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Questionnaire to determine the potential of a High Temperature Thermal Energy storage system

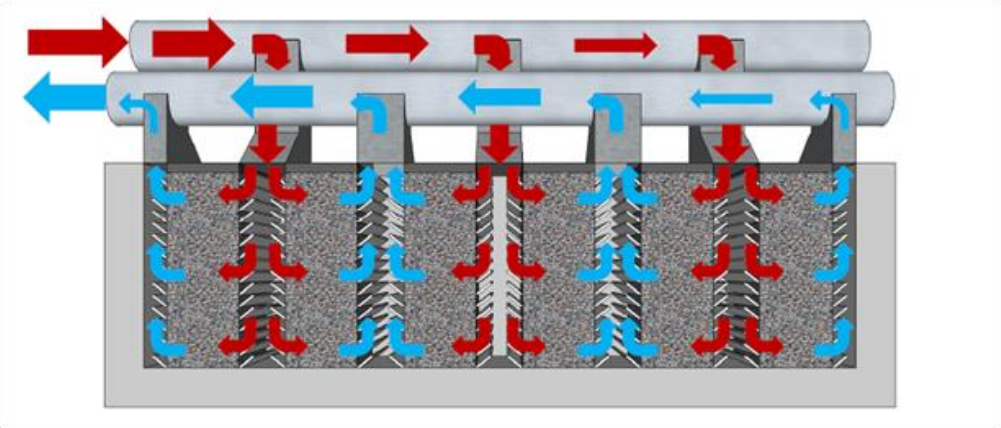
This questionnaire shall provide basic data to determine the available surplus heat energy of your process, which can be stored into the HTTES-system as well as the potential to reintegrate the stored energy into your processes. Please fill in the grey fields in paragraphs 1 to 4.

1. Company Information

Company:	
Industry:	
Site:	
Contact data:	

2. Charging Process

During the charging process excess heat from your process will be stored into modules of the storage system. Hot air is directed towards the storage and a cold air stream leaves the system. If the medium in your process is different to air, a heat exchanger can be used to transfer the heat to the air stream. If your flue gas cleanliness is good, then the heat might be stored directly by flow of



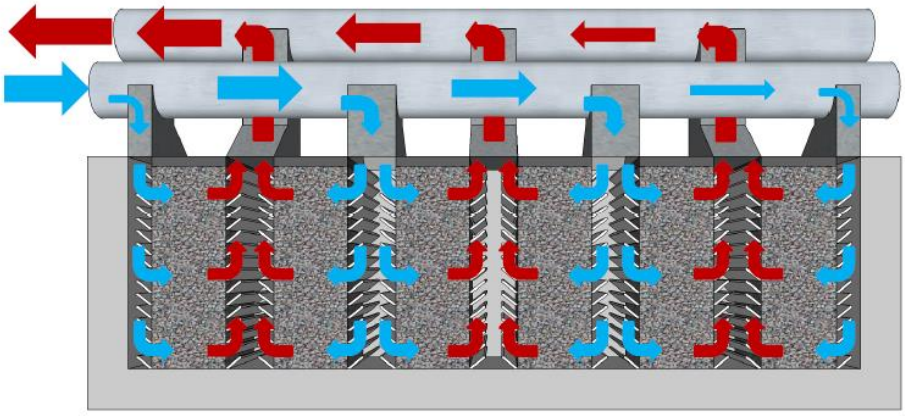
your flue gas through the heat energy storage system.

Please describe in a few short sentences why and where in your process excess heat is available:

no.	question	unit	answer
1.	Maximum temperature of heat to be stored	°C	
2.	Minimum temperature of heat to be stored	°C	
3.	Average temperature of heat to be stored	°C	
4.	Heat carrier (e.g. air, steam, flue gas, ...)	-	
5.	If the heat carrier is air/gas: Which and how much loading has to be expected (e.g. dust, SO_2...)		
6.	Total heat amount to be stored per charging event	kWh_{th}	
7.	Duration of a charging event	min or h	
8.	Frequency of the available excess heat/ the charging event (e.g. 2 times per day)		
9.	Capacity/power of excess heat to be stored	kW_{th}	
10.	Mass flow rate/ volume flow rate of heat carrier to storage	kg/s or Nm^3/h	
11.	If applicable: Is there an allowed minimal temperature of the cold air or cold gas leaving the storage (e.g. prevention of dew point undershooting)	°C	

3. Discharging Process

During the discharging process a cold air stream is directed through the modules of the storage system and a hot air stream leaves the system. The energy of the hot air stream can be used in your process (or for electricity production). Using a heat exchanger, the heat energy can be transferred to an appropriate medium of your process.



Please describe in a few short sentences why and where in your process heat can be integrated:

no.	question	unit	answer
12.	Maximum temperature of heat to be integrated	°C	
13.	Minimum temperature of heat to be integrated	°C	
14.	Average temperature of heat to be integrated	°C	
15.	Heat carrier in process (e.g. air, steam, thermal oil ...)	-	
16.	Total heat from storage to be integrated into process	kWh_{th}	
17.	Duration of an integration event or discharge event	min or h	
18.	Frequency of the needed heat / the integration / discharging event (e.g. 2 times per day)		
19.	Needed capacity of integrated heat	kW_{th}	
20.	Needed mass flow rate/ volume flow rate from the storage to the process	kg/s or Nm^3/h	

4. General Questions

no.	question	unit	answer
21.	Operating hours per year of customers process	h	
22.	Fuels used (e.g. natural gas, fuel oil, etc.)	-	
23.	Specific cost of fuels used (High Heat Value in case of natural gas)	€/ MWh HHV	
24.	Average ambient temperature	°C	
25.	Available construction area for an energy storage system	m^2	
26.	Distance from proposed storage system to customers process systems	m	
27.	Special requirements (e.g. Ex-zone requirements to be considered, etc.)	-	
28.	Cost of electricity	€/kWh	