

Biological Technologies for Methane-to-Liquids ARPA-E Workshop

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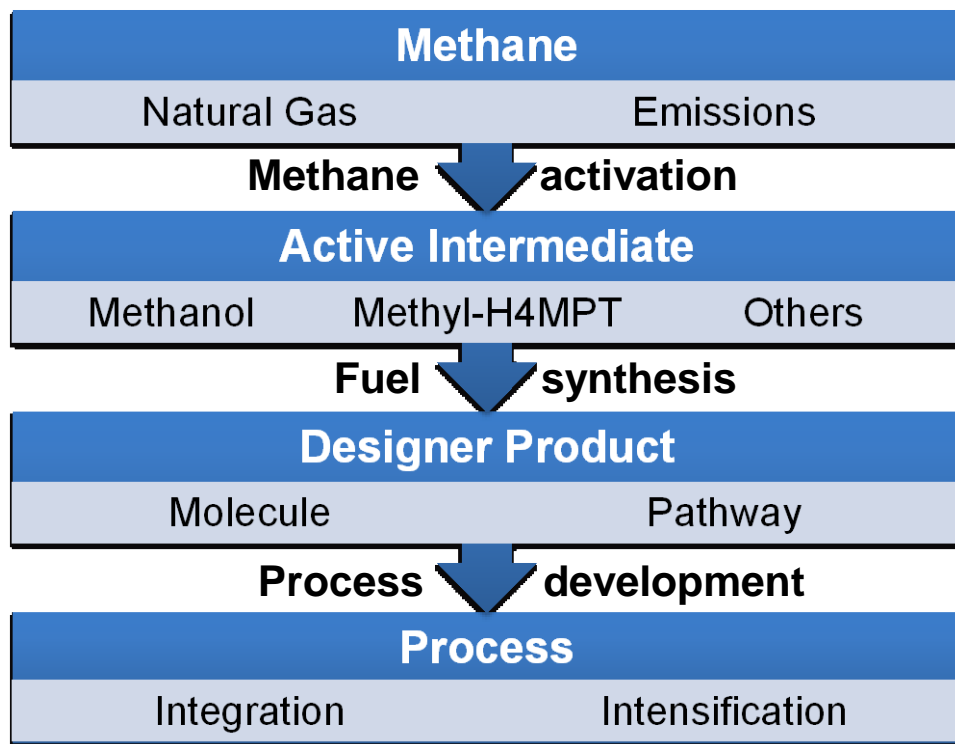
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www.arpa-e.energy.gov

An outcome of this workshop is to identify biotechnologies for methane to liquid fuels

Methane to Liquid Fuels



Representative expertise	
Methanogenesis	Aerobic methanotrophs
Anaerobic & C1 metabolism	Electrosynthesis
Industrial bioprocessing	Synthetic biology & protein engineering

An outcome of this workshop is to identify biotechnologies for methane to liquid fuels

Goals

- Discuss the feasibility of biological conversion of methane to liquid fuels:
 - Representative technologies
 - Prior experience/lessons learned
 - .Data
 - .TEA
 - Prioritization of technologies
 - Increased understanding
- Community building
- Metrics
 - What metrics should we use?
 - What should be their value (roughly)?

Representative discussion questions

- What is the resource potential for "wet"/"sour" gas?
- Are there ways around inefficiencies w/ methane conversion?
- Is it advantageous and possible to divert carbon away from CO₂ towards fuel production in the anaerobic pathway?
- What synthetic biological routes could/should be considered?
- What are possible bio-process intensification & integration strategies?

Breakout sessions

- 1st breakout session – general brainstorming
 - ▶ What are the possible routes to convert CH₄ to liquid fuels?
 - Mechanism for methane activation
 - Intermediates
 - Process inputs
 - Limitations
 - Challenges
 - Benefits
- 2nd breakout session – the back-end
 - ▶ What processes are needed to economically produce CH₄ to liquid fuels for a given route?
 - Impact of scale and feedstock
 - Process intensification & integration



Workshop agenda, morning

8:30-8:40	Eric Toone , Principal Deputy Director ARPA-E
8:40-9:00	Ramon Gonzalez , Program Director ARPA-E
9:00-9:30	Doug Cameron , Co-President & Director First Green Partners
9:30-10:00	Greg Stephanopoulos , W.H. Dow Professor of Chemical Engineering and Biotechnology MIT
10:00-10:05	Agenda & Breakout Expectations
10:05-10:20	Break & Room Change
10:20-12:15	Breakout Session A (Carver) Breakout Session B (Wright) Breakout Session C (Edison)
12:15-1:00	Lunch

Workshop agenda, afternoon

1:00-1:30	Breakout session reports
1:30-1:45	Ramon Gonzalez , Impacts & considerations for bio-opportunities for methane
1:45-2:00	Break & Room Change
2:00-3:45	Breakout Session D (Carver) Breakout Session E (Wright) Breakout Session F (Edison)
3:45-4:15	Networking time
4:15-4:45	Breakout session reports
4:45-5:15	Summary & next steps