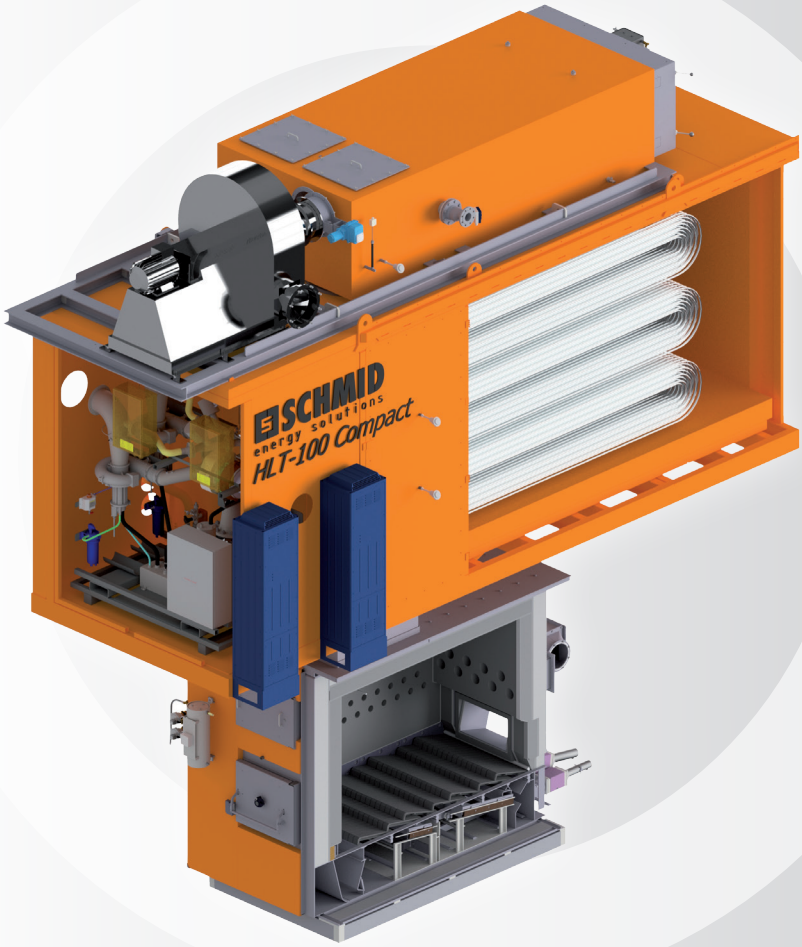
SUSTAINABLY GENERATED ELECTRICITY FROM WOOD

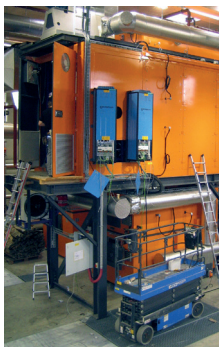
WOOD AS A FUEL

In contrast to oil and gas, wood is regarded as CO2-neutral and prevents the greenhouse effect. Generating energy from wood means heating within nature's natural CO2 cycle. This cycle is maintained as long as the amount of wood consumed does not exceed the amount that is regenerated.

SMALL-SCALE CHP SYSTEM

ORC systems or steam turbines are only of interest as medium-scale systems with a thermal capacity of more than 2 MW due to their complexity and supervision requirements. It is often the case that the amount of heat consumed is not sufficient throughout the year in systems with such a high capacity. In the lower performance range the "HLT-100 Compact" hot air turbine permits electricity generation with a wood combustion system above a heat consumption of 400 kW. The big advantage compared to wood gasifier systems is the possibility to use a broad range of virgin wood chips with moisture content up to 55 %.





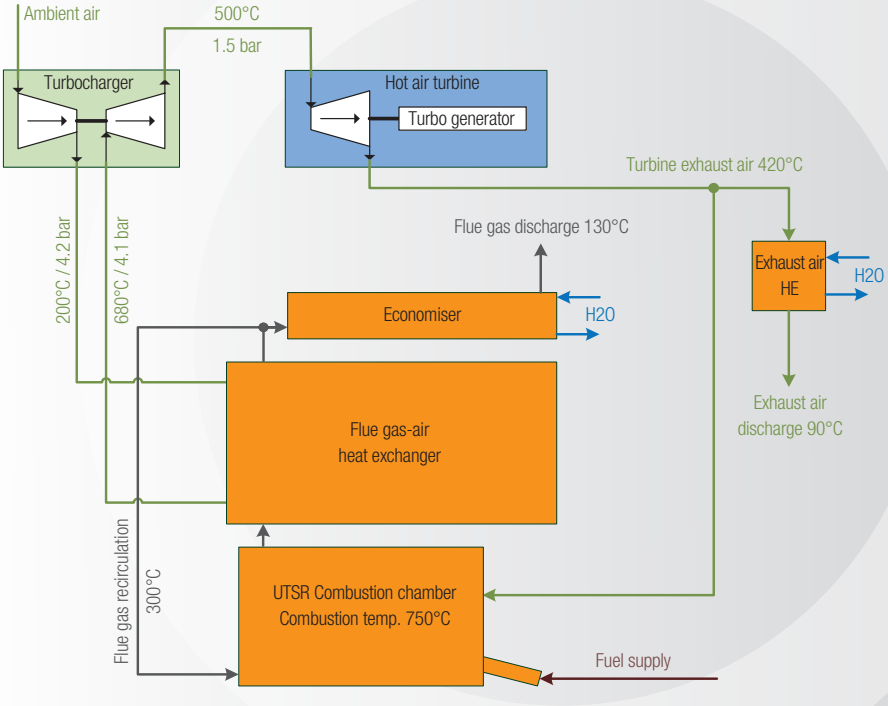
SCHMID
energy solutions

HOT AIR TURBINE TECHNOLOGY

The hot air turbine is an automated cogeneration plant with an electrical output of 80 to 100 kW. The heat produced during the generation of electricity is used in this cogeneration unit to provide a thermal output of 460 kW in the form of hot water.

The system diagram shows the main components and the hot air circuit. A turbocharger compresses the ambient air and takes the required energy from the partial decompression of the process air heated in the flue gas-air heat exchanger. The electrical power is generated in a second expansion stage with two hot air turbines with two turbo-generators. To this purpose the process air is distributed downstream from the turbocharger. A converter is used for each generator. The turbine exhaust air is partially used as combustion air or cooled by an exhaust air heat exchanger. The heat contained in the flue gases is transferred to the water network by an economiser.

The flue gas-air heat exchanger was calculated and designed in compliance with the Pressure Equipment Directive and tested, certified and approved by TÜV Süd. Control of the overall system is based on an extended Schmid Personal Touch control unit with visualisation including trending and the very latest remote control.



TECHNICAL DATA

Combustion chamber	Based on Schmid UTSR moving grate
Fuel	Virgin wood chips
Water content	M 35–55
Combustion capacity	820 kW
Electrical capacity	80–105 kW
Thermal capacity	465 kW
Electrical efficiency	13 %
Thermal efficiency	63 %
Internal electrical consumption	3–18 kW
Space requirements	8 m x 4 m x 8 m
Turbocharger	Designed for an admission temperature of 680°C and 50,000 rpm
Hot air turbine	Designed for an admission temperature of 500°C and 28,000 rpm

ANCILLARY CONDITIONS AND OPERATIONAL EXPERIENCE

Prototype commissioning in Eschlikon	November 2011
No. of operating hours	>10'000 h
Cleaning of the hot air heat exchanger	Yearly