

1000 kg of  
plastic waste  
= 10 000 kWh



# Renewable Fuel Power Plant (RFP)

Product description

**NOCART**  
Providing Power.

# Nocart Renewable Fuel Power Plant (RFP)

## Product overview

The Nocart Renewable Fuel Power Plant generates fuel oil by recycling various oil-based waste into liquids, gases, and solids. These end products can be transformed into electricity with the Nocart power plant.

The Renewable Fuel Power Plant can utilize source materials such as rubber (for example tires), plastic (excluding PVC) and difficult-to-recycle waste (such as used oil and contaminated soil). The source materials are distilled into liquids such as oil, gases such as methane, and solids such as carbon black and metals. After the process, the end products can

be further utilized: oil can be distilled into high-end petrochemical products, gas to be used for energy production and metals sold as raw material for the industry.

The Nocart Renewable Fuel Power Plant is easy to install and maintain, cost-effective, simple, and durable. Due to its modularity, it is scalable and easily upgradable.

Nocart builds the plant with the focus on the individual needs of the customer. The feasible minimum handling capacity of the plant is 8 tons of oil-based difficult-to-recycle waste per day.

### Using the Nocart RFP-Plant for energy production

The fuel oil, gas and carbon black made with the Nocart RFP-Plant can be converted into electricity and distributed with the Nocart Power Management Unit (PMU). The concept of the power plant is a unique solution for generating electricity from different source materials using various methods. The electricity production capacity of a renewable fuel power plant is from 500 kW upwards.

The Nocart RFP-Plant is a reliable source of energy that helps customers become energy self-sufficient. Using renewable fuels as an energy source has significant environmental benefits. The renewable fuel

plant has a negative carbon footprint, as it reduces the amount of otherwise unprocessable waste. This brings not only benefits in terms of ecology, but also of corporate image. In the long run, the cost savings are also significant.

The Nocart RFP-Plant is managed by an economical and reliable Power Management Unit. The system guarantees 24/7 power feed and can operate fully off-grid. With its user interface, the operation of the system can be monitored, even remotely.

### Benefits of using the Nocart RFP-Plant

The Nocart RFP-Plant produces high-quality fuel oil, gas and carbon black. The end products are fully comparable and competitive with materials made from non-renewable resources.

The Nocart RFP-Plant is fully modular and with minor changes, it is possible to upgrade the plant with a parallel unit. It can also be supplemented with unique Nocart solutions such as wind turbines, biogas production and solar panels.

Nocart provides support and training for the users of their products. With the help of on-site training, the customer will learn how to operate the plant reliably and at its full capacity. Nocart provides on-site training, or customers can travel to Finland to attend an in-depth training course on recycling at Nocart's research and training center.

Through a long period of research and testing, the experts at Nocart have developed a beneficial, industrial-scale process to recycle oil-based, difficult-to-recycle waste.

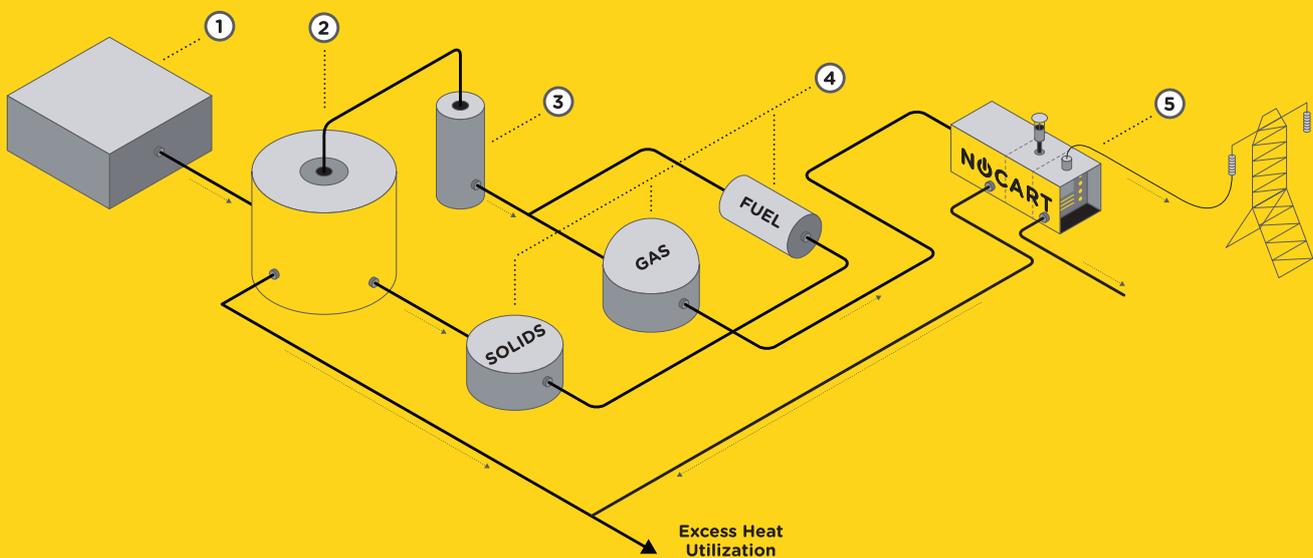
Nocart's expertise guarantees a controlled and safe production process for renewable fuel. Equipped with monitoring and control mechanisms, the Nocart Recyclable Fuel Power Plant's operation is highly automated.

## How does the Nocart RFP-Plant work?

### Parts

The Nocart RFP-Plant is composed of pre-processing equipment, one or more reactors, a distillery, end product storage, and an optional Power Management Unit. Nocart provides a modular turnkey delivery for all equipment.

1. Pre-processing equipment, such as a shredder.
2. The reactor
3. The distillery
4. Storage tanks for output materials
5. The Nocart Power Management Unit (PMU)



### Functional description

1. The source material is pre-processed by sorting and crushing it into suitable particle size.
2. The material is fed into the reactor where it is converted into gases and other end products using a thermal treatment process.
3. The gas is filtered to remove unwanted heavy particles.
4. The gas is fed into the power plant, and/or is further processed in the distillery:
  - a) Condensable gases are distilled into liquid fuel.
  - b) Non-condensable gases are stored in a gas dome for later use.
  - c) After storage, gases and liquids are converted into electricity in the power plant.
5. The process produces carbon black and metal by-products. Carbon black can be sold or used in energy production. Metals can be sold as raw material for industry; they have a high demand in the global market.

**The end products are fully comparable and competitive with materials gained from non-renewable resources.**

## Further information

### Source materials

The Nocart RFP-Plant can use all oil-based materials as source material:

- Rubber (for example tyres, hydraulic hoses)
- Plastics (excluding PVC)
- Problem waste (for example contaminated soil, used oil, oily sludge)

### Energy values for different materials

Note that specific production numbers can be defined once the quality of the source material has been analyzed.

Source material	End products			
	Liquid	Gas	Carbon black	Metals
Rubber (Tyres)	40–45 %	8–10 %	30–40 %	10–12 %
Plastic (PE)	82 %	17 %	1 %	n/a
<b>Energy value (Approx.)</b>	11,6 kWh/liter	11,6 kWh/cbm	7,5 kWh/kg	n/a

The production numbers vary depending on the raw material. The customer can send their source material to Nocart to be analyzed and tested under laboratory conditions at the research center in Finland.

### The benefits of the RFP-Plant vs. incineration

Thermal treatment is an ecological choice for recycling waste as it leaves end products for further utilization. The end products can be used in energy production or sold as raw material for industry.

Thanks to a zero-oxygen reactor, the Nocart RFP-Plant emits no oxides into the atmosphere, which reduces the greenhouse effect. With a renewable fuel plant customers can receive 100 % benefit from the energy of the source material whereas with incineration, only 4 % of the energy is utilized.

#### Safety

The Nocart Renewable Fuel Power Plant has been designed according to European safety standards as well as regulations governing health and safety at work, and fulfils the requirements of European electrical safety standards. With its monitoring and control mechanisms, the Nocart RFP-Plant operates with a high degree of automation.

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