Unit 202: Changing practices over time (tutor)

# Worksheet 4: Sustainable practices and regulatory requirements

**Task 1**: Legislation and sustainability

Answer the following questions.

1. Explain how the Environmental Protection Act 1990 helps to protect the environment from construction activities.

The Environmental Protection Act 1990 is a law that safeguards the environment during construction. It has rules to manage waste, control pollution in air and water and reduce noise. Construction projects must follow these standards to handle waste properly, prevent pollution and protect the environment. The Act allows authorities to take action against those who don't follow the rules, promoting responsible construction and keeping the environment safe.

1. Describe how the Well-being of Future Generations (Wales) Act 2015 requires the construction industry to be more sustainable

The Well-being of Future Generations (Wales) Act 2015 requires the construction industry in Wales to focus on sustainability. Public bodies involved in construction must aim to meet the well-being goals for present and future generations. This involves considering how construction activities impact society, the economy and the environment in the long run. The construction industry needs to use sustainable practices, save resources, reduce carbon emissions and benefit both people and the environment. The Act promotes teamwork, combining different elements and using new ideas in construction to create a sustainable future for generations to come.

**Task 2**: Responsible retrofit

Answer the following questions.

1. What is retrofit?

Retrofitting in construction means making changes or upgrades to an existing building to make it better. This can include adding new things or improving existing parts of the building to make it work better, use less energy and look nicer. The aim of retrofitting is to bring older buildings up to modern standards, make them work better, last longer and make them more efficient and comfortable for the people inside.

1. Briefly describe four key features of responsible retrofit on modern and traditional buildings.

Answers could include:

* + **Preservation of heritage:** For traditional buildings with historical significance, prioritise the preservation of their architectural features and materials. Use appropriate conservation techniques and materials that maintain the building's character while improving energy efficiency. ​
  + **Insulation and air sealing**: Enhance the building's insulation by adding insulation to walls, roofs and floors. Address air leaks and drafts by sealing gaps, cracks and openings. These measures improve thermal comfort and reduce energy waste. ​
  + **Efficient heating and cooling systems:** Upgrade heating and cooling systems to more energy-efficient alternatives. Consider installing high-efficiency boilers, heat pumps or district heating systems. Balance the need for modern comfort with preserving the building's looks. ​
  + **Lighting upgrades**: Replace outdated lighting fixtures with energy-efficient alternatives, such as LED lights. Incorporate smart lighting controls, occupancy sensors and daylight harvesting to optimise energy use. ​
  + **Window and glazing improvements**: Upgrade windows to double or triple glazing with low-emissivity coatings, improving thermal performance without compromising architectural integrity. Retain original windows where feasible and enhance their efficiency with weather stripping or secondary glazing. ​
  + **Renewable energy integration**: Explore opportunities for incorporating renewable energy technologies like solar panels or small wind turbines. Consider their compatibility with the building's aesthetics and historical value. ​
  + **Water efficiency measures**: Implement water-efficient fixtures and systems to reduce water consumption. Install low-flow toilets, faucets and water-saving appliances to conserve water resources.

1. Prior to commencing retrofit work on a pre-1919 building, who should be contacted?

Local planning (if needed), building control, energy assessors or retrofit specialists, historic building professionals.

1. Explain what PAS 2030 covers in relation to retrofit.

PAS 2030 is a standard that outlines the requirements for retrofitting existing buildings in the UK to improve their energy efficiency and reduce carbon emissions. It sets guidelines for the design, installation and quality management of retrofit measures.

1. Explain what PAS 2035 covers in relation to retrofit.

PAS 2035 provides guidance on the entire retrofit process, from initial assessment to project completion, with an emphasis on ensuring long-term performance and customer satisfaction.

**Task 3:** Defining BREEAM

What does BREEAM stand for?

**B**uilding

**R**esearch

**E**stablishment

**E**nvironmental

**A**ssessment

**M**ethod

**Task 4:** What is BREEAM?

Fill in the missing words in relation to the BREEAM assessment.

BREEAM is an internationally recognised sustainability assessment and certification scheme for buildings. It evaluates the environmental performance of buildings across various categories, including energy usage, water efficiency, materials, waste management and ecological impact. BREEAM assesses the design, construction and operation of buildings and provides a rating or certification based on their sustainability performance. It encourages the adoption of environmentally friendly practices and promotes the development of sustainable buildings and infrastructure

**Task 5**: BREEAM offers different levels of certification to assess the sustainability performance of buildings. Using the internet, list the five different levels of BREEAM Assessment outcomes.

* Pass.
* Good.
* Very good.
* Excellent.
* Outstanding.

**Task 6**: Improving sustainability by design and smart buildings: Using the internet, research and answer the following questions.

1. List four strategies that could be used in the design phase of a construction project to improve sustainable outcomes.

* Using sustainable materials​
* Designing for energy efficiency​
* Water management​
* Construction waste reduction and recycling​
* Increasing biodiversity and green spaces*​*
* Lifecycle assessment​
* Collaborative approach

1. Explain how sensors in smart buildings can help to improve energy efficiency in buildings.

Smart building sensors give real-time data and insights that allow for exact control and optimisation of numerous systems such as lighting, HVAC, ventilation and energy management. Buildings can reduce energy waste, increase occupant comfort and make considerable energy efficiency improvements by harnessing this data*.*

**Task 7**: Read the following statements about the use of thermal imaging cameras in construction and decide whether they are true or false. **Circle** the correct response.

1. Thermal imaging allows for the detection and visualisation of thermal patterns and anomalies in buildings.

TRUE

1. Thermal imaging can help construction professionals identify areas of heat loss, air leakage and insulation deficiencies within a building envelope.

TRUE

1. Thermal imaging can detect potential issues such as inadequate insulation, thermal bridging or moisture intrusion, which can lead to energy wastage and decreased comfort.

TRUE

1. Thermal imaging is only useful during the construction phase of a building.

FALSE

1. The value of thermal imaging in energy-efficient construction lies in its ability to pinpoint areas of energy loss, identify thermal weaknesses and facilitate targeted improvements, resulting in enhanced energy efficiency and cost savings.

TRUE

**Task 8:** List six key features of Passivhaus design.

1. Super insulation​.
2. Stringent levels of airtightness.​
3. Minimal thermal bridging​.
4. Optimisation of passive solar gain.​
5. Mechanical ventilation with heat recovery.​
6. Simple compact shape.

**Task 9:** Read the following questions on Passivhaus and decide whether they are true or false. **Circle** the correct response.

1. Passivhaus Design aims to minimise energy consumption in buildings.

TRUE

1. Passivhaus Design focuses primarily on renewable energy generation.

FALSE

1. Passivhaus Design emphasises airtight building envelopes.

TRUE

1. Passivhaus buildings require mechanical ventilation systems.

TRUE

1. Passivhaus Design principles can be applied to both residential and commercial buildings.

TRUE