Table 2: Benchmarks for roof-mounted solar thermal systems connected to (block) heating grids

Solar thermal system category	**SBH: Solar block heating** Solar assisted heating of building blocks and urban quarters (roof-mounted collector field)	
All systems of this category are **roof-mounted** and may be equipped with either - short-term (diurnal) storages **(A)** or - long-term (seasonal) storages **(B)**		
Energy/technical data	**A) with diurnal storage**	**B) with seasonal storage**
Kind of solar thermal collector used *optional*	**FPC** *ETC*	**FPC** *(ETC)*
Kind of solar energy storage used *optional*	**pressurized TTES** *non-pressurized TTES*	**BTES** *non-pressurized TTES, PTES, ATES*
Typical size per unit [m^2_{gross}] *- range (from - to)*	**1,000** *500 – 5,000*	**5,000** *1,000 – 10,000*
Typical thermal peak capacity per unit [kW] *- range (from - to)*	**700** *350 – 3,500*	**3,500** *700 – 7,000*
Typical storage volume per unit [$m^3_{.H2Oe}$]	**100**	**12,000**
Typical annual production per unit [MWh/a]	**390**	**1,500**
***Specific* storage volume per unit** [ltr./m^2_{gross}] *- range (from - to)*	**100** *75 – 125*	**2,400** *1,400 – 3,400*
Typical solar energy yield *SE* [kWh/m^2_{gross}/a] *- range (from - to)*	**390** *350 - 450*	**300** *260 - 340*
Typical solar fraction sf [-] *- range (from - to)*	**20%** *10 – 25%*	**50%** *40 – 75% (up to 90%)*
Technical life time [years]	25	25
Financial data	**A) with diurnal storage**	**B) with seasonal storage**
Specific cost ready installed [1,000€/m^2_{gross}] (excl. VAT, excl. subsidies)	**0.54** (+/- 22%) *(0.42 – 0.66)*	**0.64** (+/- 25%) *(0.48 – 0,80)*
Specific cost (material only) [1,000€/m^2_{gross}] (excl. VAT, excl. subsidies)	**0.47** (+/- 22%) *(0.37 – 0.57)*	**0.54** (+/- 25%) *(0.40 – 0.67)*
Specific cost (labor only) [1,000€/m^2_{gross}] (excl. VAT, excl. subsidies)	**0.07** *(0.05 – 0.09)*	**0.10** *(0.08 – 0.13)*
Investment per unit ready installed [1,000€/unit] (excl. VAT, excl. subsidies)	**540** (+/-22%) *(421 – 659)*	**3,200** (+/-24%) *(2,400 – 4,000)*
Fixed O&M per unit [€/m^2_{gross}/a]*	3.5	4.0
Variable O&M per unit [€/m^2_{gross}/a]**	1.4	1.1
Levelized cost of heat *LCOH* [€-ct/kWh] *- range (from - to)*	**9.2** (+/- 21%) *7.3 – 11.2*	**14.0** (+/- 24%) *10.6 – 17.4*

* 0.75% of net investment cost (excl. labor)

** Electricity for solar pump and control (around 1.5 kWh electrical / 100 kWh heat produced). Electricity: 24€-ct/MWh