Bioenergy Technologies Office

2017 Program Management Review

Biochemical Conversion

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Peer Review Process

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

BIOCHEMICAL CONVERSION REVIEW PANEL	
NAME	**AFFILIATION**
Suzanne Lantz*	DuPont
Yoram Barak	BASF
Joseph Bozell	University of Tennessee
Jamie Ryding	Corvia Biotechnology Group
Steve Van Dien	Genomatica

Review Panel Approach

- 45 minute daily discussions of the presentations during the review – focusing on strengths and weaknesses of technical presentations, and project management
- After the review, each panelist documented specific examples of impact, technical strength, significance to BETO, recommendations, etc., and these were included in the final review report
- There was considerable agreement among the panel and when exceptions occurred, they were noted in the report

Project Scores

- Average scores ranged from 5.35 to 9.20, with a median of 8.05.
- Top Performing Projects:
  1. NREL – Analytical Methods Development and Support
  2. NREL – Biochemical Process Modeling and Simulation
  3. NREL – Renewable Carbon Fibers Consortium
  4. NREL – Biochemical Platform Analysis Project
  5. NREL – Lignin Utilization

	SunSetting	Ongoing	New
Average Scores	7.57	8.10	7.74

Overall Impressions: Impact

- Clearly defined goal for BC program: $3/GGE by 2022
  - Recognized need for value-added co-products
- Strengths:
  - Core enabling projects (Analytical Methods, Modeling etc.)
  - Organization into consortia structure
  - Renewed focus on chemical bio-products
    - Lignin research
    - Diverse approaches to meet 2022 goal
  - Focus on Titer/Rate/Yield metrics
- Weaknesses
  - Fungal strain projects could benefit from consortia approach
  - Some competitive projects with unclear goals/scope (Kiverdi, JCVI)

Overall Impressions: Innovation

- Lignin as a substrate for co-products is most innovative and highest impact portfolio area
  - Whole community could benefit from standardized, characterized starting materials
- Renewable Carbon Fiber Consortium
  - Relevant and impactful target
  - Innovative and exciting work
- Would benefit from a better path to connect LDRD to BETO core

Overall Impressions: Synergies

- Subject-centered consortia are a technological strength
  - Avoids silos and works on common problems
  - Management challenges and strengths
- Could better utilize core NL skills: process modelling at NREL, SCADA at PNNL, analytical methods at NREL
  - Need to better integrate across labs and disseminate results
- Scaling facilities are a resource/strength
  - Support scale-up and pre-commercial development
  - Would benefit users to offer a coordinated package of resources between ABPDU and IBRF
- Fungal strain development coordination should be improved
  - Shared expertise

Overall Impressions: Focus

- Technology Gaps
  - Reactor and aeration design
- Standard Materials
  - NLs or CROs could provide generally applicable material and software in an open source manner
    - E.g. NREL Acid-pretreated Corn Stover or NREL Analytical Methods Development Laboratory Analytical Procedures
- Biorefinery Scenario
  - Focus on making chemical products in parallel to fuel is critical
    - Don't down-select to a single chemical (like adipic acid) too quickly
- Technology Communication
  - Better dissemination of information beyond journal articles

Overall Impressions: Commercialization

- Strengths:
  - Lygos
    - Developed both an end product, malonic acid, in the DOE top 30 as well as a rapid screening method with potentially greater applicability
    - Utilized ABPDU and IBRF to help scale
  - ABPDU
    - One stop shop for bioprocess research
    - One partner has commercialized and three are in pre-commercial prototyping
  - Texas A&M Synthetic Microorganisms to Enable Lignin Conversion
    - Integrated process that has attracted potential licensees
- Weaknesses
  - TEA not uniformly applied or communicated
  - Need to better quantify commercial metrics, track progress, and communicate state of technology relative to metrics

Overall Recommendations

Increase project management rigor

- More consistent use of TEA
- Monitor overcommitted project leadership
- Alternative evaluation procedures for core operations teams at NLs (i.e. analytics, pilot plant, modeling, etc.)
- Better explain multiple FOAs represented in Peer Review

Continue to support consortia organization in specific technology areas

- Separations, Renewable Carbon Fibers, Agile BioFoundry are good models for streamlining and coordinating R&D in certain areas
- New consortia in areas such as fungal strain development and lignin depolymerization

Encourage use of industrial advisory boards and partnerships

- Consortia industrial advisory boards (IABs) have a noticeable impact on consortia projects and should be more broadly encouraged