



Current Status of Solar Thermal Application Worldwide

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Renewable Heating and Cooling

Solar thermal



Biomass



Geothermal







THERMOSYPHON SYSTEM - Namibia



Source: AEE INTEC, Namibia Wildlife Resorts, Sesrim

Solar Water Heating Systems



Three different types of evacuated tube collectors:

**all-glass
U-tube
heat-pipe**



Solar Water Heating Systems





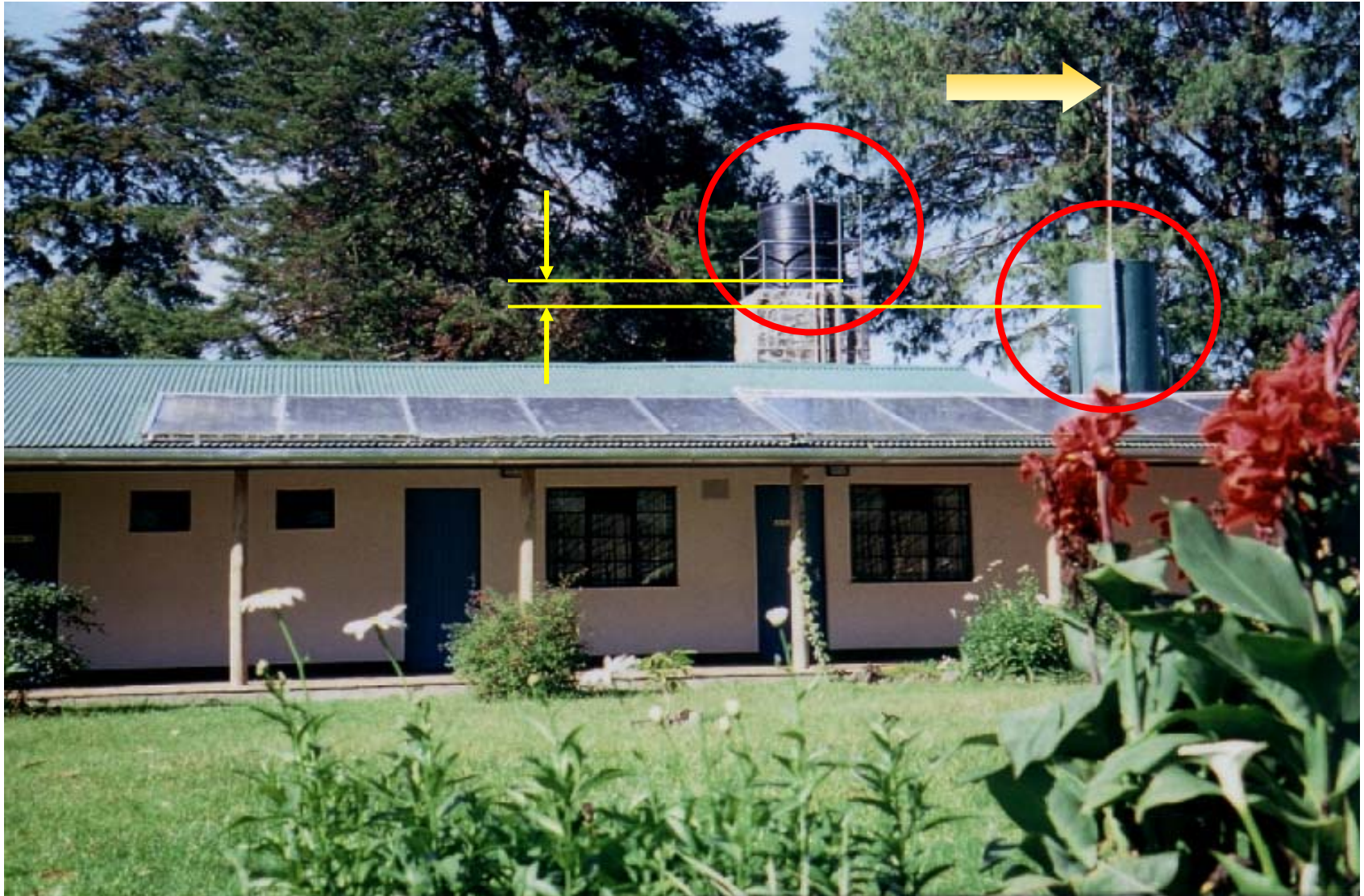
Solar Water Heating Systems



THERMOSYPHON SYSTEMS - Zimbabwe



Non pressurized storage tanks - Uganda



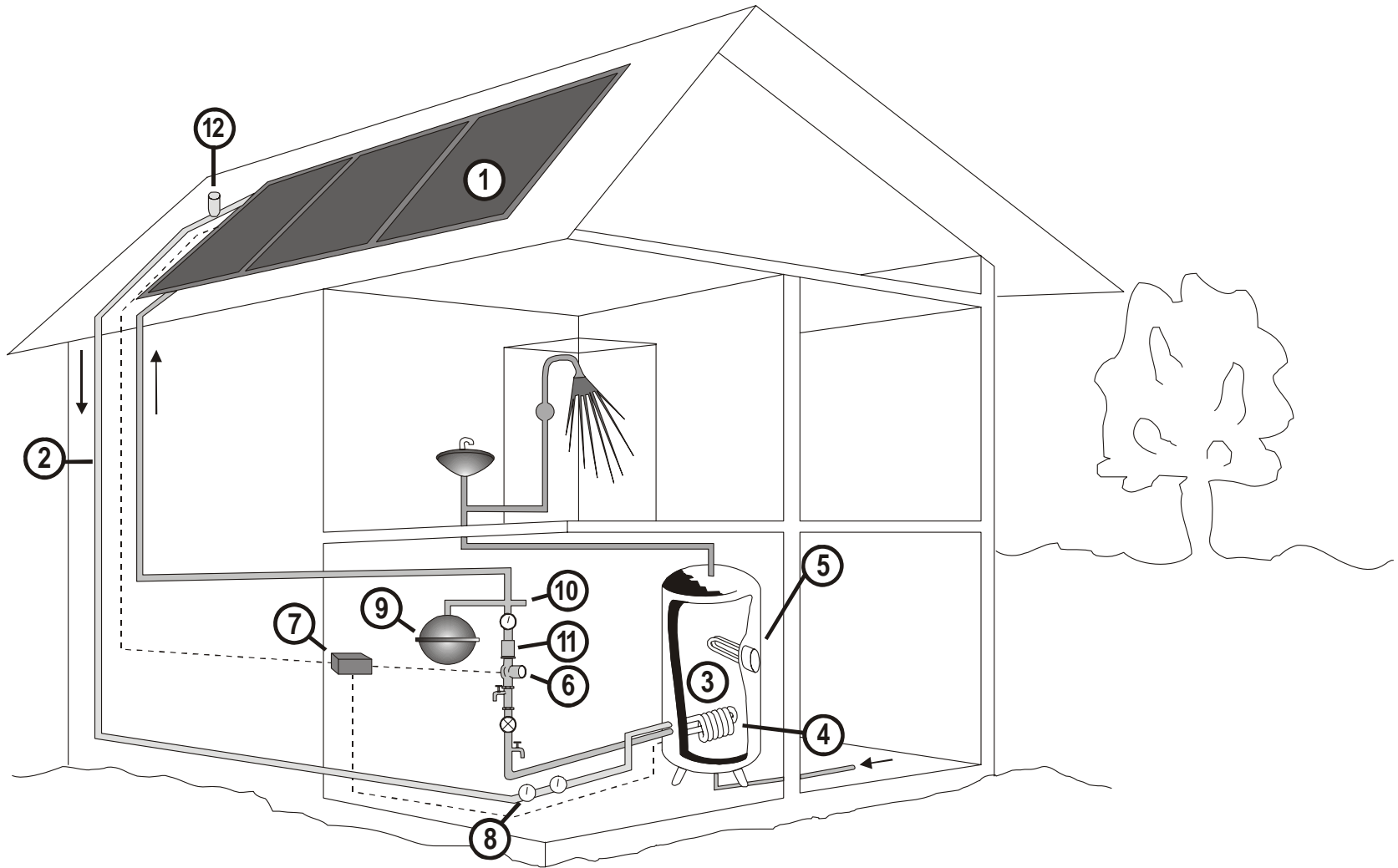


1 Million Solar Water Heater Programme in South Africa





Pumped SWH Systems



Small-scale Systems for Hot Water Preparation

$$f_{\text{sol}} = 50 - 70\%$$

$$500 - 650 \text{ kWh/kW}_{\text{th}}$$



Solar Water Heating for Hotels



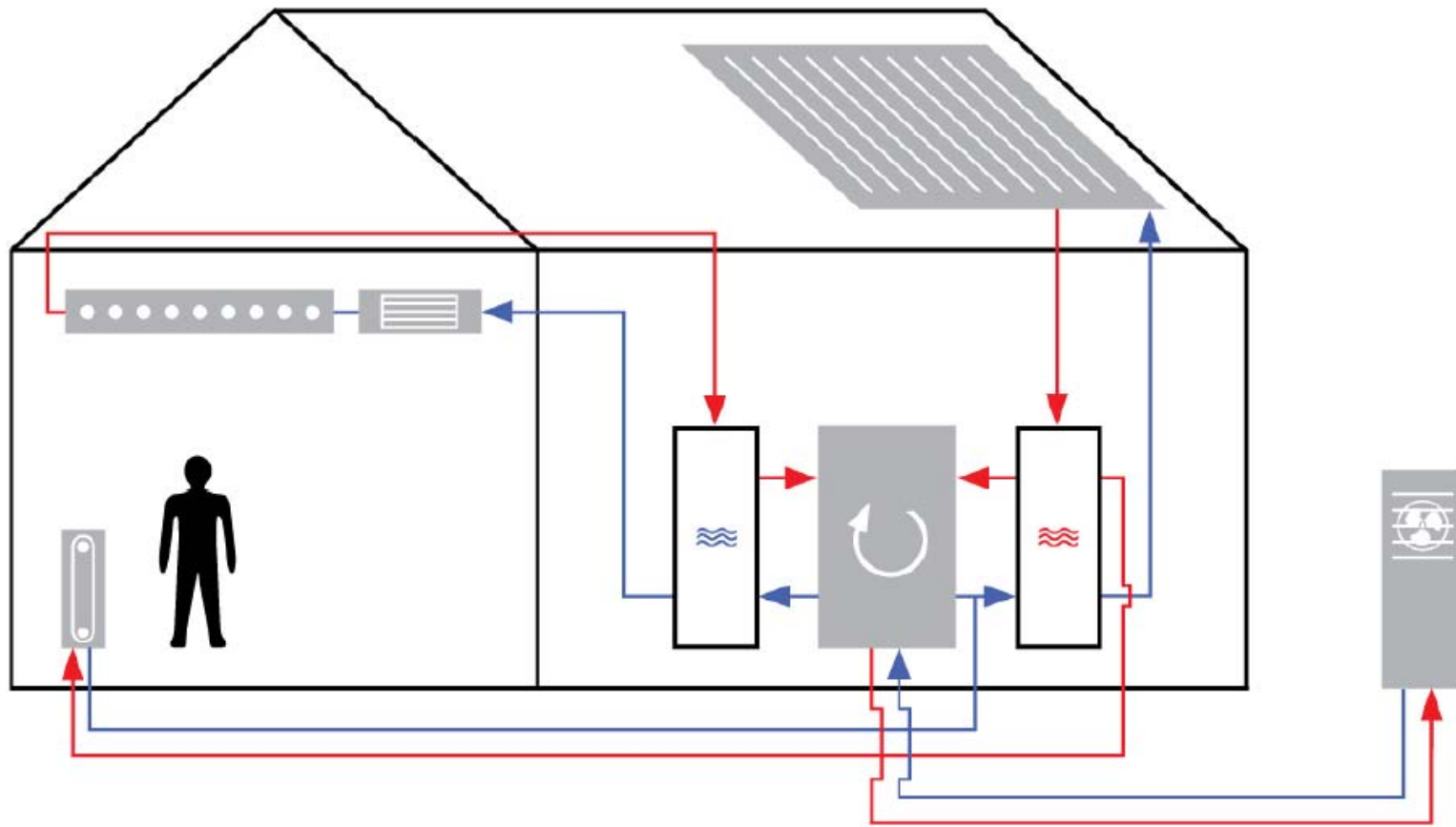
Source: TiSun

Combined Pool Heating and SWH





Solar Air Conditioning and Cooling



Combined SWH and Cooling



Solar Cooling System for the German BMVBW



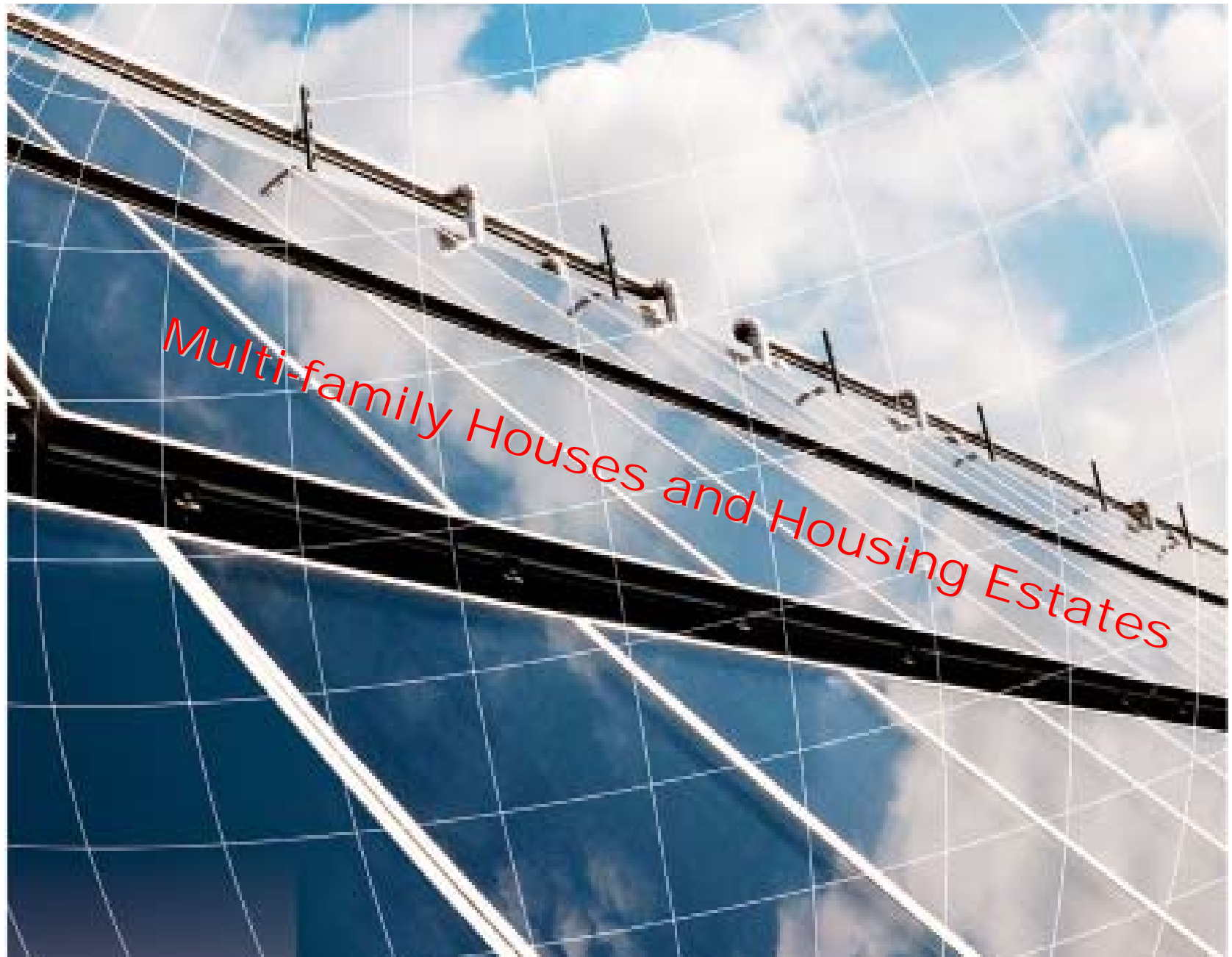
Source: Jan Albers, IMBE, TU Berlin



Evacuated Tube Collectors for Air Conditioning

9188 m² Vacuum tube collectors
1024 kW Cooling power

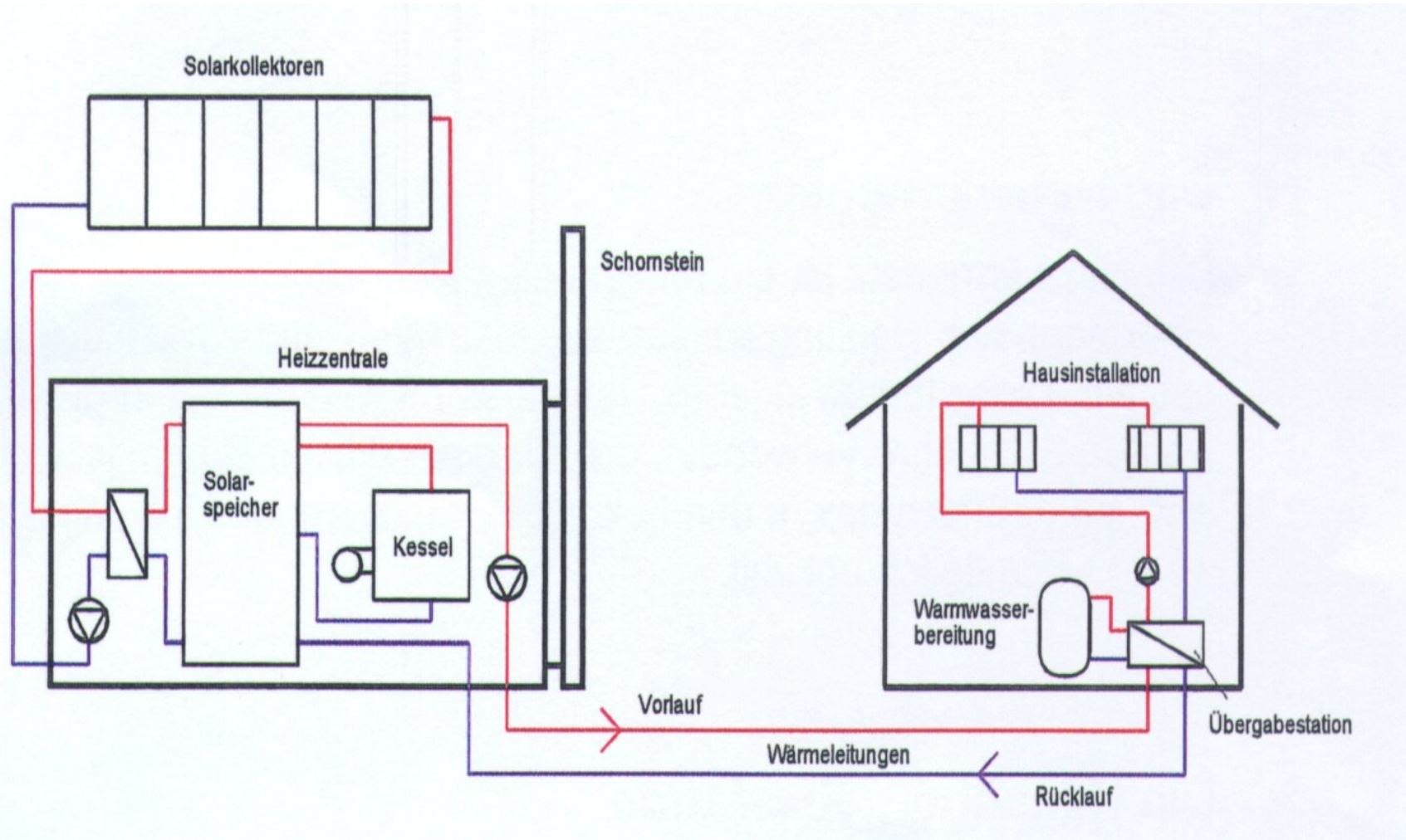




Large-scale solar heating systems



System with short-term storage – Müllheim, D



System with seasonal storage, SE

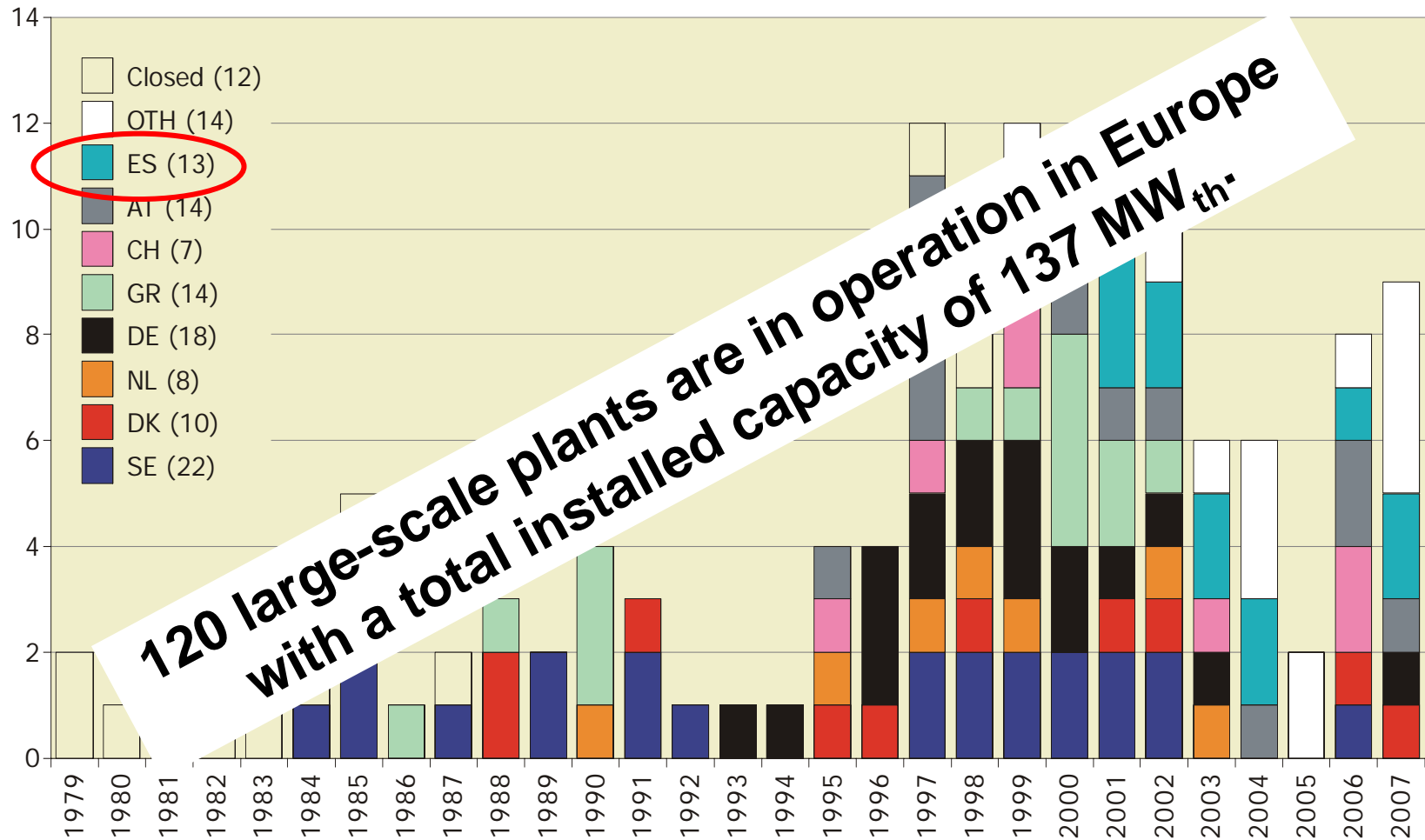


Project	Heat Storage	Project -Size			Nb. of Flats
		Collector area (m ²)	Storage Volume (m ³)	fsol (%)	
Anneberg-Danderyd	seasonal	2.400 m ²	60.000 m ³	70%	50



Large-scale Plants in Europe

No of plants



120 large-scale plants are in operation in Europe with a total installed capacity of 137 MW_{th}

Source: Jan-Olof Dalenbäck, 2008

Local District Heating – Hamburg, Germany



Source: ITW, University Stuttgart



District Heating – 3MW_{th} , AEEVG, Graz, Austria



Solar District Heating

Solar yields: 400 – 460 kWh/m².a

Marstal, Denmark 12.8 MW_{th} (18.365m²)