

LUX ENERGIE

intelligent energy contracting



Wood gasifier

Heat and power from wood

WOOD GAS - A FORGOTTEN FUEL

We mostly know wood gas technology from the post-war era, when the lack of fuel forced people to get creative so as to remain mobile. When wood is gasified, high temperatures and air in the pyrolysis processes not only produce coke or charcoal, but also flammable gas from wood. This gas can be extracted, purified and then used again. However, wood gasification had a highly detrimental side effect: the pyrolysis process also produced soot and tar. Older engine models were able to handle those. Modern

high-efficiency engines, such as those used in contemporary cogeneration plants, cannot deal with such by-products.

After five years of research and development on the wood gasifier, the firm Burkhardt has managed to give the entire system the impulse it needed to be successful. The solution came from rethinking the gasification process and using wood pellets as the standardised fuel (as per DIN EN plus A1).

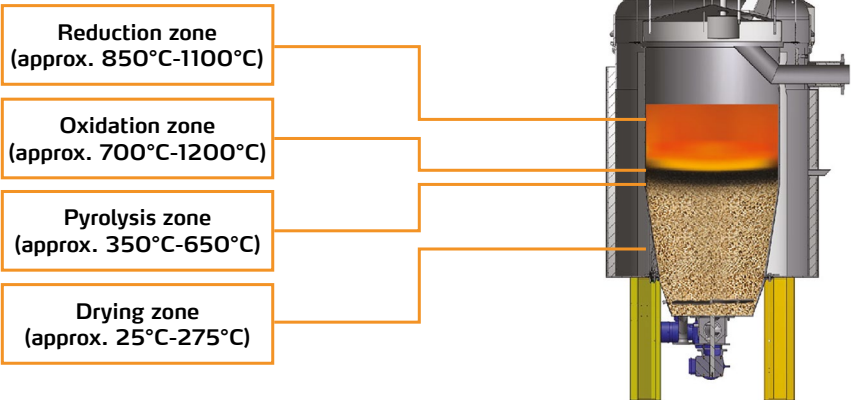


THE GASIFICATION PROCESS

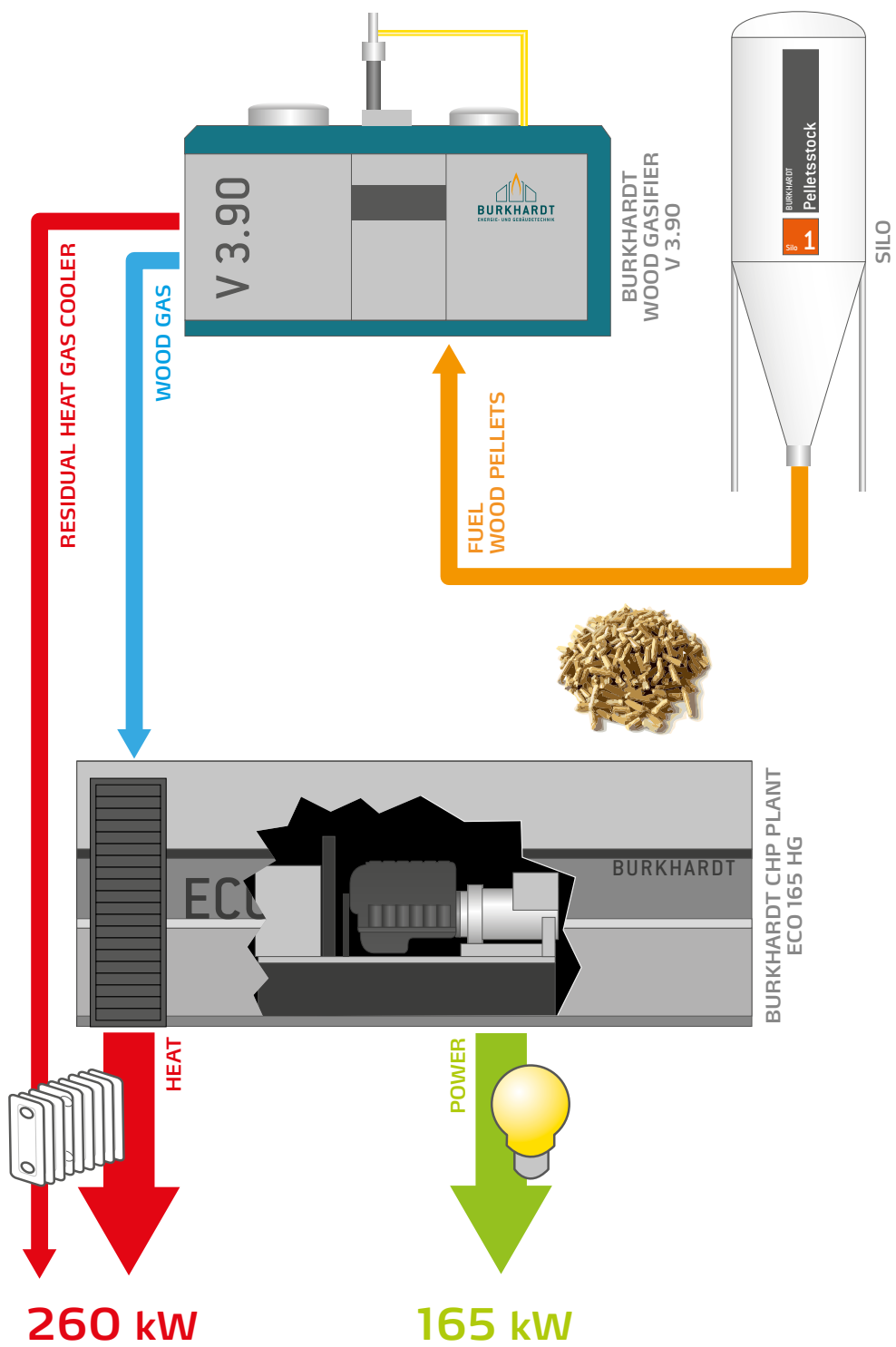
The wood gasifier uses the principle of rising downdraft gasification with a stationary fluidised bed. The gasification process takes place in four temperature ranges in which the fuel goes through different developments.

gas produced, which consists largely of carbon monoxide and hydrogen, is cooled, filtered and dried so that it can be used in the CHP plant. The gas is then converted into heat and electrical power using a combustion engine with cogeneration.

Some of the pellets are burned in the lower range of the fluidised bed. From a temperature of approximately 200°C, the wood is transformed into gaseous, liquid and solid substances. The



BURKHARDT WOOD GASIFIER AND CHP: FLOW OF MATERIAL

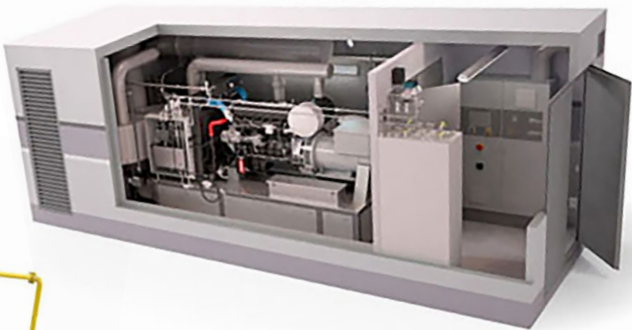


TWO DIFFERENT WOOD GASIFIERS, DEPENDING ON THE POWER REQUIRED

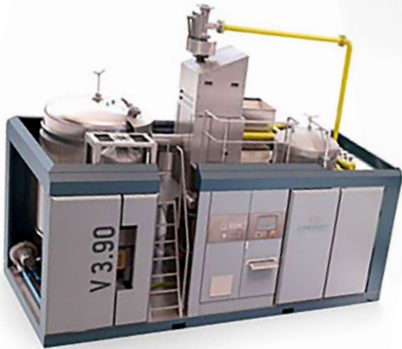
Together with the CHP plant, the wood gasifier produces electrical power and heat from wood pellets. Two different wood gasifier models in different performance classes are available:

Technical data

	Wood gasifier V 3.90 and combined heat and power plant ECO 165 HG (Ottomotor)	Wood gasifier V 4.50 with CHP plant Smartblock 50 T
Electrical output	165 kW	50 kW
Heat output	260 kW	110 kW
Wood pellet consumption	approx. 110 kg/h	approx. 40 kg/h
Plant efficiency elec.	30%	25%
Total efficiency	77%	80%



Wood gasifier V 3.90



Wood gasifier V 4.50

ALL-IN-ONE: TOTAL BUILDING SOLUTIONS

If integrating the wood gasifier into an existing building is not an option, a practical total building solution is available. In the building system, wood gasifier V 3.90, an Eco series CHP plant with acoustic protection booth and the pellet store can be installed in one unit efficiently and with minimum space requirements. The unit is fed via a bucket conveyor. A simple steel structure with a pent roof and sandwich panels is the ideal alternative to an existing building.

Dimensions (W x H):	19 x 6.4 m
Silo height:	7.15 m
Utility room height:	6.3 m
Net silo volume:	92 m ³

A total building solution can be visited in Strassen by appointment.



HOMOGENEOUS FUEL = STABLE PROCESS

The sole energy source for the wood gasifier is wood pellets as per specification EN Plus A1, which defines the composition of the pellets as regards water and ash content, size and ash softening point. This very homogeneous fuel in turn enables a very homogeneous gasification process ensuring that the plant operates consistently over a long period. Moreover, wood pellets can be stored economically and with minimum space requirements.

OVERVIEW OF ADVANTAGES

- Homogeneous, standardised fuel (water content, ash content, ash melting point)
- Renewable, regional raw material (the wood pellets are made by the firm KIWATT in Roost)
- Easy logistics
- Easier storage compared with wood chips
- Higher efficiency
- CO₂ neutral

BASIC CONDITIONS FOR THE ECONOMIC OPERATION OF A WOOD GASIFIER

A wood gasifier is used to safeguard the base load and should operate at full load all year round.

- Heat base load 260 kW or 165 kW
- Operating time 8,000 h/y

ADVANTAGES OF GENERATING POWER WITH WOOD GASIFIERS

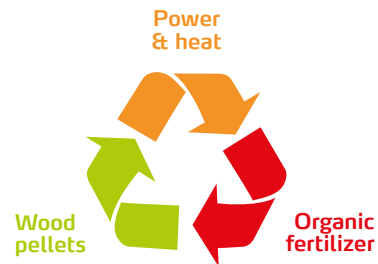
FINANCIAL

- Cost effective: mixed price* of 6-7 cents/kWh (2018 price) for a total building solution and an operating time of 8,000 hours a year, as the wood gasifier is subsidised pursuant to the "Grand-ducal regulation on the generation of electricity based on renewable energy sources of 24 April 2017",
- a possible state subsidy for the investment is available, based on the "Act of 18 February 2010 on a system of aid for the protection of the environment and the rational use of natural resources".

ENVIRONMENT

- Production of CO₂-neutral electrical power and heat.
- Maximum efficiency: electrical efficiency of approx. 30%, total efficiency of approx. 77%.

CIRCULAR ECONOMY



* mean value of price per kW and power consumption

WOOD GASIFIER AND ENERGY CONTRACTING

Energy Contracting by LuxEnergie offers customers a care-free solution for their power supply. LuxEnergie takes care of all the inspections, maintenance and repairs, without the need for any intervention by the customer.

A control centre monitors all plants day and night and sends an intervention team to the site immediately should a problem arise.

LuxEnergie has gradually mastered the optimal operation of the plants and by international comparison, its wood gasifier achieves a very high level of operating hours per year.

POTENTIAL WOOD GASIFIER CUSTOMERS

- Gas-CHP plant operators
- District heating network operators
- Municipalities
- Hospitals, hotels, swimming pools
- Industrial, forestry and agricultural companies
- Customers with high annual heating requirements

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