carb.ON Művek
Zártkörűen Működő Részvénytársaság

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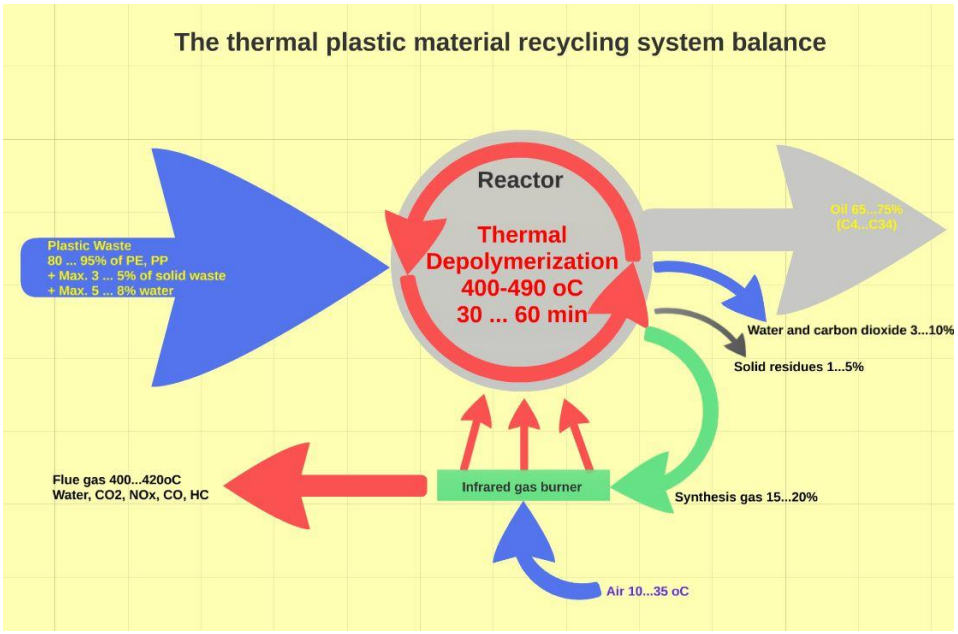
Waste To Energy Processing System

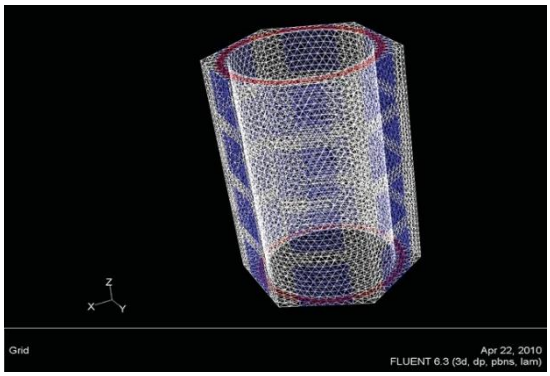
The thermolysis is a low temperature, closed waste-to-enegy system that is operating continuously with high efficiency for energy recovery from solid materials. The main component of the system is the water vapor injected thermal reactor.

As a result, the technology can be used to process a wide variety of carbon-based feedstocks, including commercial and municipal solid waste (paper, textiles, rubber, tires, leather, plastics, food scraps, composites, etc.), plastics and biomass.

- The reactor is designed to process a variety of carbonaceous materials (municipal solid waste, cardboard, paper, plastic, yard trimming, tires, rubber, food scrap, etc.). Thereby the technology used in the reactor can process most waste streams currently destined for landfill and the non-recyclable materials to get cleared (e.g. steel).



- The reactor temperature (per zone) and pressure can be precisely controlled and adjusted as required within a predetermined range. This optimises the process time for any given feedstocks.



- The rotation speed of the internal drum can be precisely monitored and controlled. This optimizes the throughput capacity of the reactor.

- The heating system uses infra-red radiation and radiates nearly unidirectionally inward. The heating system distributes heat more evenly (minimises energy loss) that accelerates the process and minimises the energy consumption.

- The heating system harnesses the temperature of recirculated flue gas. Resulting in a more

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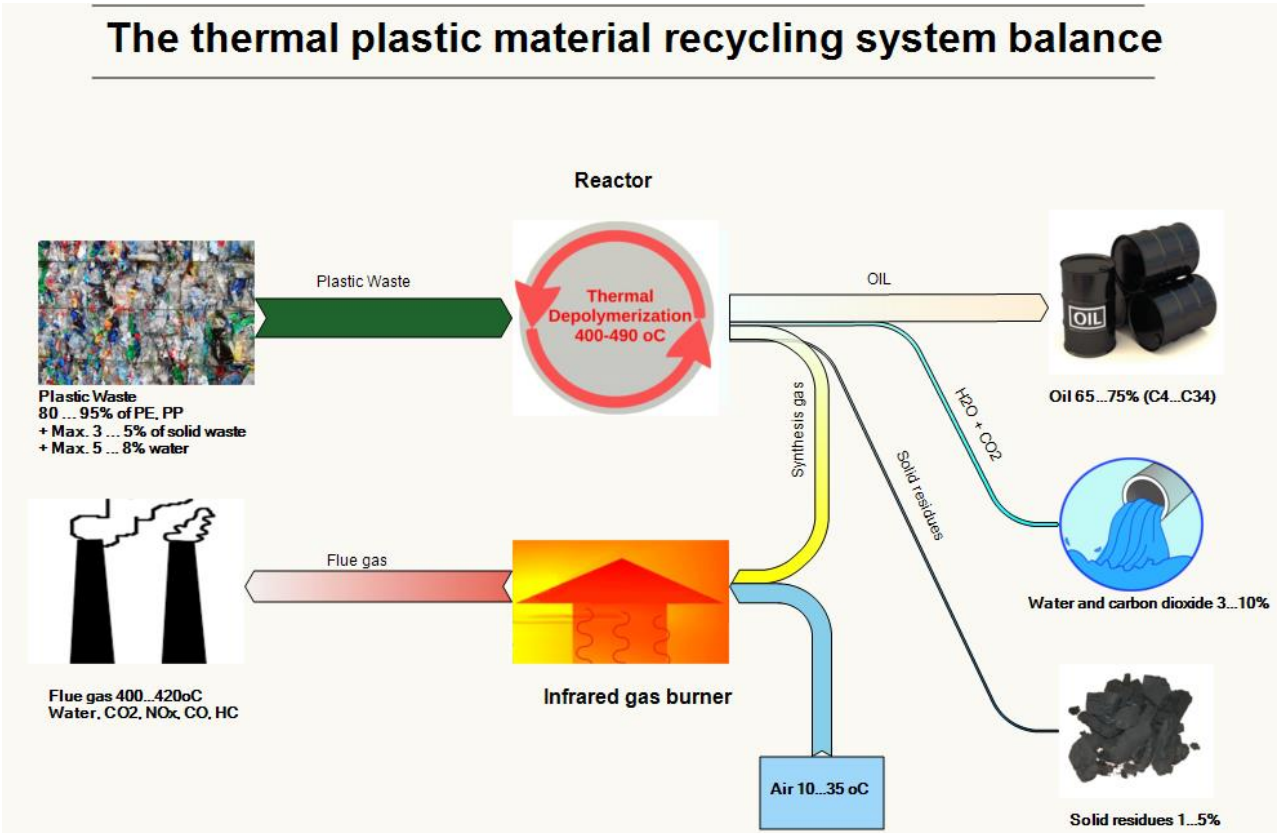

favorable energy balance due to the heat recovery of flue gas.

- The heating panels are constructed of carbon steel. They are inexpensive to manufacture and does not contain any materials that may be vulnerable to damage.

- The process uses water vapor injection. The injection of water vapor into the reaction process significantly improves the quality of the output gas and oil by reducing toxins and other hazardous elements. It also reduces the sediments in the reactor and provides for extended continuous operation.

- The system does not require the use of catalysts.

Reduces operational cost while maintaining optimal operational efficiency.

- The process is continuous and requires minimal maintenance. All reactor units operate independently. The reactor design enables each unit to conserva- tively achieve 8,000 hours annually. Each unit requires only 2 weeks of maintenance annually and does not require special materials, bearings.

- The process is a closed system, with emissions well below the required (regulatory) margins. The largest emission producers are the CHP unit and gas burners which are guaranteed by the manufacturers to meet the most stringent air and environmental regulations.

The reactor heating system optimizes unidirectional infrared radiation. The low temperature (below 500 degrees celsius) and pressure (below 0.06 MPa) in the reactor breaks down the original

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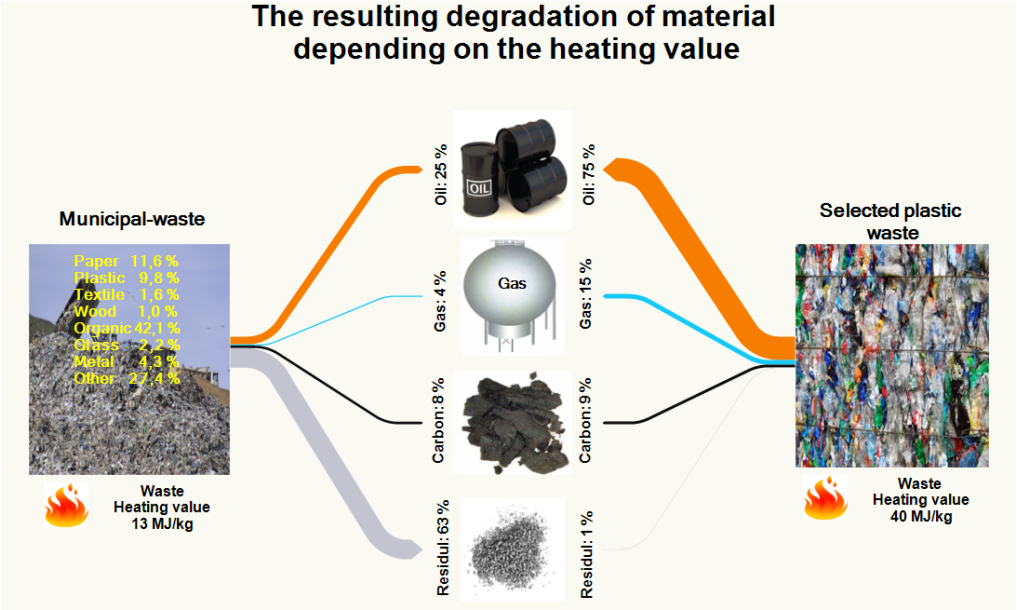
long carbon chains in the solid feedstock materials into shorter carbon chains, resulting in oil-vapor, which than condensed to gas and oil.
The injection of water vapor into the process significantly improves the output quality of gas and oil, by reducing the levels of toxins and other hazardous elements.

By the elimination of the emissions, the byproduct carbons can be harnessed more easily due to its purity (nano-carbon fiber, activated carbon, etc.). The quality of the produced oil and gas is significantly higher than what other technologies can produce. The recovered gas and oil are capable of producing electricity and heat-energy and also to produce other special products (naphta, ethanol, lubricants, waxes and other chemical materials) by futher conversion.

- The waste material is fed into the shredder and ground into 30-50 mm pieces
- The shredded waste is stored and fed into the reactor by the conveyor belt
- The application of a specific temperature and pressure, breaks the long carbon chains in the various feedstock materials into shorter carbon chains, which results in the conversion of solid materials into oil-vapor, residual and sootcoal
- The oil-vapor passes through a condensation process
- The residual sootcoal can be sold for a variety industrial uses or it can be destroyed
- The output of the condensation process is high quality syngas and oil
- A minimal percentage of the syngas is recirculated in order to lowen the external gas supply
- The remaining gas and oil is fed into the gas-diesel engine to produce electricity and heat- energy
- The flue gas of the CHP units and burners are recirculated to heat the reactor



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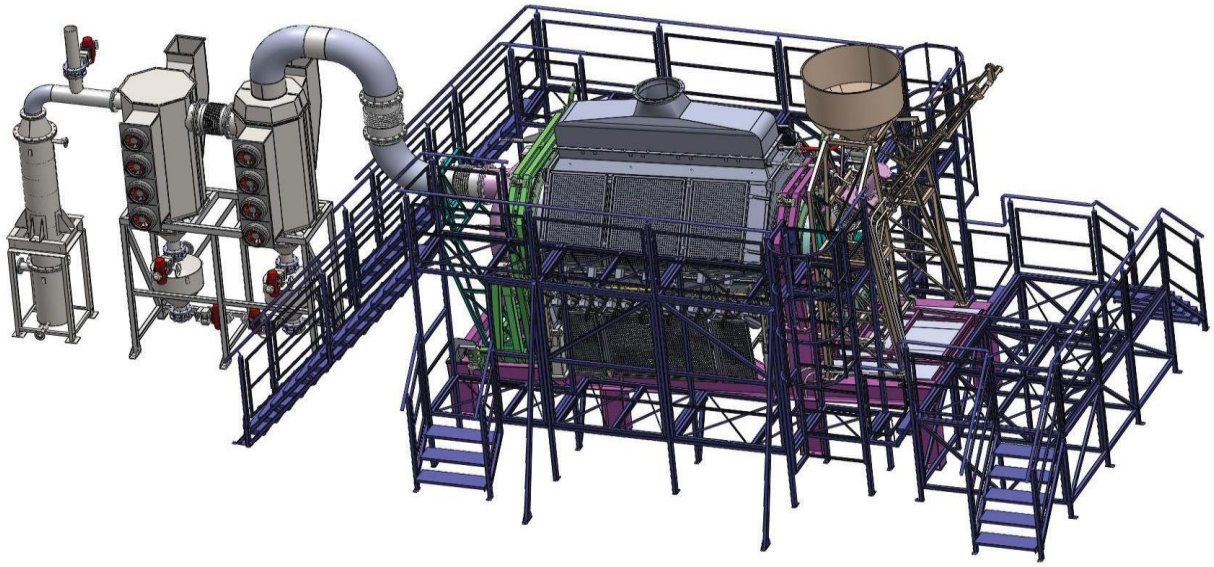

Economically Installable plant sizes

Processed materials:	2 200 ...130 000 t/year
Power generation equipment	Diesel engine or gas turbine
All Electric Power:	2...44 MW
Electricity produced:	16 400 - 360 800 MWh/year
Produced thermal energy:	18 040 - 396 880 MWh/year
Self-consumption:	6...8%
Necessary operating staff:	40...90 people
Expected return on investment:	4...8 year