

Modelling flood reservoir integrated with pumped hydropower storage for electricity production using HOMER

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Abstract. This paper presented the potential of flood reservoir integrated with pumped hydropower storage for electricity production in Pekan, Malaysia. Based on the procedure in Technical Release 55 (TR-55), the volume of the reservoir to attenuate flood was 5.2 million³. The volume estimated will be the size of the lower reservoir of proposed PHS and act as flood water catchment during flood seasons. The system proposed an integration of PHS with wind turbines and connect it to the grid. The Hybrid Optimization Model for Electric Renewable (HOMER) software was used to model system for electricity production. The software has simulated 200 different configurations of systems which included the diesel-only system and hybrid wind/diesel system. The standalone diesel system could produce about 25,041,824 kWh of electricity per year and emits 30,030,457 kg/year of pollutants into the atmosphere. Meanwhile, the hybrid wind/diesel could produce 25,668,980 kWh/year of electricity and emits 29,293,174 kg/year of total pollutants into the air. Although, the standalone diesel has the lowest cost of energy among all configurations which is RM 0.852/kWh, but it releases the most amount of carbon dioxide. The high emission of this gasses can have many environmental effects in a long term.

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