R.E.C.

TECHNOLOGY

E-COMPANY Holding, s.e., Europe

With R.E.C. ZERO-EMISSION WASTE TREATMENT

- ✓RECYCLING is guaranteed and total
- ✓ENVIRONMENT is safeguarded
- ✓COMBUSTIBLE is green and free

WASTE TO LIQUIDFUEL
Molecular Rearrangement
without combustion

we are capable of **RECYCLING** all types of waste

REC Technology performs the COMPLETE CYCLE to create liquidfuel, gas, coal, drinking water, and clean energy, from undifferentiated urban waste collection, industrial solid and/or liquid refusals, sludge, waste from petrochemical processing, medical waste and other hazardous toxic and radioactive waste, as:

- daily harvest of urban waste, landfill mining and leachate of the same
- hospital wastes
- sludge from the treatment of sewage civilians and/or industrial
- from tanneries, refineries, marine disasters etc
- car-fluff, tyres

- scraps of food processing industries, agriculture, zootechnical and/or forestry industries, dead animals
- every organic matter waste
- radioactive waste and/or contaminated materials and soil

INERT & GLASS & METALLS «only» separated and recycled as usual

R.E.C.

we safeguard the **ENVIRONMENT** with ZERO IMPACT

- ***Zero environmental impact and structural mitigation***
- ***Non-combustive Process at 350 ° C***
- ***Production of synthetic liquid automotive fuels sulfur free***
- ***Availability to generate and sell a clean electricity and heat energy***
- ***Production of clean gas***
- ***Production of utility or drinking water***
- ***Energy self - sufficiency***

R.E.C.

WITHOUT CHIMNEY

WITHOUT BAD SMELLS

we are able to produce a clean **COMBUSTIBLE** liquid & gaseous

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REC Technology is a industrial copy of a natural geological process of crude oil production; this transformation in petroleum hydrocarbons is realized not in millions of years, but within a few minutes:

The convert of all complex organic materials whose molecules contain carbon and hydrogen (therefore wood, agricultural waste, manure of animals, paper, plastic polymers etc.), occurs at a temperature 350-370°C without combustion, through the molecular catalytic dissociation and rearrangement.

The REC Technology is not a pyrolysis reaction! Consequently, if the temperature is kept below 400°C, production of toxic pollutant as carbon dioxide, dioxins, furan, polychlorinated biphenyls etc., is avoided. Our Company has applied this well-known chemical reaction of catalytic molecular cracking into a industrial application of continuous process of eco-friendly fuels production.

In a closed loop the organic waste / raw materials, mixed with the purpose-designed catalysts, produce the following catalytic reaction:

- Molecular cracking of long hydrocarbons at low temperature (290 °C 350 °C) and low pressure (0.9 bar)
- Unique high output of more than 80% of the input hydrocarbons
- Fixation of hazardous halogens into salts
- **Output of gaseous and liquid fuels.**

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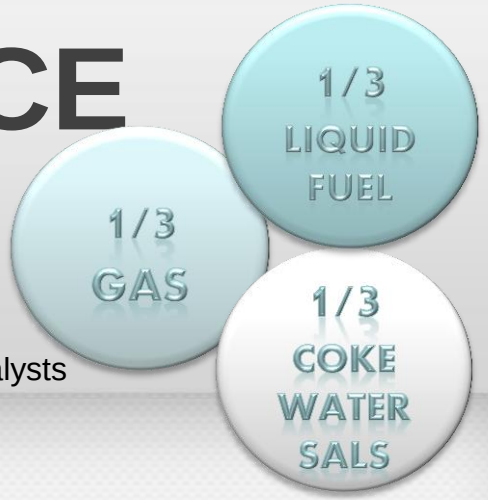
PROCESS CAPABLE OF CLEANLY CONVERTING ALL THE HUGE VOLUMES OF BIOMASS AND ORGANIC WASTES INTO GASEOUS AND LIQUID FUELS WITHOUT ANY TOXIC AIRBORNE EMISSIONS OR SOLID TOXIC RESIDUES

REC 1000 – Patter Plant MASS BALANCE

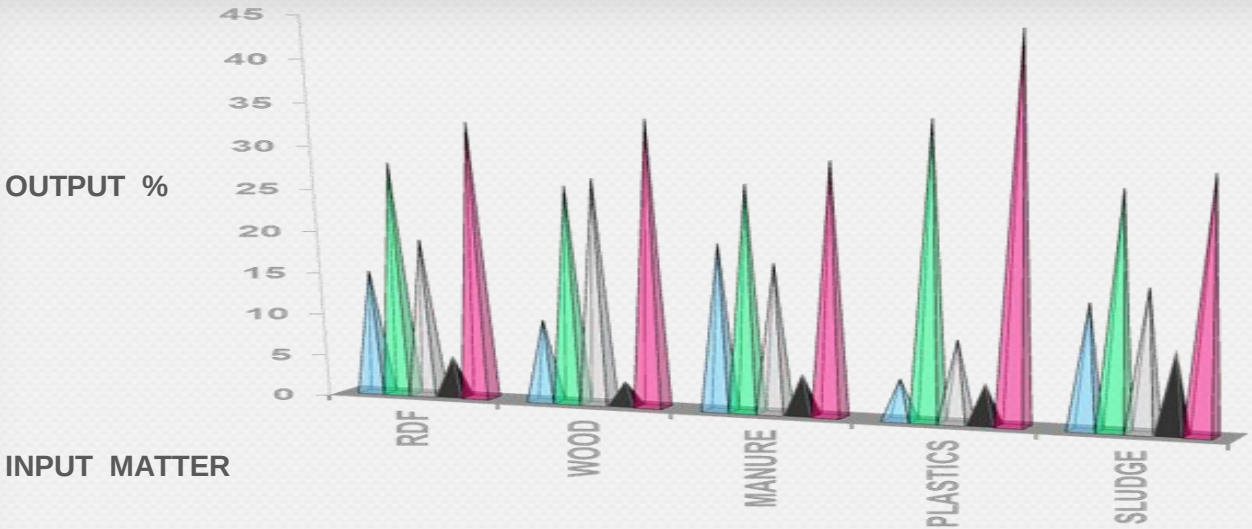


INPUT: 3 ton/h of dried and milled matter (8-10% moisture max, size 3-5mm)

OUTPUT : 1/3 gas (mixture of hydrocarbon gases)

1/3 synthetic liquid fuel (sulfur free naphta) 10.500 Kcal/kg 0,84 kg/lt

1/3 distilled water + solid residue as carbon, inorganic salts and exhausted catalysts



GAS produced from our chemical reaction is generally formed from: 50% combustible mixture as methane, ethane, butane, pentane; 30% carbon monoxide (CO); 20% CARBON DIOXID (CO2) – this balance is depending on the material input. This gas has an excellent calorific value and can be used for the auto-consumption of the plant, with medium production of 2000-2300 kWh of energy power. Wastage heat energy is recovered to a closed loop to drying of input matter.

The **SOLID RESIDUES** are composed of approximately 50% of pure carbon (coke) and the remaining components are inorganic salts present in the input material, neutralizing matter and exhausted catalyst.

The amount of solid residues is variable of 15-25%; this value depends exclusively on the quality of input material. Residues of carbon can be used to produce additional energy; other inert elements, as carbonates and silicates compounds, are very suitable additives for cement manufacturing process.

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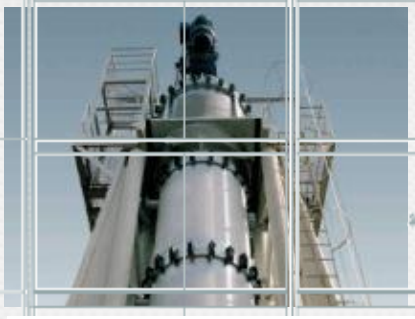
From INPUT depends OUTPUT but the critical equipment remains unchanged

KEY UNITS

CRITICAL EQUIPMENT 350° 8000 h / p.a.

KEY UNITS TO PROCESSING AND CONVERTING ALL THE HUGE VOLUMES OF WASTE INTO GREEN FUELS



REC process involves a double reaction mechanism: the molecular rearrangement and catalytic cracking. REC process induces a double mechano-thermal reaction: the molecular rearrangement and catalytic cracking. As a result of both, the heating to 350°C obtained by friction of the material mixed to diathermic oil continously self-produced, by the presence of a suitable catalyst and neutralizing, after a distillation of hydrocarbons chains in a refinery tower, we obtains the desired fuel:

- **FEEDING SECTION**
- **S105, A105, Mixer heating Conditioning**
- **F107, Heating conditioning**
- **S106, R101A-B-C , Reactor**
- **EF162, s162 Carrier Recovery**
- **Instruments and Control System**

R.E.C. FITTINGS

From TYPES of INPUT matter depends QUANTITY & QUALITY of OUTPUT balance

REC transformation process of waste into fuel : dried + milled input matter is introducing into the circuit processing with a carrier oil+ catalyst + neutralizing and subjecting this mixture, after a mechano-thermal reaction, to a distillation which make it possible to obtain the separation of the desired fuel by residual substances.

INPUT OPTIONAL FITTINGS

- **PRE-SELECTION SYSTEM** (Automatic or semi-automatic)
- **VOLUME REDUCTION** and/or STABILIZATION
- **INERT REMOVER** and INERT RECYCLING SYSTEM
- **SPECIFIC PROCESSING** (toxic, carfluff, tires, hospital, etc.)
- **HOMOGENIZATION** with milling and drying of input matter

OUTPUT OPTIONAL FITTINGS

- **GAS COGENERATION** for energy self sufficiency
- **FUELS TANKS** (recovery of Gas and Liquidfuels to sell)
- **LIQUIDFUEL COGENERATION** energy to sell or to self sufficiency
- **WATER TREATMENT** to utilities and/or to drink and sell
- **COKE BRIQUETING** and **INERTS GRANULATION** to sell

PREPARATION OF MATERIAL
The solid and/or liquid waste will be subjected to a suitable preliminary process of selection and preparation, which provides the reduction in particle size, the drying and the removal of metals and inert substances.

LIQUID FUEL is a mixture of synthetic hydrocarbons with predetermined fractions, whose calorific value is about 10.500 Kcal/Kg, produced by changeover of gaseous hydrocarbons released by REC-Process into liquid synthetic fuel (**naphta**) via direct conversion (refinery) based on evolution of Fischer-Tropsch method:

WITHOUT COMBUSTION: **GAS-TO-LIQUID (GTL).**

INVESTMENT RETURN

The calculation of break even point of the investment, just like for any other industrial plant, depends on the quantity, quality and price of the incoming waste and on the use of produced fuels and of other by-products.

RECEIVING CAPACITY per annum

REC 1000 – Patter Plant

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- 70,000 ton p.a. of MUNICIPAL WASTE, BIOMASS or other mix rubbish *or*
- 25-30,000 ton p.a. of RDF (Refuse-derived fuel, produced by shredding and dehydrating solid waste) *or*
- 100,000 ton p.a. of SLUDGE *or*
- 25,000 ton p.a. every plastic, textil, tires, carfluff *and/or* any other dry waste.

PRODUCTION VALUES

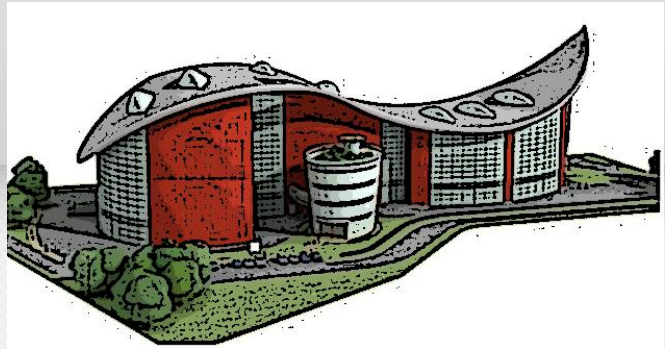
8,000,000 liters of naphta per year

naphta	gas	water	coke
940 kg / h 10.200 Kcal / kg	870 kg / ha 6.500 Kcal / kg	500 l/h	160 kg / h 5.000 Kcal / kg
5 MWe 8 MWt	**2,2 MWe** 3,3 MWt		

R.E.C. BIOCLIMATIC ARCHITECTURE

STATIC ARCHED SYSTEM

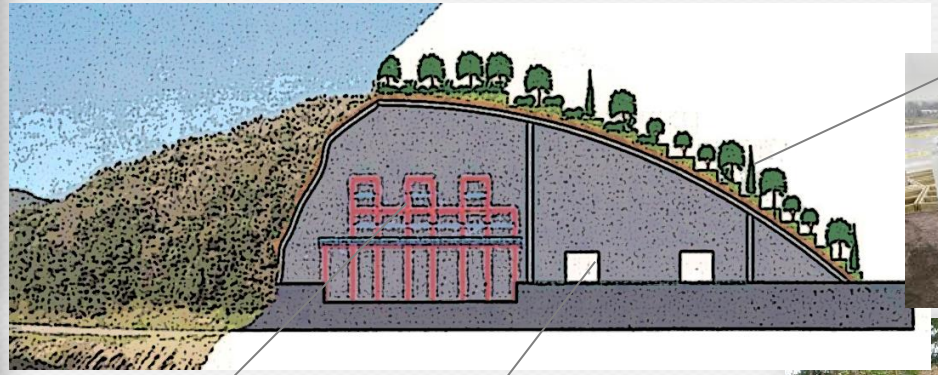
- antiseismic
- low environmental impact
- 100% recyclable materials (steel, wood and glass)



INDUSTRIAL URBANIZATION

- NO CHIMNEY
- NO ODOURS
- NO NOISE

or



TOTAL MITIGATION

RESPONSIBLE CHOICE to build ECO-FRIENDLY

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TECHNOLOGY

We feel obliged. Really.