



ADSORPTIVE OPEN TYPE HEAT STORAGE DEVICE FOR USE IN A SINGLE-FAMILY HOUSE

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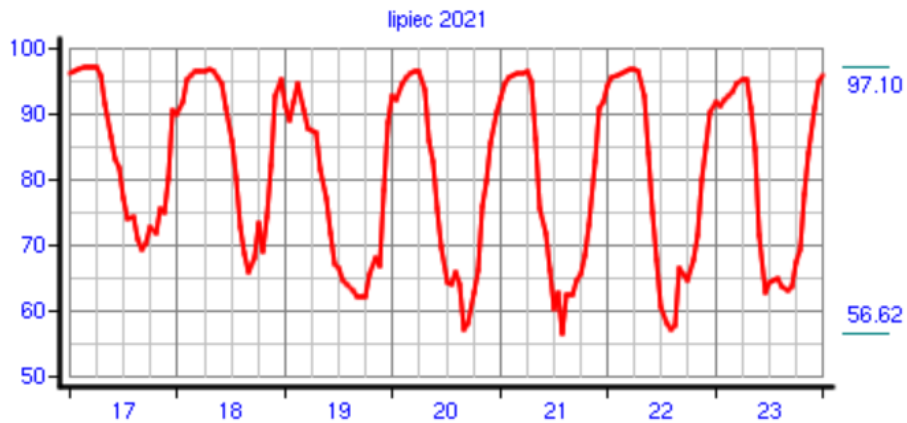
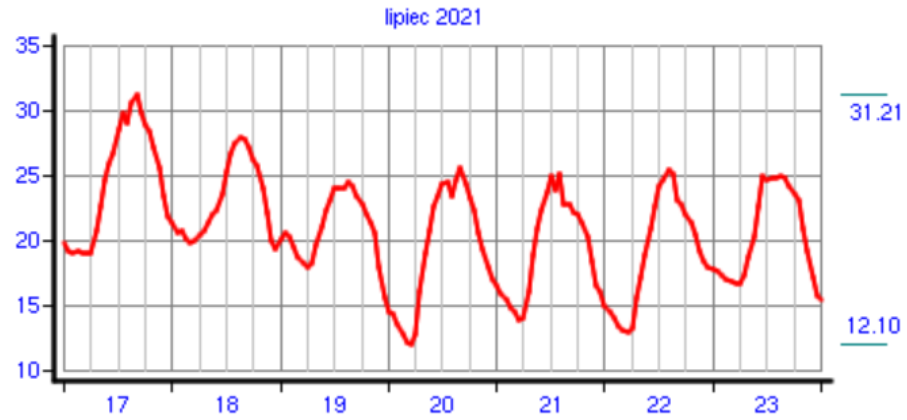
**"RENEWABLE ENERGY AND ENERGY
EFFICIENCY OF THE XXIST CENTURY"**

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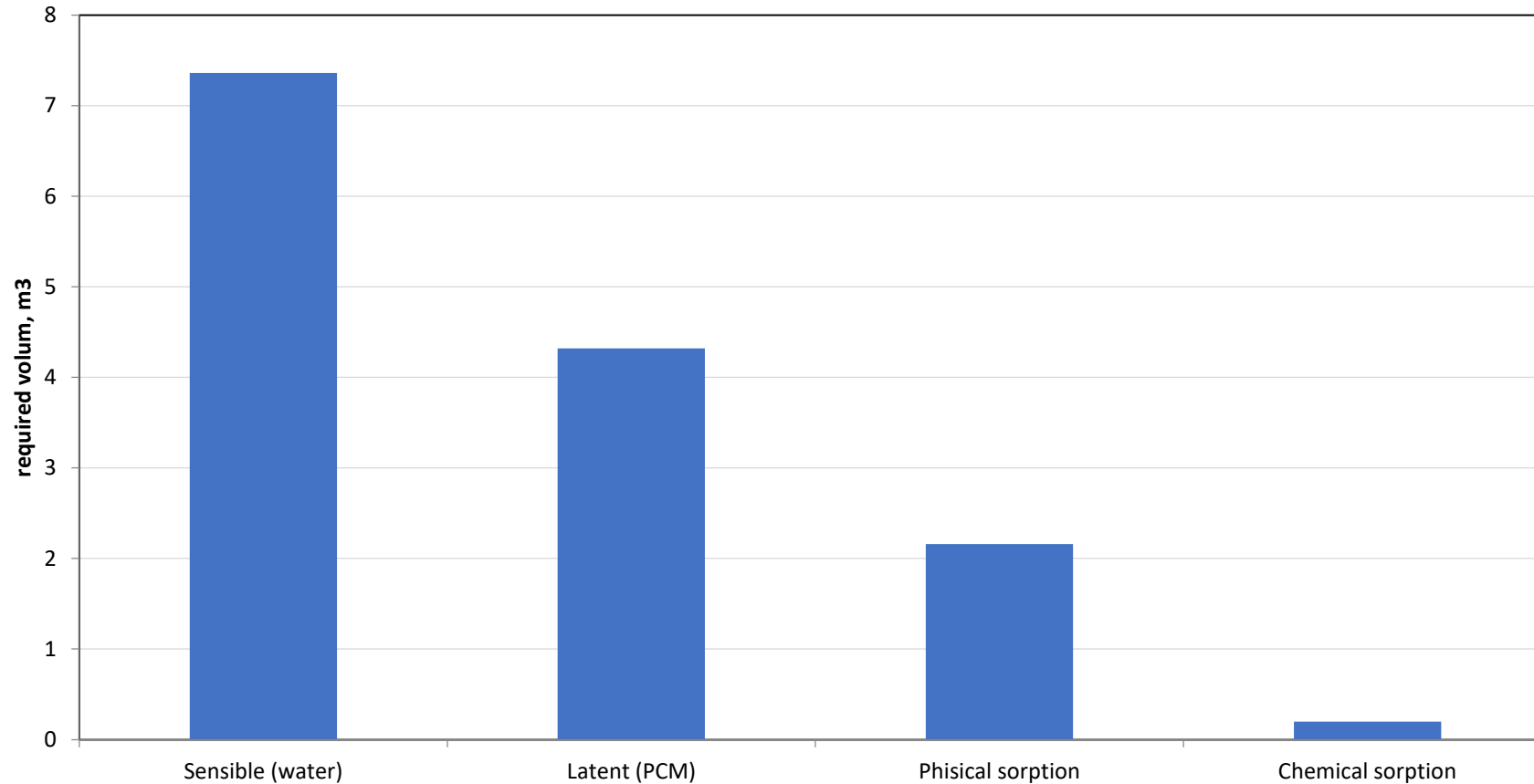
Problem to solve

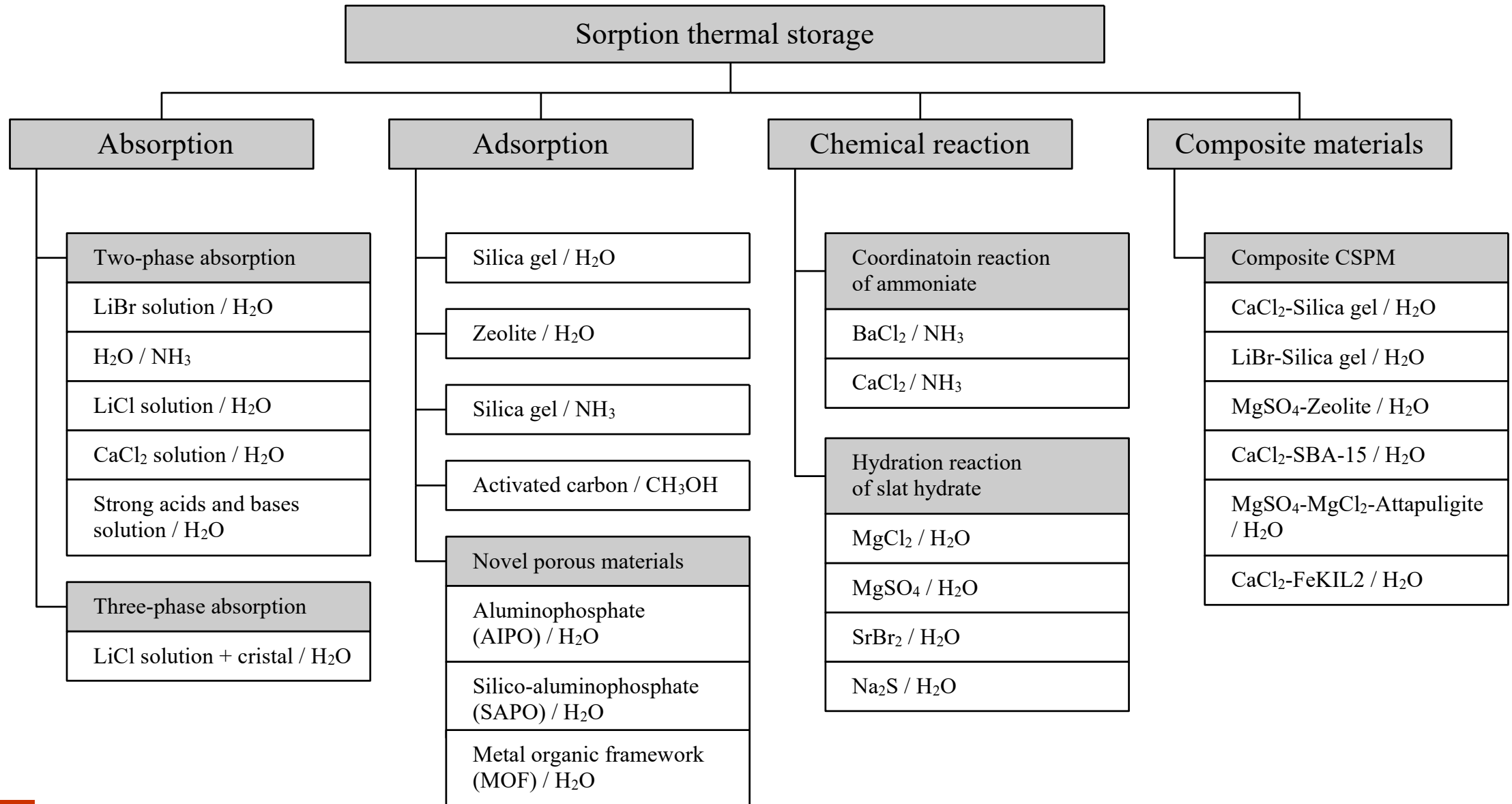
- In countries with a moderate climate, it is very common to encounter a situation where the temperature during the day is quite different from the temperature at night.
- In summer the temperature drops sharply at night and high during the day.
- In winter, the daytime temperatures are similar to those at night, but it can be used regeneration system.
- The idea of this research is to build a heat store device that will transport coolness from night to day in summer. And in winter, the heat from discharge air into the stream of fresh air.

Typical temperature and RH in Warsaw



Heat storage methods (storage capacity 80 kWh)





Adsorption heat storage

a) open type adsorption storage system

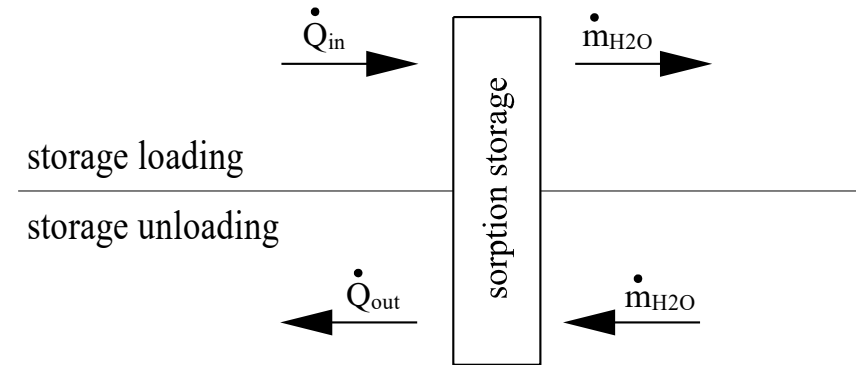
b) closed type adsorption storage

Storage loading means desorption process (for heat storage)

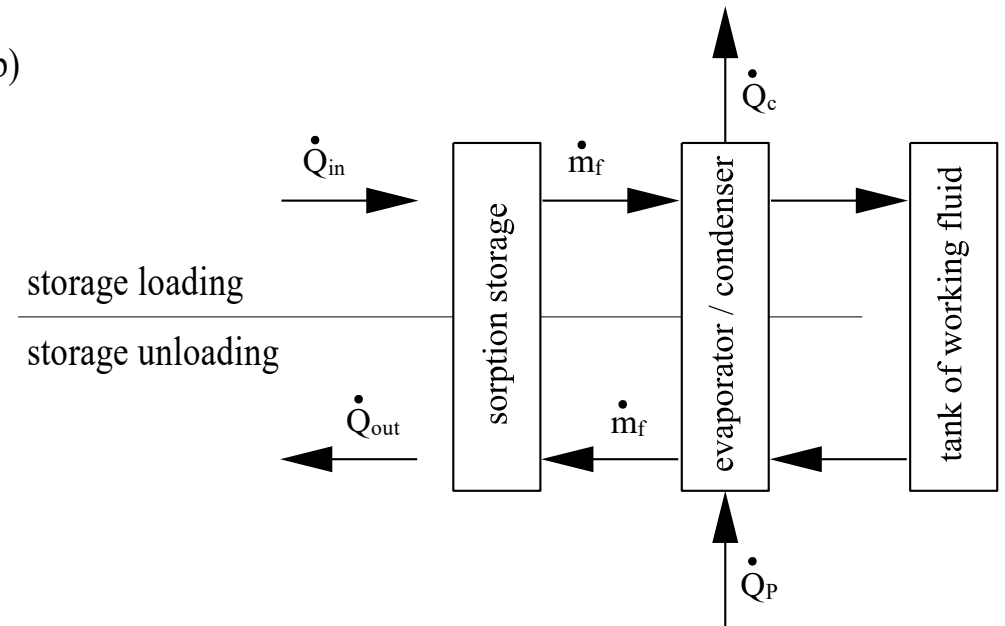
Storage unloading means adsorption process (for heat storage)

For cold storage it works in opposite direction

a)

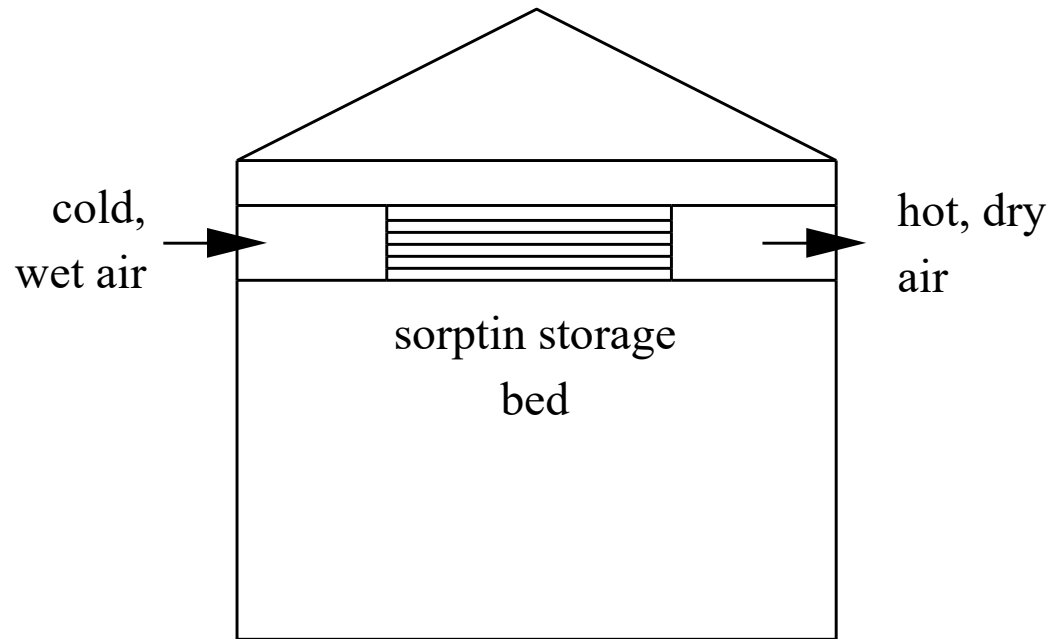


b)

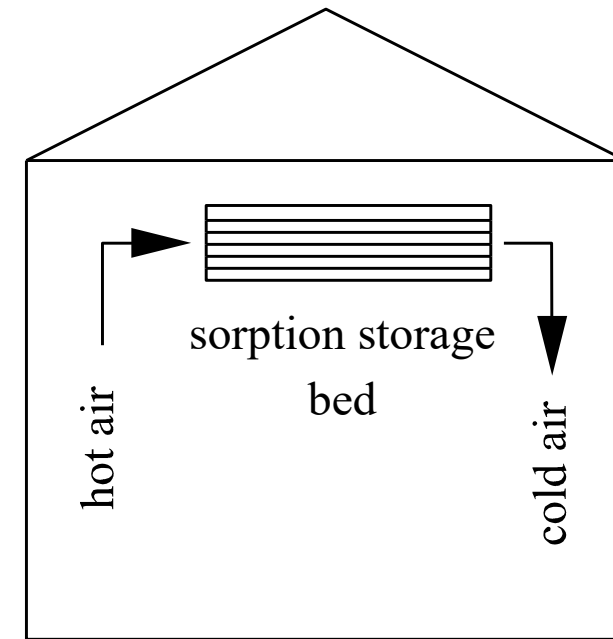


Cold storage system in summer

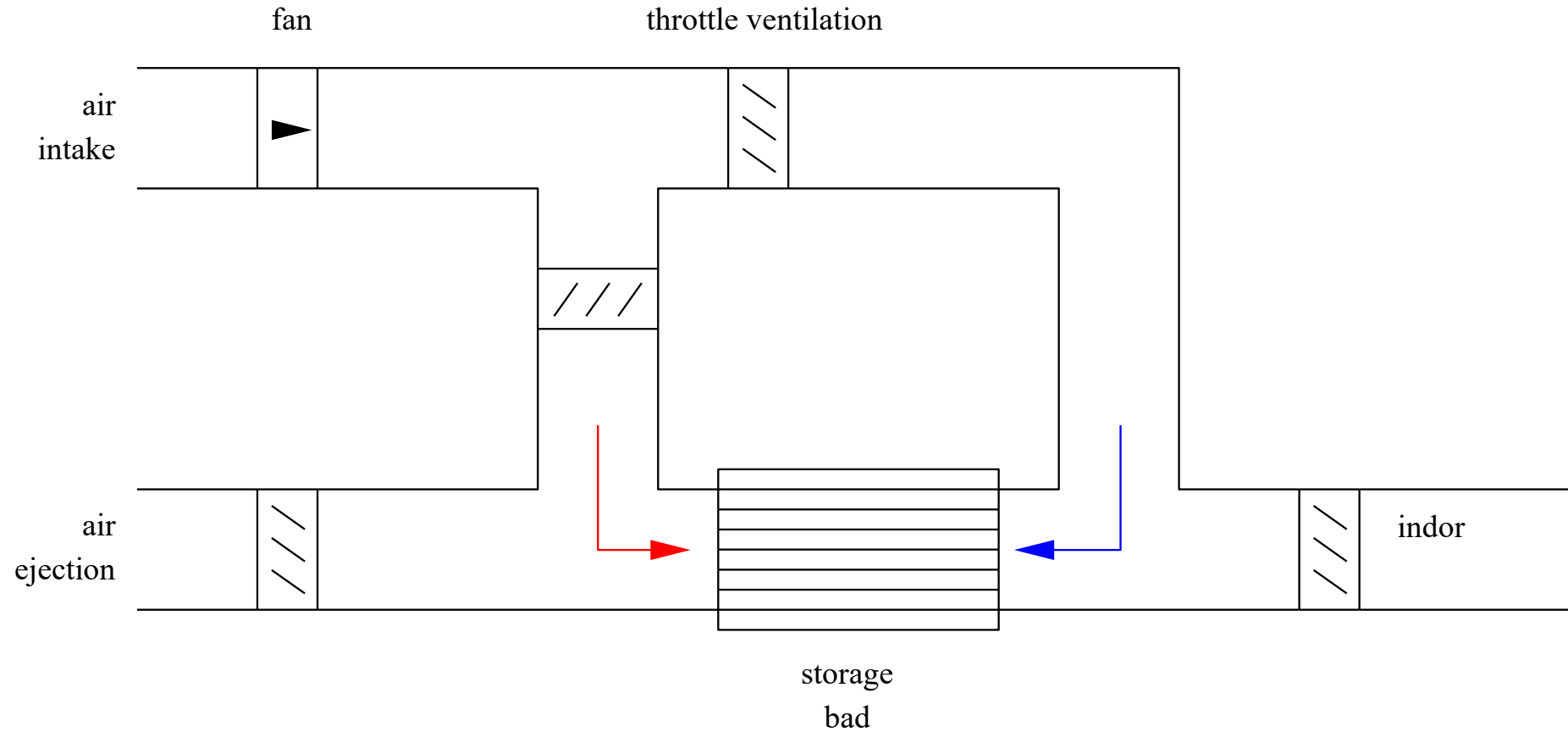
a) Summer night



b) Summer day



Whole storage system view



Conclusions

- System works properly for cold storage in summer
- The system does not fully meet the heat demand in winter, but is able to reduce the building's heat demand by about 40%.
- In winter, a larger air stream is also needed because the system works in a cyclical manner
- Large pressure drops in the bed were also observed.