

ABSTRACT

The needs of the fuel energy in this world is increasing everytime. According to the projection of International Energy Agency – IEA, until 2030 world energy demand increased by 45% or an average point increase to 1.6% per year. The distribution of annual world energy consumption is 500×10^{15} BTU/year. The role of the renewable energy sources in electrical industry increasing continuously. Projected from 2010, the role of the renewable energy in electrical industry is sitting in the second position after the coal and hydro. In the other side the rising of the fossil fuel using is the trigger of the climate changes. That is why IEA is suggesting to use the clean and efficient energy to suppress the carbon emission. The sources of renewable energy are solar energy, wind energy, water pump energy, geothermal energy, and biomass energy. Geothermal energy is an energy that is extracted from the heat that is kept in the earth. It is from the tectonical activities in the earth since the planet is made. The heat is also from the sun heat that is absorbed by the earth surface. Around 10 Gigawatt of geothermal electrical plant is placed around the world in 2007, and distributing around 0.3% of the total of electrical energy in the world. Indonesia has 40% or 27.140 MW geothermal potential in the world. That is why geothermal energy is the best source of energy that is need to be invented in Indonesia. From the total of the potential, only 4.2% that is already used as the electrical energy.

Pertamina Geothermal Energy (PGE), is a company of PT Pertamina (Persero), standing since 2006 and has already given an instruction from the governor to develop 15 Geothermal Companies in Indonesia. The new era of geothermal energy is started by the opening of Geothermal Kamojang field in 29th January 1983. PGE PLTP Kamojang Unit 4 has 1 PLTP unit installed with capacity 60 MW. PGE KMJ 4 maintenance task is mapped according to the company's Key Performance Index target. There are some special critical equipments which are classified by PGE KMJ 4 maintenance division. The critical equipments are steam turbine, main condenser, and hotwell pump. All of those equipments have a vital role in the production, so the maintenance task is needed in every critical equipment's parts. From the result of the research, those 3 equipments are in subsystem level 6 in the equipment hierarchy, it has 3 critical items. The critical components then processed using Reliability Centered Maintenance and RCM++ software for optimizing an effective and efficient maintenance activity in the time and cost side. Spare parts are divided into repairable and non-repairable spare parts. The spare parts availability is become a supporting role in this maintenance activity, so it can work simultaneously with RCM preventive task. According to the result of data processing in 3 critical subsystem components, it produces 47 tasks On Condition and 32 Failure Finding Tasks, with the variation of interval. The proposed maintenance cost in 1 year is \$17.242, it is reducing 13% from the existing maintenance cost. The non-repairable spare parts availability is 267 and the repairable spare parts availability is 5 in 1 year.

Key words: Geothermal, Reliability Centered Maintenance, Reliasoft, RCM++, Spare Parts.