VEG OIL 2 FUEL

ECOMAS.ENERGY

VEGETABLE OIL **PRETREATMENT** FOR USE AS FUEL AND **GENSET CONVERSION**

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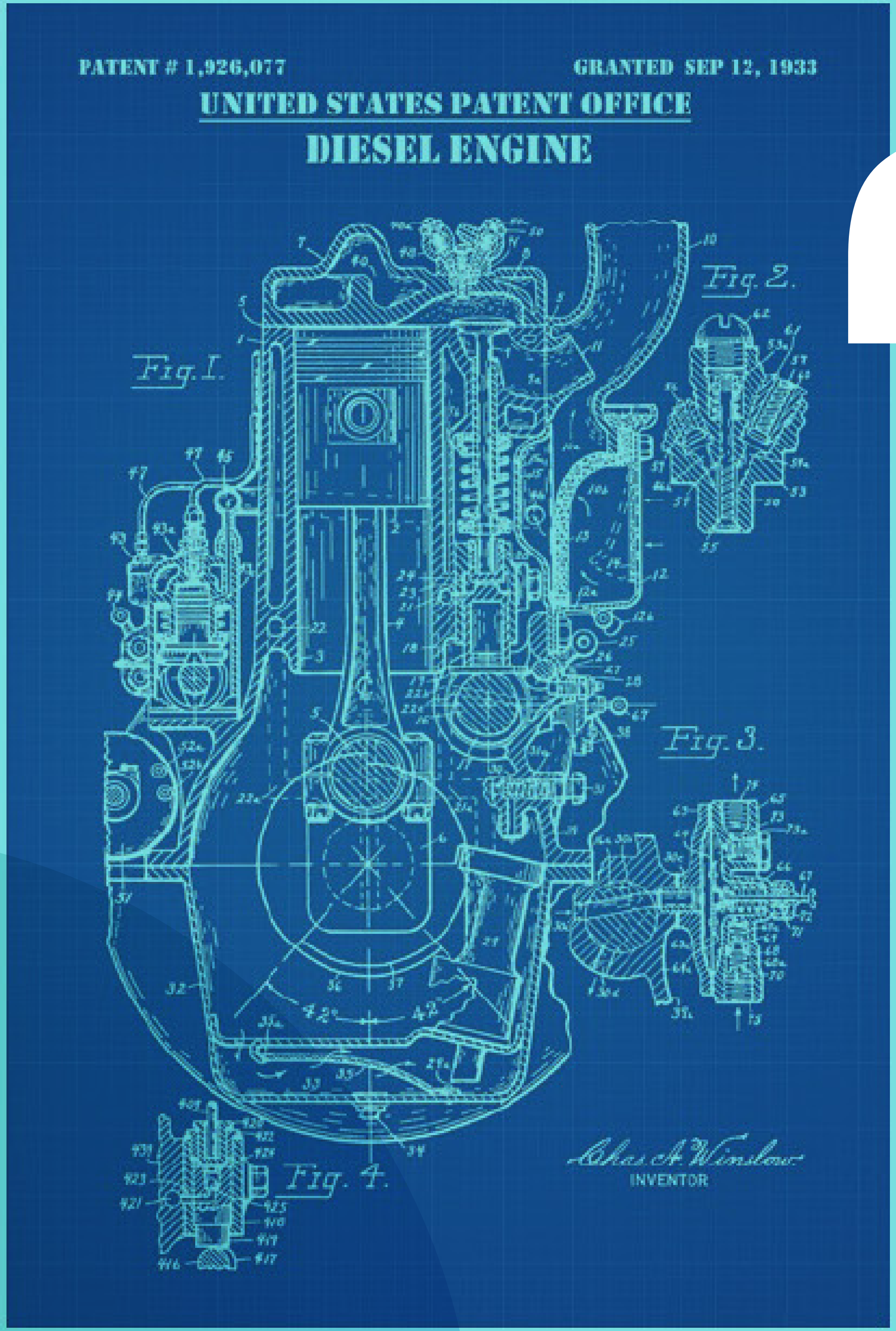


"The diesel engine can be fed with vegetable oils and would help considerably in the development of agriculture of the countries which use it."

Rudolph Diesel, 1912

Problem

Fossil fuel prices are rising and this is not likely to stop soon.

Western governments are actively discouraging fossil energy companies from investing in securing future supply of oil, gas and coal for climate reasons. Energy companies have cut their exploration investments to all-time lows. Supply will decline fast while demand will remain high, for longer, we believe, than most people anticipate. The spike in energy prices we saw at the end of 2021 is only a beginning. For remote sites that depend on diesel generators for electricity, this is a very costly trend.

Solution

In some remote tropical regions, vegetable oil from palm oil and coconut trees is cheaply available in abundance, while refined diesel is often double the price and hard to come by. Together with our suppliers, ecomas.energy has assembled a standardized line of products that allows for any vegetable oil to be used as fuel in your generator. Depending on where you are located, vegetable oil can be a cheap and carbon neutral alternative to diesel fuel. For producers of vegetable oil, there’s the additional advantage of becoming completely independent in energy supply.

Only two steps

There are two steps to this solution. The first one is a vegetable oil pre-treatment unit, which filters out and neutralizes any contaminant in the vegetable oil (particles, acidity and humidity) that might damage the generator and heats the oil to the right temperature to reduce its viscosity. The second step is the modification of the existing generator fuel supply line with automatic valves and controls. This way the generator can switch to vegetable oil combustion by simply pressing a button. It is always possible to return to normal diesel operation by pressing that same button again. No bridges are burned, within seconds the original situation is restored.

Not biodiesel

Please note that we are not offering a biodiesel solution. Biodiesel is chemically converted vegetable oil, while we keep the vegetable oil in its original chemical state. The advantage of biodiesel is that no engine modification is needed. However, the disadvantage is that the chemical conversion to biodiesel needs a more advanced processing unit and comes with the logistical challenges of chemicals and waste. Both problems do not exist for straight vegetable oil combustion as proposed in this brochure.

Veg oil operation cycle

To use pure vegetable oil as a fuel, it is necessary to first preheat the diesel engine. After about 15 to 30 minutes of running on diesel, the engine is ready (hot enough) to switch from 100% diesel to 100% vegetable oil. As long as you don't shut the engine down, you can then run continuously on pure vegetable oil for as long as needed. Just before shutting down the engine, the system automatically switches back from veg oil to diesel for a "rinsing cycle" of a few minutes. This is done to assure that no unburnt veg oil would stick in the cylinders.

Convertible engines

Most diesel engines are suitable to run on pure veg oil. Fun fact: Rudolph Diesel, the inventor of the diesel engine, modified his engine to run on 100% peanut oil in 1900. It was only in the 1930s, decades after his death that diesel fuel became a standardized product. Before, people used whatever was abundant and cheap as fuel: coal tar, rapeseed or lubricating oil, etc. At the moment we only convert direct injection diesel engines. Common rail diesel engines are possible too, but more testing is needed. If only a common rail diesel generator is available, a new generator needs to be bought. This sounds like a big investment, but for generators using thousands of liters of fuel per day, the investment is often paid back within months.

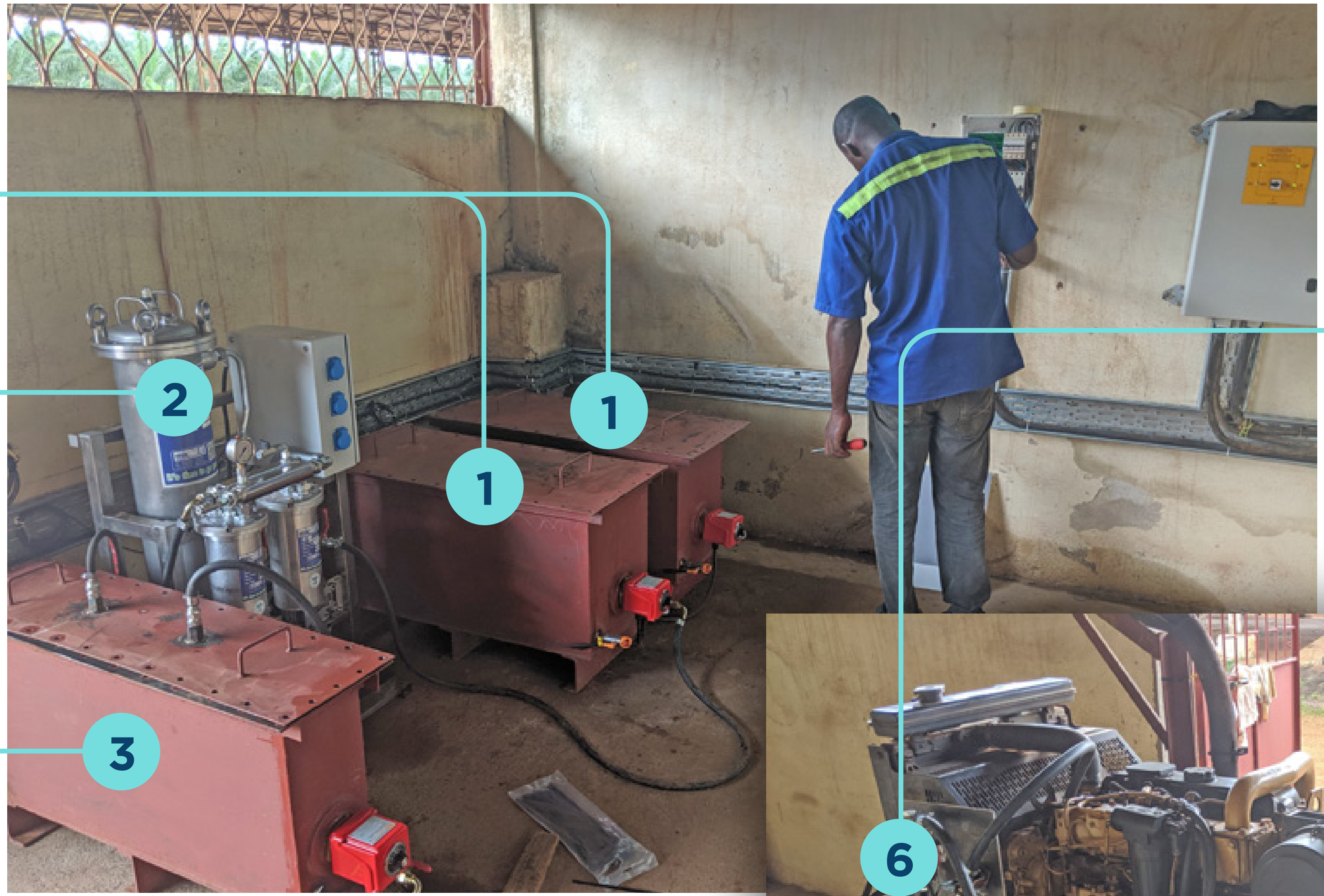
Not only gensets

We can convert trucks, tractors and cars to run on pure vegetable oil too. However, from an economic perspective, generators are by far the most interesting application of this technology. Because of the large volumes of fuel that are needed on a daily basis and the continuous operation of most generators on off grid locations.

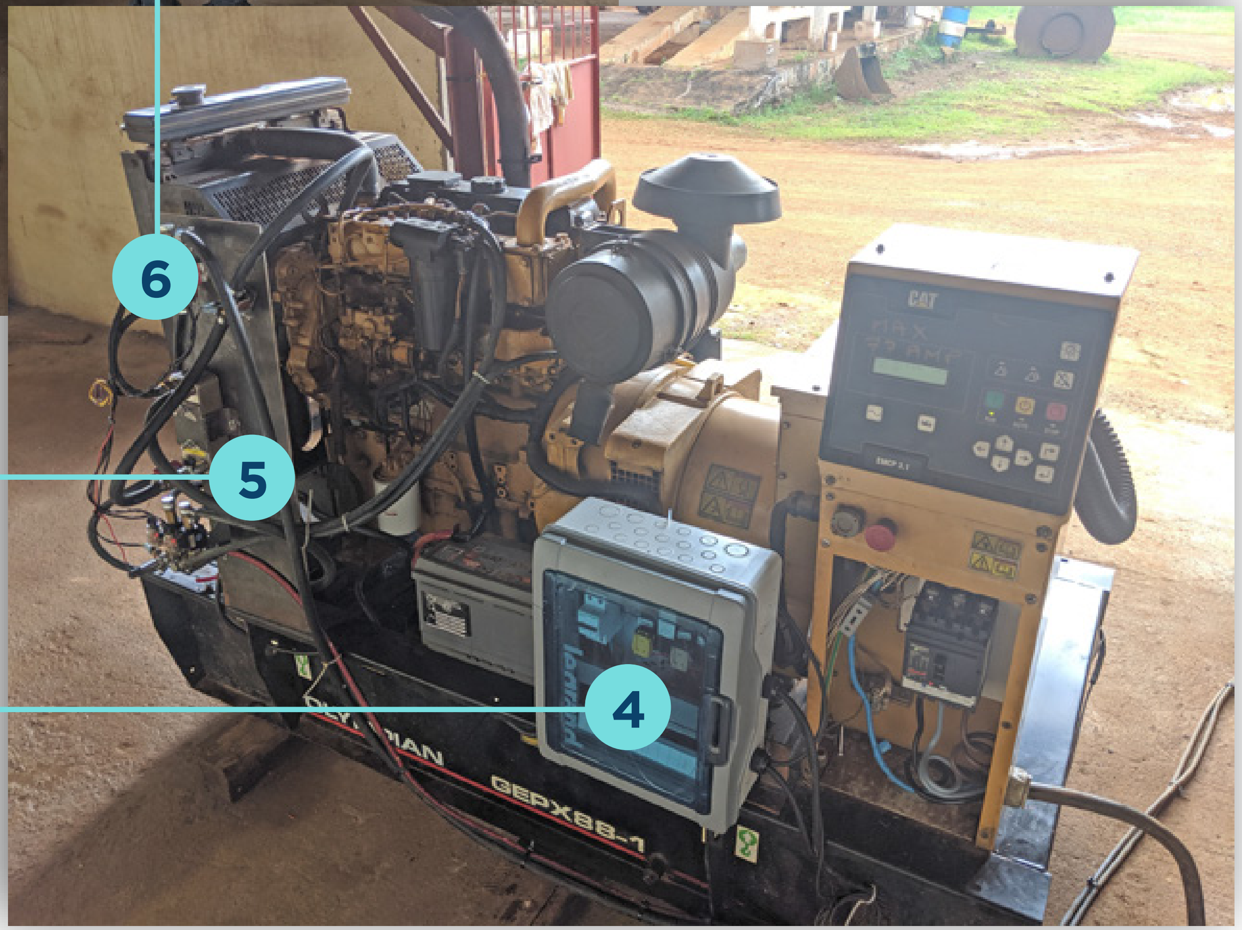
Veg oil buffer tank and preheating before filtration

Filtration and pretreatment system

Feed and return veg oil tank to generator with temperature control



Fuel booster pump



Diesel and veg oil switching valves and additional heat exchanger

Electric control panel (pilot installation only)

Components

On the picture you see a description of our pilot installation that ran successfully in Cameroun for over 4000 hours. Both CPO and PKO were used in a CAT genset of 100 kVA (Perkins engine).

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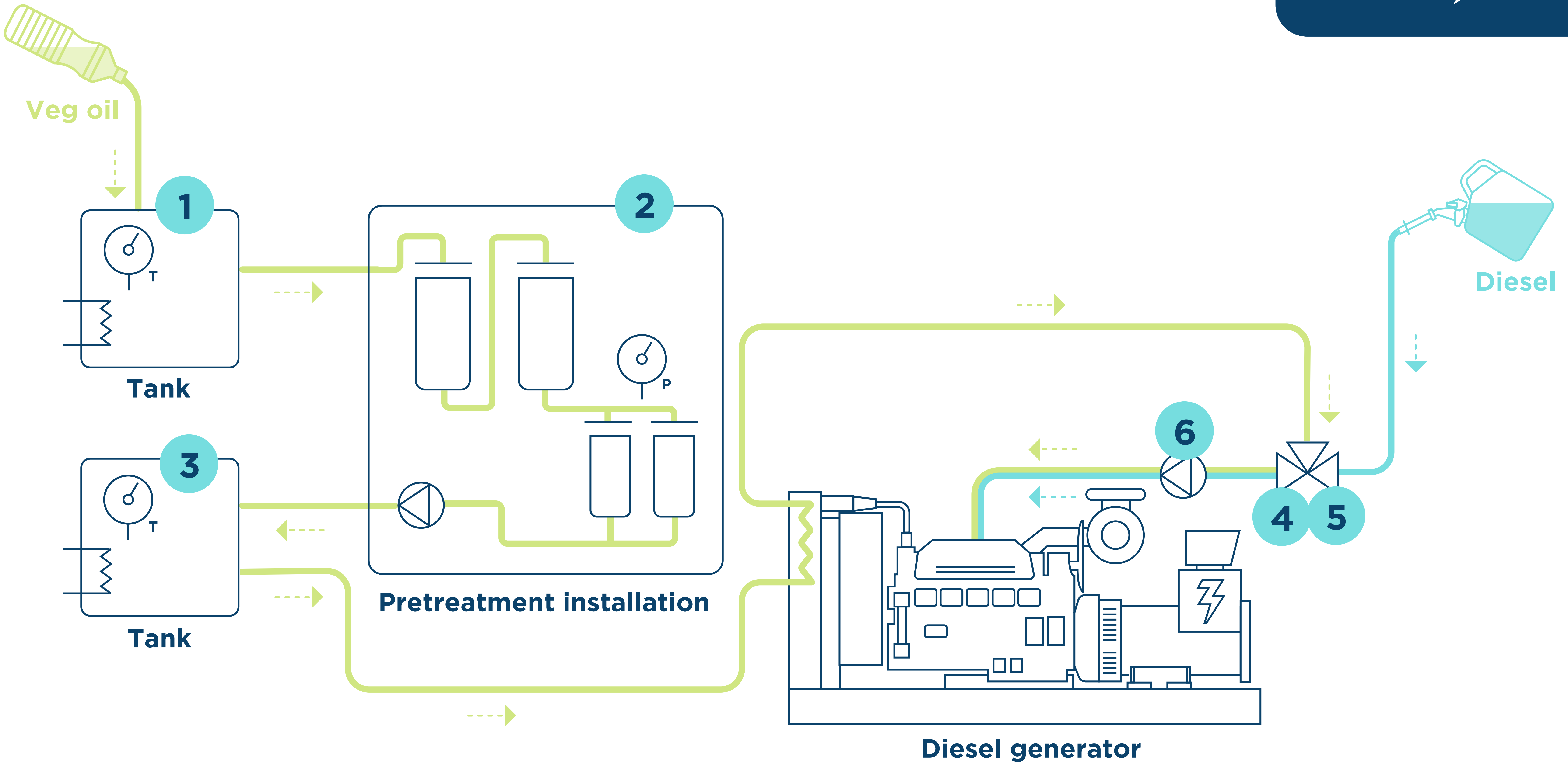

Tractor conversion

On the photos a converted Landini tractor is shown to demonstrate that a more compact modification is possible too, using a monobloc with valves and controls compactly joined together. Unlike the pilot installation, there is no separate electric control panel. The vegetable oil pretreatment is done of course in a separate unit, the tractor is equipped with a separate tank that holds the pre-treated veg oil.

Offer

For a 500 kVA diesel generator, the preatreatment unit and engine conversion costs only 25 000 euro (CAPEX). The unit can pretreat and filter about one thousand liter per hour, but higher flows are available upon request.

One filter of 50 euro allows for a filtration of at least 1000 liter. Which comes down to a filtration cost of no more than 5 cents per liter (OPEX). Of course this cost is paid back quickly, if locally, the price of veg oil is lower than the price of diesel. In some cases, where the price of diesel is about $2 and veg oil (CPO or other) is at $1, the installation is paid back within one week for a 500 kVA genset running at full load. A free cash flow of $100 000 is generated after that, every single month!

Turnkey

Ecomas.energy offers this solution turnkey wherever you are located. We dimension the needed pre-treatment installation, analyse what is needed to modify your existing diesel generator, purchase and prefabricate the equipment, ship it, mount it on site, do the commissioning, train your operators for a few weeks to a month if necessary and help to keep performance high afterwards. We design and build the whole installation together with two German suppliers who are world class in their niche.

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