

Title: Feasibility study of algae-based CO₂ capture

Lead: Marc Menetrez

Abstract: The biomass of microalgae contains approximately 50% carbon, which is commonly obtained from the atmosphere, but can also be taken from commercial sources that produce CO₂, such as coal-fired power plants. A study of operational demonstration projects is being undertaken to evaluate the benefits of using algae to reduce CO₂ emissions from industrial and small-scale utility power boilers. The operations are being studied for the use of CO₂ from flue gas for algae growth along with the production of biofuels and other useful products to prepare a comprehensive characterization of the economic feasibility of using algae to capture CO₂. Information is being generated for modeling analyses and examination of the breakthrough potential of transformational technologies and their associated environmental implications using an economic evaluation model. Three electric power generation plants (coal and fuel oil fired) equipped to send flue-gas emissions to algae culture at demonstration facilities are being studied. Data and process information are being collected and developed to facilitate feasibility and modeling evaluations of the CO₂ to algae technology. An understanding of process requirements to apply this technology to existing industries would go far in advancing carbon capture opportunities. Documenting the successful use of this technology could help bring “low-tech”, low-cost, CO₂ to algae, carbon capture to multiple size industries and could accelerate the use of “low-tech” carbon capture.