

Integration of thermal energy storage (TES) technologies in buildings

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Introduction

1. What is thermal energy? What does thermal energy storage mean?
Thermal energy is the energy that comes from heat. It's the energy that helps to keep things warm or cool. Thermal energy storage is a way to save heat or cold so you can use it later when you need it.
2. What does thermal energy storage (TES) do in buildings?
TES helps to keep buildings warm in winter and cool in summer by storing heat or cold and using it when needed. A building with good TES system, we can reduce heating bills and use less energy from the electricity grid.



Renewable energy

Source: <https://cleaneearth4kids.org/renewable-energy>

TES tank

Buildings

<https://homebuildinganimation>

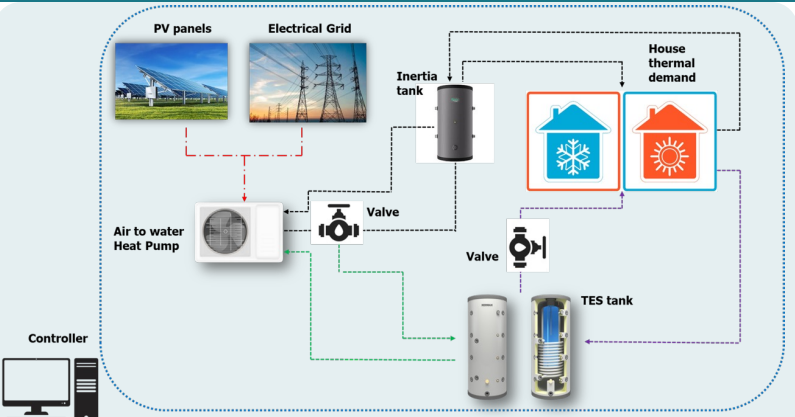
Name the types of thermal energy storage?

1. Sensible heat storage: we store thermal energy by changing the temperature of materials like heating water.
2. Latent heat storage: we use phase change materials (PCMs) that absorb or release heat during phase transitions.
3. Thermochemical storage: we use chemical reactions to store and release thermal energy.

What are the benefits of TES?

1. TES helps to use energy more efficiently.
2. We can reduce electricity consumption by using TES system.
3. By storing and using more renewable energy we can save our environment from pollution.
4. TES helps to reduce energy prices.

What is active TES technologies?



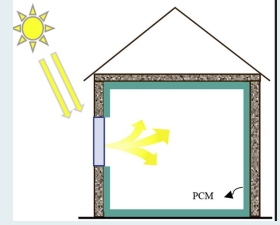
HVAC TES integrated in building

1. Active TES use mechanical and electrical devices to collect, store, and distribute heat or cold.
2. Require additional energy for HVAC devices.

What is passive TES technologies?



1. Passive TES rely on the natural movement of heat and the inherent properties of materials to collect, store, and distribute heat or cold.
2. Do not require additional energy, uses natural energy flows.



BioPCMs TES integrated in building envelope

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