ENERGY EFFICIENCY OF BINARY CYCLE POWER PLANT FOR THE REFINERY

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All petroleum distillation processes are fundamentally the same. In general, all distillation processes require the following essential units of equipment: heaters, fractionating towers, stripping columns, heat exchangers condensers and coolers, pumps and connecting lines, storage and accumulator tanks, and instrumentation. Oil refining is a complex energy-intensive process, which involves a large amount of heat transfer and hydraulic equipment. Operation of hydraulic and heat transfer equipment is associated with the consumption of a large amounts of electrical energy from an external power supply. Refineries are usual situated on a long distance from central electricity networks. It requires additional costs to provide electric power to refineries and influences on the costs of process realization.

In the refinery processes high temperature is very important to separate the crude in the distillation tower. After that the products must be cooled to use it in other processes or to flow it to the treatment unit and to the storage tank, so there is a large value of heat it will be lost in this processes. It is advisable to use the heat potential of petroleum products to produce electrical energy, thereby reducing the energy intensity of the oil refining process.

In this research the integration between the refinery and binary power plant is used to generate the electric power. We use the heat potential of heavy fuel oil to generate electric power from the binary power plant due to its high temperature and the large flow rate which it is 49% from other products. Two branches form the refinery are used. The first one is the hot branch the temperature is 288 ^{o}C and the second is the cold branch the temperature is 82 ^{o}C which are mixed in the feed line of the binary power plant to reach the heat potential for the binary power plant operation.

Influences of temperature and mass flow rate of the fuel oil on the binary power plant energy efficiency are presented in this research work. Analyse includes the consideration of different working mediums for the binary power plant realisation, such as water, isobutane, n-heptane, n-pentane.