

STORAGE

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The addition of energy storage to buildings is of utmost importance whether we plan to use power plants or nature, or both, to make those buildings comfortable. Our 24-hour day and night cycle sets the circumstances for storage. Store enough heat when the sun shines to get through the cold night or during summer store enough coolth during the night to stay cool during the hot afternoon. This must be the pattern if we use solar heat and night sky cooling.

Power plants can be turned on day or night, but best of all is to leave them on day and night. Better one power plant on 24 hours a day than two 12 hours a day. Nuclear and coal burning power plants are particularly grateful to be allowed to run at a steady pace.

(Using nature we must have storage because the sun can't shine all the time, it is funny that we would like to have the same storage if we use the grid because the power plant can shine all the time.)

Constructing a building we can forget the controversy over sustainable vs. non-sustainable until the last stages. The building needs heat and coolth storage if it is to be economical however we heat and cool it.

Heat storage is urgent today because we have gotten so good at constructing lightweight well-insulated efficient buildings that their one deficiency, lack of thermal mass, becomes apparent. Ages ago our masonry buildings had plenty of heat storage. They were also often uncomfortable, but for different reasons.

The type of heat and coolth storage that can be used with nature and with the electric grid operates at room temperature or close to it. (There are effective ways for the electric grid to store heat and coolth that can not be used in direct natural cycles, as in the storage of coolth as ice and storage of heat at high temperatures.)

Room temperature heat storage for grid and natural system would be used in one or two story buildings.

Engineers and interior decorators can make such systems if each group can refrain from passing off their own incompetence by patronizing the other.

The heat generated by people, lights, and appliances must be absorbed by the ceiling or walls during the day then disposed of at night to the sky by passive cooling or by heat pumps. This is an amount of some 250 BTU's (75 watt hours) per square foot of floor. 3 gallons of water can absorb as much in rising 10°F.

The most comfortable form of heating and cooling is radiant; the ceiling is the ideal surface to accept heat and is also good at emitting it.

There are many issues here. Is the sensible heat of plain water a perfectly satisfactory thermal storage? I think so. If phase change materials are found, so much the better. They can be added as a slurry to designs that use water. One day's storage becomes two.

If room temperature thermal storage interests those selling electricity and those using nature answers will surely be found. The developments in extruding and molding plastics make it inevitable that we will have such buildings. They will be more comfortable and less expensive to heat and cool than our buildings today.

Industrial buildings will probably be first but if the all-powerful forces of fashion take a notion they may start in our houses, at least some peoples.

Whatever suits natural heating and cooling will also suit the electric grid. Unfortunately those favoring power plants are unlikely to favor heat storage that is compatible with natural heating and cooling.

A grid fed more and more by wind generators and solar panels create more and more need for storage to accommodate the fluctuating power produced by wind and sun. Once again energy storage is of utmost importance.

A Dilema

Why would the utilities wish to help develop thermal storage that would allow buildings to evade using electric energy? In many climates the night thermal storage allows heat to coast into the building in winter and coast out in summer, no heat pump is necessary, the heat flows by itself. Though utilities may loose business to natural systems where heat flows by itself, in more difficult climates heat pumps will gain more business from natural gas and propane. Than they look to nature.