

Understanding the conditions for decarbonization in energy-intensive natural resource-based industry: towards an analytical framework

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Climate change is currently being reframed from an emissions problem to an energy system problem emphasizing ways for decarbonizing social structures and practices that generate carbon emissions. So far climate policy efforts have predominantly been geared towards achieving set emissions reduction targets, while the decarbonization of key socioeconomic sectors such as energy-intensive natural resource-based industry (ENRI) has yet not been addressed. In the GIST project we study the conditions for decarbonization in ENRI industries and explore possible pathways for governing industrial transformation.

Sustainability transition research (STR) has become a dominant influence setting the agenda for the study of sustainability transitions. However, ENRIs have been largely overlooked in STR, although posing a number of characteristics and conditions that put distinct challenges for sustainability transitions. The ENRI sectors are, from a STR perspective, assumed to represent incumbent regimes with strong path dependencies and lock-ins. Considering the capital-intensive, large-scale and long-term investment cycles, it is unlikely to expect widespread nisch-cumulation of radical innovation in this industry. Thus, we need a better understanding of regime transformation and a broader set of conceptualizations of the dynamics of industrial transformations.

The objective of this paper is to explore alternative approaches about the conditions for system innovation, structural change and regime transformations. The aim is to develop an analytical framework for studying the dynamics of industrial sustainability transitions based on different theoretical perspectives and concepts. Informed by our multi-disciplinary approach we draw on insights from system innovation studies; energy system studies, critical realist perspectives on structural transformation; structural change economics; and political science studies. This will be contrasted with evidence from the Swedish ENRIs.