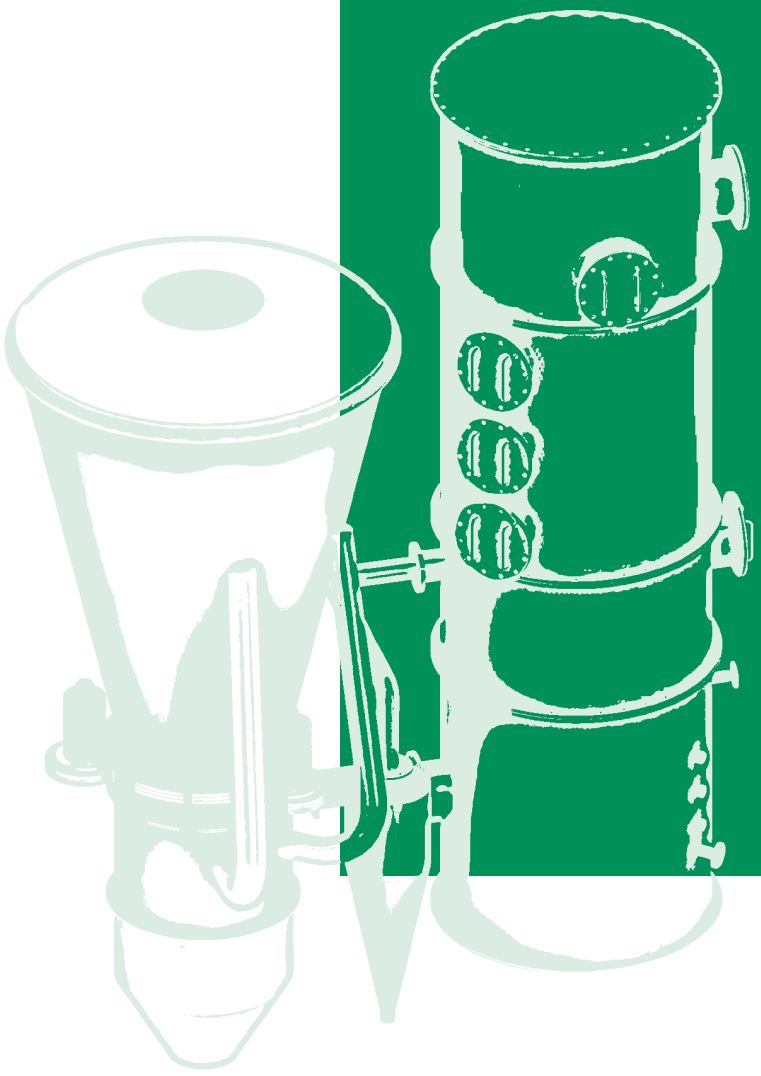
SCHMITT ENERTEC



ENERCARB

Wood gas heat and power plants

Wood gas Combined Heat and Power plants starting from 250 kW

The **ENERCARB** wood gasification process works with the fixed bed downdraft principle. This production of wood gas is characterised by the fact that tar, which develops in the pyrolysis, is cracked by a very high process temperature in the oxidation phase. Thereby a tar-free wood gas is formed, which guarantees maintenance and wear resistant operation of the combustion engine CHP downstream.

As raw material all kinds of wood can be used. Hogged wood, sawdust or shredded crowns of trees are suitable in the best way as sources of energy, in order to win electricity and heat.

The **ENERCARB** wood gas technology contains the entire process chain, from the basis of the preparation of wood, over the gasification, gas cleanup up to the power and heat generation.
As a result you receive electricity and heat with highest efficiencies and maximum life span. The plant controls automatically material flow, operating pressures and temperatures, in order to surely place optimal operating conditions in the gasifier. The sophisticated tuning of the assigned controls leads to maximum reliability and minimized parasitic loads. This permits even the use of wood substitutes with cellulose fraction.

Maintenance and service are implemented completely by SCHMITT ENERTEC. With optimal employment of the won energies the amortization of the entire plant is possible within short periods down to 4 years.

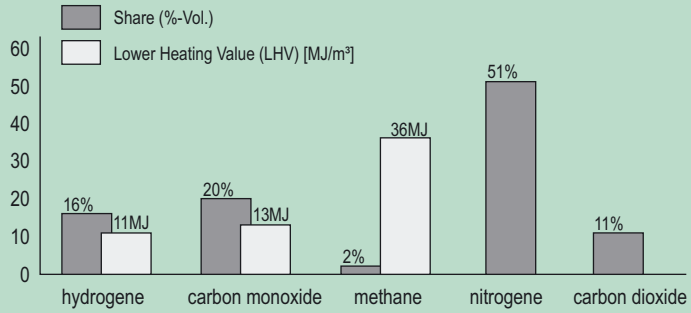
ENERCARB wood gas heat and power plants are modular designed. Each unit is appropriate for electrical power generation of 250 kW. So standardized plants with 1 MW or more can be realized by parallel connection of several units. The individual components such as gasifier, scrubbers, filters and CHP are supplied as prefabricated units, so that the local installation expenditure is small. The highest possible availability is obtained by the modular structure. The space requirement for the equipment technology is small with approx. 0,5 m² per installed electrical kW. If desired, the plant can be supplied also including the building.

The emission limits of the German TA-Luft are surely kept by the employment of lean burn engines with oxidation catalyst. The installation can take place in direct proximity to heat customers in the industry, housing developments or municipal facilities. By the advantage of cogeneration, connected with the employment of renewable energy, a **ENERCARB 500** wood gas heat and power plant can avoid around 2800 tons of CO_2 emissions, annually.

Advantages of the **ENERCARB** process

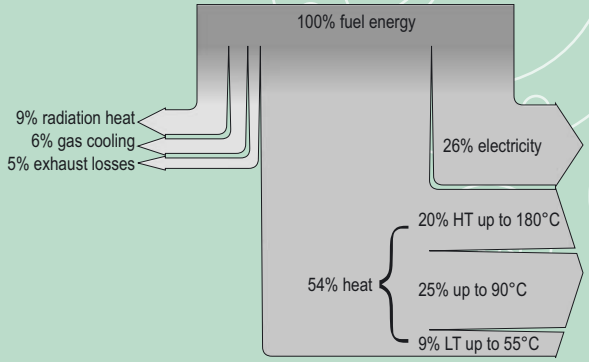
- High temperature gasification for tar-free gas and the maintenance and wear resistant use thereof
- Most different wood and qualities applicable
- Ready for turnkey supply
- Full service contract for the entire plant
- No by-products, except ash
- CHP with SCHMITT ENERTEC spark ignited wood gas engine, thereby no need for bi-fuels like fuel oil
- Highest uncoupling of electricity and heat
- Minimum parasitic loads, maximum reliability
- Modular structure
- Small space requirement

Gas composition



The heat value of the product gas amounts, fuel-dependently about 5 MJ/m³
(all data are subject to a fuel-dependent fluctuation of approx. 5%)

Sankey Diagram



Technical data

Type	electric power [kW]	thermal power [kW]	primary energy input [kW]	wood mass flow [kg/h]	space demand L x W [m]
ENERCARB 250	250	525	970	245	18 x 9
ENERCARB 500	500	1050	1940	490	18 x 12
ENERCARB 750	750	1575	2910	735	21 x 15
ENERCARB 1000	1000	2100	3880	980	21 x 18

Heat Recovery: 85% of the thermal power as hot water: 90°C supply, max. 70°C return • 15 % of the thermal power as warm air: 55°C
Reference conditions: combustion air / ambient temperature 27°C; elevation max. 300 m • LHV of the wood fuel 4.4 kWh / kg
Exhaust gas emissions: NOx < 500 mg / Nm³ • CO < 300 mg / Nm³

Usage of the thermal energy

- Normally, the heat recovery takes place in the form of hot water with 90°C and warm air with 55°C.
- Hot water can be merged into district heating networks or used locally for heating purposes.
- Warm air is used locally for the wood drying process.
- Uncoupling of the exhaust gas heat and process gas cooling can take place even on higher temperature level. Hereby the production of process steam or thermal oil can be used for process heat or for further power generation, for example in an ORC process.

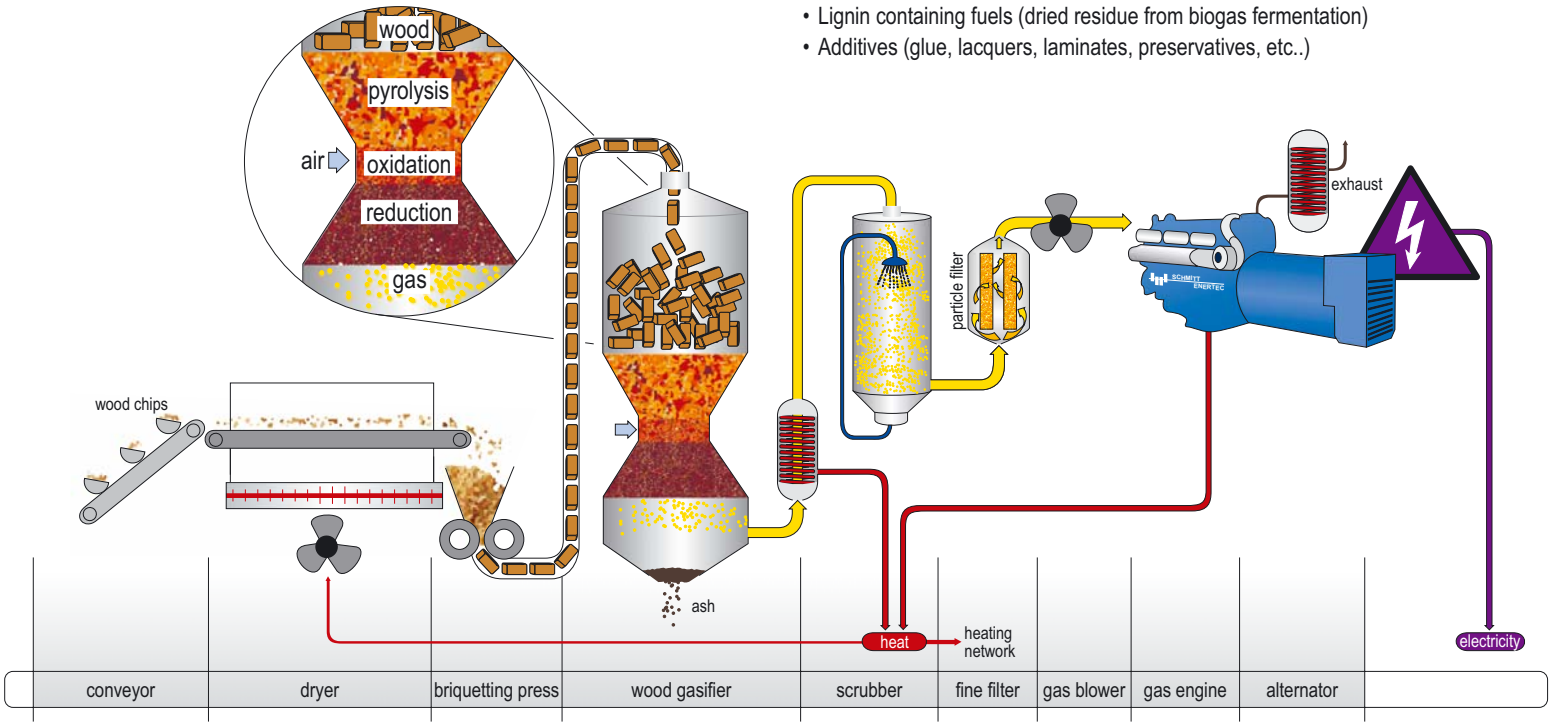
Usable Woods and their qualtities

All classical kinds of wood can be used.

Without forming of briquettes:
- Hogged wood (approx. 60-80 mm in diameter, 10-15 cm in length)

With forming of briquettes:
- Woodchips
- Wood dust
- Wood sawdust particles
- Bark (up to 15% by volume)
- Tree needles and leaves (proportionately to the tree material)

On request / after consultation
- Lignin containing fuels (dried residue from biogas fermentation)
- Additives (glue, lacquers, laminates, preservatives, etc..)



system diagram **ENERCARB**

Standard scope of supply

- Wood dryer
- Mechanical briquetting press with bunker
- Automated fuel conveying from the wood-fuel input to ash discharge
- Fixed bed downdraft gasifier with automatic briquette fuel feeding, ash discharge and cyclone separator for fly ash
- Shell and tube type heat exchanger for heat recovery from the hot wood gas
- Gas scrubber with water cooling and sludge separation
- Gas chiller dryer with condensate separation
- Wood gas sawdust filter with automated recirculation of the filtering medium
- Gas torch / flare for starting the plant
- Ventilation
- SCHMITT ENERTEC spark ignited gas engine CHP with exhaust gas heat recovery, plate and frame type heat exchanger and hot water supply header
- Central control by SCHMITT ENERTEC PLC with visualization and remote supervision

The Company SCHMITT ENERTEC

Since 1976 the economic and ecological generation of heat and power from natural gas, biogas, and special gases with CHP´s is our profession. With more than 70 employees we design and manufacture, at our location in Mendig, gas engines, CHP´s and wood gasification plants.

Especially with our wood gas combined Heat and Power plants the comprehensive authority of SCHMITT ENERTEC in construction, manufacturing and service of the entire plant is an important decision criterion for the **ENERCARB** wood gas technology.

SCHMITT ENERTEC is your competent partner for compact energy solutions.

SCHMITT ENERTEC

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