

# The revolution of storing thermal energy

Our solution, HeatTank is a revolution in thermal energy storage systems. Our technology can reduce storage volume by 90%, save at least 20-50% energy with a payback time between 3-5 years. The innovation is using special, bio-based phase change materials with tailor-engineered phase change temperature, and our patented, large-area heat-exchange tubing. HeatVentors' technologies are patented, customizable yet scalable, thanks to our flexibly adjustable mechanical designs as well as the optimization and control algorithms.



## OUR OFFER



### Fast ROI

Lower than 3-5 years.



### Decrease energy cost by 20-50%

Transfer cheap energy to peak periods by increasing and balancing the efficiency of the cooling/heating system.



### 100% Operation security

Provides immediate cooling/heating in case of emergency as a redundant factor.



### Cut CO2 emission by 30-50%

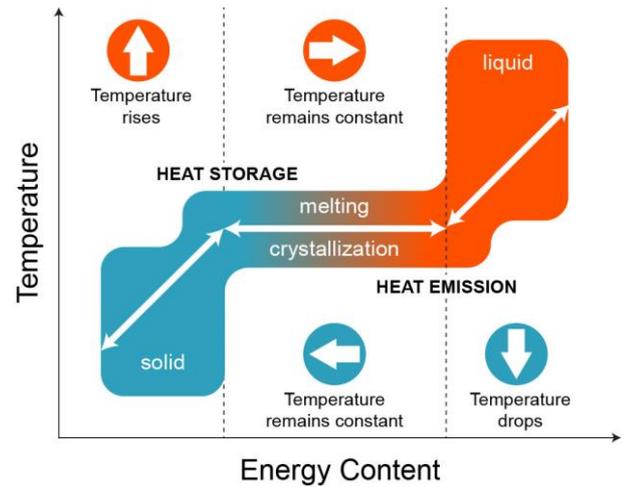
Smaller ecological footprint via reduced CO2 emissions.

# HOW IT WORKS

## Using Phase Change Materials

Traditional thermal energy storage systems store heat by changing the temperature of the water.

HeatTank uses special Phase Change Materials (PCM) instead to store the heating or cooling energy in a more concentrated way through melting and solidification.



1

### Charging phase

When excess thermal energy is available or can be generated more efficiently, part of it is stored within HeatTank. When cold energy is stored, the PCM solidifies. With heating energy the PCM melts.

2

### Store energy

HeatTank stores the thermal energy which was produced during the charging phase.

3

### Discharging phase

HeatTank releases the stored energy when the HVAC system calls for it. During the discharge period of the cold energy the PCM melts, while with the heating energy, the PCM solidifies.

# SYSTEM ELEMENTS



## Phase Change Material

Different cases require different materials. With an operational life of about 30 years, these PCMs are completely harmless for the environment and for humans. With several suppliers, HeatVentors' insure the availability and quality of the various PCMs.

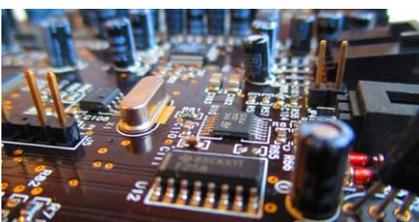
## Storage structure

The storage's patented structure includes an expanded heat transfer surface to ensure its high performance, while its cuboid shape ensures space efficiency. With no pressure involved, the technology is completely safe..



## Control system

HeatTank has its own, patented controller unit, with unique hardware and software. The controller's primary task is to ensure the most efficient operation of the system while taking into account more than 30 parameters.



# DIFFERENT USE CASES

The different materials used allow HeatTank to store heating as well as cooling energy.

## Heating solutions



Gas engine heat recovery



District heating system



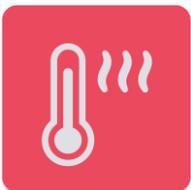
Commercial building heating



Heating of industrial processes



Other usage possibilities



Save heat



Save money



Peak performance management



Stable system, less maintenance



Remote control



Cut CO2 emission by 30-50%

# Cooling solutions



Data center cooling



Telecommunication site cooling



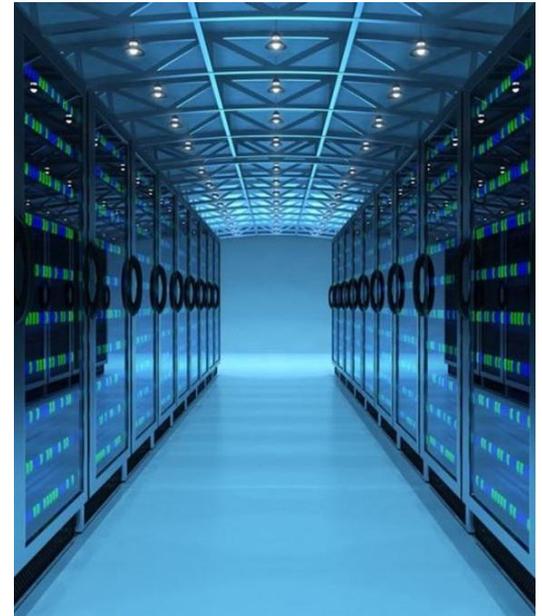
Commercial building cooling



Factory building cooling



Other usage possibilities



## Benefits



Fast 3-5 years ROI



Decrease energy cost by 20-50%



100% Operation security



Increase efficiency



Peak performance management  
Reduce the initial costs by 30%



Cut CO2 emission by 30-50%



Higher certification



Stable system, less maintenance

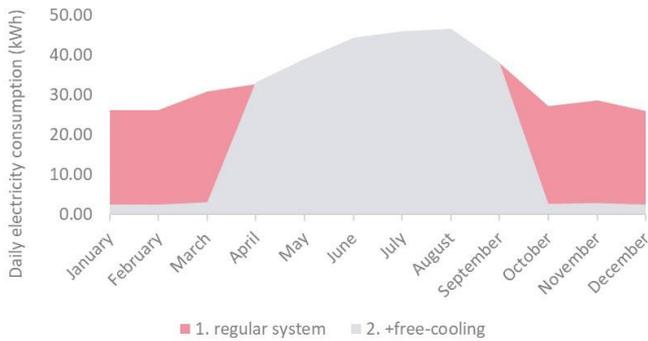


Remote control

# INCREASING THE EFFICIENCY OF THE COOLING SYSTEM

## The problem

Cooling systems work with changing efficiency during a day. When the outside temperature is low (usually at night) the efficiency is high, But as the outside temperature rises (usually at midday) the efficiency is low. This means that when the outside temperature is low we can generate more cooling energy from one unit of electricity than when the outside temperature is high.

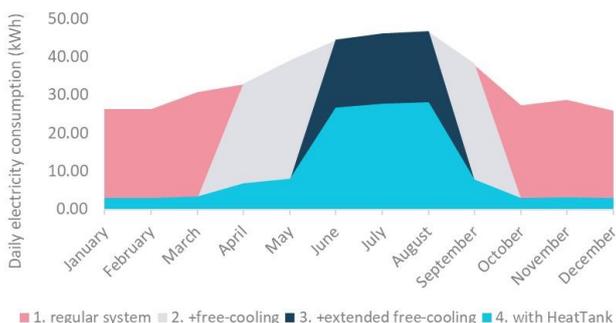
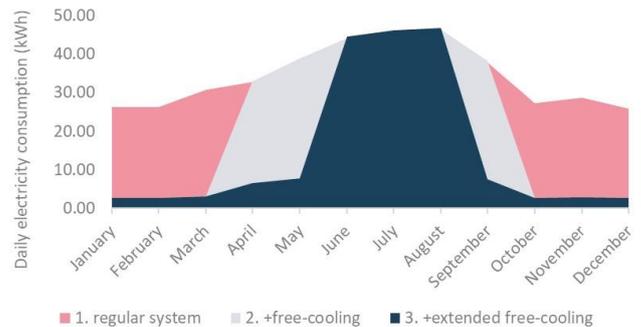


## Free-cooling

Another option is free-cooling. When the outside temperature is lower than the inside temperature the cooling potential of the outside air can be used. HeatTank uses indirect free-cooling with 2 independent heat exchange surfaces, so the moisture and dust do not get in the building.

## Increasing free-cooling period

The third option is extending the free-cooling period. When free-cooling is only available during the night or for only a few hours per day, HeatTank can be fully charged and used when the free-cooling is no longer possible.



## Energy Efficiency Ratio

The EER (Energy Efficiency Ratio) of the cooling systems are based on the outside temperature and the air humidity. In case of a lower outside temperature the EER is higher, meaning that the energy consumption could be reduced by generating the cooling energy in the most efficient periods (e.g. at night). HeatTank stores this cooling energy and uses it when the efficiency is lower. The figure to the left shows the real efficiency of a modern chiller, based on measurements.

# WORK WITH US

1

## Assessment & Design

HeatTank specifications as per your system and design based on client's energy and efficiency goals (energy&cost saving, increase operational security, reduced maintenance, smaller sized HVAC, etc.).

2

## Offer

You get an offer, when you are pleased with the calculations, which is personalized for your unique system.

3

## Manufacture

We manufacture and deliver your tank with the phase change material together and your system elements (thermoventilators, pump etc.).

4

## Installation

Simple installation - Client or HeatVentors install system as per client's need. HeatVentors optimize the operation for your cooling system.

5

## Energy reports

After the installation and optimization regular reporting provides savings and fine tuning information.

## Standard products

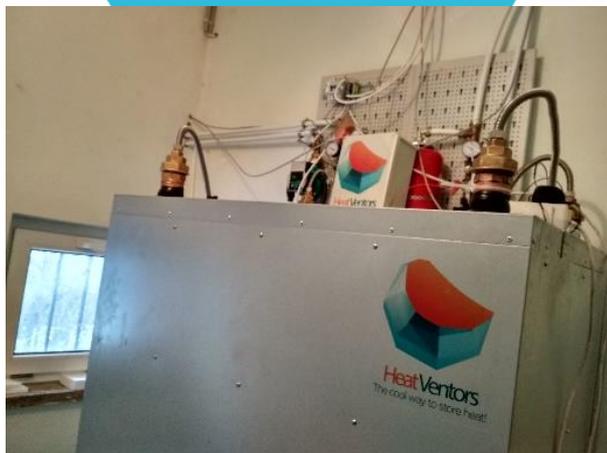
We offer the following standard products for you. These are small size storages so it is easy to move them and in case of an existing system we do not have to demolish walls.

In case of higher needs we offer more storages which could work together in a modular system.

Type	HeatTank 25-1	HeatTank 25-2	HeatTank 50-1	HeatTank 50-2
Capacity [kWh]	20-35	20-35	45-65	45-65
Max performance [kW]	100	100	200	200
External volume [m3]	0,91	1,05	1,77	1,94
PCM volume [m3]	0,48	0,55	0,91	0,98
Height with insulation [mm]	1436	1436	1960	1960
Width with insulation [mm]	979	979	770	770
Length with insulation [mm]	648	745	1175	1286
Heat exchanger circuits [nr.]	1	2	1	2
Connections [DN]	28	28	42	42
Empty weight [kg]	275	295	485	515
Total weight [kg]	650-900	700-980	1100-1450	1150-1700

# OUR REFERENCES

Use case: data centre cooling  
Installation time: 01.2019  
HeatTank type: 25 kWh  
HeatTank price: ~9.000 EUR  
Energy saving: 54% / year  
Payback time: 4 years



Use case:  
data centre cooling  
Installation: 03.2020  
HeatTank type: 50 kWh  
HeatTank price: ~18.000 EUR  
Energy saving: 41% / year  
Payback time: 4,2 years

Use case: gas engine heat recovery  
Installation time: 02.2020  
HeatTank type: 50 kWh  
HeatTank price: ~8.000 EUR  
Energy saving: 20,6% / year  
Payback time: 2 years



Use case:  
district heating system  
Installation: 05.2020  
HeatTank type: 50 kWh  
HeatTank price: ~18.000 EUR  
Energy saving: 30 % / year  
Payback time: 3,8 years

# We are HeatVentors

A dedicated engineer team with over 8 years experience in thermal energy storage. The story begins as a university research projects and blooms into a successful ad-venture. A dedicated team of professional – assembled to turn the dream into reality as we move into world of business and international markets – with one single objective:

**To make the world a greener and better place to live**

We are the proof that everybody can reach his or her dreams with hard work and commitment.



Rita Farkas  
CEO



Zoltán Andrásy, PhD  
CTO



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CCO



István Sebestyén  
Business Developer



Gergely Csende  
Business Developer



László Tömöri  
Business Developer



János Mucha  
Control system specialist

We believe that technology can make the world a better place. When science and engineering comes together, something magical happens.



Dénes Solnay  
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