Solid media Storages for Temperatures from 100-600 °C

**Goals**
Development of cost-efficient solid media storage units for commercial solar-thermal power plants and industrial process heat, with specific capital costs of less than 30 €/kWh of thermal storage capacity.

**Applications**
An increased usage of renewable energy sources, acute waste heat usage and the expansion of co-generation markets result in an urgent need for energy storage units. These allow for an efficient integration into existing generation and supply systems. Due to their sliding temperature characteristics, regenerative solid media storage units are the most favorable storage option for many thermal processes.

**Research & Development**
For solid media storage units, low temperatures do not pose the risk they do in molten-salt storage units, where the salt solidifies at temperatures below 230 °C. Furthermore, the capital costs for a solid storage material are considerably less than those for molten salt.

In particular when concrete is used as the heat-storage material, especially inexpensive solutions can be realized; other solids, such as natural rocks or sodium chloride are also being studied.

The development work includes the following scopes:
- Development and qualification of storage materials
- Development of alternative heat transfer concepts
- Thermal design and component modeling
- Development and design of subcomponents, applying cost-efficient manufacturing and joining technologies
- Conceptual design and experimental qualification of test storage units in the 10-1000 kWh range
- System simulation for analysis of the storage system integration in power plants and industrial processes

400 kWh concrete test storage module without insulation (developed in collaboration with Ed. Züblin AG)

Conceptual design of solid media storage unit with decoupled output and capacity for an arbitrary heat transfer medium

Temperature profile in solid storage material without and with heat transfer structures

100 kW storage test bed for test operation up to 400 °C