

Development of solar power system for Sarawak peat water continuous electrocoagulation treatment process

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Abstract. Sarawak state government has established Sarawak Alternative Rural Water Supply (SAWAS) programme in order to serve as a purpose of providing safe and clean water to the rural communities not connected to municipal clean water supply. In the rural areas of Sarawak, particularly on the coastal region where municipal water supply is not available, the villagers are normally resorted to utilize rainwater and peat water for daily usage. Some of these rural areas are even not connected to electricity grid. Subsequently, one of the proposed methods to eradicate these problems in supplying clean water without electricity supply grid is to implement stand-alone water treatment system with solar power system. As such, the main aim of the study is to design a solar power system to support Sarawak peat water electrocoagulation treatment process. The study is divided into two stages. In the first stage, the study designs a solar power system to support the treatment process of peat water for both batch and continuous electrocoagulation systems. This includes designing and fabrication of a small-scale solar power system. The second stage of the study involved experimental studies on both batch and continuous electrocoagulation systems in order to study the effectiveness of solar power system to supply electricity for the electrocoagulation systems. Overall, the study has developed a solar power system for both batch and continuous electrocoagulation of peat water system. From the experiments conducted, the developed systems are capable to reduce 18.8% and 46.15% of peat water turbidity for batch and continuous electrocoagulation systems respectively. However, in order to meet a more stringent drinking water standards, some improvements on the designed systems are indispensable.

1. Introduction

Located in the northwest of Borneo, Sarawak has a population of about 2.6 million [1] in which electricity grid need to be extended through rugged terrain and thick jungle in order to reach isolated communities. However, extending such grid to sparse and remote communities is not always practical in economic terms [2]. Hence, there are still about 30,000 remaining rural households which are not connected to the electricity grid [3]. For villages located more than 30 km from the electricity grid, an off-grid method is preferred [1]. Sarawak is located near the equator line where the climate is hot and

