



1

1 *Transport of the mobile latent heat storage.*

## MOBILE LATENT HEAT STORAGE HEAT PICKS UP SPEED

### Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT

Institute Branch  
Sulzbach-Rosenberg  
An der Maxhütte 1  
92237 Sulzbach-Rosenberg

Contact Person  
Dr.-Ing. Robert Daschner  
Head of Department Renewable Energy  
Phone +49 9661 8155-410  
robert.daschner@umsicht.fraunhofer.de

Director  
Prof. Dr.-Ing. Matthias Franke  
Phone +49 9661 8155-600  
matthias.franke@umsicht.fraunhofer.de

[www.umsicht-suro.fraunhofer.de](http://www.umsicht-suro.fraunhofer.de)  
[www.umsicht.fraunhofer.de](http://www.umsicht.fraunhofer.de)

The utilisation of waste heat contributes to improve energy efficiency and hence reduce the need of primary energy in the future. Latent heat storages take advantage of charging and discharging of heat on constant temperature level from liquid to solid and vice versa. Compared to sensible heat storages, the energy storage density in a close temperature range is considerably higher. The combination with transportable storage devices offers the possibility to use waste heat independent by time and location. Therefore utilisation concepts with constant heat demand throughout the whole course of the year are primarily focused. Moreover seasonably combinable heat consumers, such as swimming pools in summer and heating systems for schools or public institutions in winter, are potential applications.

### Keywords

- Latent heat storage
- Decentralised energy supply
- Waste heat utilisation concepts
- Combined heat and power
- Energy efficiency
- Heat contracting

### Sectors

- Heat generators and consumers
- Heat contractors
- Waste management companies
- Agricultural companies
- Public utility companies
- Biomass heating plants
- Waste incineration plants
- Manufacturing industries
- Energy consulting



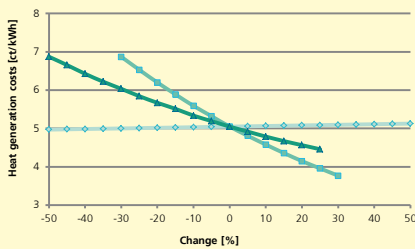
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2 Instrumentation and external heat exchanger.

3 Practical operation at a waste management company.

### Heat generation costs of a mobile latent heat storage<sup>1</sup>

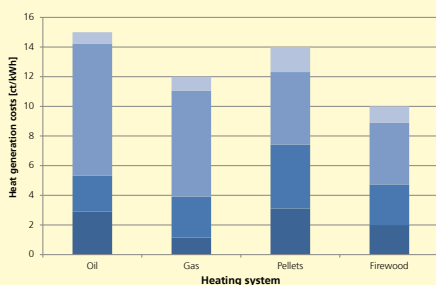


- Number of cycles (200)
- Storage mass (16.6 mg)
- Distance (5.6 km)

1 Utilisation of two latent heat storages, own calculations.

### Heat generation costs of comparable heating systems<sup>2</sup>

	Oil	Gas	Pellets	Firewood	Unit
Investment costs	2,9	1,2	3,1	2,0	cent./kWh
Capital costs	2,4	2,8	4,3	2,7	cent./kWh
Fuel costs	8,9	7,2	4,9	4,2	cent./kWh
Operation-related costs	0,8	0,9	1,7	1,1	cent./kWh
<b>Σ</b>	<b>15,0</b>	<b>12,0</b>	<b>14,0</b>	<b>10,0</b>	<b>cent./kWh</b>



- Investment costs
- Capital costs
- Fuel costs
- Operation-related costs

2 Fachagentur Nachwachsende Rohstoffe e.V. (FNR)

### Storage prototype specifications

- 20 feet container
- 2 separate storage tanks, parallel-connected
- Total mass: 25,000 kg
- PCM: sodium acetate trihydrate
- PCM mass: 16,600 kg
- Phase change temperature: 58 °C
- Lower process temperature: 35 °C
- Upper process temperature: 95 °C
- Av. charging power: 120 kW
- Av. discharging power: 90 kW
- Storage capacity: 2,000 kWh<sub>therm</sub>

### Our service

Fraunhofer UMSICHT will accompany you in planning your specific heat utilisation concept from consulting to implementation until monitoring and assessment. Our consulting approach is based on analysis of specific waste heat potentials regarding the application of mobile latent heat storages. This includes both detailed technical and economical considerations of the feasibility concept. In our demonstration center in Sulzbach-Rosenberg, we are able to determine the storage capacity of applied latent heat storages.

An intensive service and analysis of measurement data guarantees the determination of ideal operation parameters for your application. This also includes the development of economical transport and logistic concepts for your specific application. Based on our measurements and calculations, Fraunhofer UMSICHT offers a detailed feasibility study. Thus we supply an economically optimised heat utilisation concept based on your mobile latent heat storage.

### Your benefits

Fraunhofer UMSICHT is highly experienced in mobile latent heat storage technologies. Independently developed assessment methods and calculation tools are available for the analysis of measurement data and for the preparation of feasibility studies. These enable ideal control strategies and operation modes for your heat utilisation concept based on mobile latent heat storages. Based on the recommendations of Fraunhofer UMSICHT, the charging and discharging cycles of your mobile latent heat storage will be adjusted to your requirements to additionally increase the storage efficiency.