

Breakout Session 5:

Other Process Intensification Applications

Technology Needs, Barriers, & Challenges

- Improved material use & recovery
 - Cost effective, distributed approach to waste recovery
 - Smart recycling technologies; including opportunities for local feedstock
- Analysis of impact of waste recovery, e.g., on water/energy/food nexus
- Improvement on manufacturing steps that would lead to intensified processes:
 - Control systems
 - Highly selective catalysis for micro reactors & separators
- New product development approach, that includes requirements/constraints from product's end of life

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R&D Needs

- Improved life cycle cost analysis, including cost analysis of
 - Recovery & recycling
 - Environment
- Development of Standards and Metrics
 - Technology vs. TRL vs. priority, etc
- Hardware development & integration
 - Low cost sensors
 - Low cost manufacturing methods for PI
 - Reactor design that leverages new manufacturing technologies
- Basic R&D
 - Flexible catalysis, membrane, etc, to different feedstock
 - Material substitution

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Metrics and Impacts

- Performance & productivity improvement
 - \$ of value add / unit of interest
- New business models and Industry impact
 - \$ invested / unit product
- Resource savings
 - Reduction of fossil carbon emissions
 - Reduced tonnage of waste water stream
 - Etc.
- Resource recovery
 - Material fitness & property / # of cycles of reuse
- Other externalities
 - Environmental & health impacts

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Other Considerations

- Definition of P.I. for the purposes of a PPP
- Education
 - Work with universities to develop curriculum on P.I.
 - Facilitate industry / university collaboration
- Industry impact
 - Develop new business models
 - Facilitate communication / lessons learned between various segments of the chemical industry
- Public / national impact
 - Enhance U.S. competitiveness
 - Regional ecosystems
 - Communicate health/environmental impacts