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Presenting at
Leveraging First Generation Bioethanol Production Facilities
BETO Workshop, 9/25/2019

Worked with 40+ industrial collaborators

Biofuels & Biomass

Materials & Chemicals

Food & Health

Environment & Ag



Mosaic
Materials



UCSF
University of California
San Francisco



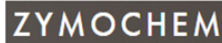
KALION, INC.



Ongoing projects



HelioBioSys, Inc.



QUEENS UNIVERSITY
OF CHARLOTTE

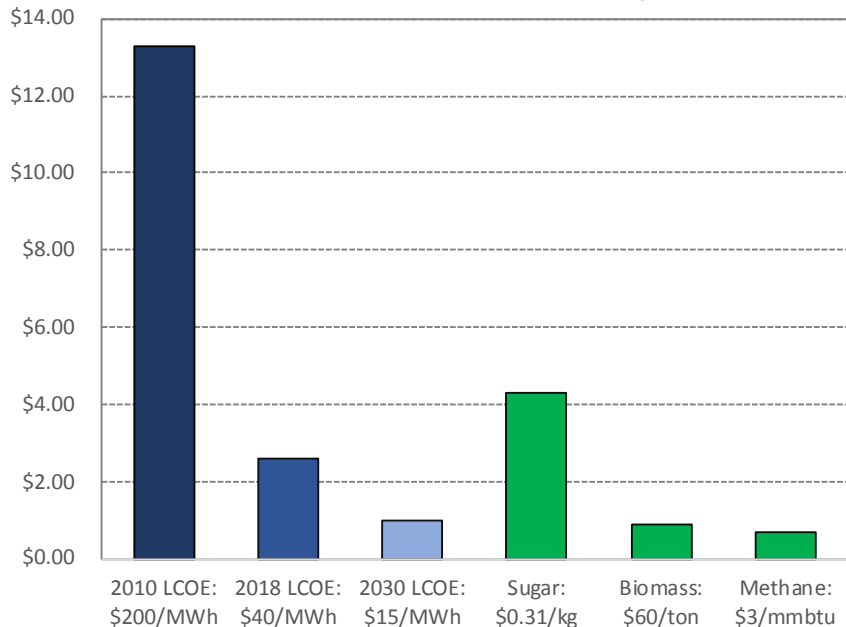


GINKGO BIOWORKS™
THE ORGANISM COMPANY

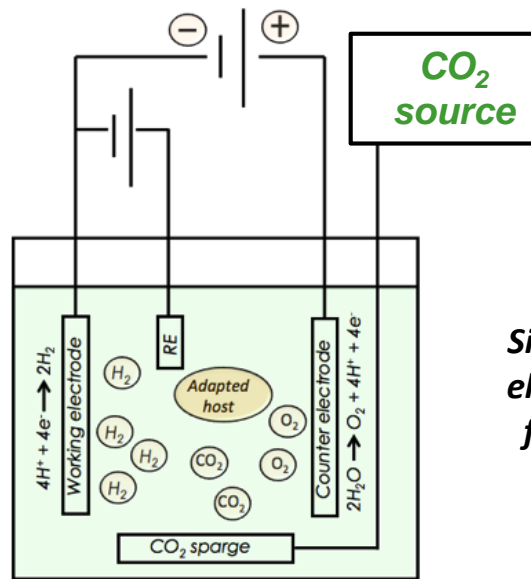


Energy Efficiency &
Renewable Energy

Feedstock cost per GGE: 50% conversion efficiency



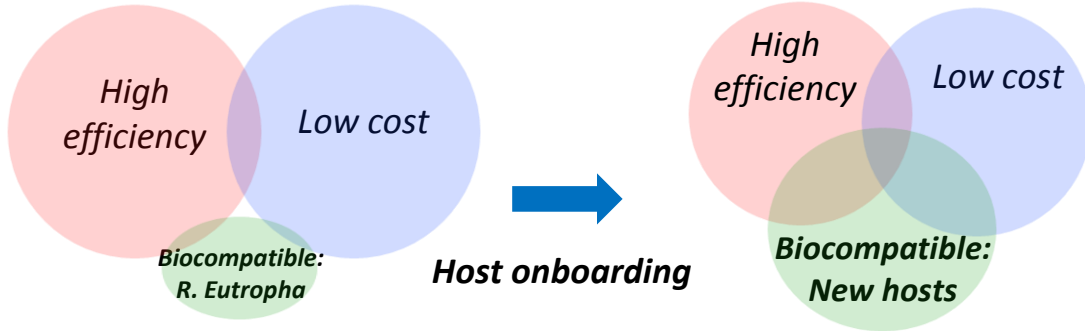
**Renewable electrons are approaching
\$/kJ parity with biomass**



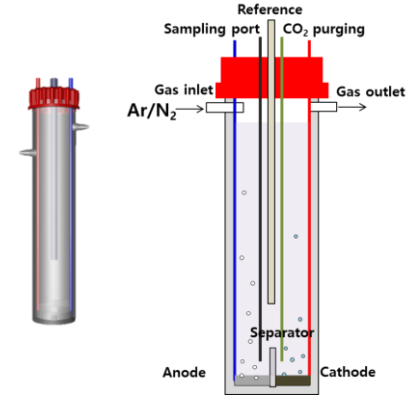
**Single chamber
electrolysis and
fermentation**

Key benefits	Key challenges
Simplified mass transfer, no sparging	Reactive oxygen species
Flexible aerobic metabolism	Metal ions
Simple, separation-free electrolysis	High temperature
Modular scaling	High salinity, extreme pH

New hosts are required for production under optimal electrolysis conditions



New bioreactor designs are required



Co-optimizing electrolysis and fermentation

Environmental enrichments



Strain libraries

