

Breakout A₁: Saltwater Anaerobic Digestion



David Babson

ARPA-E Program Director



Grace Ryan

ARPA-E Tech SETA

- ▶ **What are key challenges in developing economically scalable technologies for macroalgae biorefining with minimal freshwater use?**
- ▶ Strategies to maximize carbon conversion to final product (CH₄ + CO₂): > 75% of feedstock carbon
- ▶ Rate of methane generation (HRT-hydraulic residence time)
- ▶ Trade-off between operating temperature control vs. methane generation rate (psychrophilic AD?)
- ▶ What are appropriate low-cost reactor solutions (conversion speed vs. capital cost)? Are floating reactors an option?
- ▶ Can seasonal storage (e.g. ensiling) be leveraged as a pretreatment process?
- ▶ Use options for residual biomass (nutrient recovery, protein source, carbon sequestration)

Breakout A₂: Saltwater Anaerobic Digestion



Jack Lewnard
ARPA-E Program Director



Dora Lopez
ARPA-E Tech SETA

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Breakout B: Saltwater Hydrothermal Liquefaction



Doug Wicks
ARPA-E Program Director



Matt Mattozzi
ARPA-E Tech SETA

- ▶ **What are key challenges in developing economically scalable technologies for macroalgae biorefining with minimal freshwater use?**
- ▶ How do we maximize bio-crude yield and energy content?
- ▶ What pretreatment (mechanical, chemical, biological) is required for seaweed?
- ▶ Can we minimize use of (chlorinated) organic solvents for bio-crude extraction?
- ▶ Best options for utilizing of carbon in aqueous fraction (anaerobic digestion, nutrient recovery)?
- ▶ Utilization options of hydrochar (nutrient recovery, energy recovery)
- ▶ What are potential uses for the residual ash, beyond fertilizer recovery?

Breakout C: Nutrient Recovery



Krishna Doraiswamy
ARPA-E Tech to Market Adviser



Dylan Temple
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- ▶ **What are key challenges in developing economically scalable technologies for macroalgae biorefining with minimal freshwater use?**
- ▶ What are the best options for integration of fertilizer recovery with AD or HTL process flows?
- ▶ What are critical technology gaps for concentrating the various fertilizer components?
- ▶ What fertilizer formulation is most desirable?
- ▶ Alternatively, can nitrogen be recovered as protein from the process flows?
- ▶ What salt and heavy metal separation/removal strategies are needed?