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**ALGAE FROM WASTE WATER: A DYNAMIC ASSESSMENT OF POTENTIAL**

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**ABSTRACT:** Large scale cultivation and processing of algae for energy supply purposes requires water, energy in the form of sunlight, and nutrients including nitrogen, phosphorous, and carbon dioxide (CO<sub>2</sub>). All of these nutrients are available in human waste streams; nitrogen and phosphorous in municipal waste waters, and CO<sub>2</sub> in exhaust streams from a variety of industrial sources most significantly fossil fuel powered electricity generation stations. Sandia National Laboratories has developed a dynamic assessment tool for evaluation of the potential nutrient and energy resources available for cultivation of algae in select regions of Canada and Australia. Basic data inputs include location and nutrient load information for waste water treatment plants and CO<sub>2</sub> sources, and solar insolation data by region. Assumptions employed to develop estimates of resource potential can be manipulated by the model user through a graphic user interface, and updated results viewed in real time. Resource potential can be viewed in terms of biomass production potential, potential CO<sub>2</sub> fixed, biocrude production potential or area required, and can be viewed by location and size of the potential resource. Preliminary results suggest that the CO<sub>2</sub> resource is plentiful compared to other necessary nutrients, and thus that siting and prospects for successful large scale algae cultivation efforts will be driven by availability of nutrients besides CO<sub>2</sub>, and the efficiency with which they can be used and re-used. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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