National Energy Technology Laboratory
Carbon Utilization Project Review Meeting
Panel Discussion on Direct Air Capture (DAC) and Utilization

October 22, 2020
BETO’s Advanced Algal Systems Program

BETO funds R&D to strategically address lowering costs, improving quality, and increasing productivity of algal biomass.

BETO partners are developing sustainable, scalable algae cultivation systems and approaches to:

• maximize reliable annual biomass yield and quality, and
• minimize energy use, water consumption, land use, and nutrient additions.
Sensitivity Plot for Algae Biomass Cost – Why CO2 Capture and Utilization?
Advanced Algal Systems Program

Like terrestrial plants, algae require CO₂ for growth – a perfect biological, photosynthetic capture and utilization mechanism!

- Initial CO₂-focused projects awarded from Targeted Algal Biofuels and Bioproducts FOA in 2015 (one on CO₂ from flue gas, one on direct air capture)
- Algae Cultivation for Carbon Capture and Utilization Workshop, May 23, 2017 (in coordination with Office of Fossil Energy and Stanton Energy Center)
- Efficient Carbon Utilization in Algal Systems FOA, 2018 two topic areas – CO₂ utilization within cultivation systems and direct air capture)
- Coordination/Information Sharing with the Office of Fossil Energy (most recently coordinated language, metrics, topic areas for both FE’s and BETO’s FY20 FOAs, including participation on each other’s FCBs; sharing project info for synergies and to avoid duplicative efforts)
- FY20 BETO Multi-topic FOA – Topic Area 3, Algal Bioproducts and CO₂ Direct Air Capture Efficiency (all projects include direct air capture technologies and CO₂ utilization metrics/goals)
The algae industry is an early DAC and flue gas capture adopter. BETO has **partnered with FE on carbon utilization** algae efforts to investigate both flue gas capture and direct air capture (DAC) to reduce delivered CO$_2$ costs and provide added value.

**Selection of FOA awards that include carbon utilization from a point source and direct air capture**

**ECUAS Topic language developed with input from FE**

**45Q includes algae as a CCU technology**

**ABCDE**

Scoping on FOA discussed with FE

FE reviewer

FE Federal Consensus Board

The IRS released a new set of regulations for the Section 45Q tax code that can award a federal investment tax credit of up to $35 per ton for carbon utilization with algae.
Support for AAS Carbon Capture and Utilization R&D

**Engineering** and **biological** solutions are needed to increase the efficiencies of CO₂ delivery and uptake by the algae, and it is important to show that algae can **thrive** on these emissions while **reducing costs** of production.
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