Bioenergy Technologies Office

2017 Program Management Review

Demonstration & Market Transformation

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Peer Review Process

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Review Panel Approach

- DMT Presenters provided summary updates for their projects in Denver, Colorado in a public forum in March 2017
- Short summary of the first impressions, what is working well, and opportunities for improvement provided to Steering Committee on March 10th
- Peer Review Panel members provided feedback and 1 to 10 scoring of the various aspects of the DMT projects using a DOE website
- Summary report prepared and delivered to DOE BETO personnel for review
- Summary presentation delivered today July 13 for Steering Committee consideration
- Note Co-Optima project is a significant part of the DMT portfolio but was reviewed separately due to its size/complexity

Project Scores

- Average Weighted Scores ranged from **5.25** to **7.92**, with a median of **7.63**

- **Top** performing project:
  - ORNL – Fire Standards, Codes, and Prevention in IBRs

	SunSetting	Ongoing
Average Scores	7.58	6.95

DMT Program

- Demonstration and Market Transformation (DMT) program focuses on mitigating commercialization risks in technology and market adoption of biofuels, specifically;
  - Demonstration of integrated conversion processes at scale (technology)
  - Biofuels distribution infrastructure and end use activities (market adoption)
- Four projects in DMT program reviewed during 2017 Peer Review
  - Two Integrated Biorefinery (IBR) projects;
    - Poet Liberty, a pioneer scale cellulosic ethanol facility
    - Mercurius Biofuels, a pilot scale conversion facility
  - And two market adoption projects;
    - Oak Ridge National Lab (ORNL) – Fire Codes and Standards
    - Brookhaven National Lab (BNL) – Bio-Oil Deployment in Home Heating
- Co-Optima fuels and engine optimization project is part of DMT but reviewed separately due to its scope and complexity

Overall Impressions: Impact

- DMT Program continues to have a tremendous impact on the *commercialization* of biofuels technologies by demonstrating;
  - Yield of products at scale (pilot)
  - Availability of production facilities (pioneer commercial)
- Poet Liberty – demonstrate availability of commercial plant, will open up the debt market for biofuel producers and lessen the dependence on credit enhancement programs (loan guarantees, grants, etc.)
- ORNL Fire Codes – fires are an industrywide problem that causes delays and shifts resources away from technology development. BETO's investment here will assist everyone in the space and speed up detailed design
- Need more funding to continue to have an impact in this space

Overall Impressions: Innovation

- BETO has good innovative technology investment strategy including both breadth and depth
  - Poet; innovations in operation and retrofit of process units to enable stable sustained operations
  - Mercurius; investment outside of other technologies where DOE has a stake increases odds that one of the technologies will be successful
- BNL Bio-Oil project innovative in that it identified a large potential market with lower barriers to entry
  - Speeds up time to market
- BETO's stage gate review process is very innovative in that it;
  - Rewards progress, not effort
  - Ensures private side investment in technologies, not dependent on Federal Government for continued development
  - Prevents wasteful spending on projects that are not progressing

Overall Impressions: Synergies

- DMT program and Projects have significant synergies with the industry at large, particularly
  - Biomass handling and preprocessing
  - Fuels qualification
  - Identification of market opportunities
- While BETO Team Members work informally to capitalize on the synergies within the program, it may be beneficial to establish more formal links between BETO projects
  - For example, success of Bio-Oil project was limited due to unavailability of Bio-Oil for testing. Coordination with Bio-Oil projects in Conversion or DMT may have mitigated this problem

Overall Impressions: Focus

- Funding – Peer Review Panel would like to see more funding in the technology side of DMT
  - While helpful, supporting only two technologies limits the potential impact the program can have
  - Co-Optima investments address the market development focus for DMT (peer reviewed separately)
- Focus National Lab projects on availability issues versus yield,
  - Projects in the Conversion and FCIC portfolios that focus on optimization of unit operations or generating data for use by other private and public researchers
  - Feedback between the DMT and upstream (Conversion, FCIC, etc.) programs could speed up development of both

Overall Impressions: Commercialization

- Availability and Yield are the key commercialization metrics
- Reviewers noted that it may be beneficial for BETO to favor future pilot plant applications that are to be operated for more than 1,000 hours
  - While 1,000 hours is generally viewed as sufficient to derive useful data on the process, it is insufficient to identify long term operations and maintenance issues that would be encountered at the commercial scale
- Reviewers noted that more focus on the operation of existing assets rather than construction may allow BETO to stretch the budget

Overall Recommendations

- More DMT Projects and Funding –
  - It will be key to get more projects into the DMT portfolio as it is likely not all of them will be successful
  - While expensive, it is critical to have enough successful outcomes so that taxpayers see a return on their R&D
- Focus efforts by National Labs on availability (versus yield) outside the core technologies
  - Efforts such as ORNL Fire Codes and BNL Bio-Oil have a positive industry wide impact
- FOA's that use existing assets for long duration testing
  - Reduce the amount of resources allocated to developing greenfield assets, yielding more rapid results