Algae Direct Air Capture of CO₂ for Commodities National Energy Technology Laboratory

Direct Air Capture Virtual Kickoff Meeting

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Global Algae Innovations



Global Algae Innovations Algae Solutions to Global Dilemmas

Harness the unparalleled productivity of algae to provide food and fuel for the world, dramatically improving the environment, economy, and quality of life for all people

Vision

- Founded Dec 2013
- Algae for commodities
- Radical advances throughout the entire process
- Successful technology development in 8-acre farm
- Scaling –up now with design for 160-acre farm



Algae Process and Products



ALGAE

Algae Bioproducts: Food, Feed, Fuel, Polymers, & Consumer Products

Global Algae has Developed Many Breakthroughs and Innovations to Achieve Economical Production



GLOBAL ALGAE

Ready for Scale-up

Global Algae Innovations Research and Development Farm



CO₂ Supply

2014 - 2019: power plant flue gas

2019 to present: direct air capture

Same productivity achieved with direct air capture as with externally supplied CO₂

DAC CO₂ supply: 15-20 tons/acre-yr ~\$8/ton





All IPCC pathways limiting global warming to 1.5°C require stopping deforestation and almost all include reforestation

Amazon Rainforest

- 100 million ha deforested
- Rate of deforestation is increasing
- Many societal benefits
 - Soy and ranching for income
 - Meet world protein demand
 - Increasing value of protein

South East Asian Rainforest 18 million ha planted for palm Palm oil to quadruple by 2050 Many societal benefits of palm • Improving livelihoods • Eradicating poverty



Algae is Pivotal to Achieving Our Climate Change Goals because of the Unprecedented Productivity Increase





Large-scale algae for feed and fuel could reduce Global CO₂ emissions by 13.3 Gt/year

Algae for animal feed and biofuels:

- Agriculture 5.4 Gt/y, 32% with algae, 60% GHG reduction = 1 Gt/y
- Fuels 12 Gt/y, 20% with algae biofuel, 94% GHG reduction = 2.3 Gt/y
- Stopping deforestation = 5 Gt/y
- Restoring forests = 5 Gt/y

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Walsh, B.J., Rydzak, F., Palazzo, A. et al. New feed sources key to ambitious climate targets. Carbon Balance Manage 10, 26 (2015).



Unique Approach because of the IMPACT of ALGAE

