

Conversion Technologies IWG FY18 Work Plan Status

Biomass R&D Board TAC Meeting

August 22, 2018

Key Activities/Deliverables Planned in FY18

Goal #1: Remove barriers to biointermediate refining and upgrading via existing infrastructure.

Specific approaches to achieve this goal:

- Study and identify key chemical and biochemical technologies to advance biorefining efficiencies.
- Address barriers to generating intermediates and products at relevant scales
 - Develop new and effective biomass handling and pretreatment technologies
 - Study how inhibitors impact the metabolisms' of biochemical conversion organisms
 - Develop strategies to avoid toxicity and/or increase resiliency to it
 - Crosscutting strategies to avoid toxicity may include interfacing with feedstock genetics researchers to inform them of inherent feedstock constituents that are inhibitors
 - Conversion-only strategies to increase resiliency include pretreatment processing to remove the inhibitors, and increasing the tolerance of the conversion system (organism or catalyst/solvent)
- Focus on new chemical and biochemical reaction engineering and genetic pathway engineering strategies to improve overall system reaction kinetics and conversion product yield
 - Establish meaningful performance targets in titer, rate, and yield

Key Activities/Deliverables Planned in FY18

Goal #2: Address critical risks and uncertainties to improve the prospects for capital investments in the bioeconomy

Specific approaches to achieve this goal:

- Inform a technical communications strategy to better characterize the advantages and value proposition of a robust bioeconomy
- Develop and provide technical advice to relevant agencies on the emerging bioeconomy to help inform appropriate policymaking and regulatory frameworks
- Promote R&D in valorizing residual side streams produced in biomass conversion processes

Progress Toward FY18 Deliverables

Goal #1: Remove barriers to biointermediate refining and upgrading via existing infrastructure.

- Using system modeling tools and corresponding process data to identify key processing parameters (chemical and biochemical) for optimizing refining efficiency
- Addressing barriers to generating intermediates and products at relevant scales through new catalyst development and biochemical pathway engineering

Goal #2: Address critical risks and uncertainties to improve the prospects for capital investments in the bioeconomy

- Reported on successful verification case for biomass to jet fuel via gasification, gas fermentation, and ethanol upgrading.
- Assessments on the value proposition for new efficiency measures, waste minimization, and carbon utilization have been initiated and reported outcomes expected by the end of the year.

- Continued efforts to improve efficiencies for intermediate upgrading with improved refining efficiencies
- Continued efforts to develop and report on relevant technologies that have been derisked.
- New carbon utilization, carbon efficiency, and carbon management goals to be established
 - CO₂ reduction and upgrading
 - Pathway and reactor engineering strategies for avoiding CO₂ evolution during fermentation
 - Implications for pathway carbon efficiency as a function of carbon source (carbon efficiency versus biomass efficiency)