



IETS ANNEX PROPOSAL
INDUSTRIAL SYMBIOSIS IN A
CLOSED CARBON CYCLE ECONOMY

28 November 2019

Annex Proposal

Industrial Symbiosis in a closed carbon cycle economy

- The proposal results from the discussions at the IETS Vienna workshop.
- There is no IETS annex on industrial symbiosis.
- There is no IETS annex on Circular Economy.
- Focusing the implications on industry, this annex analyses the interconnections of the two concepts with regard to a „closed carbon cycle“:
 - Circular Economy
 - Renewable & efficient energy system

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Motivation 1/3

- Circularity, efficiency and renewability will play an important role in a sustainable economy. However, it is evident that (i) the environmental / resource sector and (ii) the energy sector are separately discussing their future systems, **missing a joint consideration of the two concepts.**
 - The environmental / resource sector's vision is the so-called **circular economy**, a concept that focuses the reusability of the products or their components.
 - The energy sector's vision is a sustainable, **carbon-neutral energy system** that almost exclusively relies on renewables and is very energy efficient.

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Motivation 2/3

- In a sustainable economy, which is also enforced by the need to avoid a more drastic climate change, carbon is crucial.
 - While the use of energy cannot enter a closed loop, fossil carbon must not be released at the balance sheet →
 - “Closed carbon cycle”.
 - **Carbon must be circulated both in the energy and in the product sector.**
 - Here, overlaps between a Sustainable Energy System and the Circular Economy will be particularly important.

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Motivation 3/3

- Moreover, many industries and the prospects of a future energy system show a
 - strong interaction with the hydrogen topic, with
 - both molecules being crucial for fuels, storage and production based on well-established processes.
- As it becomes obvious already today, Industrial Symbiosis is one of the key solutions, first, for using energy and resources efficiently and in cascaded manner, and second, to realize circularity (only possible for resources).
- However, cooperation between two or more companies is not common. Obviously, good examples exist, but due to the lack of information and social / economic / technical risks, manifold potentials for the increase of resource- and energy efficiency remain unrealized.

IETS Annex Phase 0.1

Industrial Symbiosis in a closed carbon cycle economy

- Phase #1:
 - carried out as a project commissioned by the Austrian climate and energy funds, uniting potential partners and seeking common interests and potentials for cooperation, or
 - carried out as an IETS annex following the above-mentioned investigation for joint definition of subtasks and potential contributions.
- The aim of phase 0.1 is to clarify potentials of cooperation and identify subtasks for a long-standing annex:
 - Exchange on recent research results
 - Discussion and comparison of ongoing projects
 - Description of best practices

IETS Annex Phase #2

Potential subtask topics

Subtask 1: The sustainable economy: uniting the concepts of a renewable & efficient energy system and a Circular Economy

- In current discussion, the concepts of circular economy and sustainable energy systems have a parallel existence.
- This subtask aims to analyze the two concepts with regard to their interconnections and overlaps. By focusing the details of the concepts, contradicting and complementary aspects are identified. Special attention is paid to the fact that material and energy flows are to be considered together.

Subtask 2: Closed carbon cycle

- Both concepts imply the non-use of (additional) fossil carbon. The aims of this subtasks are to
 - Identify the requirements with regard to the other concept and
 - Discuss technological needs: carbon capture, carbon storage, carbon economy

Subtask 3: Industrial symbiosis in the case of carbon & hydrogen as a need within both concepts

- The barriers to industrial symbiosis are barely different for both concepts, i.e. resources and energy: it is the risks of cooperation. These should be investigated using the examples of carbon and hydrogen. The (future) systemic need for industrial symbiosis with regard to carbon and hydrogen shall be identified. This subtask aims to highlight the future indispensability of industrial symbiosis for achieving a sustainable economy.



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