

Decarbonising the process industry: transforming a forgotten sector

Introduction/Motivation

The industrial production processes of energy-intensive process industries (EPIs), producing basic materials like steel, pulp, paper, cement, plastics, petrochemicals, etc., are still highly carbon intensive and responsible for a large share of global greenhouse gas emissions. For instance, in Sweden EPIs account for 25 % of total carbon emissions and approximately 30 % of total final energy use (2014). The basic materials produced by EPIs, e.g. steel, insulation material and silicon, are essential for realising transitions in other sectors. Whereas much of sustainability transition research has been directed at the energy, transport and water sectors, the conditions and prospects for decarbonisation of EPIs have received less attention.

The transformation of EPIs have been largely overlooked in transitions research, despite these industrial sectors having a number of characteristics that put distinct challenges for sustainability transitions. Considering key features such as the capital intensity, economies of scale and long-term investment cycles, it is unlikely to expect wide-spread niche-cumulation of radical innovation, or grassroots innovation, as an important dynamic of industrial transformations in the process industry. Thus, deep decarbonisation of the EPIs will require long-term innovation and technological shifts that goes beyond incremental processes of change. In this session, we bring together scholars and practitioners to deliberate on the theoretical and practical challenges of rendering industrial decarbonisation possible in, perhaps, the hardest sectors to transform.

How it relates to the conference theme

Privately owned large capital intensive technical systems creates powerful vested interests and lock-in, which in combination with distinctive material and spatio-temporal characteristics, few co-benefits, and exposure to international competition, impede the structural transformation needed to decarbonise the production processes of EPIs. Research on this problem need to provide understanding of among other things the problems and challenges for agents that aspire to lead sustainable transitions of EPIs. How is it possible to lead transformation when decarbonisation basically involves production of the same product, with few co-benefits, but at a higher cost?

Issues to be covered

What are the pathways to decarbonised and more sustainable EPIs?

How can such transformations of EPIs be lead and governed?

What does it entail in terms of research needs (e.g., on theory, frameworks, method, empirics)?

What are the prospects for creating a network of researchers in this field?

Format, chair and participants

The dialogue session will start off with a short introductory presentation by the chairs to set the stage. The participants of a panel of discussants will then be given a few minutes each to shortly reflect on two main questions:

What are the key challenges in leading a transition of an industry with these characteristics?

What important research needs do you see in relation to the transformation of EPIs?

The chairs will then, with the help of the audience, lead a discussion among the panel members.

The session will be chaired by Lars J Nilsson, Oscar Svensson and Roger Hildingsson, Lund University. Members of the panel of discussants invited to the session are:

Fredric Bauer (Lund University)

Simon Bolwig (DTU)

Harriet Bulkeley (Durham University)

Lars Coenen (University of Melbourne)

Lars J. Nilsson has more than 25 years of experience in the fields of energy efficiency and renewable energy, energy and transport systems, as well as energy and climate policy analysis. Recent research has been on different aspects of low carbon transition policy strategies and governance in the context of multi-objective strategies for sustainable development. A topical field of research is low carbon transitions in basic industry and their co-evolution with energy system transitions in the perspective of green economy, industrial development and innovation policy strategies. He is currently coordinating the EU-H2020 project REINVENT (Realising Innovation in Transitions for Decarbonisation) where the approach is to study and understand transitions and emerging climate innovations and initiatives from within sectoral contexts. Lars is/was a member of the Scientific Advisory Boards of the Wuppertal Institute (since 2014), Seoul International Energy Advisory Council (since 2013) and the E.ON Energy Research Centre at RWTH Aachen University (2011-2015).

Oscar Svensson is a PhD student from Lund University, with a multi-disciplinary academic background in Engineering Physics and Economic History from Lund University and UC Berkeley. He is particularly interested in what constitutes a radical transition, and how to radically break with inert structural relations within which problems and solutions are framed and transformation is conditioned. Oscar is currently working on a project on long-term structural shifts in Sweden's energy-intensive process industries, focusing specifically on the case of the Swedish iron and steel industry. Influenced by, among other things, critical realism he wishes to problematize the conception of structure in transition theory in light of the conditions and characteristics of structural transformation in EPIs.

Roger Hildingsson is a postdoctoral researcher in environmental politics and climate governance at the Dept of Political Science, Lund University. He has been involved in research on sustainability governance, European energy and climate policy, the environmental state and the governance of low-carbon transitions. In his doctoral thesis on *Governing Decarbonisation: The State and the New Politics of Climate Change* (2014) he explored the evolution of the environmental welfare state and its institutional capacity to govern decarbonisation by means of steering and enabling low-carbon transitions in the case of Sweden. He has a particular interest in emerging climate governance initiatives and how gradual processes of change over time unfold to foster progressive social change. Currently, he is involved in research on the conditions for industrial transformation and strategies for industrial decarbonisation in energy-intensive basic industries (www.gist2050.com).