

CHP

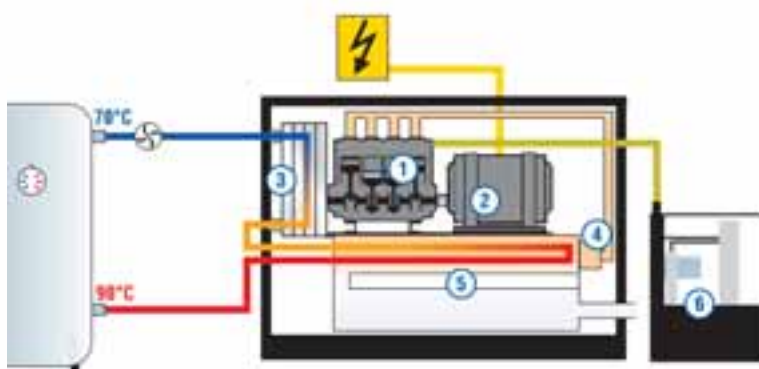


Cogeneration
plants



Energy has never been so cheap!

Cogeneration: combined heat and electric power: tomorrow's leading edge heating systems and current generators!



Plant elements

- 1 Engine
- 2 Generator
- 3 Motor heat exchanger
- 4 Catalyst (optional)
- 5 Combined heat exchanger (exhaust gas heat exchanger and silencer)
- 6 Vegetable oil prefiltering system

The technology

Compact cogeneration plants are called upon to produce heat and electric power, working according to the combined heat and power principle which, by means of the combustion of vegetable oils, for example, generates electric power with heat as a secondary product.

The deciding factor of these plants is their energy saving potential plus the fact the decentralized units are highly eco-compatible.

The condition for an effective use of cogeneration plants is a tendentially constant need and consumption of heat. This means they are ideal in the industrial, agricultural, handicraft and production sectors, in swimming pools, hospitals, sports and therapeutic facilities, hotels, residences and schools.

Since electric power and heat are produced in a decentralised manner (which is also where they are exploited) losses are minimised.

Technological standards

Cogeneration plants are equipped with endothermic engines, conceived in the naval and industrial sectors for long-term operation and distributed successfully on the market for many years now. The Diesel engine was developed and patented in 1890 for the direct combustion of coal dust. Among other things, the very first liquid fuel used in a Diesel engine was vegetable oil, replaced later by the much more economical petrol. In the next 115 years this brought about the transformation of the original multi-fuel engine to the high power one of today. **This short history proves that the hypothesis that vegetable oil combustion in a Diesel engine is harmful is completely untrue**, being the result of ignorance on the subject. All this considered however, the most peripheral parts of modern Diesel engines have been adapted to a qualitatively homogeneous and top quality fuel. This is particularly so for supply pumps, injection pumps and the nozzles. But another fuel must also have the same quality and homogeneity characteristics as Diesel at the distribution pump.

Concept

The concept is to produce eco-friendly energy:

The combustion process produces electric power and heat. Exhaust heat (cold water/exhaust gas) is transported by the heat exchanger to heat circuit of a centralised heating system of a building. Thus doing, the cogeneration plant reaches an efficiency of about 95% depending on the load.

Exploiting biomass in the cogeneration plant:

Thanks to the incentives on bioenergies, companies can take advantage of a second support and long-term cost stabilisation as regards to energy expenses: this is made possible by the vegetable oil cogeneration plant. With a sufficiently high base load and thanks to the larger reimbursements, these aggregates can produce **high gains** due to the sale of energy, alongside an efficient supply of heat and electric energy/emergency energy.

The vegetable oil engine:

Our cogeneration plants have been using engines and generators for this purpose for decades. Those on vegetable oil are made in the electric power range between 100 and 450 kW. Each module undergoes an operating test and delivered ready to use only after the final test and inspection. Seeing as thermal exposure and uniform operation are a guarantee of the duration of this engine power plant, all the components are adapted to site characteristics. A vegetable oil cogeneration plant has numerous advantages: The heat requirement is met by the exhaust heat produced by the plant itself which causes actual heating costs to plummet. Electric energy is accumulated in the public supply circuit and, therefore, reimbursed.



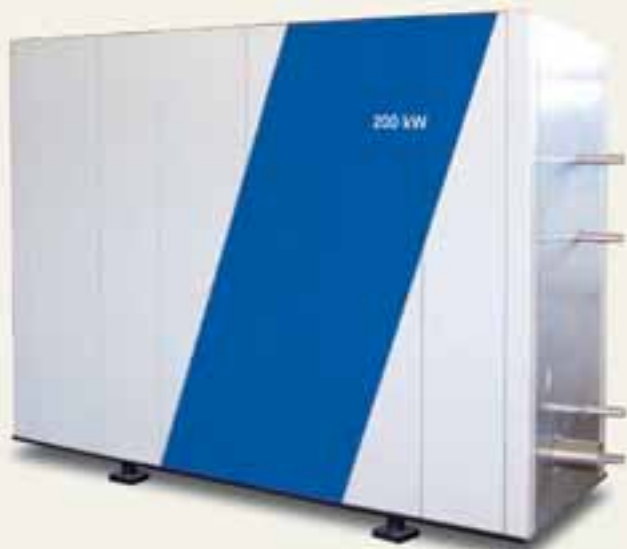
Our cogeneration plants work with diesel, biodiesel, vegetable oil, natural gas, propane or biogas and are distinguished for their long duration and high effectiveness: with 1 litre of vegetable oil 4 kWh of electricity and 5 kWh of heat can be produced!

Ideal for:

- district remote heating systems
- huts
- hotels
- residences
- biogas plants
- swimming pools
- hospitals
- industries
- business areas
- sports facilities
- schools

Advantages:

- profit earning thanks to the sale of energy
- reliability in the supply (in the case of black-outs as happened in summer 2003)
- very quickly written-off
- not dependent on the energy market
- climate and environment protection



Version to choose:

- open
- supersilenced
- in a container for outdoors

Modular structure

An industrial vegetable oil engine produces energy by means of a flange fixed generator which, when combustion occurs and via a heat exchanger, stores the heat produced by the engine and exhaust gases in the heating circuit. The generator works in parallel with the public supply circuit.

At present we are offering, vegetable oil, gas or biogas cogeneration plants with a power ranging between 100 and 450 kW/el. The base engines used are Deutz, Kubota, MAN, Volvo and MTU while the generators are Stamford.

Our plants comprise engines and generators on a frame, ready to use, fitted with controls for working in parallel with the circuit and (optional) sound reduction. Barring technical variations.

A modular cogeneration plant for the simultaneous production of electric energy and heat consists of:

- oil engine or gas engine
- generator
- control panel for adjusting and working in parallel with the circuit or emergency circuit
- modular adjustment
- motor heat exchanger
- topping up and automatic changing of engine oil
- exhaust gas heat exchanger (316 stainless steel) fitted with muffler and automatic bypass
- vegetable oil preparation and treatment unit

Optional:

- remote data transfer
- fuel tank, optionally heated
- heat count
- circulation pump for the heat cycle

Services

Thanks to our know-how and excellent network of partners, we guarantee you an economical, long-term plant operation.

Dissertori Services:

- technological development
- pilot plants/lab tests
- project management: support when planning, designing, implementing and supplying the fuel
- location assessment and evaluation
- intermediation with contracting projects
- system control
- operation management and optimisation
- assistance and maintenance
- remote control
- assistance
- insurance policy as protection against machine breakage and interruption of service
- reliable supply thanks to sector contracts.

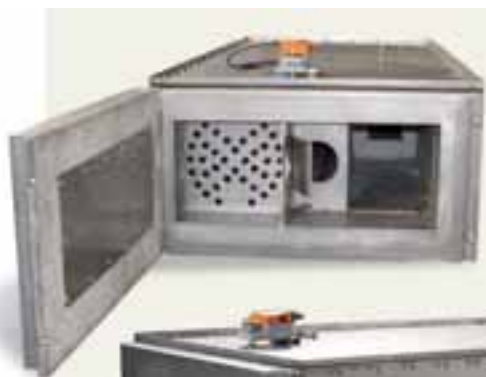
Your complete system is monitored by our partner companies.



Combined exchanger: Exhaust gas heat exchanger and ultra muffler in just the one element!

Combined exchanger built entirely in 316 stainless steel (combined heat exchanger and industrial supersilenced muffler) for recovery of the heat from exhaust gases (built to allow easy cleaning and/or maintenance) with automatic bypass. With the exhaust gas exchanger it is also possible to obtain high temperatures (up to 200°C).

Type	set for an engine power of
KT 100	fino a 100 kW
KT 200	fino a 200 kW
KT 300	fino a 300 kW
KT 450	fino a 450 kW



Vegetable oil prefiltering system

Fuel (vegetable oil) preparation/treatment unit with electrical preheating in the event of engine stopping – Heat exchanger – Filtering station with special extra fine filter - Valves

Type	set for an engine power of
PV 100	fino a 100 kW
PV 200	fino a 200 kW
PV 300	fino a 300 kW
PV 450	fino a 450 kW



Shelf for the battery

Universal shelf for battery and battery charger.

Vegetable oil

the fuel of the future!



What is vegetable oil?

Vegetable oil is solar energy biochemically stored at maximum concentration. Compared to solid biological raw materials (wood, straw) and biogas, vegetable oil is the most concentrated form of energy of photosynthesis. With an energetic density equal to approximately 9.2 kWh/litre, its place is between petrol (8.6 kWh/l) and diesel (9.8 kWh/l) but unlike the latter it can be regenerated with zero CO₂ impact and is free from sulphur, heavy metals and radioactivity. Moreover, it is made up of carbon (C), hydrogen (H) and a minimum part of oxygen (O) at a ratio of about C₆₀ H₁₂₀ O₆ and, therefore, is harmless for waterways in the

are eliminated by filtering or sedimentation and, therefore, this oil is not treated chemically as is the case for biodiesel. Environmental pollution caused by the particles of soot and elements that con-



tribute to the greenhouse effect are considerably reduced. During combustion the vegetable oil in a vehicle's engine has zero impact in terms of carbon dioxide, it has no sulphur and the emissions of toxic substances are considerably lower compared to the exhaust gas values of fossil mineral oils.

Main advantages in using vegetable oil as a fuel:

- it can be stored without any risk
- it has absolutely no risk for the environment during transport and storage
- its ignition point is higher than 270°C so it is safe
- it has a 0 risk class for water
- it does not evaporate so is not a fire hazard
- it is neutral to combustion in the presence of CO₂ it has about 50% less soot emissions than diesel
- it has no sulphur or heavy metal emissions
- it reduces the harmful emission of carbon dioxide by about 20%
- it reduces the emissions of toxic hydrocarbon substances by about 30%
- 90% is disposed of in the ground within three weeks
- it helps reduce the greenhouse effect; reduction of approximately 2.9 kg CO₂/kg

From an ecological point of view vegetable oil is the ideal fuel. To replace diesel in adapted engines a few expedients are necessary. We would also like to tell you about the quality of vegetable oil as a fuel and its storage.



ground.

The vegetable oil production cycle

Vegetable oil consists of cold pressed oil from rape seeds, soya seeds or seeds of other plants with a high oil percentage. The suspended substances in crude oil

Lastly, its eco-friendly storage in simple and economical tanks is possible without any problems as it biodegrades quickly and there is no risk for drinking water (risk class for water is 0). Being a raw material that grows continuously, it is undoubtedly a guarantee in terms of supply. Thanks to its energy content, vegetable oil is perfectly suitable to replace diesel and represents a great alternative for operating power plants and work machinery.

Storing vegetable oil

Unlike mineral oil, vegetable oil is subject to a far quicker ageing process (deterioration due to oxidation, the formation of free fatty acids). The oxidation processes are accelerated due to contact with oxygen, light and heat and with heavy metals with a catalytic effect (e.g. copper, brass, iron). Even the massing of sediments in the soil or penetration of water (condensate) reduces the storage stability of fresh oil. Good conditions permitting, therefore, storage can be from 1 to 1 •f5 years. To prevent untimely alteration to the oil the necessary factors are:

- a dark warehouse without any direct sunlight
- a steel tank
- the tanks must be cleaned thoroughly before being filled the first time
- the tanks must have large openings to allow for their periodical cleaning
- the fuel must be taken from the highest point to avoid any suction of sediment that could be in the fuel
- very little oxygen in the tank
- no water or dirt must be allowed inside
- the tanks and elements for conveying the oil must NOT be in copper or brass
- use pipes in stainless steel, steel or aluminium

The quality of vegetable oil used as a fuel

Combustion engines need guaranteed quality fuels. If a vegetable oil engine is to work with absolutely no problems the quality of this fuel is fundamental.

Only vegetable oil conforming to the Weihenstephan or DIN 51605 standards can be used in our cogeneration plants and must be requested at the moment of purchase. Avoid mixtures with gas oil or diesel oil as they would considerably compromise mixture stability.

The use of poor quality vegetable oil can seriously damage the engine, cause carbonisation of the injection nozzles in the combustion chamber and of the pistons, damage the injection nozzles, jam the elastic phases of the pistons and, as a result, thicken the oil in the engine meaning costly repairs.



Biogas

on-site production of energy!

What is Biogas?

Biogas is a gas mixture, originating from the microbial decomposition of organic substances without any air and consisting of 50-70% natural gas, 30-50% carbon dioxide and other different gases in minimum concentrations.

Biogas, with a high energy value, can be transformed into electricity and heat via compact power cogeneration plants. The resulting electricity is sent into the public supply circuit or used inside the company.

The resulting heat can be used for heating stables, stalls, homes, big and small industrial facilities as well as other buildings.

As energy costs rise the use of biogas in boilers will gradually increase too.

For the production of Biogas, renewable raw materials are suitable such as, for example, corn, rye but also liquid manure and dung.

