SUSTAINABILITY OF ALGAL BIOFUEL PRODUCTION USING INTEGRATED RENEWAL ENERGY PARK (IREP) AND ALGAL BIOREFINERY APPROACH

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Abstract

Algal biomass can provide a viable third generation feedstock for liquid transportation fuel. However, for a mature commercial industry to develop, sustainability as well as technological and economic issues pertinent to algal biofuel sector must be addressed first. This viewpoint focuses on three integrated approaches laid out to meet these challenges. First, an integrated algal biorefinery for sequential biomass processing for multiple high-value products is delineated to bring in the financial sustainability to the algal biofuel production units. Second, an integrated renewable energy park (IREP) approach is proposed for amalgamating various renewable energy industries established in different locations. This would aid in synergistic and efficient electricity and liquid biofuel production with net zero carbon emissions while obviating numerous sustainability issues such as productive usage of agricultural land, water and fossil fuel usage. A 'renewable energy corridor' rich in multiple energy sources needed for algal biofuel production for deploying IREPs in the United States is also illustrated. Finally, the integration of various industries with algal biofuel sector can bring a multitude of sustainable deliverables to society such as renewable supply of cheap protein supplements, health products and aquafeed ingredients. The benefits, challenges, and policy needs of the IREP approach are discussed.