SUMMARY

In Indonesia, especially in the East Java region, the potential of renewable energy sources in the form of waterfalls are mostly located in a remote mountain area far from the highway. Existing conditions on average have a low head with a medium capacity. This capacity fluctuates widely depending on the season (rainy and dry). As the substitution of electrical energy limitations, several micro hydro power plants has been operated to overcome this limitation, but the plant is generally owned by individuals with a very simple design, the power is not adjusted to the available energy and low efficiency. Besides, the lack of knowledge of the operation and maintenance, so many plants found damaged or not operating.

We know that the water turbine is a machine that uses the potential energy of water to produce mechanical energy in the form of shaft rotation. This energy is then converted into other energy ie electrical energy. In the design of water turbine, in order to obtain optimum efficiency, the type and dimensions depend on the head and capacity conditions existing. For that before designing, survey location is absolutely necessary. In this research survey conducted in 3 locations of potential areas of East Java. The selected location is expected to represent the design of each type turbine. The survey was conducted in order to obtain a detailed picture of socio-economic conditions of society and the natural environment that can be used as a design consideration. In addition to providing a detailed picture of potential areas that will be developed as an energy independent country.

The results of this study include a survey and feasibility report 3 potential areas to be developed as an energy independent country. Three locations are: Slawu Village, Sub Patrang, Jember District, Curah Bire Village, sub Manggisan, Jember District, and Pakisan Village, sub Tlogosari, Bondowoso District. The location of the next 3 designed water turbine adapted to conditions in each location, so the design is expected to be applied for real. From the calculated output power and the selection of the turbine based on its specific speed, then for the Slawu Village gained 41.43 KW power with Francis type turbines. Curah Bire Village gained 19.6 KW power with Pelton turbine type. Village Pakisan gained 31.36 KW of power to the type Kaplan turbine.

In addition to the turbine design is also carried out technical assistance in 4 (four) locations that have been used as a water turbine power plants. These activities include providing technical guidance and design of simple water turbine manufacturing, electrical installation, operation, maintenance, machine layout, cleanliness, and knowledge of work safety.

As the beginning of the training center and development of water turbines (especially in East Java), so in this activity is also carried out design of a model water turbine installation. This installation model is also very useful for students in order to develop engineering knowledge, practical fluid machinery as well as the final project topic. Students who had a role and has successfully completed his studies include 5 students S program and 5 students D program. Superficial is paper in order to Apteec seminar in December 2009, organized by LPPM ITS.