The IETS TCP’s International Conference

Energy Future in Industry

9–11 May 2023
Gothenburg, Sweden
Task XXI
Decarbonizing industrial systems in a circular economy framework

Energy Future in Industry Conference
10th May 2023 - Gothenburg

Moderator: Valerie Rodin
(Energieinstitut an der Johannes Kepler Universität Linz)
Agenda

   - How Task XXI started and results from first phase (Valerie Rodin)
   - Subtask 2 “Circular Carbon” (Hans Böhm)
   - Subtask 3 "Energy- and carbon-oriented Industrial Symbiosis” (Rickard Fornell)


   - How to handle Circular Carbon in theory and/or policy - Focus: CCU and LCA (Susan Fancy)
   - A Business and Financing Model for Industrial Symbiosis (Thomas Parker)

4. Elevator Pitches [14:20 – 14:40]
   - Imagining Circular Carbon: A mitigation (deterrence) strategy for the chemical industry (Ellen Palm)
   - Circular approaches to net-zero emissions in the heavy industry (Andrea Lanzini)

5. Panel Discussion [14:40 – 15:10]
Getting to know the audience (SLIDO)

Where are you from (Country) & which IETS Task are you involved in (if any)?

Wordcloud Poll  26 responses  26 participants
Getting to know the audience (SLIDO)

In which sector do you work?

- Research - 13 votes (57%)
- Academia - 6 votes (26%)
- Industry - 2 votes (9%)
- Association - 0 votes (0%)
- Public agency - 2 votes (9%)
Getting to know the audience (SLIDO)

Are you working on / interested in...?

Multiple Choice Poll  25 votes  25 participants

- **Industrial Symbiosis** - 2 votes  8%
- **Circular Carbon** - 6 votes  24%
- **both** - 14 votes  56%
- **other** - 3 votes  12%
Task XXI Introduction
Core team of Task XXI

• Simon Moser, EI-JKU/AT – overall Task lead

• Hans Böhm, EI-JKU/AT – Subtask 2 Lead

• Rickard Fornell, RISE/SE – Subtask 3 Lead

• Valerie Rodin, EI-JKU/AT – Co-worker Subtasks
Two concepts – one pathway?

Circular carbon

- CO₂ / carbon
- e-fuels
- renewable energy
- carbon-based products
- biomass & natural resources

Industrial Symbiosis

- heat/cold
- renewable energy
- various materials/wastes
- various intermediates
- knowledge

These could be CO₂ and/or carbon-resources!
Recap

• Task delimitation (excerpt)
  • Focus industrial processes
  • Focus energy and carbon
  • Do not look into other resources
  • Do not look into biorefineries
  • Do not look into waste heat except when needed for carbon capture
  • Do not look into permanent carbon storage
  • Network with related IEA TCPs and IETS Tasks
Recap

• IETS Workshop 2019
  • „Circular + Carbon + Symbiosis“

• Definition Phase 2020
  • Definition of title
  • Definition of framework
  • Establishing a broad topic
  • Won many interested groups / participants

• Subtask 1 Framework
  • Clear delimitation to other IEA TCPs and IETS Tasks
  • Approval by ExCo
  • Five activities
  • First elaboration of a broad topic: “clarify joint work, find white spots”
Recap

• Subtask 1 content
  • Definitions and metrics (Energieinstitut)
  • Circularity in modelling (FFE)
  • Circular Carbon Technologies and Systems (ENEA)
  • Industrial Symbiosis (Energieinstitut)
  • Networking (WIVA P&G)

Find the final report here:
Recap

• Lessons learnt for 1st phase
  • Broad topic with many participants, but
    • Little interaction
    • Little contribution
  • Need to focus the work
    • Two subtasks
    • More detailed topics
      • Make topics workable
      • On the risk of loosing groups
      • But focused work may attract new groups
  • Get out of the vicious circle
    • Define groups → define projects → define topics → redefine → … → work?

IETS Workshop
Vienna, Oct 2019

Definition phase
2020

Subtask 1
Feb 2021 – May 2022

Subtasks 2 & 3
Jul 2022 – Dec 2024
Task structure – current term

Current time frame: July 2022 – December 2024
Task Manager: Simon Moser, Energieinstitut an der JKU Linz, AT

<table>
<thead>
<tr>
<th>Sub-task no</th>
<th>Sub-task title</th>
<th>Sub-task Manager [Name, Org., Country]</th>
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<td>Simon Moser / Hans Böhm, Energieinstitut an der JKU Linz, AT</td>
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<td>3</td>
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Current subtasks

• **Subtask 2: Circular Carbon**
  - Activity A: How to handle circular carbon in LCA modelling
  - Activity B: Integration of carbon capture in industry
  - Activity C: Networking

• **Subtask 3: Energy- and carbon-oriented Industrial Symbiosis**
  - Activity A: Definition and delimitation
  - Activity B: Good practice examples and new development in knowledge
  - Activity C: Business Models
  - Activity D: Networking
Participants

Austria
• Energieinstitut an der JKU Linz
  • Task Lead; Subtask 3 Lead
• AEE INTEC
• AIT Austrian Institute of Technology
• University of Leoben
• University of Natural Sciences (BOKU) Vienna

Sweden: RISE
• Subtask 3 Lead

Denmark: University of Southern Denmark (SDU)

Italy: ENEA & POLITO

Netherlands: TU Delft & TNO

Portugal: Universidade de Lisboa

Canada: Université du Québec à Trois-Rivières (UQTR)

Austria, Sweden and Denmark collaborated in drafting the Subtask proposal
## Collected projects (ongoing work)

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<th>CC Process Integration</th>
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Session
Discussion & Conclusions
Audience Questions (selection)

• What level of interconnectedness is reasonable to achieve in the future?
• Don’t you think that Track 1 and Track 2 categories are set too wide to reflect the importance and urgency of reducing CO₂ emissions in a timely manner?
• Are you looking for industry clustering in view of centralized carbon storage?
• Do you include plastics and other carbon-based chemicals CO…?)?
• The high decrease in costs of PV was achieved by having heavenly subsidized PV for many years, is this what we need to also do for CCU?
• What are your views on rebound effects from industrial symbiosis?
• To your knowledge, how is CCU is perceived by the general public? How relevant is it in the roll out of CCU?
• …
Session Conclusions

• Circular Carbon technologies have a huge potential but…
  • We need to understand the real effects – there is no „silver bullet“ and not every CCU pathway creates sustainability
  • Thus, we need to rethink today’s and future Carbon demands – when the way we live changes, also Carbon demand will change
  • Industrial Symbiosis is well known, however business models need to be developed and adapted for the industries that are not used to sector interlinkages
  • North America and Europe are not the only ones who need to adapt – the question is, how will the rest of the world implement Circular Carbon & Industrial Symbiosis

➢ There is a lot of work ahead of us!
Task XXI Outlook
Timeline Phase 2

14.2.2023
- General kick-off

Early March ´23
- Preliminary notification by interested groups

May 2023
- Energy Future in Industry conference

Summer 2023
- Kickoff subtasks
- New participants

... 
- Ongoing work

April 2024
- Task Meeting Graz/AT (ISEC conference)
...we are open for more participants 😊

Rules for participation

- Official registration at the IETS secretariat, done by IETS ExCo member
- Inform ExCo member and in CC the Task manager about your participation
- ExCo member will register at the IETS secretariat and in CC at the Task manager

Groups become Task participant but must not contribute in both subtasks.
...we are open for more participants 😊

Reach out to us during the conference!

...or get in touch with Simon Moser (Task Manager)

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