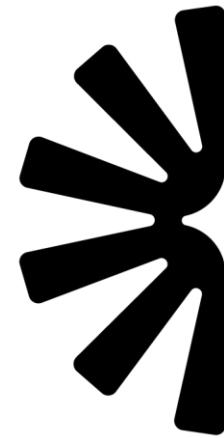


# Types of buildings



# Who are we?

- Energy charity based in Bristol
- Focused on ending the suffering caused by cold homes and combating the climate crisis
- We support people in fuel poverty through our advice line and retrofit team
- We support community organisations on energy, fuel poverty, retrofit and local and central government with decarbonisation and energy plans
- We are supporting the SiB ERF application process with technical buildings advice



**Centre for  
Sustainable  
Energy**





# Subjects covered today

Types of community building and possible measures

The unique factors that affect your building

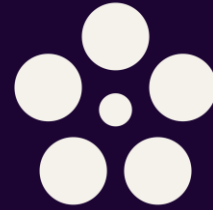
Payback calculations

Tradespeople



# Current building stock

The most sustainable buildings are often those which already exist. Retrofitting existing structures is often better than new construction.



## 2050 buildings

An estimated 80% of the buildings we will have in 2050 are already built today.



## Heritage value

Successful interventions lead to the continued use and care of buildings, preserving heritage features.



## Embodied carbon

Retrofitting existing buildings reduces waste and avoids emissions which would have come from new construction.

# UK policy & targets



UK's key piece of climate policy = the Climate Change Act (2008; amended in 2019)

The Act commits the UK government by law to reducing greenhouse gas emissions by at least 100% of 1990 levels (net zero) by 2050.

## Building stock

- Reducing energy demand, making energy use 'smarter', and **decarbonising our heat**
- Which (predominantly) means **electrification of heating**
- Think about **possible measures to reduce demand first**



# Community buildings

# Community buildings



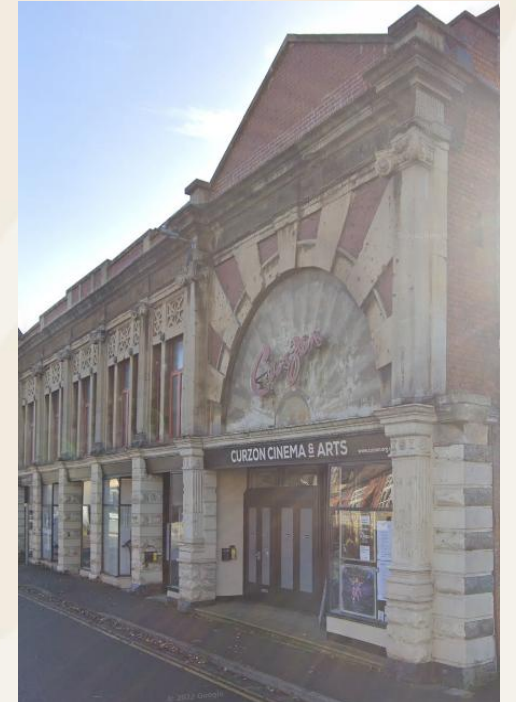
		Friday 19th May 2023		11:19:01
Room-12	9:00am	6:00pm	Shanti Centre Training School	
Room-07	9:30am	1:00pm	Missing Link: Reflective Practice Claire	
Room-01	9:45am	11:15am	Tiger Stripes Dance Fitness: Dance Class	
Room-08	10:00am	12:15pm	Parent and Toddler Yoga with Jess: Parent and Toddler ...	
Room-09	10:30am	1:30pm	Khaas: Conference	
Room-01	1:00pm	2:30pm	Ahmadiyya Muslim Association UK: Ahmadiyya Muslim ...	
Room-09	2:00pm	3:00pm	Tai Chi	
Room-08	3:45pm	6:15pm	Ashley Down Kumon Study Centre: English & Maths	
Room-07	7:00pm	9:00pm	Den of Wonder: Dance Class	

# Understanding a building



## Diversity in:

- Building Type
- Age
- Location & setting
- Function
- Services provided
- Users
- Set-up – voluntary or paid staff
- Staff capacity
- Tenure



# Buildings – all shapes & sizes



# Understanding the difference



# Example – Places of worship

- Occupant comfort
- Heating controls and zoning
- Localised heat source
- Insulating the fabric
- Window upgrades
- Solar PV
- Rainwater goods



# Example – Former industrial

- Understand user needs
- Intelligent controls
- Insulating the fabric
- Window upgrades
- Heat pumps
- Solar PV
- Reduce overheating



# Example – Modern buildings

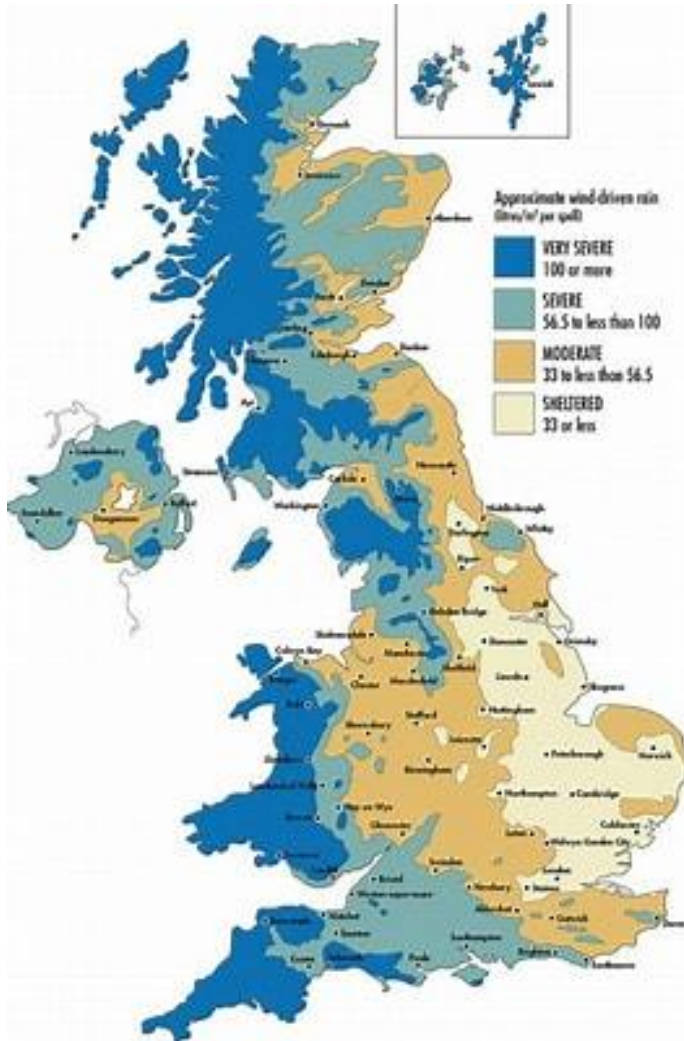
- Occupant comfort
- Efficient services
- Insulating the fabric
- Window upgrades
- Heat pumps
- Solar PV
- Reduce overheating





# Unique factors of your building

# Location and local climate



Every building performs differently according to location, orientation, design, construction, services, use pattern and condition.

Construction type plays a key part in this – traditional vs modern

# Knowledge - location



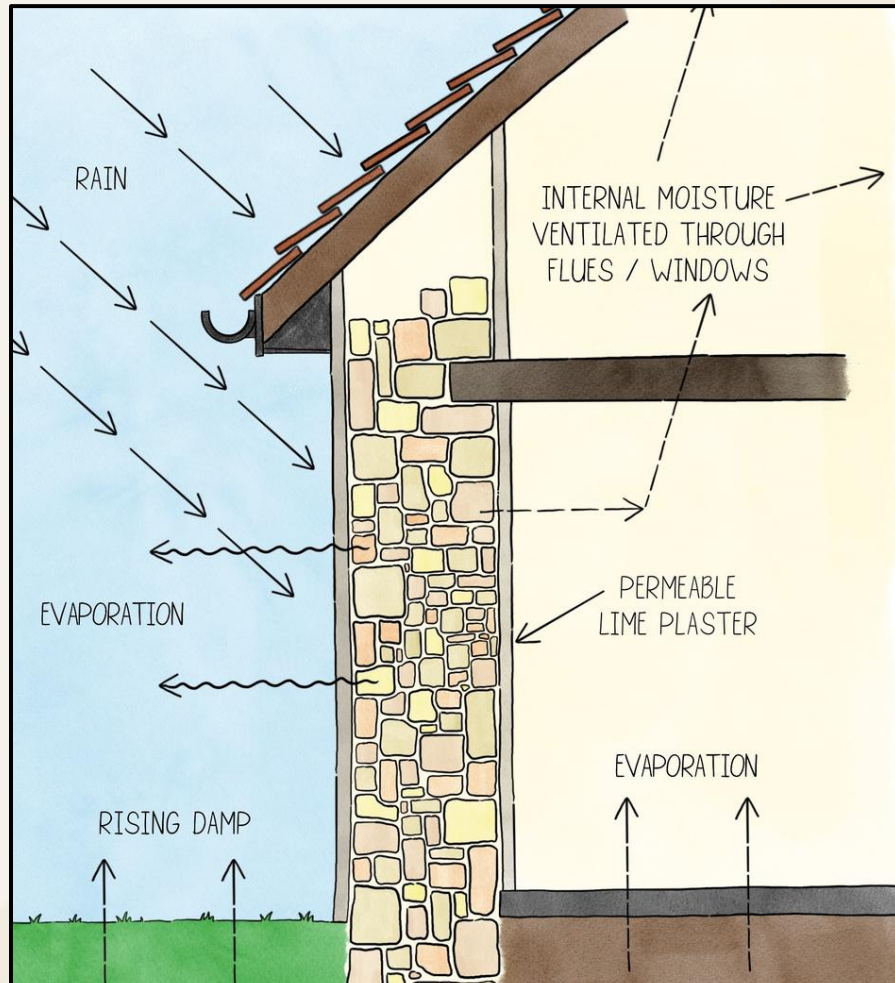
Region	Climatic Impact-driver																													
	Heat and Cold				Wet and Dry						Wind			Snow and Ice				Coastal and Oceanic			Other									
	Mean air temperature	Extreme heat	Cold spell	Frost	Mean precipitation	River flood	Heavy precipitation and pluvial flood	Landslide	Aridity	Hydrological drought	Agricultural and ecological drought	Fire weather	Mean wind speed	Severe wind storm	Tropical cyclone	Sand and dust storm	Snow, glacier and ice sheet	Permafrost	Lake, river and sea ice	Heavy snowfall and ice storm	Hail	Snow avalanche	Relative sea level	Coastal flood	Coastal erosion	Marine heatwave	Ocean acidity	Air pollution weather	Atmospheric CO <sub>2</sub> at surface	Radiation at surface
Mediterranean (MED)	●	●	●	●	●	5						6	7				●					●		2		●		●		
Western and Central Europe (WCE)	●	●	●					4									●		●				●		2		●		●	
Eastern Europe (EEU)	●	●	●														●											●		
Northern Europe (NEU)	●	●	●			1											●		●				●	8	2,3		●		●	

1. Excluding southern UK.
  2. Along sandy coasts and in the absence of additional sediment sinks/sources or any physical barriers to shoreline retreat.
  3. The Baltic Sea shoreline is projected to prograde if present-day ambient shoreline change rates continue.
  4. For the Alps, conditions conducive to landslides are expected to increase.
  5. Low confidence of decrease in the southernmost part of the region.
  6. General decrease except in Aegean Sea.
  7. Medium confidence of decrease in frequency and increase in intensities.
  8. Except in the northern Baltic Sea region.
- Already emerged in the historical period (*medium to high confidence*)
  - Emerging by 2050 at least in scenarios RCP8.5/SSP5-8.5 (*medium to high confidence*)
  - Emerging after 2050 and by 2100 at least in scenarios RCP8.5/SSP5-8.5 (*medium to high confidence*)

High confidence of decrease
Medium confidence of decrease
Low confidence in direction of change
Medium confidence of increase
High confidence of increase
Not broadly relevant

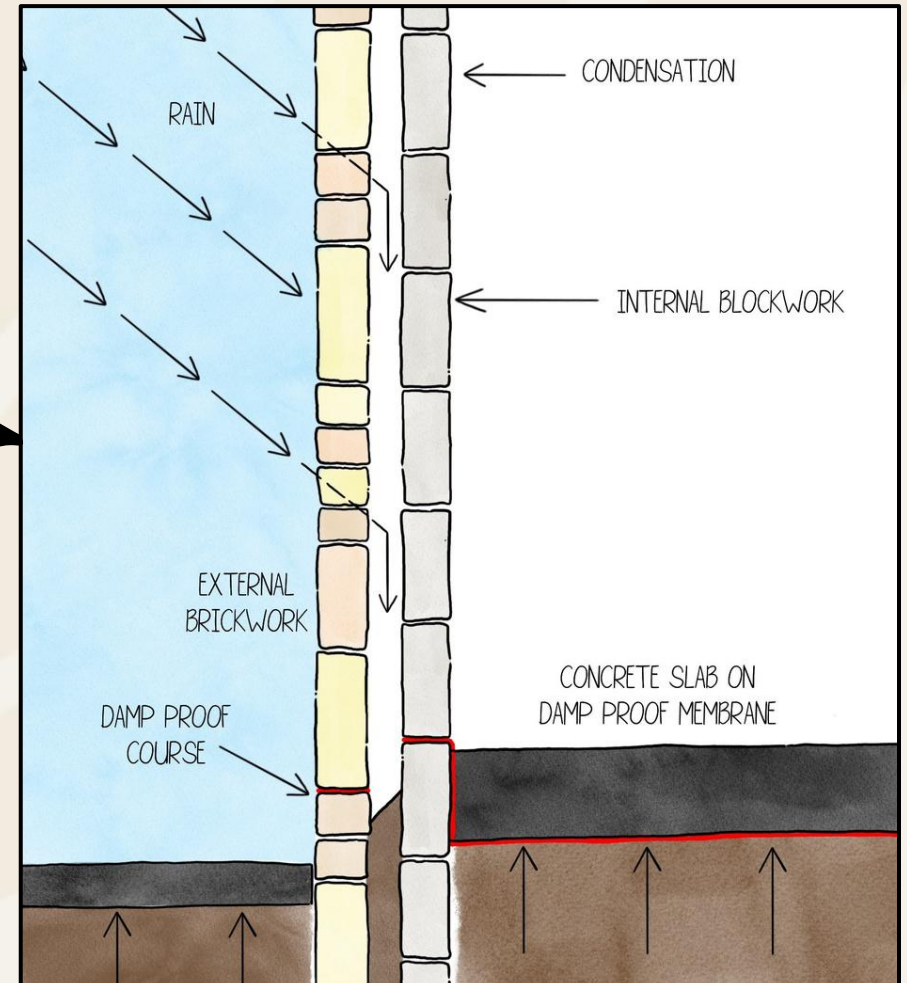


# Traditional vs modern fabric



Traditionally built solid stone wall - allows for moisture to evaporate.

Cavity walls - rely upon a gap in-between the two 'skins' to keep the inner 'skin' dry. Known as a cavity.



# Understanding 'Waterproofness'



Water conducts  
heat 25x faster  
than air

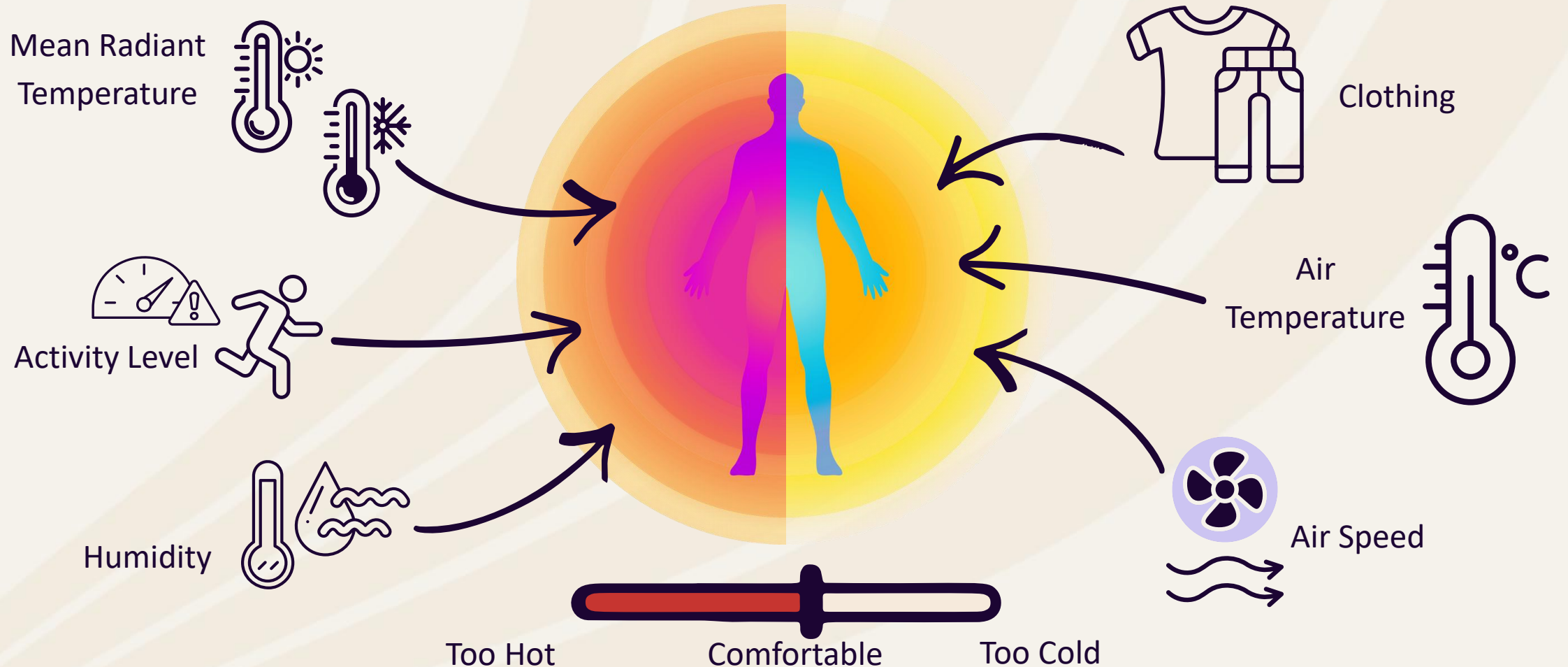
Damp fabric = cold  
fabric = increased  
heat loss!



# Understanding use & thermal comfort



“The condition of the mind that expresses satisfaction with the environment”



# Understanding current condition



# Understanding prior works







# Planning permission

- It might be necessary to apply for planning permission or seek other consent from the local authority before carrying out retrofit works.
- Planning permission may be needed for some retrofit measures. Some things are classed as 'permitted development' and don't need it

## Other consents – Heritage

- Listed Building Consent
- Conservation Area Consent
- Scheduled Monument Consent
- Consent for Registered Parks, Gardens and Battlefields
- Protected Wreck Sites
- Ecclesiastical Exemption
- Tree Consents
- Nationally Significant Infrastructure Projects

# Heritage consent



Type of heritage asset	Consent needed for internal work	Consent needed for external work
Listed building	Yes	Yes
Conservation area	No	Yes - if the change is visible from the road
Article 4 directive	Potentially	Potentially
Scheduled monument	Yes	Yes
National park/area of outstanding natural beauty (AONB)	No	Potentially

# Key points to remember



- Financial paybacks will vary depending on the quality of installation, the weather, how any system is set up, and how it is used.
- It is not possible to estimate any potential whole life carbon savings without having more details, the amount of embodied carbon in any measure will vary, and many energy efficiency measures may not realise any carbon savings over the course of their lifespan.
- When undertaking multiple interventions calculated financial and carbon savings will be deceiving due to their interdependent nature, therefore caution is advised.
- Where possible we encourage a holistic view when decision making to consider additional benefits to health, wellbeing, comfort, and safety.
- Whilst it is not possible to calculate savings brought from undertaking repairs, maintenance, or compliance works, we strongly encourage organisations to deal with any issues noted and to prevent any further deterioration.
- It's a criminal offence to carry out works to a listed building without having the relevant permissions and consent, due to this, further costs may be incurred.

# Health and safety checklist



Health and Safety Executive provide a checklist for village halls and community buildings

The checklist covers the most common areas of risk and responsibility –

1. Car park – surfaces/ vehicle & pedestrian flows/ lighting/ emergency access
2. Internal & external movement – maintenance of surfaces /lighting/ trip hazards/ flooring/ stairs
3. Electrical equipment – correctly installed/ inspected/ tested
4. Gas equipment – servicing/ maintenance
5. LPG – access/ storage/ pipework safety
6. Asbestos – is it present? / condition/ warning signs/ if damaged can it be removed?
7. Fire – Risk assessment/ fire alarm testing/ fire exits/ fire extinguishers
8. Legionnaires disease – is sprayed water present? (showers in changing rooms?)





# Payback

# Calculating simple payback



'Payback' (or 'break even') refers to the time it will take you to make operational (ongoing) savings that equal the initial investment in the installed measure or system.

$$\frac{\text{Total Initial Investment}}{\text{Annual Savings}} = \text{'Payback' period (yrs)}$$

# Factors influencing payback



Though payback calculations are helpful indicators of financial performance, it is important to remember that they do not consider all the factors affecting actual financial performance, including:

- Rising energy costs
- Available grants or tariffs
- Maintenance, servicing and/ or replacement costs associated with the measures and systems
- Cost of borrowing the money (if required),
- The benefits of a 'lower energy' building to future tenants
- Occupants' behaviour change and increased beneficial building use



# Tradespeople

# Contractor considerations



Skills and experience in modern building methods alone are not enough for traditional buildings

Every building's energy performance is complex and unique

Ask around locally for recommendations

Search the national registers for members of construction industry trade associations

Look at other jobs the builder has completed and check references

Ask about training and qualifications



# Getting quotes



- 3 Free quotes?
- Have they been to site?
- Any design work?
- Who has specified the work/system/materials?
- Local contractor or national organisation who follow around government funding?
- Are they suitably trained?
- Do they have suitable insurance?
- Is their work guaranteed?
- Who will check the work?

# Contractor examples



Building Management System (BMS) or Ventilation =

## **Mechanical Engineer**

Mechanical Engineers are typically needed for ventilation units and a BMS.

Ventilation unit contractors should be F-Gas certified - most common certification schemes are REFCO, F-Gas Register or Bureau Veritas.

Contractors are listed on NICEIC database.

Renewables (Solar PV and Heat Pump) =

## **Renewable Energy Installer**

Choose an installer and products that are certified by the Microgeneration Certification Scheme (MCS).

MCS has a directory of installers.

For existing gas heating, any contractor working with gas must be registered with the Gas Safety Register.

Lighting =

## **Electrical Contractor**

Competent contractors should be registered with an accreditation scheme, such as the National Inspection Council for Electrical Installation Contracting (NICEIC).

The services offered by NICEIC also extend to heating and gas engineers and renewable energy installers.

# Any questions?



Centre for  
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Energy



We're a charity supporting people and organisations across the UK to tackle the climate emergency and end the suffering caused by cold homes.

[cse.org.uk](https://www.cse.org.uk)