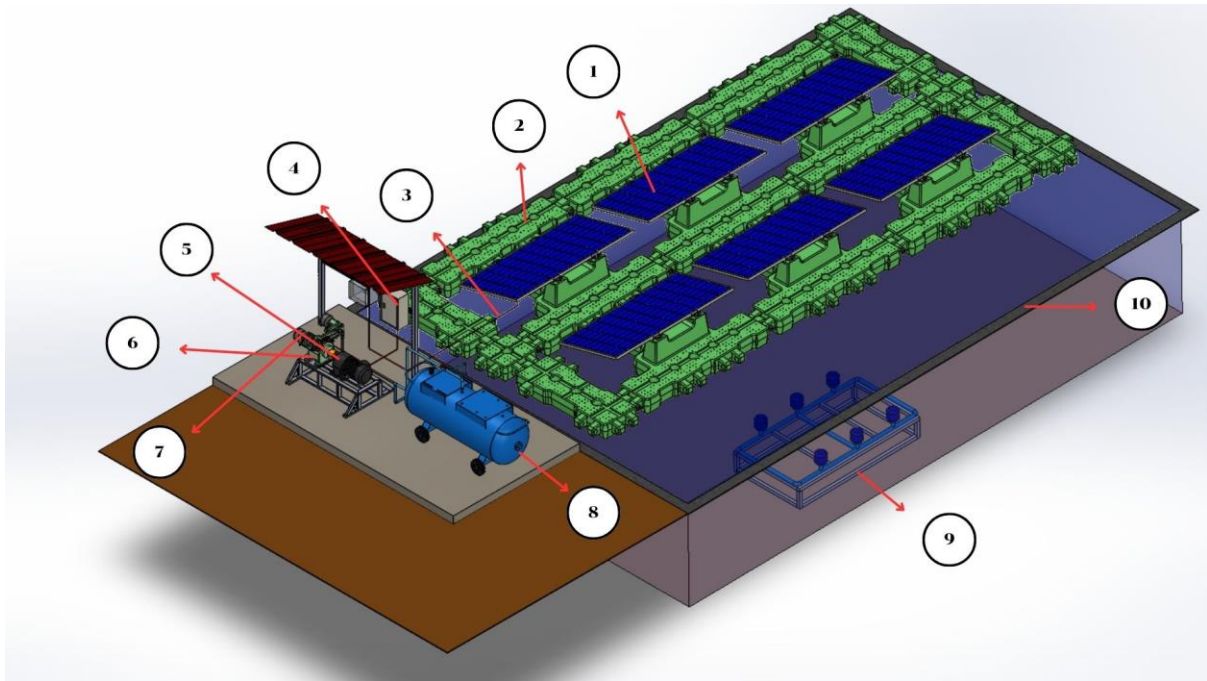


Innovation of a 3 kW PV Air-Compressed System for Water Treatment Applications

Abstract

Presently, there are three main types of wastewater treatment: primary treatment, which focuses on removing large solids; secondary, which involves biological processes to degrade dissolved organic matter; and tertiary treatment, which further purifies the water to meet higher quality of oxygen dissolved in the water. However, in every process used the electricity from fossil fuel, that mean treatment water but increasing the air pollution and more CO₂ releasing to the globe caused in global warming nowadays. Therefore, to fix of the problems, this project is designed and innovated of *a 3 kW PV Air-Compressed System for Water Treatment Applications* to mitigate the environmental impact associated with traditional water treatment that rely on fossil fuels. It can generate air flows approximately 400 liters/minute, at the solar density approximately of 500 W/M². The system operates about 5-6 hours per day, that coverage capacity of the air to the wastewater about 1,500 m³ to purify the wastewater. Additionally. from the site test, and actual operation indicates that it requires 0.2 units of electricity to compress a cubic of air that resulting in saving of approximately 30 units of electricity bill daily from fossil. At a rate of 5 Baht per unit of electric bill in Thailand, this system saves about 55,000 Baht or approximately 1,600USD annually, leading to reduction of approximately 25 tons of CO₂ to the Globe. This innovation is now commercially and used around in Thailand to reduce greenhouse gas to the globe in term of “Clean water with Clean air for Cleaner Earth” .



Technical Specifications

3kW Air-Compressed using 3 PV System for Water Treatment Applications

-PV module : 3 kWp of Monocrystals PV type

-Floating structure : MDPE Drinking Water Grade Resisting UV 8++

-Motor Gear: 3HP AC @1500 RPM, 3Phases at 50 Hz, Gear ratio 13

-Air compressor: Piston type with special coating valve 500-800 rpm at 800 liters/min Max. Pressure 8 Bar

-Air tank: 300 liters at Max. Pressure of 8 bar

-AC/DC inverter : 2.5Kw variable speed control constant frequency

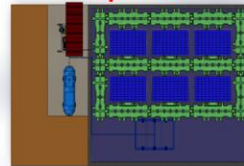
-Controller Arduino

The System was designed for solar float ,solar land and mobile unit for water treatment application and also can be applied to aquaculture, or the farming of aquatic organisms, involves the breeding, raising, and harvesting of fish, shellfish, and aquatic plants.

Air flow meter



Top View



Side View



1. Floating device, 3 kW PV Module, and DC Cable Power



2. DC/AC inverter and controller units



3. 3HP AC motor and Gear reducing unit



4. 3HP Air Compressor



5. Air pressure tank



6. Air stone



7. Water Treatment Pond

