



GreenyHouse Concept

Phase Change Materials And Vacuum Technology
In Greenhouse Buildings

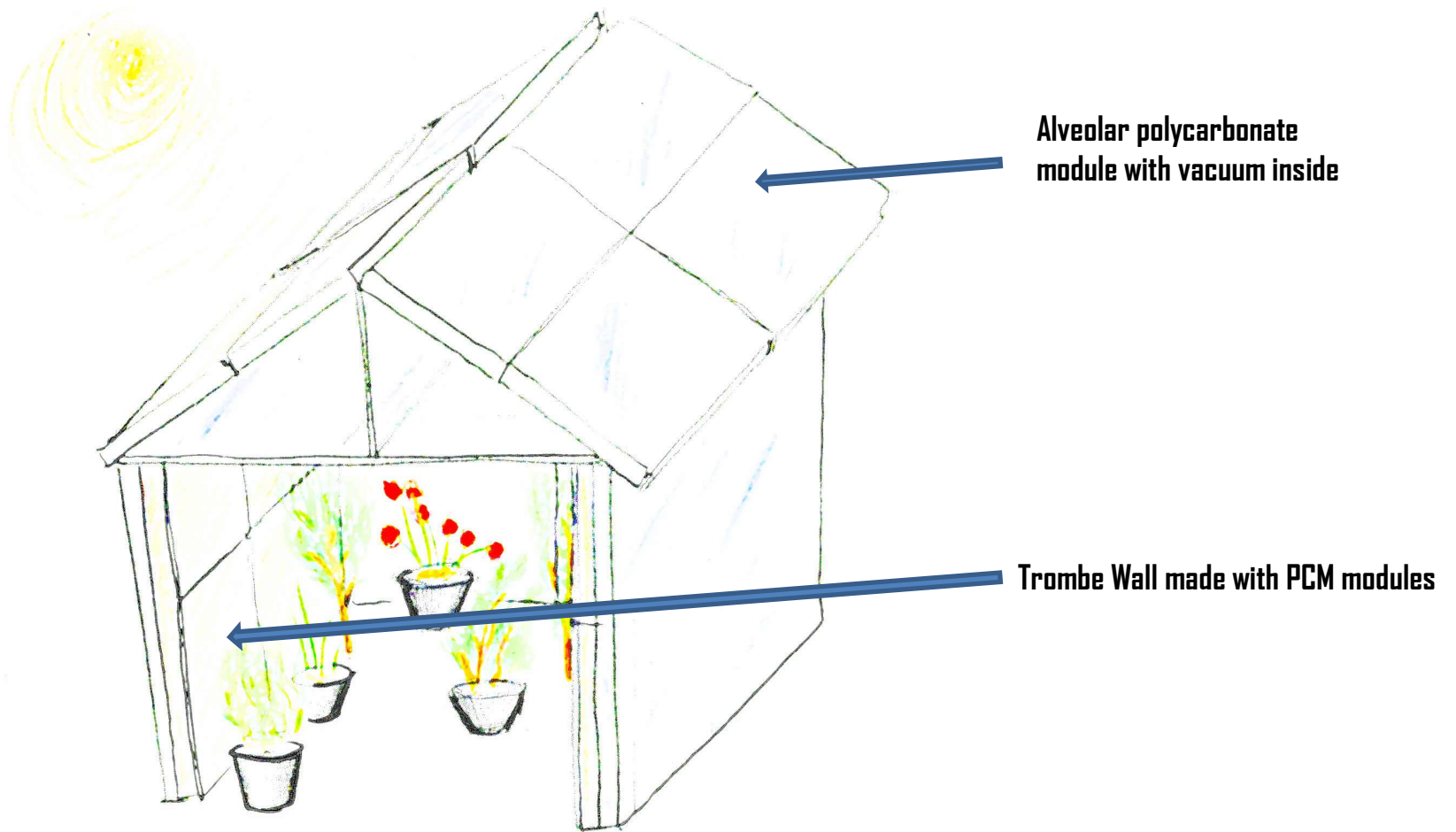


GreenyHouse Concept use a bioclimatic approach to build greenhouses for plants growing:

Passive air conditioning technologies to improve the climatic comfort and health of cultivated plants and to reduce / eliminate heating / cooling expenses.

All materials used in **GreenyHouse** are completely recyclable.

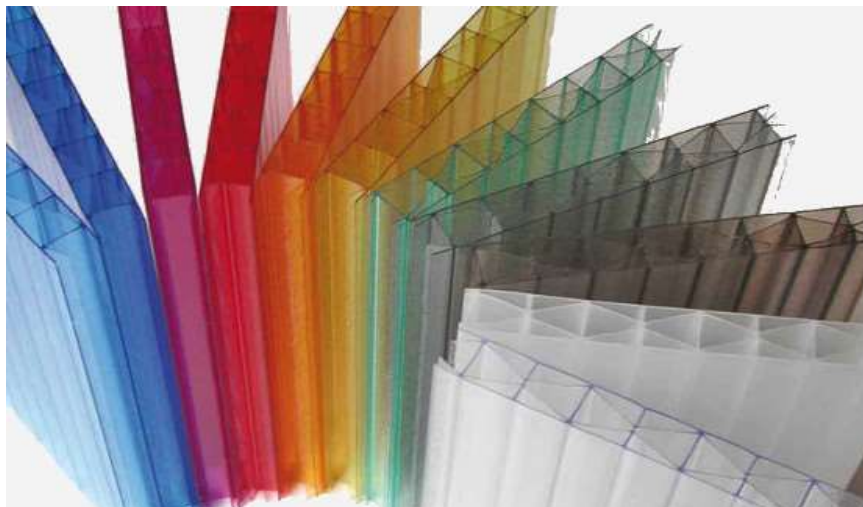
View of a greenhouse model using **GreenyHouse Concept** technologies



GreenyHouse Concept Key Points (1)

Modular alveolar polycarbonate walls and roof for system simplicity, versatility and lightness.

Alveolar polycarbonate ensures light transmission inside the building for plants photosynthesis.





GreenyHouse Concept Key Points

(2)

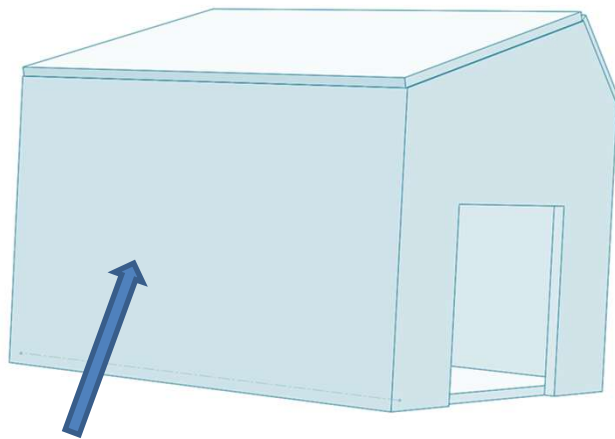
Vacuum is one of the best thermal insulator available

Vacuum is created inside the alveolar polycarbonate walls for a better thermal insulation of the structure

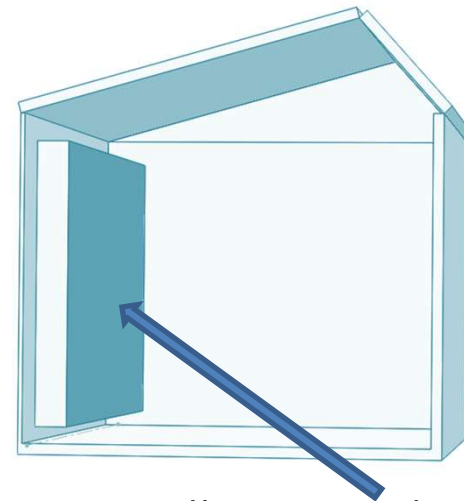
GreenyHouse Concept Key Points (3)

Elements with Phase Change Materials (PCM) acting as thermal energy storage systems (like a Trombe Wall)

These elements temporarily stores energy at high or low temperature for later use. The storage cycle can be daily, weekly, monthly, seasonal depending on the application, weather conditions and heat source.



Heat storage system with PCM powered with sunlight

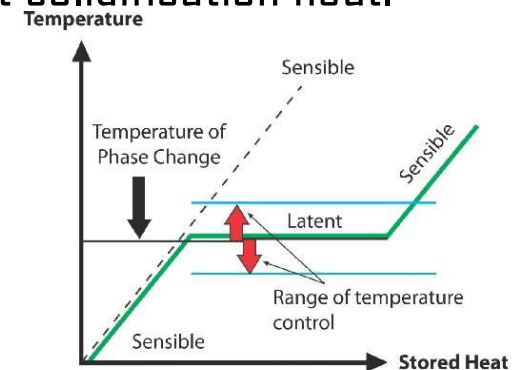


Heat storage element with PCM

What is a Phase Change Material (PCM)?

PCMs are materials that store and release thermal energy during a phase change such as melting and solidification / crystallization.

When the material melts, it accumulates a large amount of energy (latent heat), when it solidifies it releases energy in the form of latent solidification heat.



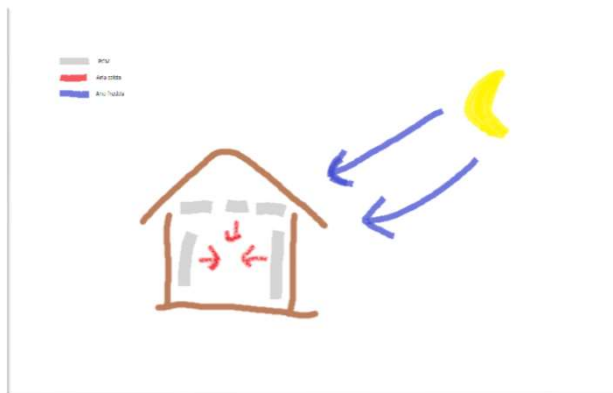
Phase change temperature is selected to adapt to application and to weather conditions.

Passive heating with PCM:

reducing energy cost for heating greenhouse during cold weather



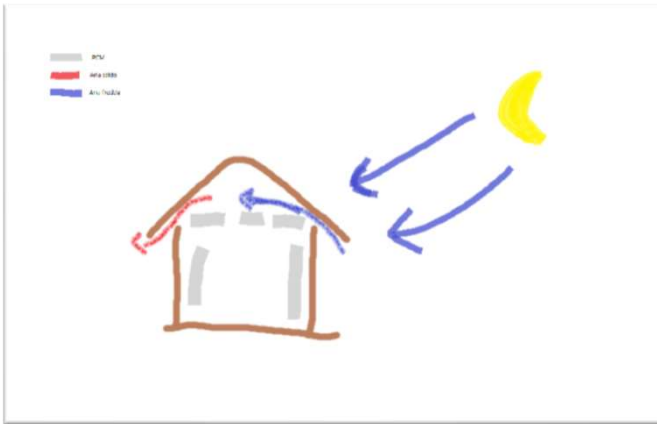
Charging phase: during the day the PCM accumulates (melting) heat coming from the sun (or other energy sources), contributing to a better thermal comfort.



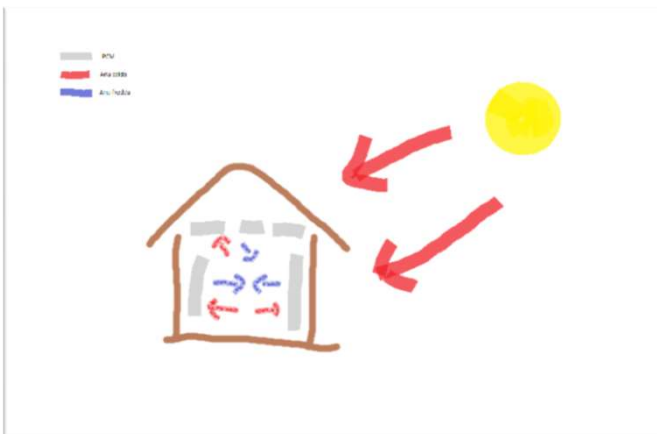
Discharge phase: during the night the PCM releases (solidifying) the accumulated heat that can be reused for heating the greenhouse.

Passive cooling with PCM:

reducing energy cost for cooling greenhouse during hot weather



Charging phase: during the night the PCM stores cold (solidifying) eliminating the heat absorbed during the day.



Discharge phase: during the day they absorb heat (melting) from the greenhouse, contributing to inside space cooling.



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