

ALGAE AS BIOFUEL: RESEARCH & MODELING



GREENLIGHT GREENPAPER

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This project used techno-economic and energetic analyses to identify possible areas which could improve the environmental and economic impacts of a proposed combination of an algae bioremediation and biofuel production process.



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Lightworks was supporting a group of ASU chemical engineering researchers in exploring infrastructure-level implementation of a combined wastewater treatment and biofuel production process with algae. They needed to both benchmark this process in terms of its economic and environmental impacts at scale and offer operational suggestions on how to enhance feasibility. This entailed constructing techno-economic and energetic models which simulated the impacts of different operating strategies. To carry this out, insights from various disciplines from chemical engineering to biotechnology to finance were needed.

The project found the proposed process had a very robust positive net energy ROI, which was a key benefit to be emphasized in discussions with future partners. The project also determined that various operating strategies had substantial impacts on financial feasibility. In presenting the results, we also provided examples of how to communicate key scientific and financial elements of the project to a broader audience.

BENEFITS TO PROJECT PARTNER

- Presentation to LightWorks and collaborators on results, conclusions, and recommendations
- Techno-economic model with instructions
- Written summary report (4-5 pages)
- Executive summary (1-2 pages)

BENEFITS TO SOLUTIONEERS

Students learned the centrality of both financial and environmental objectives to renewable infrastructure, their trade-offs, and the synergies between them. Students from various departments learned to communicate more effectively with each other and also gained an appreciation for the complexities of other fields. It also offered an opportunity for students interested in translational research to network with professionals in related fields.

BENEFITS TO THE COMMUNITY

The proposed process was set on a more direct path to offering sustainable wastewater treatment and biofuel production at community scale.

