HEM
ARCHITECTS

HOMEBUILDING & RENOVATING SHOW

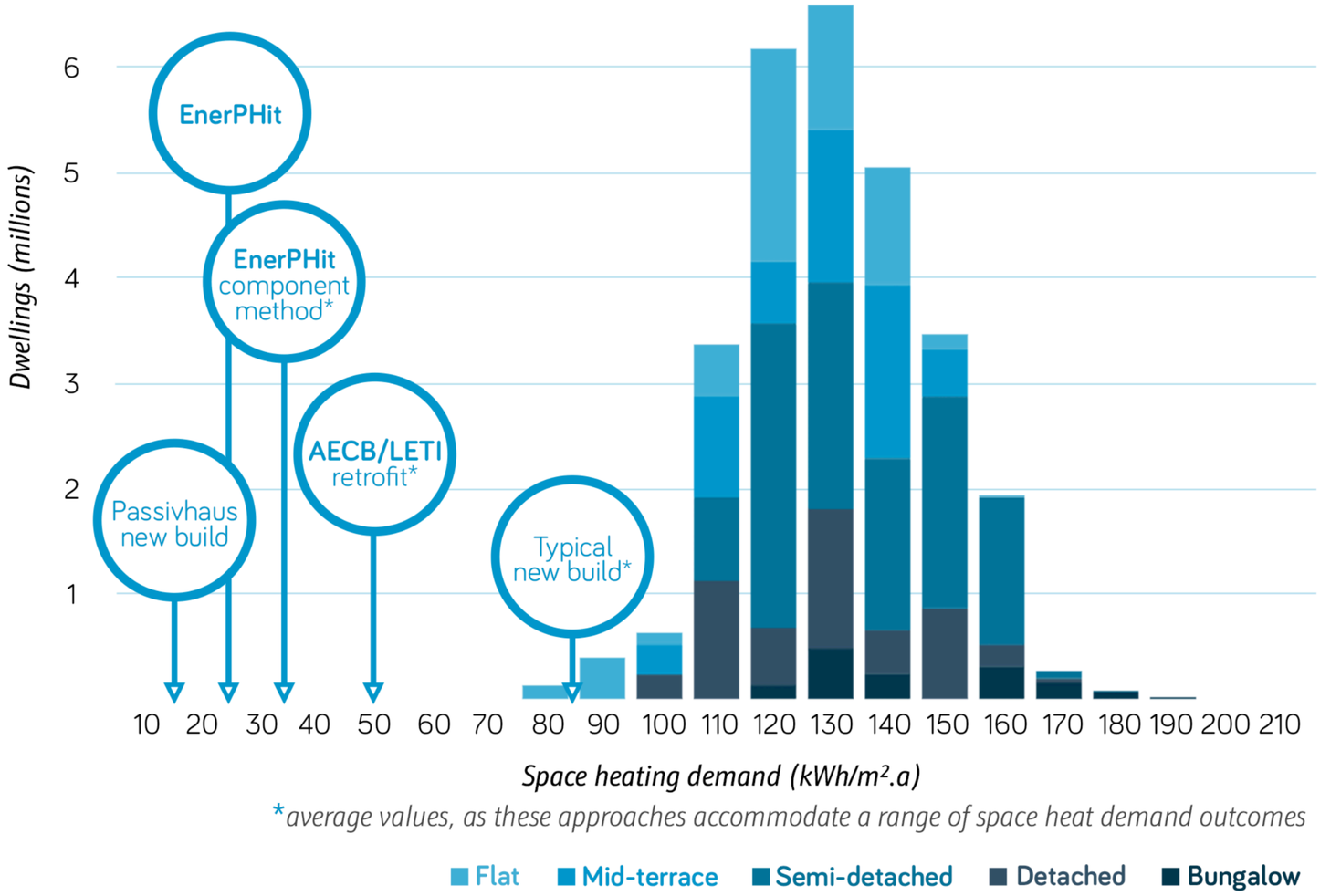
Sustainable home design & construction

SUSTAINABLE HOME DESIGN & CONSTRUCTION

1. What performance to aim for
2. Fabric first
3. Know your site
4. Form Factor
5. Orientation
6. Fenestration
7. Embodied carbon
8. Other ways of reducing demand
9. What to build out of?

1. What performance to aim for

1. Is building regulations good enough?
2. Cost vs performance depends on very early decisions
3. Don't design yourself into a corner too early



2. Fabric first

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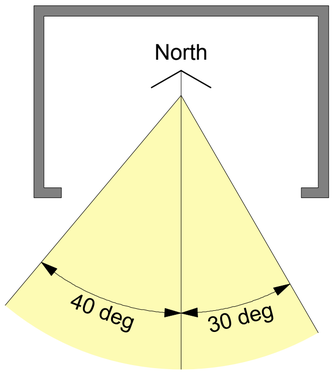
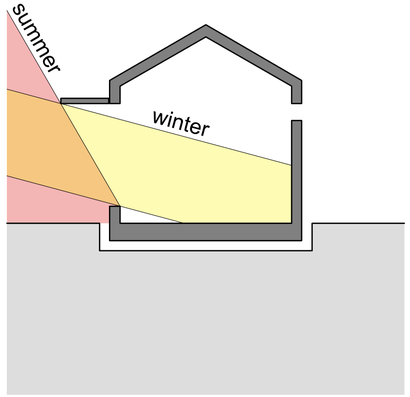
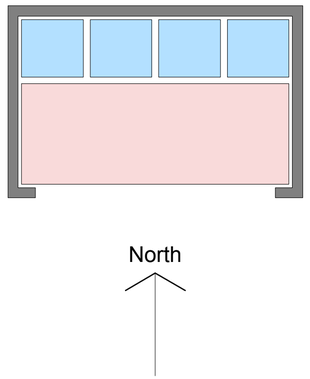


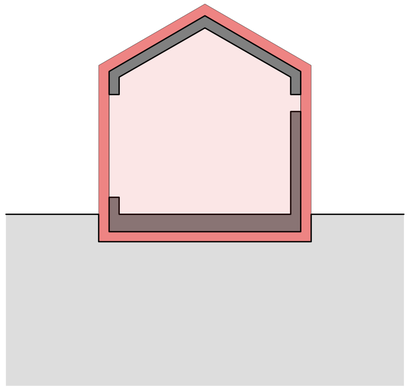
orientation



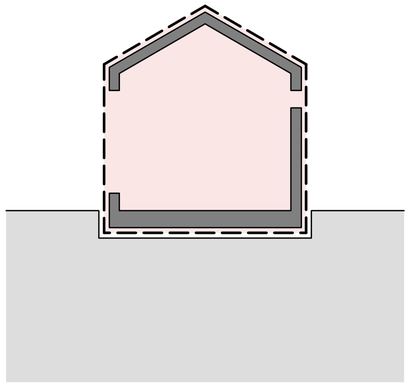
passive solar gain



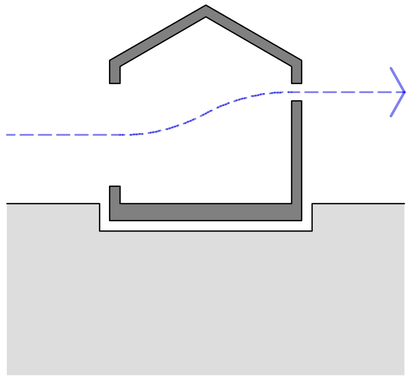
organisation



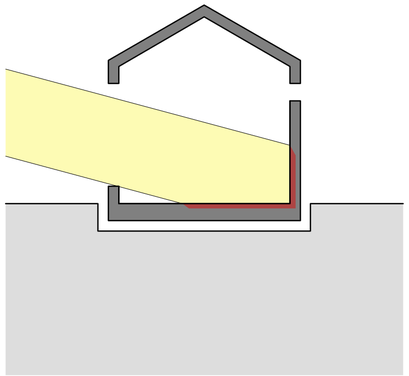
super insulation



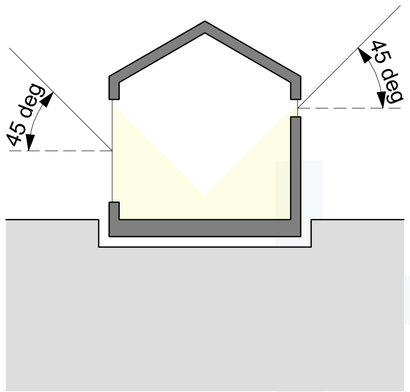
air-tightness



natural ventilation

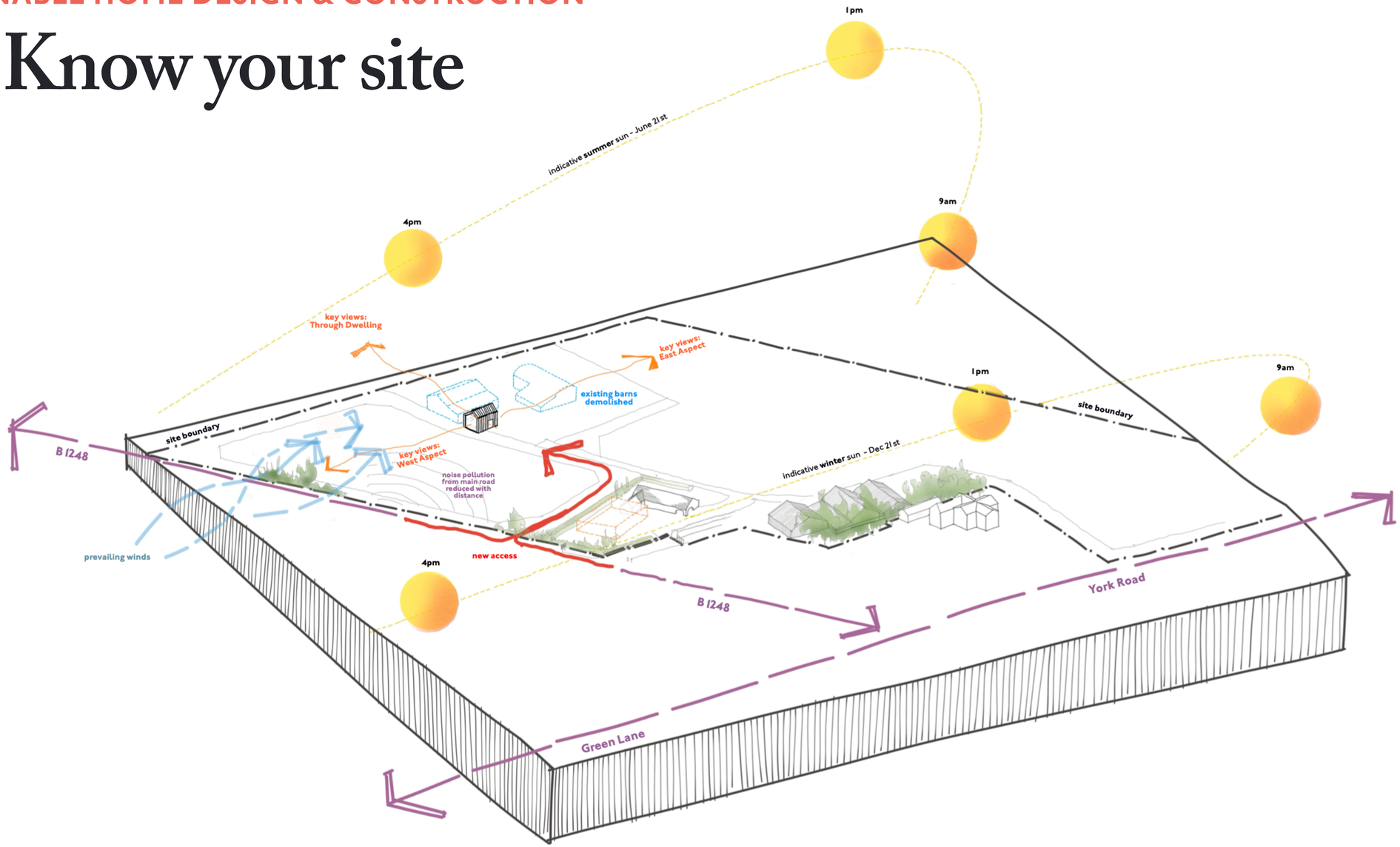


thermal mass



daylight

3. Know your site



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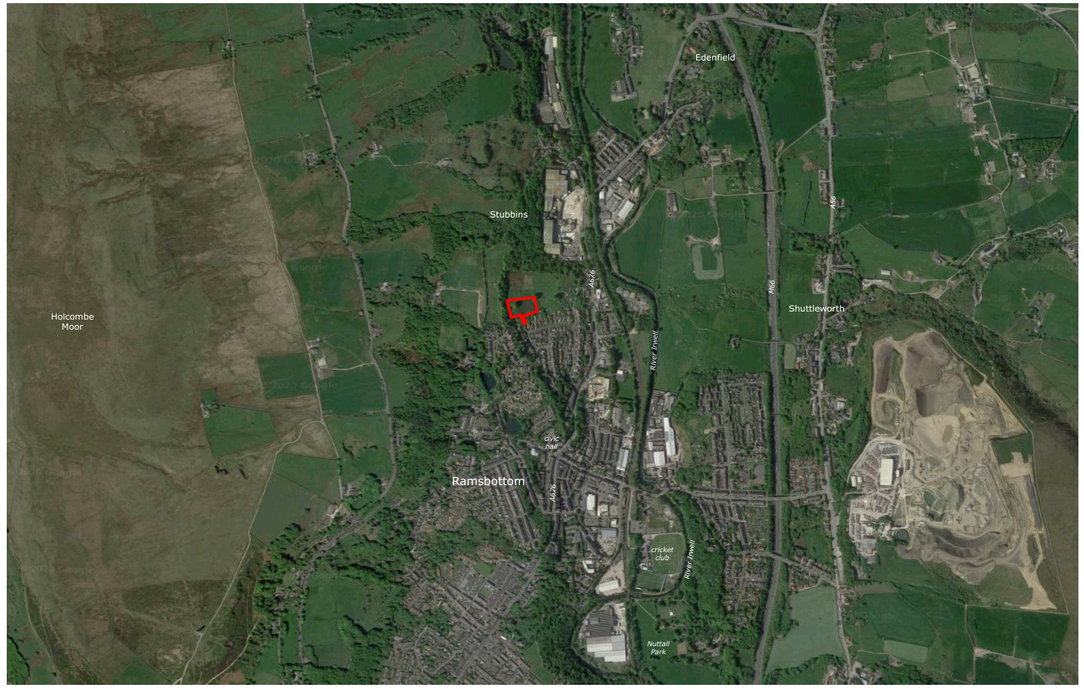
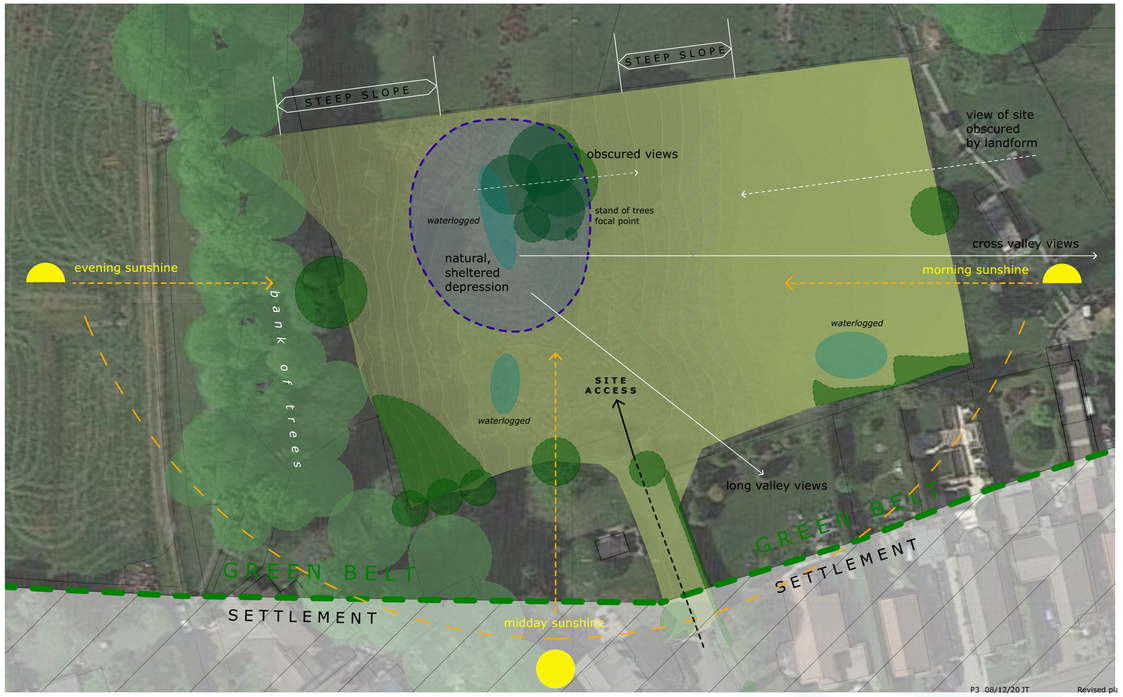
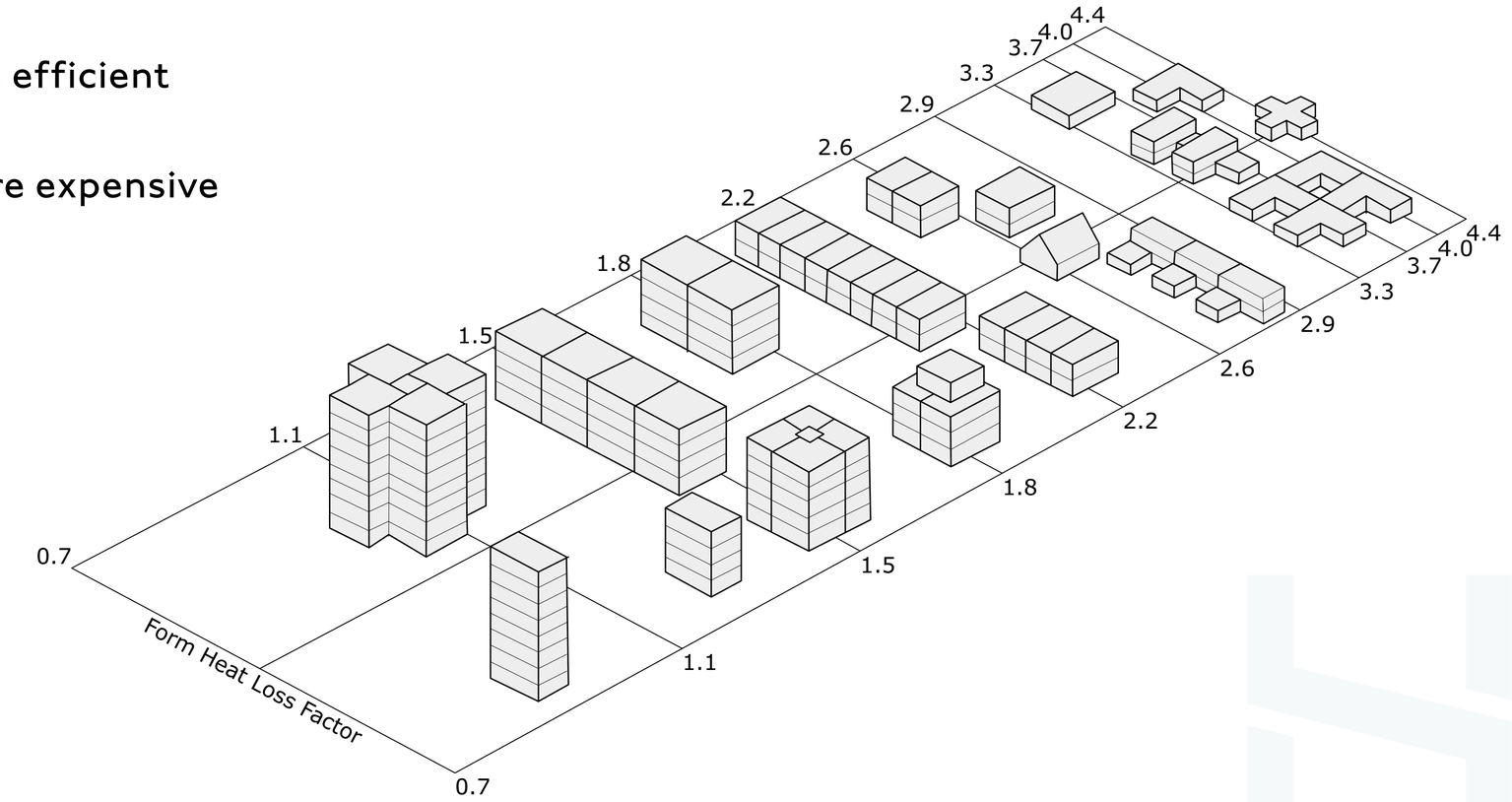




3. Know your site

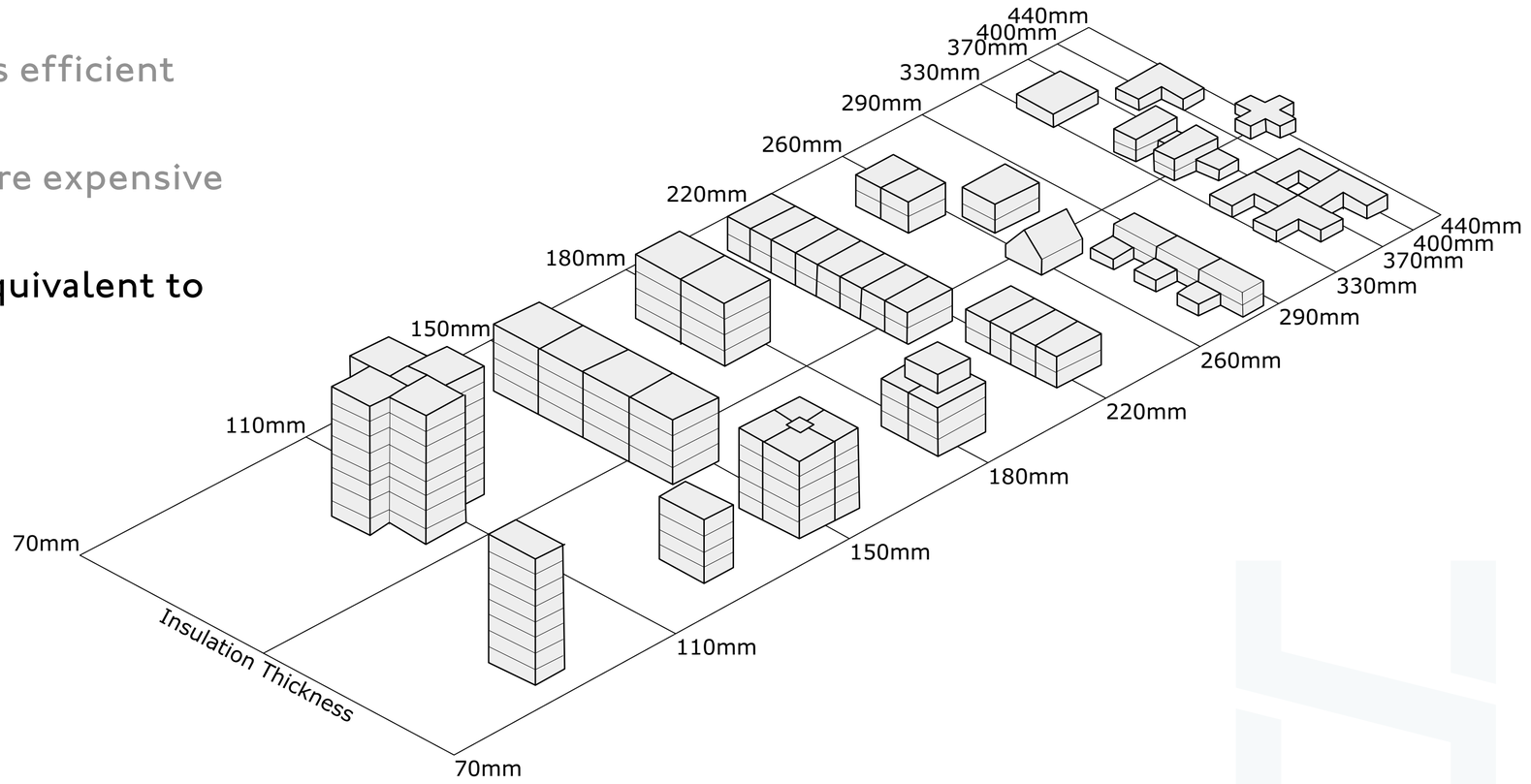
4. Form factor

1. Ratio of useable floor area to building envelope
2. The higher the number the less efficient the form
3. The higher the number the more expensive the build

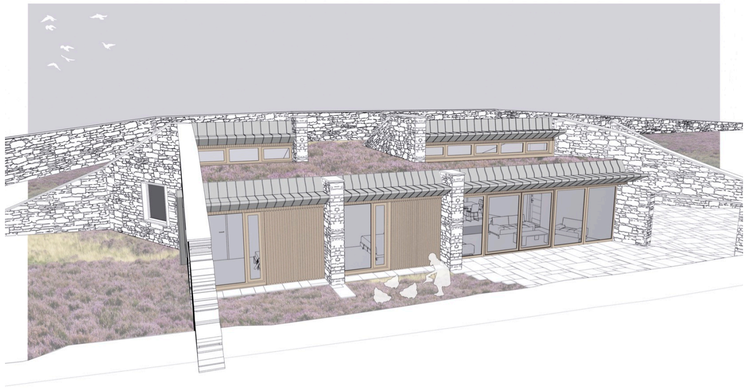


4. Form factor

1. Ratio of useable floor area to building envelope
2. The higher the number the less efficient the form
3. The higher the number the more expensive the build
4. Form factor 1 approximately equivalent to 100mm insulation



4. Form factor

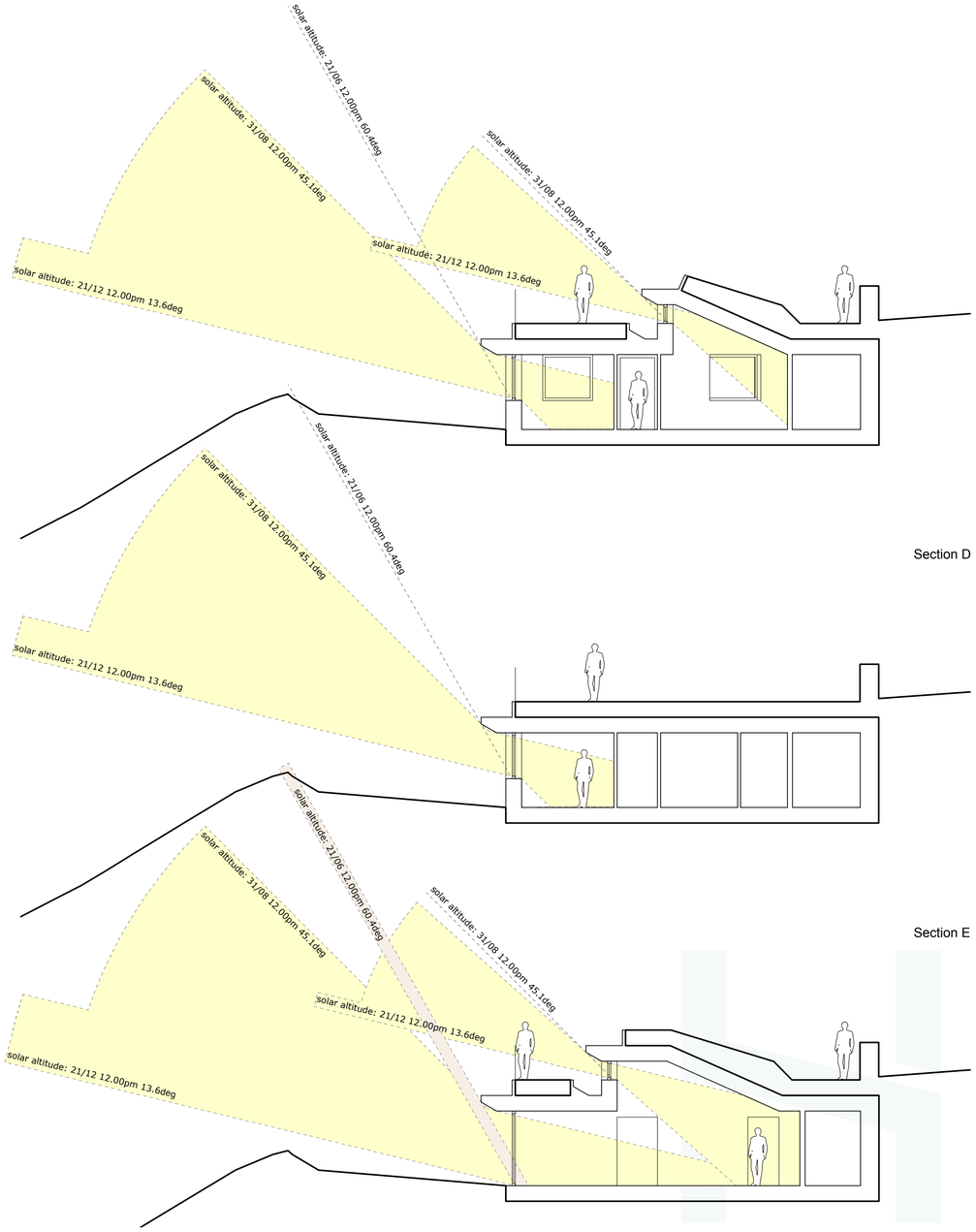


Heat Loss Form Factor: 4.30

Heat Loss Form Factor: 3.31

Heat Loss Form Factor: 2.77

5. Orientation



5. Orientation

1. Orientate to suit your site, views and house organisation.
2. Take advantage of thick wall construction to give deep reveals.
3. No aspect is impossible; just understand your risks.
4. South is the easiest aspect to take advantage of solar gain and design out summer overheating
5. East is harder, and West is the highest risk.
6. West, especially, should consider moveable shading eg. External blinds.

6. Fenestration

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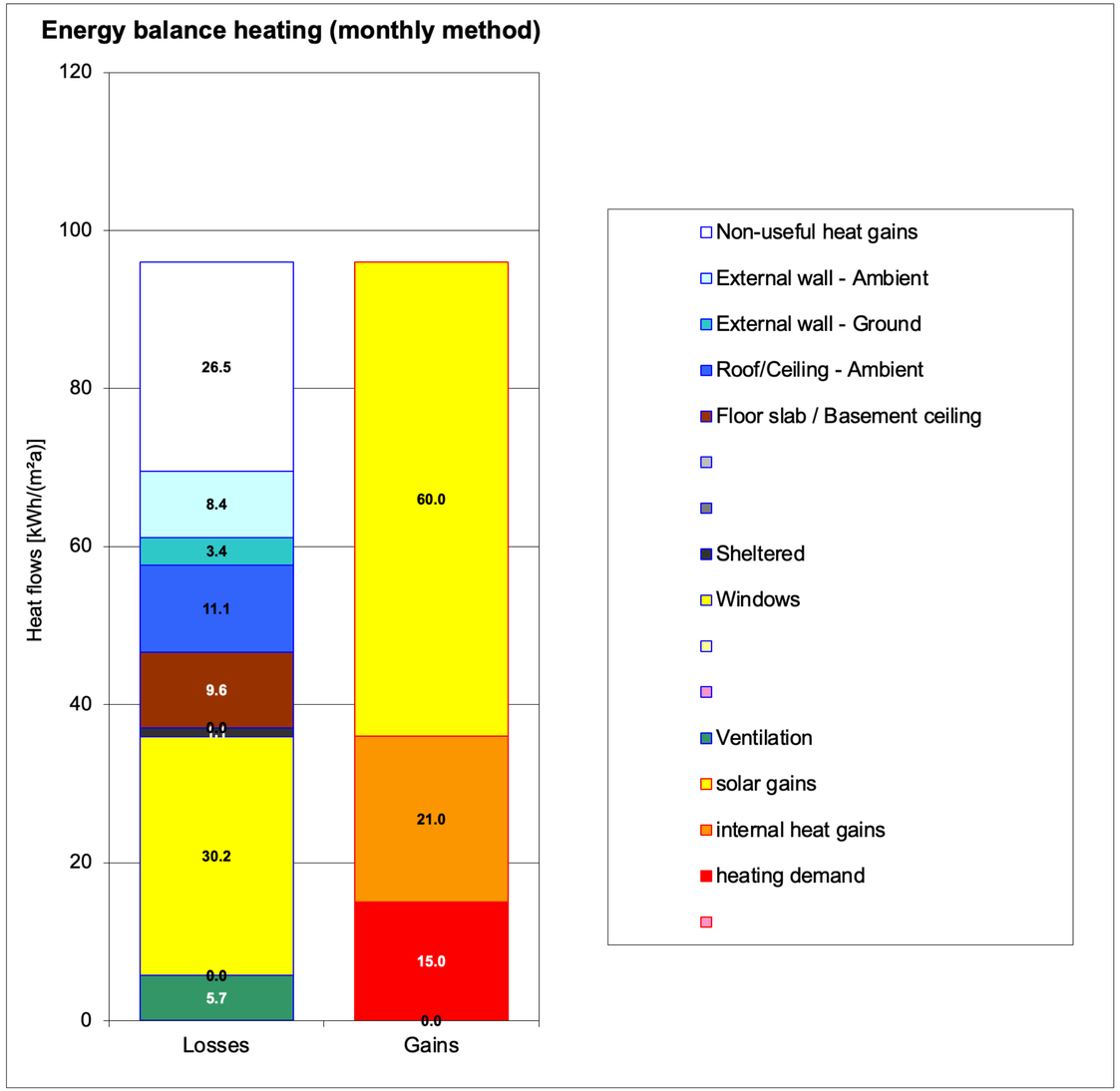
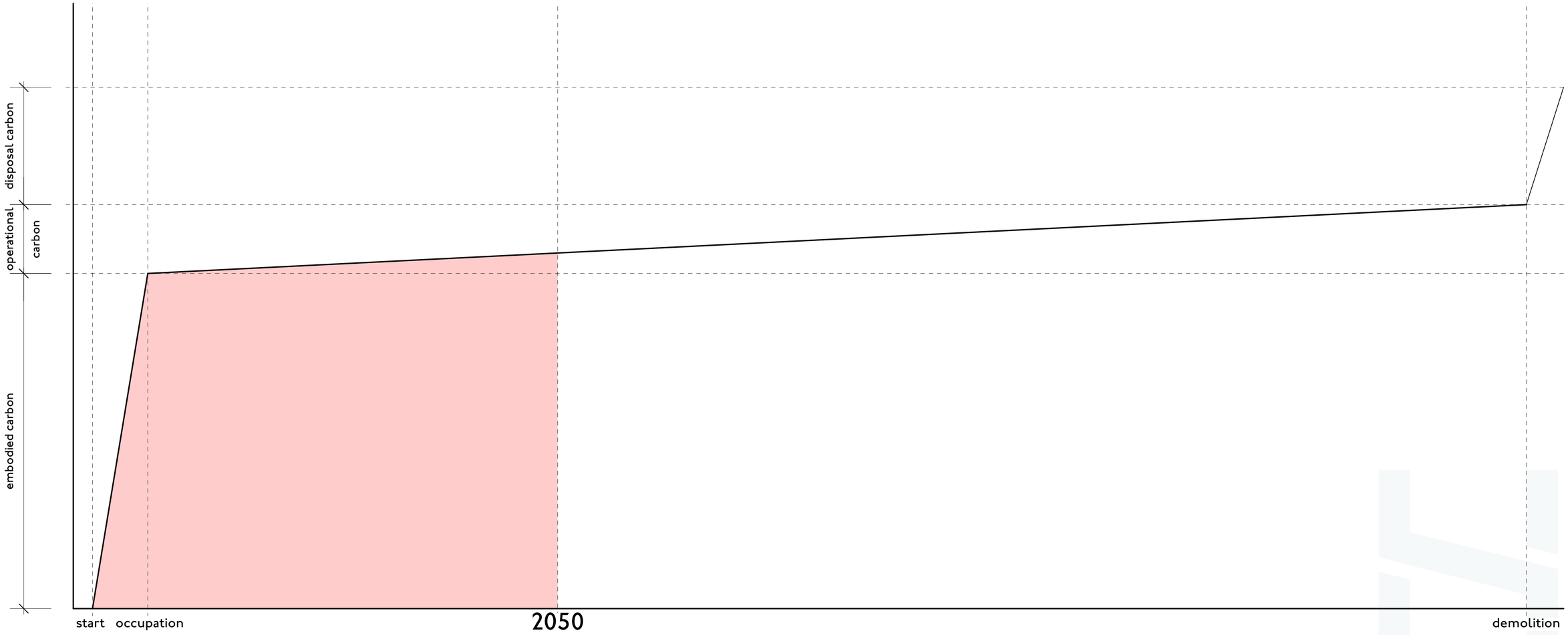
1. Full height glazing is lovely but gives you overheating risk and more heat loss without any more daylight
2. Enough glazing for good daylight is enough
3. Frame views for delight
4. Pitched windows can cause issues.
5. Don’t over-rely on glazing for winter solar gain

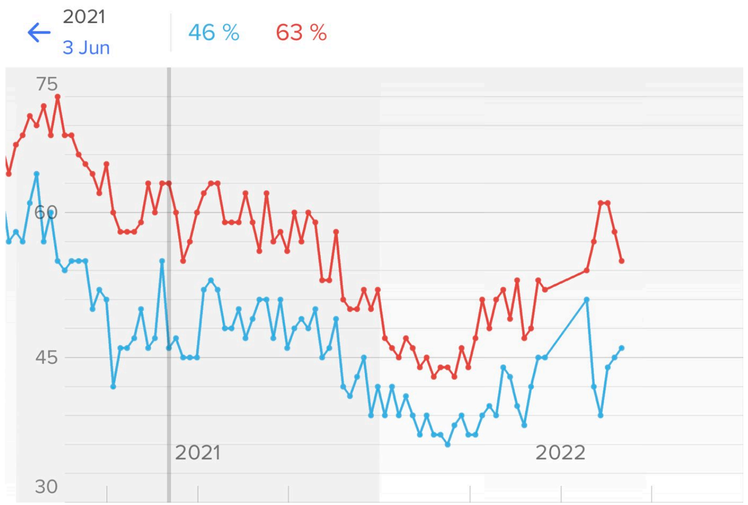


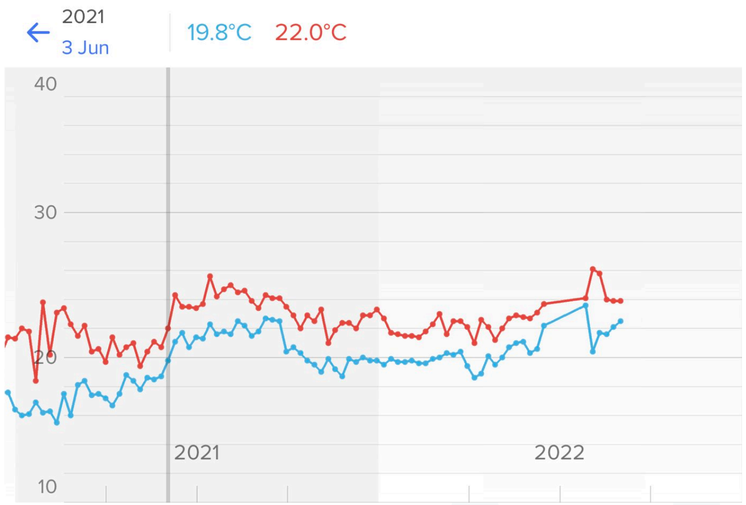
7. Embodied carbon



8. Other ways of reducing demand

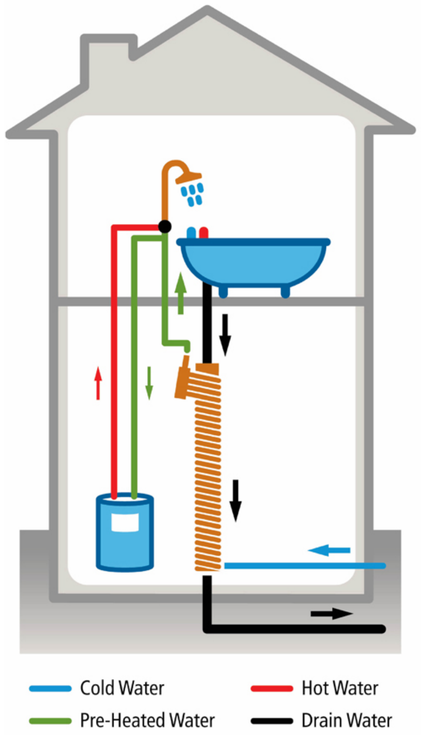
1. Mechanical Ventilation with Heat Recovery (MVHR)

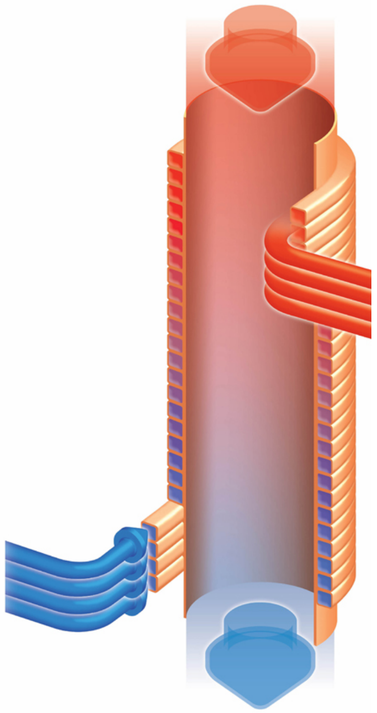




8. Other ways of reducing demand

2. Waste Water Heat Recovery (WWHR)





8. Other ways of reducing demand

3. Efficient plumbing

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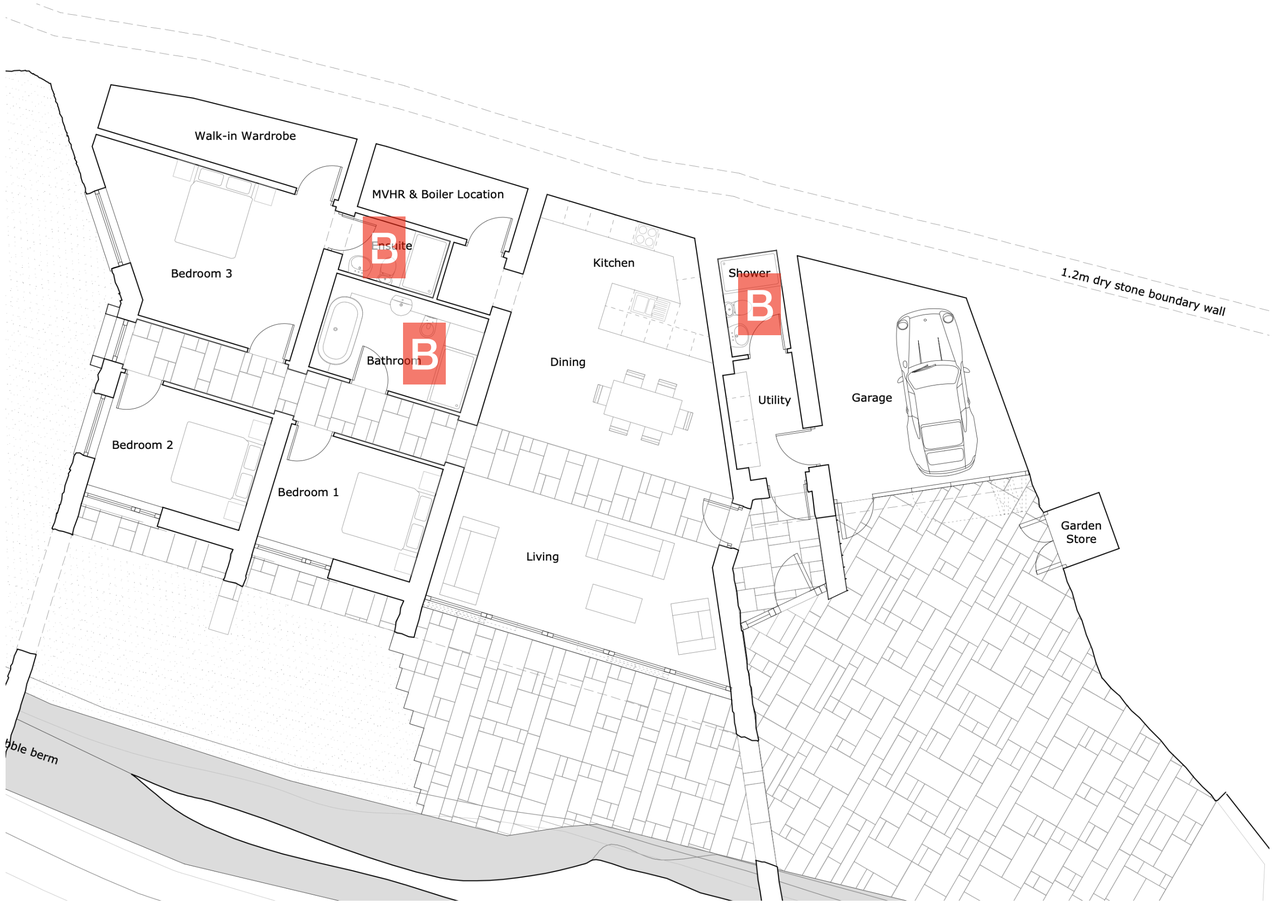

9. What to build out of?

1. No one construction system is the perfect answer, no matter what the manufacturer says.
2. What you choose is a balance or compromise between:
    1. Available materials
    2. Available skills
    3. Climatic/site constraints
    4. Energy performance
    5. Embodied carbon
    6. Longevity
    7. Maintenance

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Thank you

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