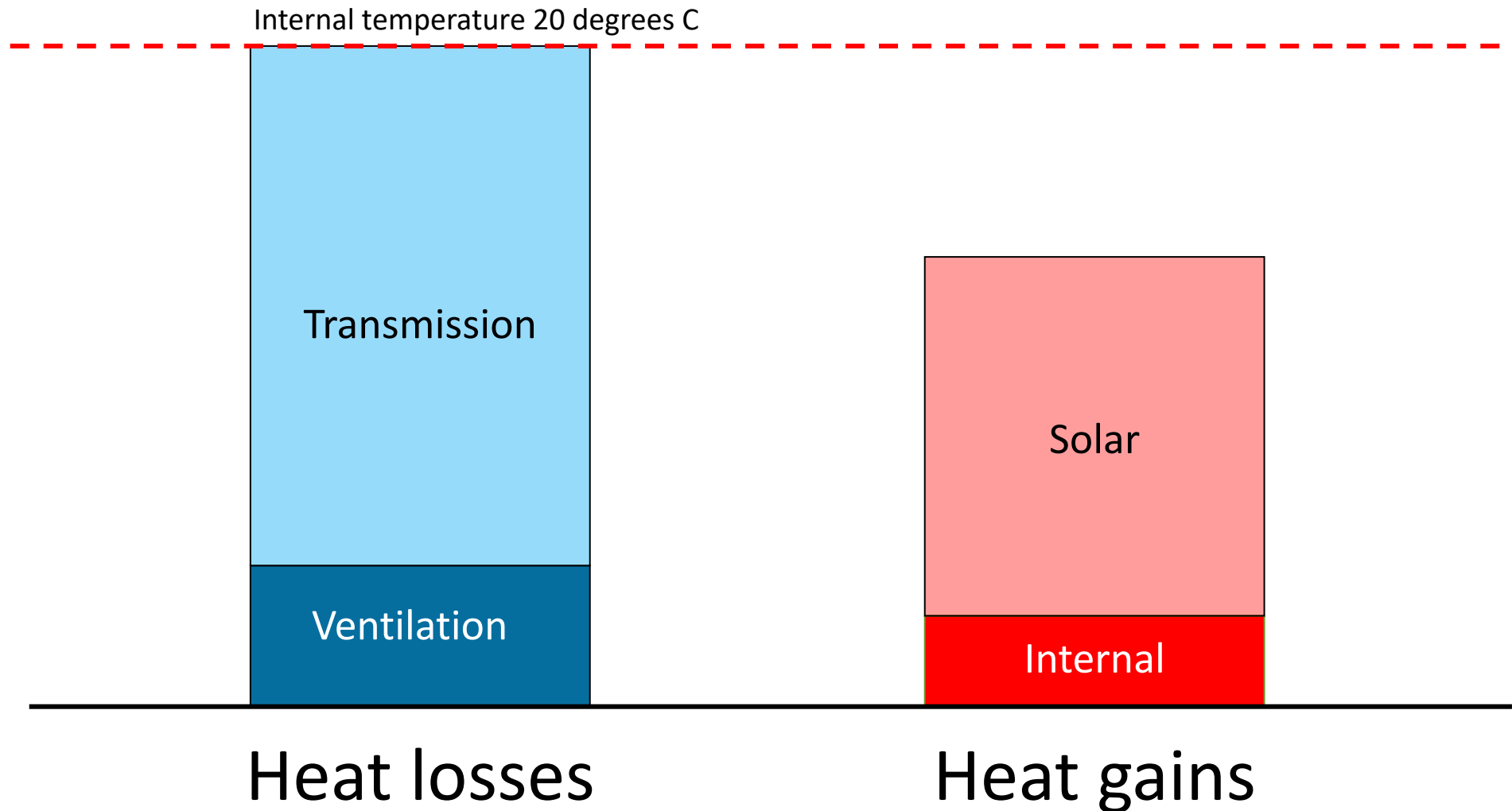


Gains

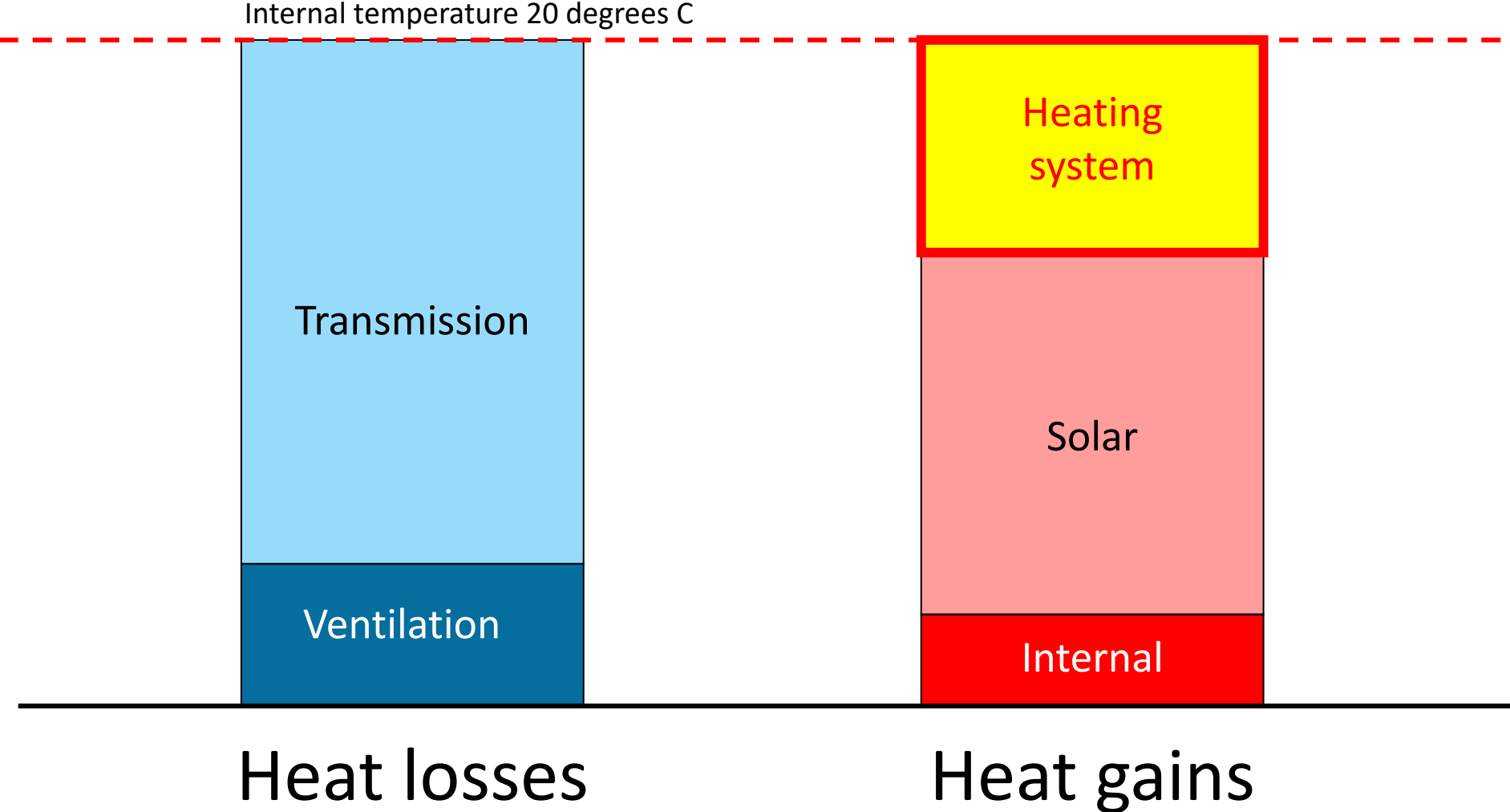
Transmission heat losses



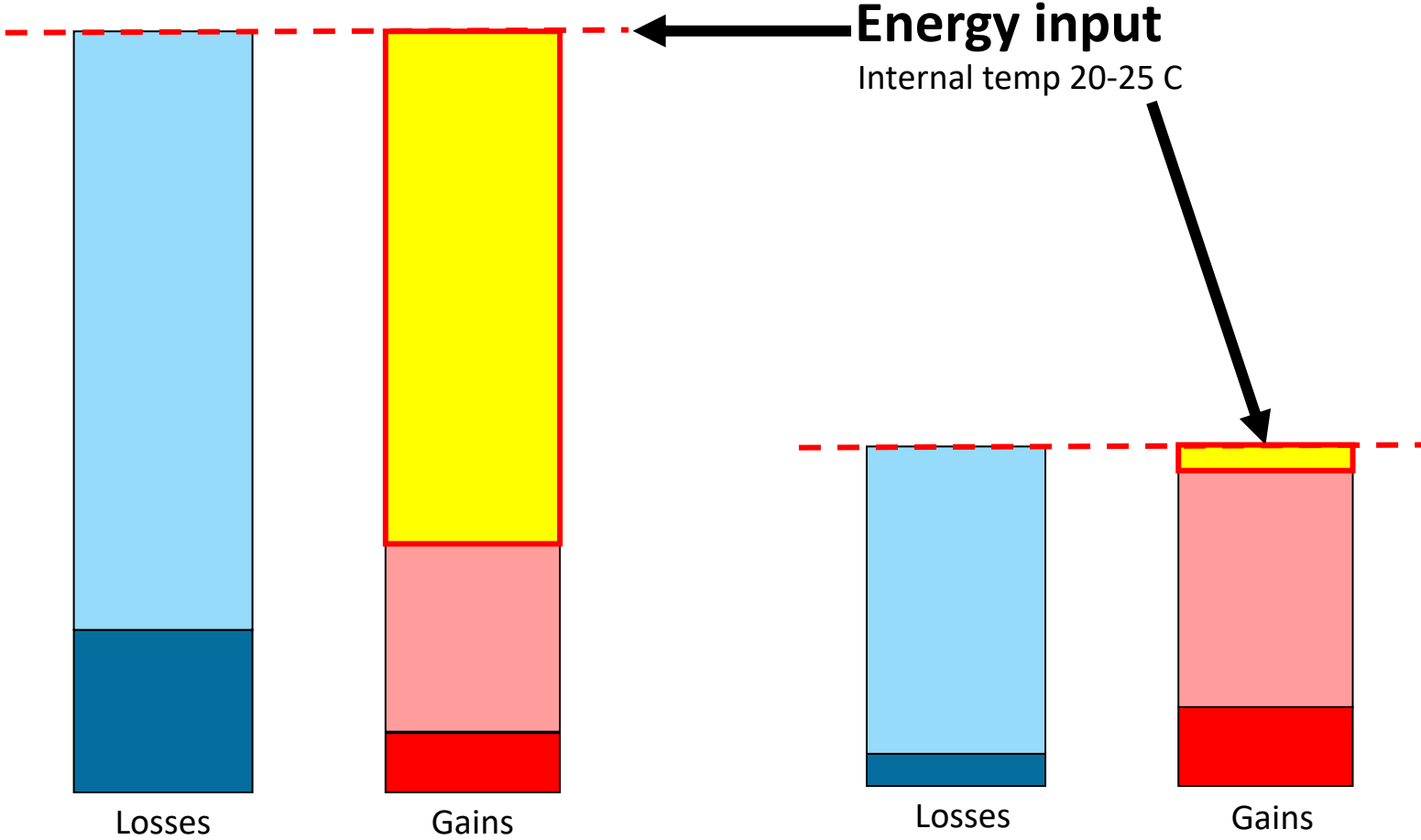
Energy balance: winter



Energy balance: winter



Energy balance



Code building

Passive House

Heat LOAD

Air tightness	Heating		Cooling		
	Demand	Load	Demand	Load	Overheating
ACH	kWh/m ² .yr	W/m ²	kWh/m ² .yr	W/m ²	%
0.6	15	10	15	10	10%

Heat LOAD

Heat load $< 10\text{W/m}^2$

Say, $150\text{m}^2 \times 10\text{W/m}^2 = 1500\text{W}$

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Certify.....or not



Certification

- Calculation package
- Building details
- Product and material information
- Blower door test certificate
- Photo record of construction



Partial compliance

		Risk
Insulation	Yes	
Air tightness	No	Moisture / condensation
Thermal bridges	No	
Windows	Yes	
Ventilation and heat recovery	Yes	

Partial compliance

		Risk
Insulation	Yes	
Air tightness	Yes	
Thermal bridges	Yes	
Windows	Yes	
Ventilation and heat recovery	No	Poor indoor air

Occupancy



Constructed to meet Passive House criteria.
How building is used is up to the occupant.

- Temperature
- Ventilation
- Windows etc



Thank you!