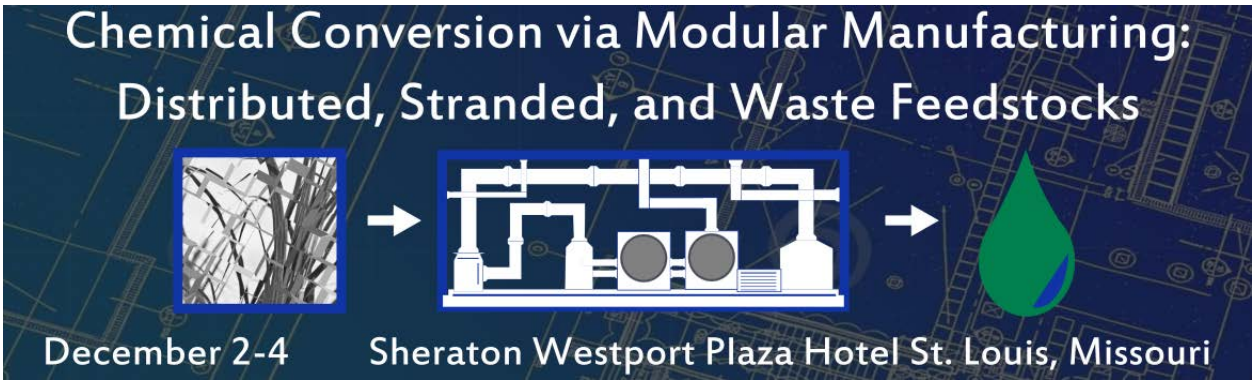


**Workshop Agenda**
**Revised: November 28, 2015**

December 2—Evening

| | | |
|---|---|---|
| 4:00 pm | Welcome and Introductions (John Holladay, Pacific Northwest National Laboratory)<br>Review of Workshop I (Robert Brown, Iowa State University)<br>Workshop Objectives, Guiding Principles, and Big Idea Concept (Cynthia Jenks, Ames Laboratory) | *East B/C* |
| 4:30 pm | Panel Discussion: Federal Agency Planning in this Area and Drivers<br>(Moderator: Mark Petri, Iowa Energy Center; Panelists: Jonathan Male, DOE-EERE-BETO; Mark Philbrick, DOE-EERE-BETO) | *East B/C* |
| 5:30 pm | Keynote State-of-Technology Presentations<br>• Modular manufacturing (Mark Gaalswyk, Easy Energy Solutions)<br>• Industrial challenges for the conversion of lignocellulosic materials: Would modularization work? (Magdalena Ramirez, Consultant)<br>• Market Realities/Project Finance/Applications (Brian Baynes, Flagship Ventures) | *East B/C* |
| 7:00 pm | Dinner | *East A* |
| 7: 45 pm | Keynote Dinner Speaker—Biomass Sources, Characteristics, and Challenges<br>(Bruce Rittmann, Arizona State University) | *East A* |

December 3—Morning

| | | |
|---|---|---|
| 7:00 am | Breakfast | *East A* |
| 8:00 am | Keynote Speaker—Economics of Waste Conversion<br>(Mark Mba Wright, Iowa State University) | *East B/C* |
| 8:30 am | Technical Challenges Presentations Part 1<br>• Anaerobic Digestion (Largus Angenent, Cornell University)<br>• Steam Reforming and Solvent Liquefaction (John Holladay, Pacific Northwest National Laboratory) | *East B/C* |
| 9:20 am | Break | *East Foyer* |
| 9:40 am | Panel Discussion: Feedstock Issues<br>(Moderator: Robert Brown; Panelists: Thomas Tarka, National Energy Technology Laboratory; Kevin Kenney, Idaho National Laboratory; Chuck Hamstra, City of Phoenix) | *East B/C* |
| 10:40 am | Breakout Session Expectations | *East B/C* |
| 10:50 am | Moderated Group Breakout Session<br>• Topic Area 1: *Plaza 2* - Discuss and recommend 2-4 target feedstocks based on overall impact and technical feasibility or economical difficulty (Moderator: Robert Brown; Scribe: Jill Euken)<br>• Topic Area 2: *East B/C* - Discuss modular chemical processing and identify scaling inflection points (size of process), manufacturing inflection points (number of units), and manufacturing technology needs (Moderator: John Holladay; Scribe: Mark Mba Wright)<br>• Topic Area 3: *Plaza 1* - Discuss advantages and disadvantages for possible products, including crude intermediate, chemical intermediate, finished fuels, etc. (Moderator: Mark Petri; Scribe: Cynthia Jenks) | |
| 11:40 am | Presentations and Discussion of Results of Breakout Sessions | *East B/C* |

December 3—Afternoon

| | | |
|---|---|---|
| 12:10 pm | Boxed lunch | *East Foyer* |
| 12:15 pm | Box Lunch en route to Red Bud, IL for Optional Tour of Roeslein & Associates Facilities | |
| 1:15 pm | Presentations and Tour of Roeslein (Rudi Roeslein, Roeslein & Associates) | |
| 4 pm | Return to Hotel | |
| 5:00 pm | Social Hour | *East A* |
| 6:00 pm | Dinner | *East A* |
| 7:00 pm | Keynote Dinner Speaker—Manufacturing Scaling Economics<br>(Jack Hu, University of Michigan) | *East A* |

December 4 – Morning

| | | |
|---|---|---|
| 7:00 am | Breakfast | *East A* |
| 8:00 am | Technical Challenges Presentations Part 2<br>• Fermentation (Laurel Harmon, LanzaTech)<br>• GTL (Dane Boysen, GTI)<br>• Pyrolysis (Robert Brown, Iowa State University) | *East B/C* |
| 9:15 am | Break | *East Foyer* |
| 9:35 am- | Instructions for Table Discussions | *East B/C* |
| 9:40 am | Table Discussions about Appropriate Conversion Technologies for Selected Feedstocks (include emerging technologies that may impact current economics or feasibility)<br>• Discuss engineering paradigm shift for designing for modularity<br>• Discuss opportunities for process intensification and modularization for various technologies<br>• Identify technology needs to reduce cost of manufacturing process equipment, process intensification components, skid components, and module assembly | *East B/C* |
| 10:45 am | Table Discussion Session Sharing | *East B/C* |
| 11:30 am | Wrap-up and Discussion of Next Steps | *East B/C* |
| Noon | Lunch | *East A* |
| 1:00 pm | Workshop Concludes | |