

*Bioenergy Technologies Office*

**2017 Program Management  
Review**

*FSL/Conversion Response*

**Steve Thomas**

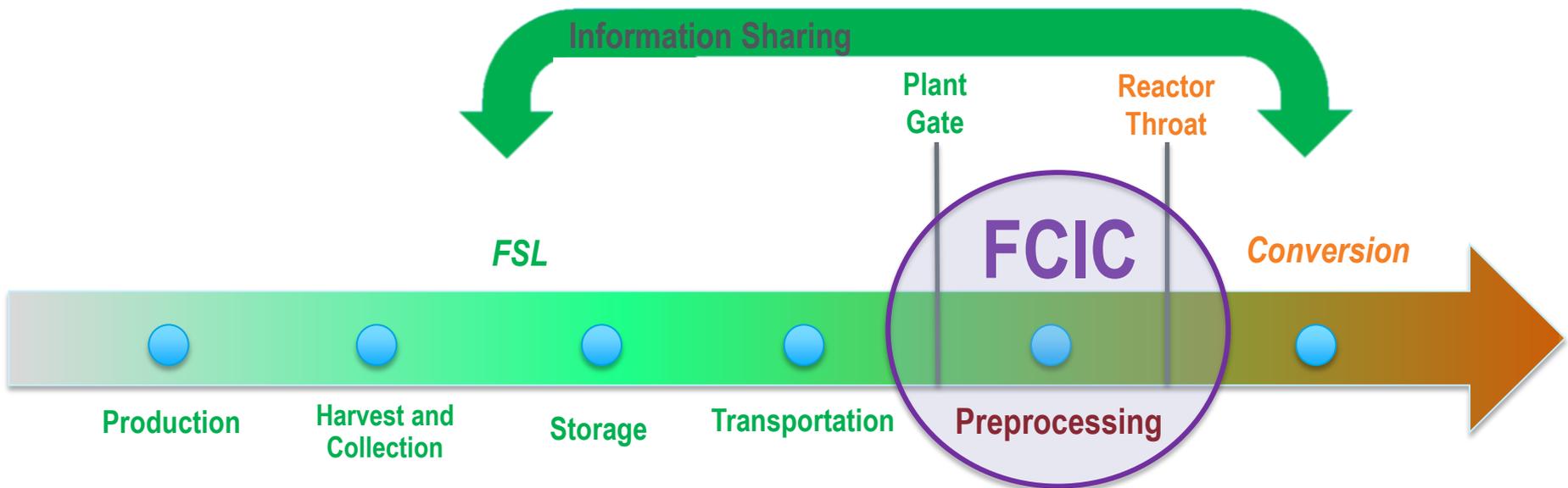
**Technology Manager**

**Arlington, Virginia**

**July 13, 2017**

- Lead Reviewer, Gerson Santos-Leon of Abengoa
  - Emily Heaton, Iowa State University
  - Brandon Emme, ICM
  - Phillip Marrone, Leidos
  - Mike McCurdy, Leidos
  - Luca Zullo, Verde Nero
- Project successes highlighted in evaluation
  - The panel commends BETO for recognizing the importance of the FCIC
  - INL’s Biomass Feedstock Library – “meaningful information accumulated and into a myriad of usable forms...an excellent effort to create a common baseline...arguably one of the most important projects that BETO has implemented”
  - NREL’s Pretreatment and Process Hydrolysis – promising results, innovative approach, far reaching significance
  - INL’s Biomass Feedstock PDU will define the concepts and strategies for FCIC

- Total of **9** Projects Reviewed
- Total of **\$35,062,470** Funding Reviewed
- **5%** of total BETO Portfolio



*“Identify and appoint a diverse industrial guiding committee to build on the recommendations of the Biorefinery Optimization Workshop to continue capturing real world technical and operational issues.”*

## Response

- It has been BETO’s intention from onset to establish an Industrial Advisory Board for the FCIC
  - Intention is to include members ranging from agriculture and forestry harvesting equipment manufacturers, biomass producers and suppliers, preprocessing equipment manufacturers, co-product distributors, conversion technology developers, biorefineries, end users, etc.
  - Workshop planned for Fall 2017
- BETO will support the national lab partners and FCIC researchers to engage industry stakeholders, gather input and solicit feedback via:
  - Listening days, workshops, webinars, etc.
  - Virtual Scale-up Team
  - Industry collaborative R&D

*“Develop an integrated FCIC plan based on the recommendations of the Biorefinery Optimization Workshop and the guiding committee considering the different requirements of the various thermochemical and biochemical conversion processes.”*

## Response

- Three BETO Programs (FSL, Conversion, and Advanced Development and Optimization) are working closely with the national labs during the Merit Review cycle to develop well integrated, impactful work plans for FY18-20.
- Five full proposals submitted, covering the range of FCIC research priorities to help enable >90% operational reliability in biorefineries. FCIC AOP titles are:
  - Feedstock Variability
  - Feedstock Informed Process Development
  - Modeling of Biomass and Feedstock Physical Performance
  - Integrated Analysis
  - Industry Engagement

*“Balance the portfolio of projects to include near-, mid- and long-term FCIC projects. Wind-down or terminate projects that do not fit in the portfolio.”*

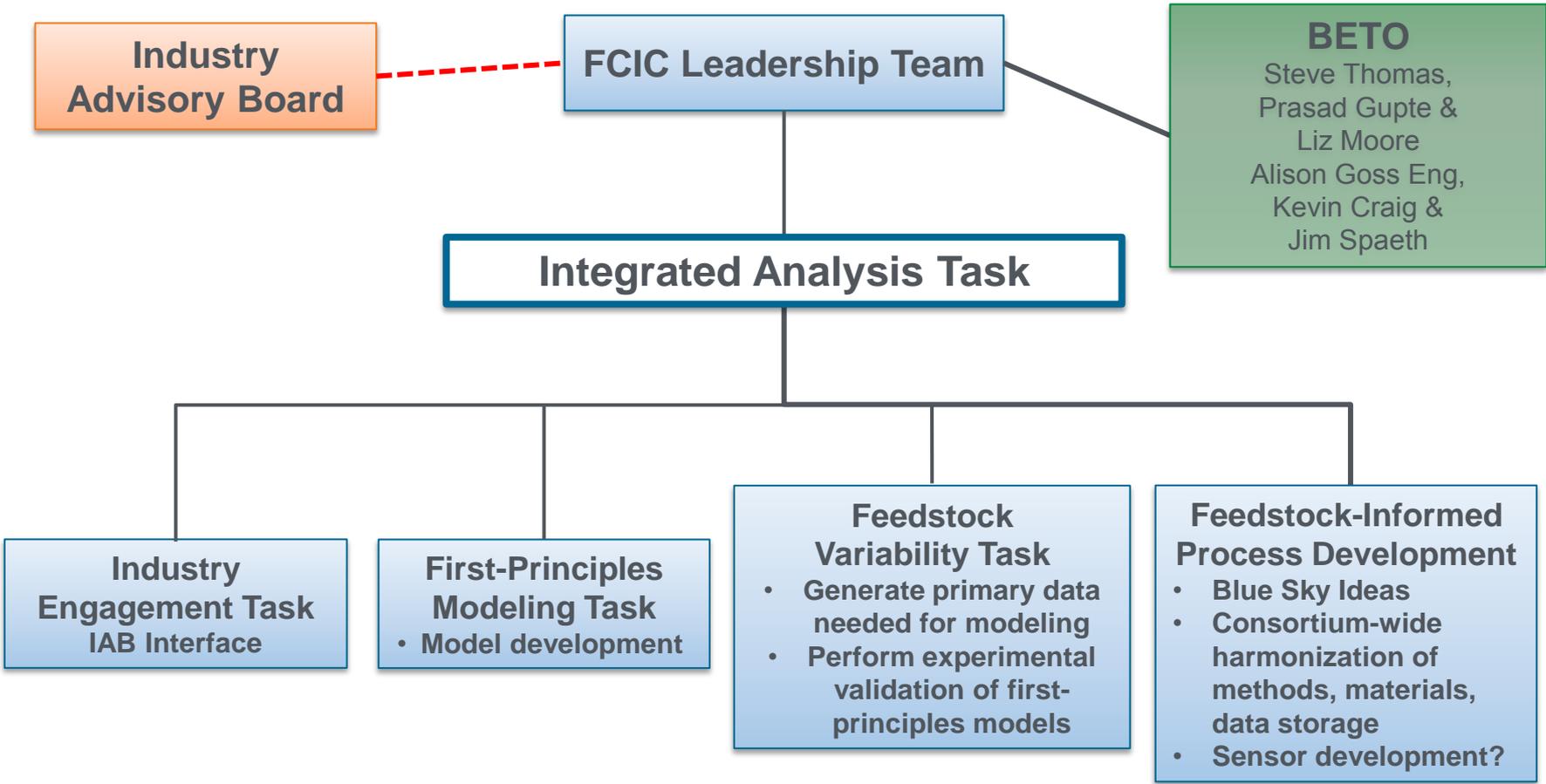
## Response

- All the current FCIC-relevant AOPs (9 presented at 2017 Peer Review) will be terminated at the end of FY17.
- FCIC work plans are included in 5 new AOPs designed to operate on the same 3-year cycle (FY18-20), and are currently undergoing independent review. All are focused on mutually agreed upon, well-integrated FCIC goals and objectives. The overall goal is to help enable integrated feedstock/conversion processes that function at >90% operational reliability (i.e., time-on-stream).

*“Perform a trade-off evaluation and TEA of the depot and preprocessing concepts to validate the solutions and guide FCIC activities.”*

## Response

- BETO agrees regarding the importance of understanding the downstream technical and financial impacts of feedstock quality parameters, potential preprocessing operations, and the depot concept for FCIC activities on overall process reliability.
- FCIC’s Integrated Analysis project will evaluate the integrated value chain, which spans the field-to-fuel system-wide impacts of feedstock variability on cost, down time, achievable biofuel yield, and environmental sustainability trade-offs to understand the path forward for IBRs to realize reliable and profitable operations.



TASKS	DELIVERABLES/RESPONSIBILITIES	HANDOFFS TO OTHER TASKS
<b>Industry Engagement</b>	<ul style="list-style-type: none"> <li>Identify key/prioritized industry needs translated to low-TRL research topics</li> <li>Provide feedback from IAB on FCIC structure, plans, results</li> </ul>	<ul style="list-style-type: none"> <li>Information on the key research questions that will address industry needs</li> </ul>
<b>First Principles Modeling</b>	<ul style="list-style-type: none"> <li>Define/execute Fundamental heat/mass/momentum modeling approaches for feedstock handling, TC, and BC conversion pathways</li> </ul>	<ul style="list-style-type: none"> <li>Define primary data (chemical, mechanical, physical properties) required each modeling approach to Feedstock Variability TASK</li> </ul>
<b>Integrated Analysis</b>	<ul style="list-style-type: none"> <li>Develop framework for guiding &amp; evaluating research results from Consortium, ensuring consistency across FSL &amp; Conversion Platforms</li> </ul>	<ul style="list-style-type: none"> <li>Information on the impact and critical research needs based on modeling framework</li> </ul>
<b>Feedstock Variability</b>	<ul style="list-style-type: none"> <li>Define key chemical, physical, mechanical properties of biomass that affect handling and conversion performance</li> <li>Understand variability of these properties across the biomass resource/feedstock value chain</li> </ul>	<ul style="list-style-type: none"> <li>Generate well-characterized primary data (chemical, mechanical, physical properties) required for modeling tasks</li> <li>Generate multiscale experimental results for validating modeling approaches to Modeling Task</li> </ul>
<b>Feedstock-Informed Process Development</b>	<ul style="list-style-type: none"> <li>“Blue sky” high-risk, high-reward projects?</li> </ul>	<ul style="list-style-type: none"> <li>Harmonized data management practices, analytical, and experimental methods for other tasks</li> </ul>