

# IETS-IEA Workshop Series

## Future Scenarios and Strategic Decision-Making for Industry Transformation: Powered by Systems Engineering

Day 1 – April 15, 2021 | Day 2 – May 6, 2021

1.30 pm-5:00 pm CET = 7:30 am-11:00 am EST

### Workshop Preamble

Systems engineering, as well as decision-making methods and tools, have been traditionally used for industrial process and energy system evaluation. However, considering the need for radical and rapid improvements of industrial sites for deep decarbonization, the need for strategic decision-making with large uncertainty has become imminent.

Scenario planning and ex-ante research is a tool for decision-makers to visualize the future and assess how to will respond in different situations, and understand more clearly how complex environments and policy might impact outcomes. Scenario planning and ex-ante research can be effective in every industrial sector. According to a 2019 McKinsey survey, most organizations seem to make trade-offs between how fast decisions are made and executed, versus how carefully-planned the decision is. Further, decisions tend to be made considering current and/or imminent policies, whereas longer-term policies are more pertinent for new industrial implementations that will operate for the coming decades. This has led to the development of hybrid approaches and novel tools, which have proven to be powerful in support of decision-making in industry. Reasons for this can be attributed to their usefulness in one or more of the following aspects:

- **Radical changes and disruptions in the future, where old rule of thumbs are not applicable**
- **Combinations of novel technologies/systems, with knowledge gaps**
- **Both foreground and background (surrounding system in and around industry sites) are changing**
- **Conditions regarding economic and policy instruments are changing rapidly, resulting in a need to evaluate future scenarios**

The main aims of this two-day workshop are to highlight international strategies for deep decarbonization and scaling-up the sustainable bioeconomy, as well as novel developments in methods and tools for strategic decision-making, and to discuss interests for enhanced international collaboration in this area.

**Day 1: April 15, 2021 | 1.30 pm to 5:00 pm CET (7:30 am to 11:00 am EST)**

Time	Title of the presentation	Name of the speaker
1:30 pm CET 7:30 am EST	Welcome address	Thore Berntsson (Chalmers University of Technology, Sweden)
1:35 pm – 2:05 pm CET 7:35 am – 8:05 am EST	Industry perspective of deep decarbonization, DSS and ex-ante	Ernst Worrell (Utrecht University, The Netherlands) and Andrea Ramirez (Delft University of Technology, The Netherlands)
2:05 pm – 2:20 pm CET 8:05 am – 8:20 am EST	Technology design approaches for radical GHG emissions reduction in industrial sites	Mahmoud M. El-Halwagi (Texas A&M University, USA)
2:20 pm – 2:35 pm CET 8:20 am – 8:35 am EST	<b>Q&amp;A</b>	
2:35 pm – 3:40 pm CET 8:35 am – 9:40 am EST	Roundtable discussion on complexity of decision-making for industrial deep decarbonization and systems analysis	<p><b>Moderator:</b> Marzouk Benali (NRCan/CanmetENERGY, Canada)</p> <p><b>Panelists:</b></p> <ul style="list-style-type: none"> <li>• Christoph Brunner (AEE-INTEC, Austria)</li> <li>• Eemeli Hytönen (VTT, Finland)</li> <li>• Elliott Mari (ADEME, France)</li> <li>• Erik Furusjö (RISE Bioeconomy, Sweden)</li> <li>• François Maréchal (EPFL, Switzerland)</li> </ul>
3:40 pm – 3:50 pm CET 9:40 am – 9:50 am EST	<b>HEALTH BREAK</b>	
3:50 pm – 4:05 pm CET 9:50 am – 10:05 am EST	Creating alignment with industry through multi-criteria analysis	Virginie Chambost (EnVertis, Canada)
4:05 pm – 4:20 pm CET 10:05 am – 10:20 am EST	Scenario building and strategic planning for government and industry	Johan Gott (PRISM, USA)
4:20 pm – 4:35 pm CET 10:20 am – 10:35 am EST	<b>Q&amp;A</b>	
10:35 am – 11:00 am EST 4:35 pm – 5:00 pm CET	Wrap-up and introduction of Day 2	Paul Stuart (Polytechnique Montréal, Canada)

**Day 2: May 6, 2021 | 1.30 pm to 5:00 pm CET (7:30 am to 11:00 am EST)**

Time	Title of the presentation	Name of the speaker
1:30 pm CET 7:30 am EST	Welcome address	Marzouk Benali (NRCan/CanmetENERGY, Canada)
1:35 pm – 1:55 pm CET 7:35 am – 7:55 am EST	Bioeconomy scenario analysis	Emily Newes (National Renewable Energy Laboratory, USA)
1:55 pm – 2:15 pm CET 7:55 am – 8:15 am EST	Decision-making for the emerging biofuels market	Lars Peter Lindfors (NESTE, Finland)
2:15 pm – 2:30 pm CET 8:15 am – 8:30 am EST	<b>Q&amp;A</b>	
2:30 pm – 2:40 pm CET 8:30 am – 8:40 am EST	Biorefinery technology strategies	Chris Bataille (Simon Fraser University, Canada)
2:40 pm – 2:50 pm CET 8:40 am – 8:50 am EST	Biorefining in a circular economy	Bert Annevelink (Wageningen Food & Biobased Research, Leader of IEA Bioenergy Task 42, The Netherlands)
2:50 pm – 3:00 pm CET 8:50 am – 9:00 am EST	Government perspective of bioeconomy: Policy strategies and challenges	<b><i>Speaker to be confirmed</i></b>
3:00 pm – 3:15 pm CET 9:00 am – 9:15 am EST	Task XI Task Overview: Decision support systems and ex-ante research	Paul Stuart (Polytechnique Montréal, Canada)
3:15 pm – 3:25 pm CET 9:15 am – 9:25 am EST	<b>HEALTH BREAK</b>	
<b>POTENTIAL PROJECTS ON DECISION-SUPPORT SYSTEMS AND EX-ANTE</b>		
3:25 pm – 3:35 pm CET 9:25 am – 9:35 am EST	ENPAC for ex ante evaluation	Elin Svensson (CIT-Industrial Energy, Sweden)
3:35 pm – 3:45 pm CET 9:35 am – 9:45 am EST	I-BIOREF for renewable fuel production	Nima Ghavidel Mehr (NRCan/CanmetENERGY, Canada)
3:45 pm – 3:55 pm CET 9:45 am – 9:55 am EST	An assessment framework for Bio-CCS and Bio-CCU	Yawer Jafri (Luleå University of Technology, Sweden)
3:55 pm – 4:05 pm CET 9:55 am – 10:05 am EST	Decision support in public policies for bioenergy development	Ana Andrade (DGEG, Portugal)
4:05 pm – 4:15 pm CET 10:05 am – 10:15 am EST	BIOFIT - digital support tools for decision making	Lauri Kujanpää (VTT, Finland)
4:15 pm – 4:25 pm CET 10:15 am – 10:25 am EST	Assessment methodology for combined resource and energy efficiency in biorefineries	Bettina Muster-Slawitsch (AEE-INTEC, Austria)
4:25 pm – 4:35 pm CET 10:25 am – 10:35 am EST	The role of bioenergy in the decarbonization of the French cement industry	Elliot Mari (ADEME, France)
4:35 pm – 5:00 pm CET 10:35 am – 11:00 am EST	Wrap-up and Path forward	Paul Stuart (Polytechnique Montréal, Canada)