IETS Conference Session on: Industrial Biorefineries

Welcome!

Paul Stuart, Polytechnique Montréal & EnVertis Inc
Marzouk Benali, Natural Resources Canada/CanmetENERGY
Co-Managers – IETS Task XI on Industry-Based Biorefineries

9 May 2023
Task XI on Industry-based Biorefineries
Sub-Tasks Being Initiated
Task XI on Industry-based Biorefineries
Decision Support Systems and Ex-ante Research

• Objective
  • Advance and share the knowledge on decision support approaches and tools.
  • Better understand the complex decision-making needs of industry and government related to setting bioeconomy strategies.
  • Demonstrate the resolution of complex bioeconomy decisions critical to industry, especially considering the link with ex-ante research.

• Key Activities
  • Review decision making methodologies and decision support tools, and establish harmonized DSS and Ex-Ante approaches/methods.
  • Synthesize industrial case studies in the area of DSS and Ex Ante.

• Subtask Managers
  • Dr. Paul Stuart, Polytechnique Montréal, Quebec, Canada
  • Dr. Marzouk Benali, Natural Resources Canada, CanmetENERGY in Varennes, Quebec, Canada
Task XI on Industry-based Biorefineries
Technology Pathways for Negative and/or Net-Zero Emission Biorefineries

• Objective
  • Technology Pathways embracing any technical attribute (new processing technology; new product pathway; new CCU/CCS strategy or implementation of renewable energy) and novel concepts that lead to overall net-zero/negative emissions in integrated biorefineries.

• Key Activities
  • Initial meetings held to explore the key elements related to the Sub-Task objective
  • Review emerging technologies for combined resource and energy efficiency with overall impacts on GHG emissions in biorefineries
  • Evaluate and adapt available tools and methodologies for energy efficiency and renewable energy systems integration
  • Synthesize industrial case studies (conceptual and demonstrated) in at least three different industrial sectors

• Subtask Managers
  • Dr. Bettina Muster-Slawitsch, AEE-Institute for Sustainable Technologies, Austria
  • Dr. Sarah Meitz, AEE-Institute for Sustainable Technologies, Austria
Task XI on Industry-based Biorefineries
Circular Bioeconomy and Biomass-Oriented Industrial Symbiosis

• Objective
  • *Focus on systems analyses to identify optimized solutions based on carbon circularity approaches, sharing information on strategies and methodologies to assess the potential for establishing industrial symbiosis involving biorefineries in industrial plants.*

• Recent Activity
  • Sub-Task goals based on a ½-day workshop where strong interest was shown for this topic
  • Proposal has just been approved by the IETS ExCo, and the 1st meeting is being organized

• Subtask Managers
  • Dr. Jorge Costa, Instituto Superior de Educação e Ciências - ISEC (PT)
  • Dr Isabel Cabrita, Instituto Superior de Educação e Ciências - ISEC (PT)
Task XI on Industry-based Biorefineries

The Monday Task XI Workshop was a Great Success...

• Task XI on Industry-based biorefineries has recently initiated or is about to initiate 3 Sub-Tasks – and the goal of the meeting on Monday was to describe these, and attract great people and projects

• We were overwhelmed by the response to the workshop: 25 attendees, and 25 presentations

• It was the opportunity to join one or more of the Sub-Tasks…
## Task XI on Industry-based Biorefineries
### The Monday Task XI Workshop was a Great Success…

You are welcome to join the party!

---

### Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Agenda Item</th>
<th>Facilitator - Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>8h30-9h00</td>
<td>Overview of Task XI Roundtable</td>
<td>Paul Stuart Polytechnique Montréal (Canada)</td>
</tr>
<tr>
<td>9h00-10h00</td>
<td>Project Presentations</td>
<td>Invited Speakers (see table below)</td>
</tr>
<tr>
<td>10h00-10h30</td>
<td>Questions and Discussion</td>
<td></td>
</tr>
<tr>
<td>10h30-11h30</td>
<td>Project Presentations</td>
<td>Invited Speakers (see table below)</td>
</tr>
<tr>
<td>11h30-12h00</td>
<td>Lunch together at Wijkanders</td>
<td><a href="https://wijkanders.nl/en/">Website</a></td>
</tr>
<tr>
<td>13h00-14h00</td>
<td>Project Presentations</td>
<td>Invited Speakers (see table below)</td>
</tr>
<tr>
<td>14h00-14h30</td>
<td>Questions and Discussion</td>
<td></td>
</tr>
<tr>
<td>14h30-15h30</td>
<td>Project Presentations</td>
<td>Invited Speakers (see table below)</td>
</tr>
<tr>
<td>15h30-16h30</td>
<td>Overview of 3 Task XI Sub-Tasks</td>
<td>Sub-Task Managers:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1) Jorge Ostea, Circular Bioeconomy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) Bettina Muster, Net Zero</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3) Paul Stuart, DSS Ex-Ante</td>
</tr>
<tr>
<td>16h30-17h00</td>
<td>Sub-Task Selection</td>
<td></td>
</tr>
</tbody>
</table>
Task XI on Industry-based Biorefineries
The Roll-Out this Afternoon…

• **4 Keynote Speakers x 20 minutes**

• Some directed questions by none other than…
  • Importance of industry-based biorefineries to energy futures and meeting climate targets, ie Beyond Net Zero objectives for industry
  • Importance of systems analytics for complex decisions relative to industry-based biorefineries for sustainability
  • The importance of biomass and its sustainability relative to meeting climate targets
  • What system boundaries should be considered in addressing bio-based biorefineries to evaluate Net Zero, circularity etc?

• **A final questions to the speakers:**
  • Related to your sub-task theme, what is the single critical issue you recommend be addressed?
IETS Conference Session on Industrial Biorefineries
The Line-Up this Afternoon…

• **Bettina Muster-Slawitsch**, AEE Institute of Sustainable Technologies (Austria)
  • “Approaches towards Net-Zero Biorefineries”
  • *Technology pathways towards net-zero/negative emission biorefineries*

• **François Maréchal**, École Polytechnique Fédérale de Lausanne (Switzerland)
  • “Designing biorefineries with a holistic and systemic approach”
  • *The circular bioeconomy and industrial symbiosis*

• **Andrea Ramirez Ramirez**, Delft University of Technology (Netherlands)
  • “Ex-ante technology assessment of novel routes for production of chemicals”
  • *Decision support systems and ex-ante research for assessing biorefineries*

• **William Mackintosh**, RISE Research Institutes of Sweden - RISE (Sweden)
  • “Enabling upscaling of Biorefineries from R&D to commercial scale through investment in hardware, software and digitalization: Case study Swedish Biorefinery Arena project”
  • *Adoption of digitalization in the bio-based industries for decarbonisation*
Merci - Thank You!

Paul Stuart  
Professor  
Product and Process Design Laboratory  
Department of Chemical Engineering  
Polytechnique Montréal, Quebec, Canada  
Telephone: +1(514) 891-3506  
Email: paul.stuart@polymtl.ca  
https://www.polymtl.ca/en/

Marzouk Benali  
Senior Research Scientist  
Industrial Systems Optimization  
Natural Resources Canada/CanmetENERGY  
Telephone (Mobile): +1 (514) 241-5915  
Email: marzouk.benali@nrcan-rncan.gc.ca  
www.nrcan.gc.ca  

Natural Resources Canada  
Ressources naturelles Canada