Bioenergy Technologies Office

2017 Program Management Review

Thermochemical Conversion Response

Kevin Craig

Program Manager

Arlington, Virginia

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Thank you!

THERMOCHEMICAL CONVERSION REVIEW PANEL	
NAME	**AFFILIATION**
Shawn Freitas*	Thermochem Recovery International
Lorenz (Larry) Bauer	Independent Consultant
Timothy Brandvold	Abbott Molecular
Jeffrey J. Scheibel	Independent Consultant
Neils Udengaard	Haldor Topsoe (Retired)

- Successes:
- "Some of the highest impact directions were viewed as those projects where a significant effort was made to utilize existing commercial facilities or commercially relevant reactors to prove a conversion or catalysis step."

Thank you!

- Successes:
- “The last 3-5 years have seen some fairly significant improvements in solvent and hydrothermal liquefaction technology and BETO’s support of this work appears to pushing it towards an inflection point where commercial adoption is more likely.”
- “The Consortium for Computational Physics and Chemistry has done an exceptional job in this (consortium) area and could be used as model for some of the newer consortiums.”

Technology Area Introduction

Thermochemical # of Projects	33
Thermochemical Total Funding Reviewed	$144,621,875
% of BETO Total	21%

- Introduction to Program Manager and Session Lead
  - Program Manager Kevin Craig
  - Session Lead Andrea Bailey

Recommendation #1

Re-scope Pyrolysis

- **Fast pyrolysis and hydrotreating requires new directions and further breakthroughs.**
- **Transition pyrolysis research from whole biomass to pyrolysis and liquefaction of biomass components such as various forms of lignin, cellulose, hemicellulose, and extractives.**
- **Examine co-reactants and alternative H2 donors to avoid traditional hydrotreating**

Actions

- New pyrolysis R&D strategy being developed
- ChemCatBio will increase focus on other thermochemical and hybrid pathways
- Results of the FY17 verification process and stakeholder input will be taken into account when developing new priorities
- Continue advanced modeling efforts on particle heating/reaction/hydrodynamics to support R&D

Recommendation #2

Value Proposition

- **Focus on high performance/value products like jet fuels, fuel additives, solvents;**
- **Lower volumes of higher value fuels/chemicals should be prioritized**
- **Leverage functionality and reactivity of biomass for targeted synthesis of useful chemicals and fuels.**

Action

- Continue collaboration and strengthen interactions with Co-Optimization projects.
- Ongoing effort to expand biomass value proposition by evaluating additional final products (MEGABio FOA, functional replacements/bioadvantaged products workshop, analysis of most impactful potential bioproducts)
- Program cost targets for finished fuel remain a significant driver of R&D; however, given persistent low oil prices, and need for flexibility, alternative success measures are being considered

Recommendation #3

Leverage "waste" streams and existing capital resources

- **include more technologies designed to function at both smaller scales**
- **Consider retrofits to existing industrial facilities involved in biochemical, biomass, and microbial conversions – (biogas, wastewater, P&P, food processing)**
- **Utilize existing commercial facilities or commercially relevant reactors to prove a conversion or catalysis step**

Action

- Have performed additional analysis on modular and point-source systems (not reviewed in this portfolio)
- Additional analysis of the potential of "wastes" and other process residues present in the WTE portfolio
- Re-examining approach to technology verifications