Caldera

STORAGE BOILER DATA SHEET

Each **Storage Boiler** system is comprised of three sub-system packages:

1. **Heat Cell** – Blocks of Caldera's patented thermal storage material are enclosed in a vacuum-insulated cover and heated directly by electricity from the grid or on-site renewables. A single Heat Cell stores 5 MWh; storage is increased by adding further Heat Cells. Stored heat is transferred to a closed-loop water-steam circuit, which supplies energy to the site's steam or hot water system via the Heat Exchanger Skid.
2. **Heat Exchanger Skid** – A factory-assembled package, including a standard plate & shell heat exchanger, pumps and controls, manages the extraction of heat from the Heat Cell in response to a change in the site's heat demand. The Heat Exchanger Skid interfaces with existing steam, condensate or hot water infrastructure.
3. **Power & Control System** – A factory-assembled package that connects the Heat Cell to the site's MV power grid, and controls charging. This includes an energy management system which dynamically responds to variable input power (e.g. from variable renewables) and/or output heat demand.

The system is **modular** and **scalable**. The **example** overleaf is for two Heat Cells, one Power & Control System, and one Heat Exchanger Skid.

Example specification	Model SBX-4.0-10-2.6
Nominal storage capacity*	10 MWh (2 Heat Cells)
Maximum charge rate	4.0 MW_e
Charge response (switching time)	< 1 s
Charging efficiency (full load)	97%
Maximum discharge rate*	4 t/h (2.6 MW_{th})
Minimum discharge rate	0.4 t/h
F&A 100°C (From and At 100°C)	4.4 t/h
Round trip efficiency (typical daily cycling)	94%
Heat loss rate (in standby)	3.6% / 24 h
Depth of discharge	0-100%
Design lifetime	> 20 years
Primary rated voltage	10 to 33 kV
Secondary rated voltage	690 V
Maximum operating pressure	10 bar
Steam dryness	> 95%
Feedwater temperature range	80 – 95°C
System size	
Power & Control System footprint	6.1 m x 2.4 m
Heat Exchanger footprint	6.0 m x 2.0 m
Single Heat Cell footprint	3.0 m diameter
Heat Cell height	9.8 m
Single Heat Cell mass	110 t

* Nominal storage capacity and maximum discharge rate assumes 6 bar delivery pressure and 80°C feedwater temperature.

Heat Cells are designed, manufactured and tested in accordance with Pressure Equipment Directive 2014/68/EU, and the requirements of harmonised ISO standards.

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