

Mesin Pembuatan Bahan Api Dari Bahan Plastik

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Introduction

- ▶ “plastics” includes materials composed of various elements such as carbon, hydrogen, nitrogen, chlorine and sulphur
- ▶ Macromolecules, formed by polymerization and having the ability to be shaped into many appliance
- ▶ Polyethylene, polyvinyl chloride, polystyrene are largely used in the manufacturing of plastics (environmental issues)

Problem Statement

- ▶ Environmental Protection agency (EPA) expected that billion of tons waste plastic are generated every year
- ▶ Incineration is an alternative to landfill disposal of plastic wastes, but could result the formation of unacceptable emissions
- ▶ The other option is to reprocessing of plastic waste into new plastic products
- ▶ The method of converting the polymers present in the waste plastics into oil

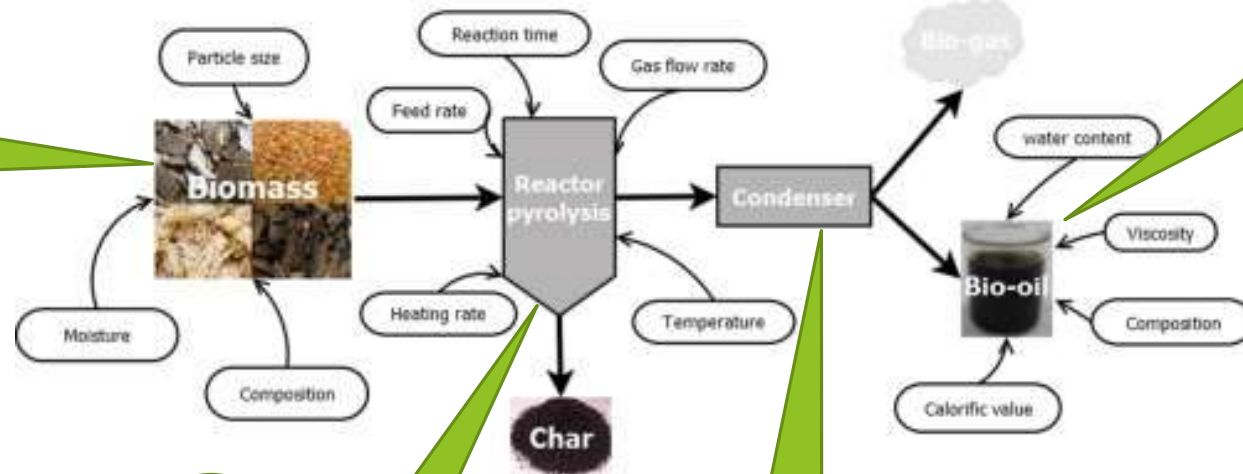
FLOW PROCESS OF THE PROJECT

1



-Sisa bahan buangan seperti botol-botol plastic dikisar menjadi kepingan-kepingan kecil (feedstock)

-botol air mineral, plastic bungkus makanan, dll



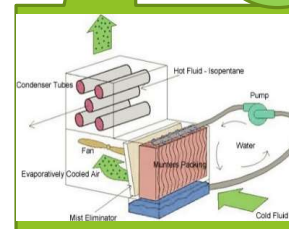
2



-Proses pembakaran (pyrolysis)

-menghasilkan gas/asap

3

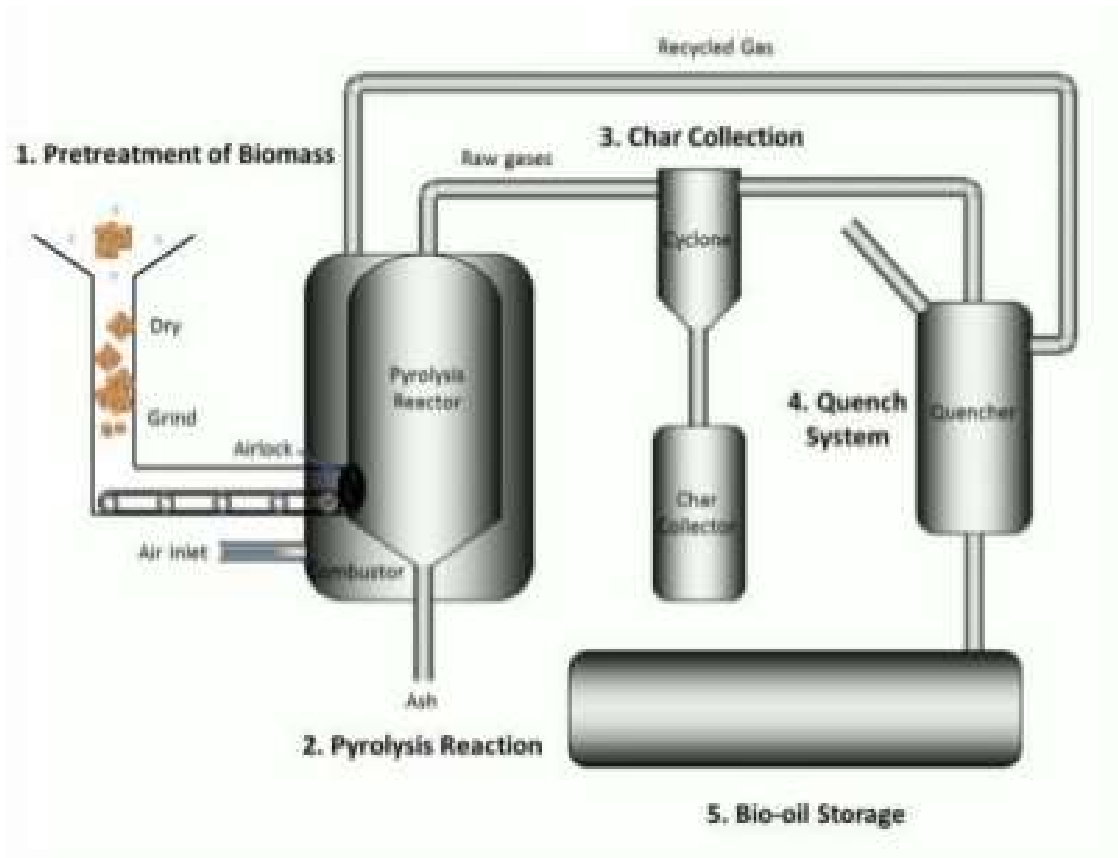


-Proses kondensasi, menukar gas hasil pembakaran bahan plastic tadi ke bentuk cecair

4



- Crude Oil (diesel, gasoline, dll)



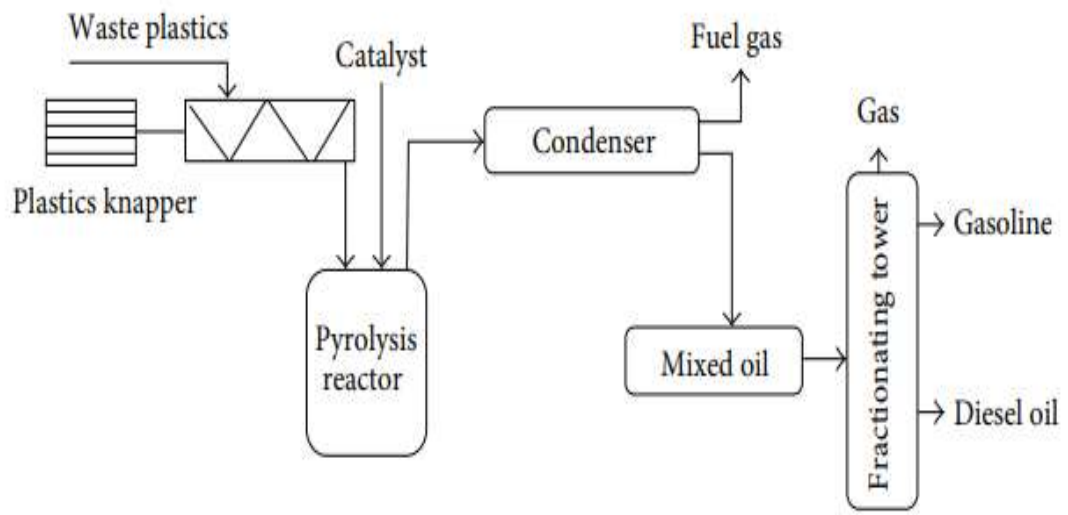
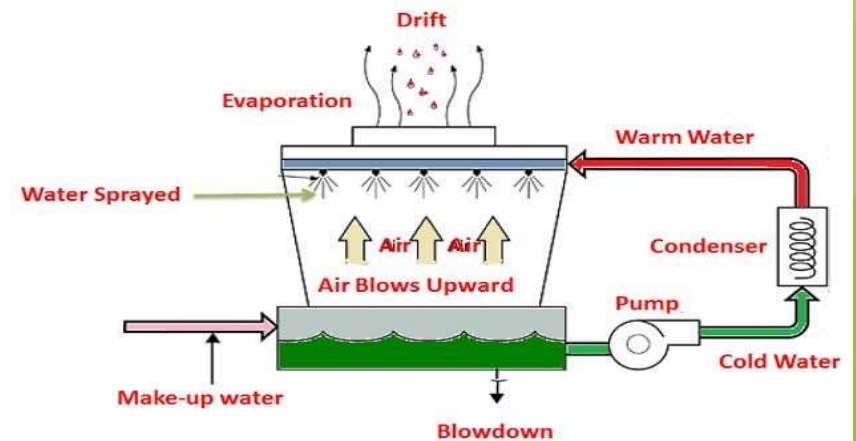
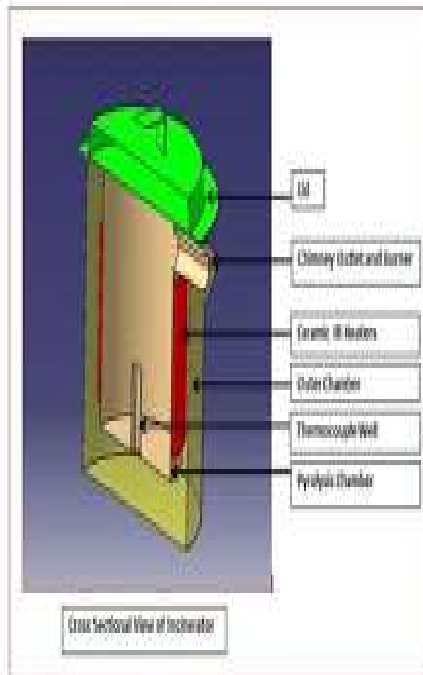


Figure : Pyrolysis process of generating fuel from waste plastic

DESIGN STAGE



Benefits of the projects

- ▶ Waste management strategy (reduce waste)
- ▶ depth study regarding the recycling techniques of plastic solid waste (PSW)
- ▶ Alternative solution of production of fuel - diesel, kerosene, petrol (pyrolysis incinerator)
- ▶ Help in promotion of sustainable environment

Reference:

- ▶ A. K. Panda, R. K. Singh, and D. K. Mishra, “Thermolysis of waste plastics to liquid fuel. A suitable method for plastic waste management and manufacture of value added products—a world prospective,” *Renewable and Sustainable Energy Reviews*, vol. 14, no. 1, pp. 233-248, 2010.
- ▶ S. M. Al-Salem, P. Lettieri, and J. Baeyens, “The valorization of plastic solid waste (PSW) by primary to quaternary routes: from re-use to energy and chemicals,” *Progress in Energy and Combustion Science*, vol. 36, no. 1, pp. 103-129, 2010.
- ▶ R. P. Singhad, V. V. Tyagib, T. Allen et al., “An overview for exploring the possibilities of energy generation from municipal solid waste (MSW) in Indian scenario,” *Renewable and Sustainable Energy Reviews*, vol. 15, no. 9, pp. 4797-4808, 2011.
- ▶ T.-T. Wei, K.-J. Wu, S.-L. Lee, and Y.-H. Lin, “Chemical recycling of post-consumer polymer waste over fluidizing cracking catalysts for producing chemicals and hydrocarbon fuels,” *Resources, Conservation and Recycling*, vol. 54, no. 11, pp. 952- 961, 2010.
- ▶ H.-T. Lin, M.-S. Huang, J.-W. Luo, L.-H. Lin, C.-M. Lee, and K.-L. Ou, “Hydrocarbon fuels produced by catalytic pyrolysis of hospital plastic wastes in a fluidizing cracking process,” *Fuel Processing Technology*, vol. 91, no. 11, pp. 1355-1363, 2010.