Recycle
Energy

We are on a different and more environmentally friendly way than known energy sources. This allows us to produce more energy.

5D RECYCYLE & ENERGY

PLASTIC WASTE TO ENERGY

ENERGY AND PYROLYCTIC OIL PRODUCTION FROM PLASTIC WASTE

(By Pyrolysis process)

INDEX

Plastic **Waste Problem**

Plastic waste problem is very serious concern to the natural World. Waste problem is becoming more theatening to Environment, Finance and especially to Public Health.

- Environment
- Plastic Waste **Disposal Problem**
- Dangerous Gas Leakage
- Fire and Explosion
- Hazard of Public Health

Environmental Pollution

144 TON

Plastic waste being disposed to sea everyday in Turkey

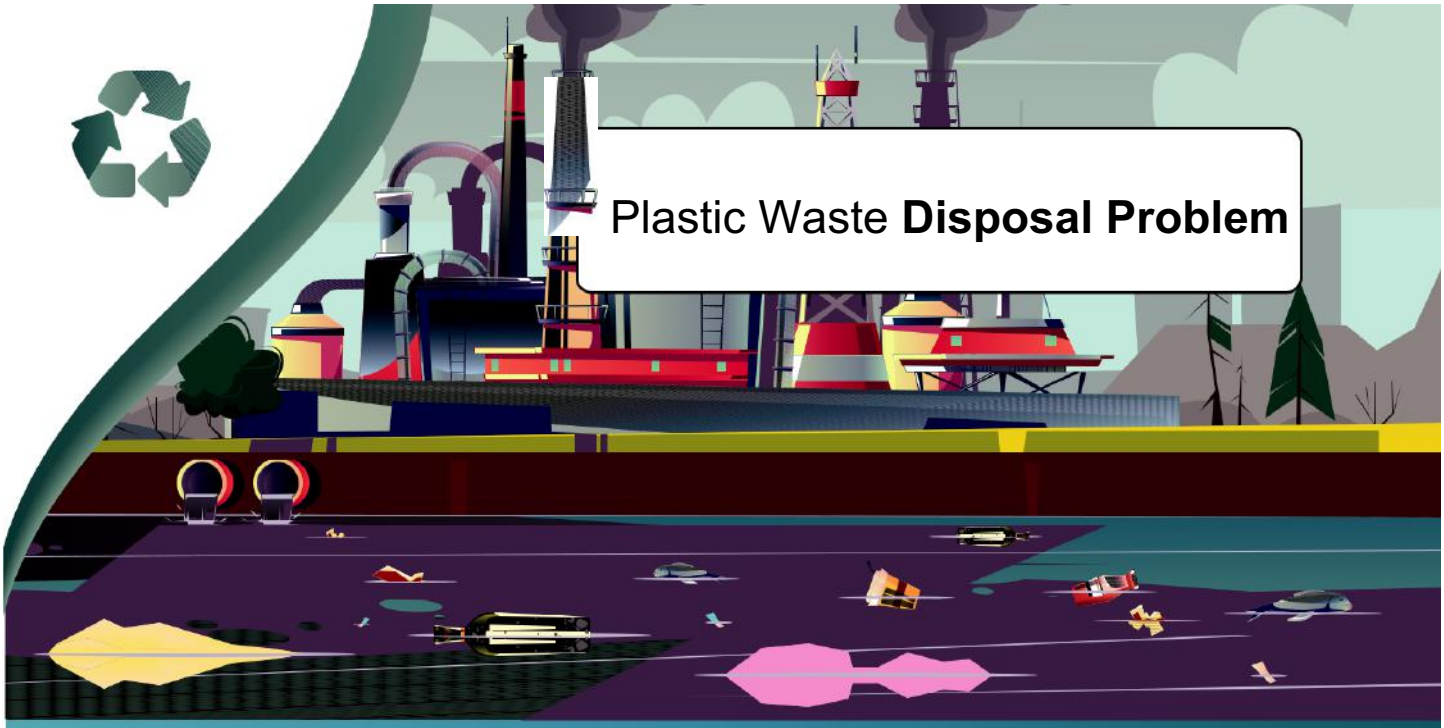
As per specialists, The harm to sea eco-system by plastic waste is around **13 bilion usd.**

31 MILLION TON

domestic waste being produces in Turkey in every year.

12%

Plastic waste is 12% of the domestic wastes.

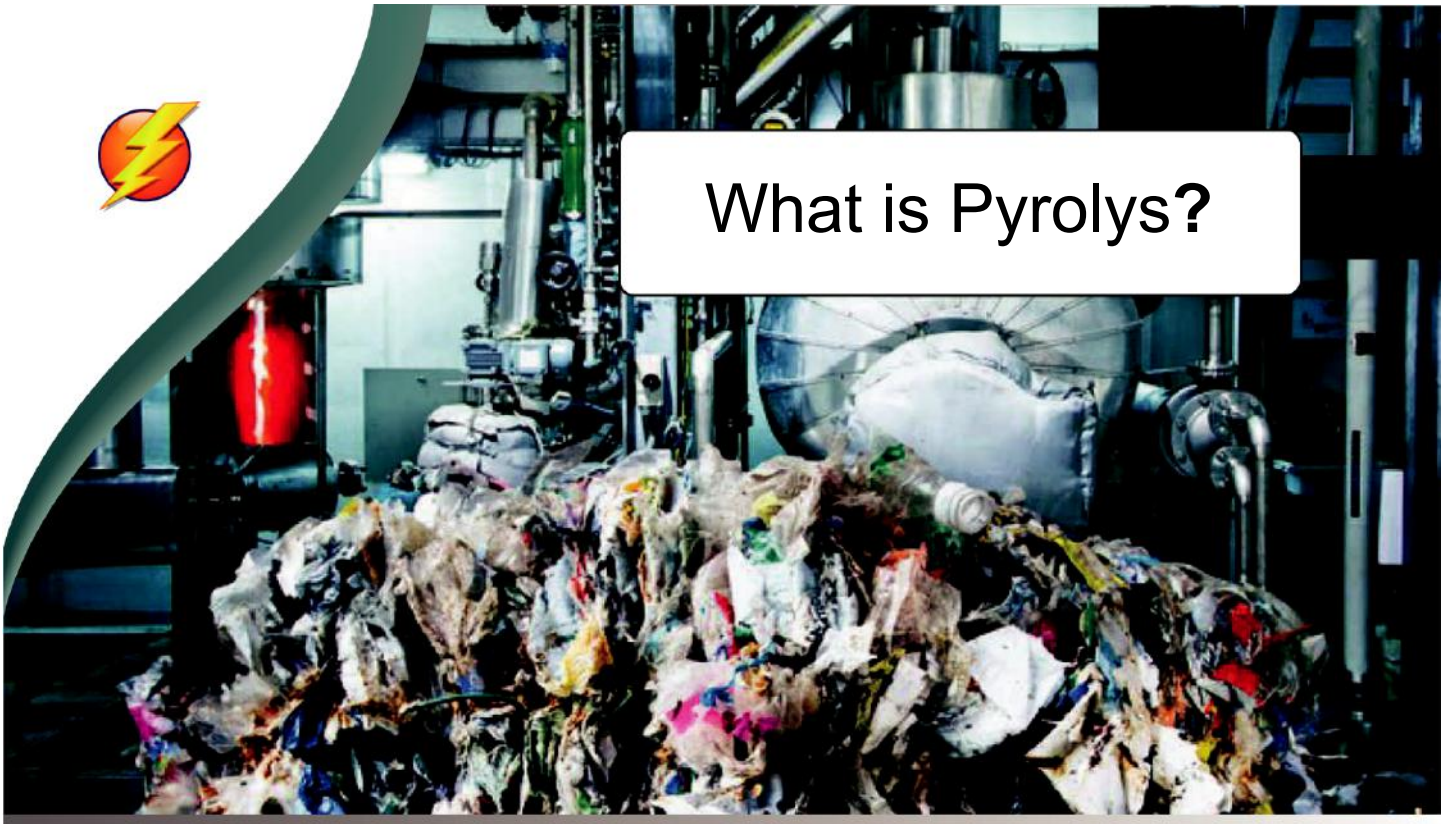


Plastic Waste **Disposal Problem**

Very limited part of plastic waste can be recycled, however, rest of plastic wastes being end up in landfill.

Plastic wastes are not organic and being dumped in landfill with other wastes.

This process is causing environmental pollution and serious harm to the environemnt.



What is Pyrolys?

1 Organic and **Plastic wastes**

2 Being heated upto **1000℃**

“pyro” Heat

3 In an oxygen **Free atmosphere**

“lyse” Decomposing

4 **Decomposing in** solid, liquid and gas form

“pyrolyse”

PYROLYSE **PROCESS**

Solid Plastic Waste

Plastic wastes, which not being recycled and to be dumped in landfill, are being used as raw material of the process.

1

Reaction **Without Oxygen**

2

Thermic **Decomposion**

3

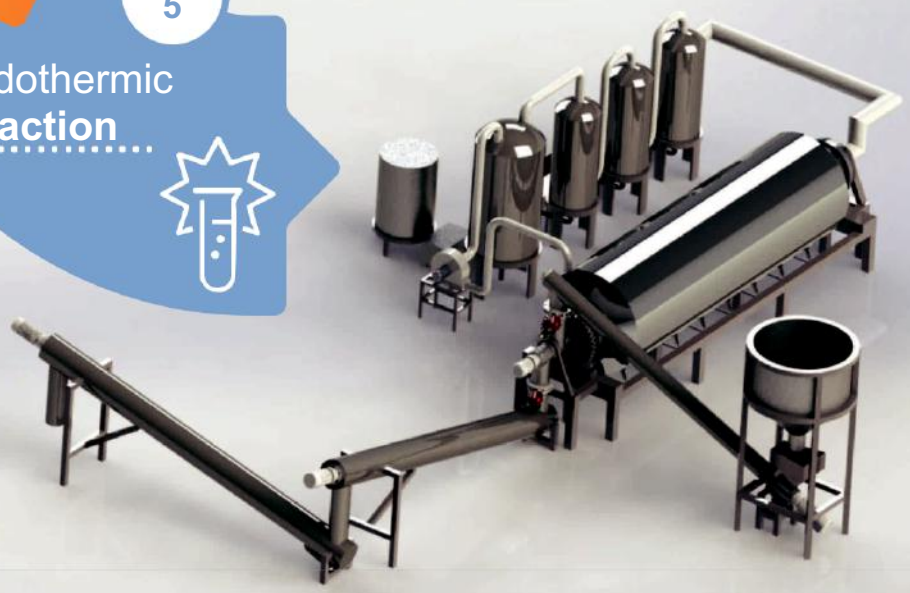
Collected plastic wastes are being formed in small parts, which are being loaded to main reactor.

Electrical energy is being used to heat up to **500-1000 celsius** in order to thermal decomposion of plastic wastes in the main reactor. The process getting speed once gas reach from main reactor to catalityc converter.

500 C - 1000C

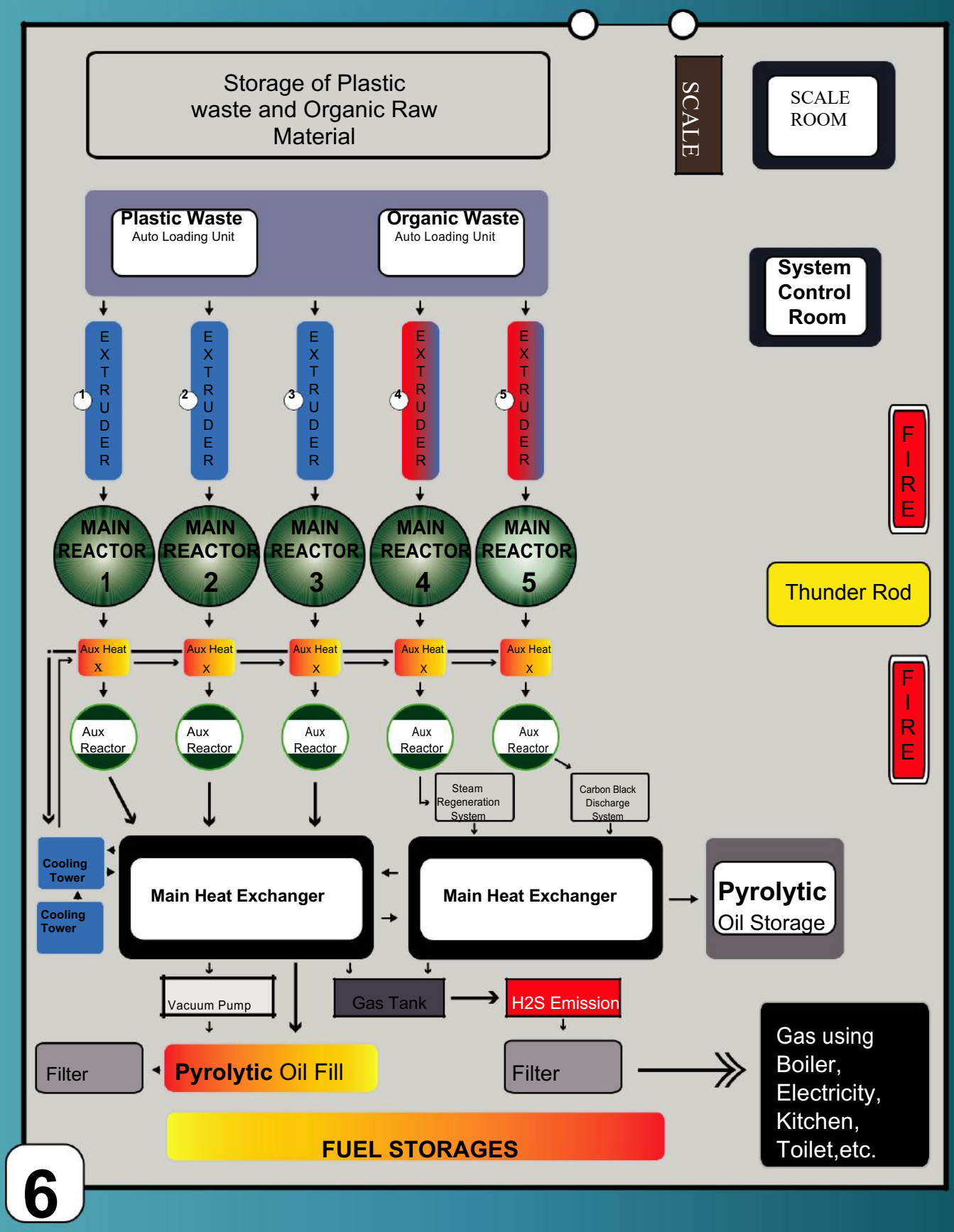
5

Endothermic **Reaction**



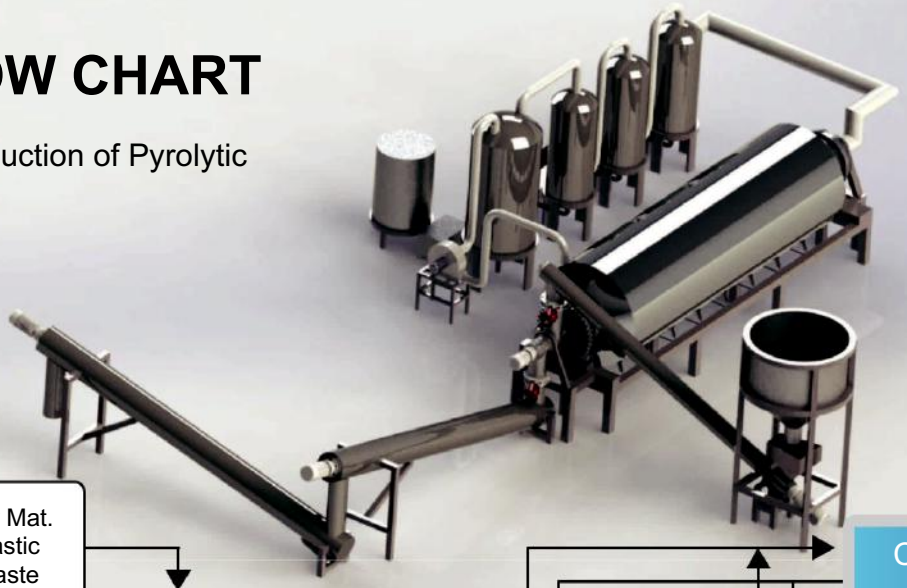
At ambient temperature, the gases is being condensed to Pyrol Carbon black and Paraffin by the auxilary reactor.

Energy Production from Plastic Waste **Plant Field**



FLOW CHART

Of production of Pyrolytic Liquid



Raw Mat. Plastic Waste

Auto **Loading Unit**

Nitrogen Loading Unit

Paraffin Loading Unit

MAIN REACTOR

Catalytic Converter

Freezing Unit

Cooling Tower + **CHILLER**

Aux Heat X

FINAL Destiliation Reactor

Cooling Reactor

Paraffin Storage Tank

Steam Generator Unit

Auto **Discharge Unit**

CARBON BLACK PACKING UNIT

Waste Metal And Charcoal Seperator

PYROLYTIC LIQUID STORAGE 1

Explosive Gas Tank

Vacuum Pump

MAIN HEAT EXCHANGER GROUP

Storage Gas Tank

PYROLYTIC LIQUID STORAGE 2

PYROLYTIC LIQUID STORAGE 3

Production Filtering **Unit**

PYROLYTIC LIQUID DISTRIBUTION TANK

Daily 10 Ton per unit x 5 Unit = 50 Ton / day

WASTE TO **ENERGY**

Energy can be produced from plastic waste by **Pyrolysis Process**;

- Plastic bags
- Polypropylen plastics (PP)
- Polyethylen plastics (PE)
- Polystryens (PS)
- Bags, Packing
- Mixed Plastics
- Plastics dumped in Landfill

* Decomposed elements are to be recycled and re-used by the industry base on types.

• Organic Pyrolysis Process;

Additionally;

It is possible to install a process to pyrolysis organic, inorganic and used lube oils which can not be recycled.

TYPE OF **PRODUCTION** BY PYROLYSES PROCESS

PYROLYTIC OIL

PYROLYTIC LIQUID

10500 - 10700 kcal/kg

CARBON BLACK

PARAFFIN

EXPLOSIVE GAS

LPG

CHAR

Type Of Productions | Percentage %

75% — Pyrolytic Liquid.

10% CB — Carbon Black.

15% — Gas and Paraffin

PYROLYTIC OIL

Pyrolytic oil samples as below, produced from Plastic and tyres 10500-10700 kcal/kg

Produced Pyrolytic Oil has high calorific value (min 10.500 kcal) and the least emission values.

Fuel Type	*Calorific Value*
Liqufied Petroleum Products	8.300 - 9.000 kcal/kg
Clean Petroleum Products	10.000 - 10.200 kcal/kg
PYROLYTIC OIL	**10.500-11.000 kcal/kg**

Final destillation rate is %95 and K1 Pyrolysis Oil

PYROLYTIC OIL

Where to use

PYROLYTIC OIL

DIRECT SELLING / DITRIBUTION AREAS

01 Gunpowder Factory
Instead of diesel oil

02 Hydraulic Oil Rafineries
Instead of petrochemical products for fining

03 BioDiesel Rafineries
For increasing fuel efficiency and anti-freezing

04 Chemical Factories
For additional or main raw material for petro-chemical productions.

05 Fuel for Heating
Factories, Mines, Steam systems etc.

06 Lube Oil Rafineries
For fining additives and rosin

07 Electricity Generation Facilities
For diesel engines and steam turbines

08 Hotels
Instead of Fuel oil or coal where there is no natural gas facility.

CB

CARBON BLACK

Pyrolytic Liquid samples as below, produced from Plastic and tyres 10500-10700 kcal/kg

Solid Product **(char)** is being used as fuel and also used for chemical industry and metallurgic purposes. During pyrolyctic process, certain amount of char is being produced by the main reactor unit.

Produces carbon black (Char) can be used for colouring black, hose production and organic fertilizer production.

PARAFFIN

50 °C liquid
10.500 – 10.700 kcal/kg

Paraffin is being used in very common areas.

Where to use Paraffin?

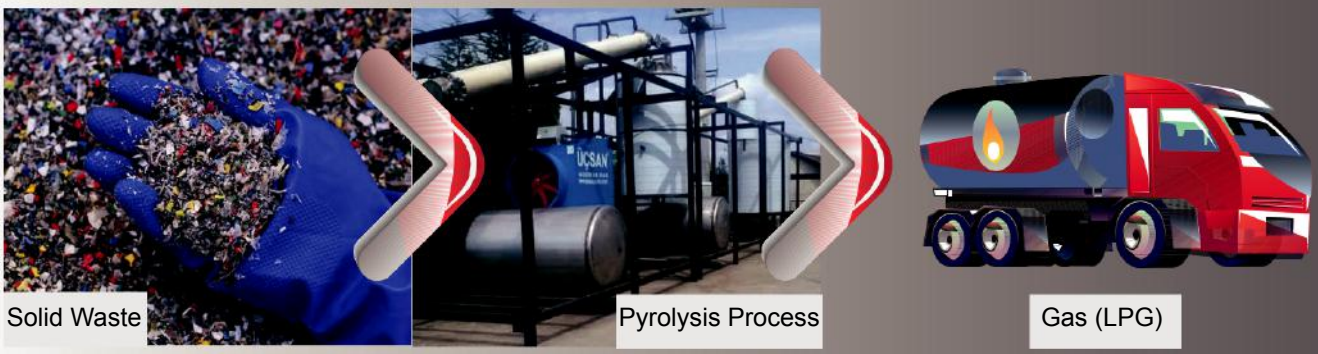
There is common areas such that pharmacy, textile, cosmetic factories, packing and storing of foods, farming, production of electrical equipments etc.

Paraffin has benefit for isolatation by its passivity and not reacting with other materials.

GAS - LPG

There is apx %10-15 gas can be produced by the pyrolytic process.

The pyrolytic gas, which is not condensed during the process, is have better calorific value than natural gas.



Pyrolytic process have capacity to accumulate pyrolytic gas by %10-15 (1.000 - 1.500 m3/ day), which is considerable energy potential.

Non-condensed gas is being cooled and stored in waste gas storage tank.

Once reached up to required volume, gas is storing by compressors in liquid form to use for facility requirements.

WASTE TO ENERGY

01

Plastic wastes, which are not recycled or re-used are being dumped in landfill.

This is very serious loss for nature and economy.

02

Pyrolytic oil have advantageous calorific values, that appropriate to produce electricity.

Despite to common fossil wastes such as LPG, LNG, CNG etc; Energy production by pyrolytic process (from plastic wastes) is very simple and efficient solution for industries to produce electricity and power.

SOLUTION IS PYROLYTIC PROCESS

The Advantages of Pyrolytic Process

In pyrolyctic process, there is no hazardous gases such as Dioxin and Furan.

Therefore, there is no requirement for expensive emission control systems.

Process is self-sufficient.

Therefore, process is not required any fuel but only start up.

Pyrolytic process is developed to provide zero waste. Each output material can be used and sold on demand.

Process can use any raw material which require low or high temperatures.

Efficient and faster to produce energy.

Process is faster such that production in minutes despite to other system which can take apx 35 days.

Process require less space and can produce more production comparing to other systems.

Profit of the process is higher than any alternative method.

PROCESS EFFECTIVENESS IN MODULAR STRUCTURE

Planned process structure is base on capacity of 10 tonnes per day. Capacity can be improved as long as process facility is made in modular structure.

Pyrolytic process is developed in order to avoid any loss of efficiency during production. In case of any unit failure / trouble; production can be maintained at same level by increasing of capacity of other two units by %12.

Pyrolytic process have the least emission values and environmental friendly.

About the Company

Leader in the Recycling

Best Engineering

Domestic Production

New Generation Reactor

Innovative

The supplied materials (Organic wastes) of BIOGAS technology is %65 of solid wastes.

The rate of plastic wastes which can not be recycled by the BIOGAS Tehcnology is %35.

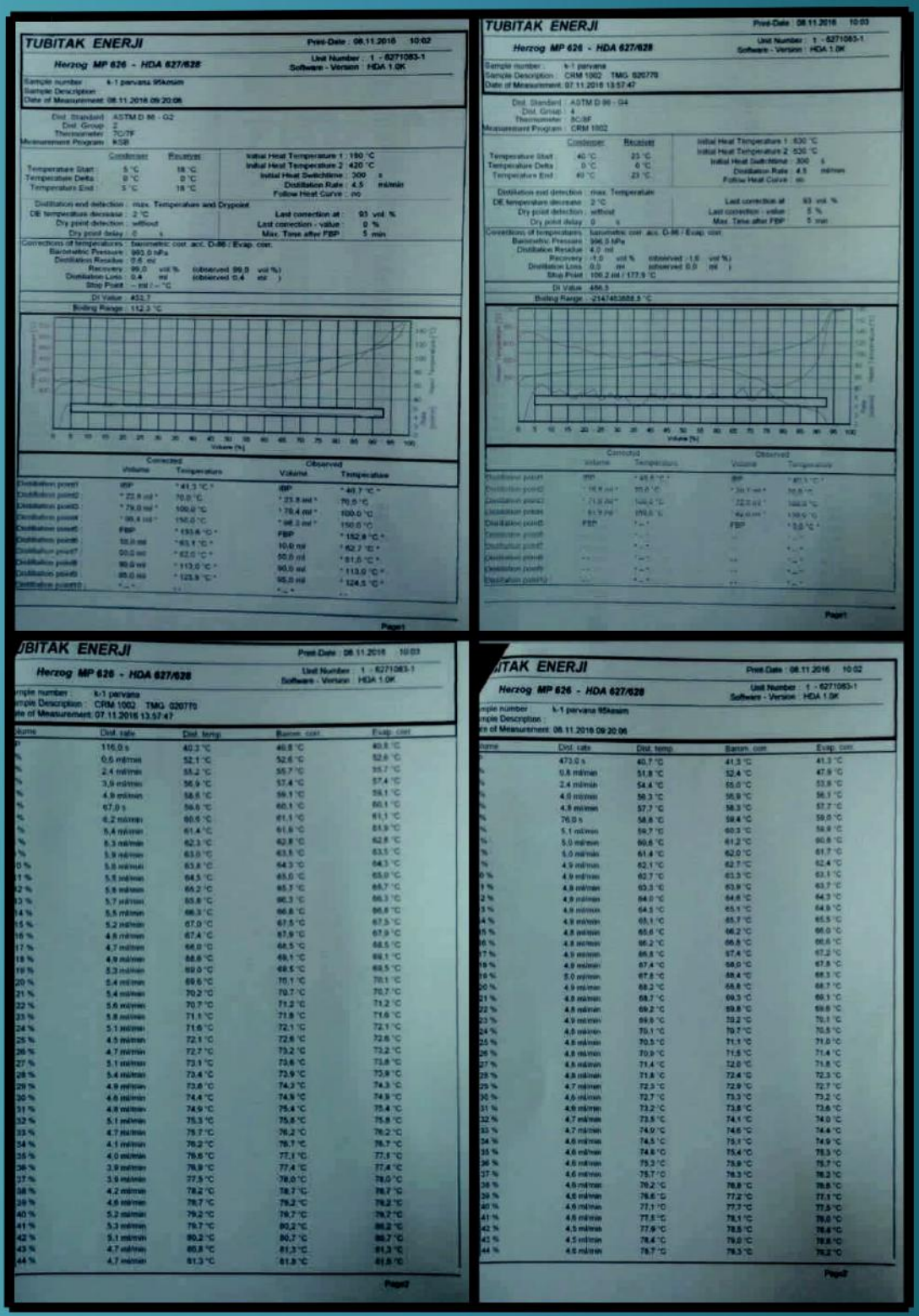
%35

From WASTE to ENERGY

Pyrolytic process is very important for environmental protection and saving for country economy.


If using Pyrolytic oil for electricity generation
Daily
30 Tonnes
Plastic Wastes
25.000 liters
Oil
by 1 liter fuel, producing
5 Kw/h electricity
Daily
25.000 liters
x
5 Kw/h
≡ 125.000 Kw/h
4 Million Kw/h
Monthly
Yearly
48.000 Mw/h
19

Analyses Result of Pyrolytic Oil



IT IS OUR CHOICE…

Recycle Energy

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thanks for your attention