

**Green Dreams, Local Realities:
Complexities of the European Union's energy transition to ensure local health and well-being in a fossil fuel-based industrial region**

Abstract:

European Union's Green Deal is a legal obligation to EU countries to shift towards environment-friendly energy systems from fossil-fuel-based systems. This transition will bring significant global health benefits by combating climate change, but it is crucial to understand the so far understudied impacts on local communities' lives and, thus, on their health and well-being. The study proposes a novel conceptual framework based on socio-technical systems theory and the production of space theory to identify the interacting points between energy systems and health and well-being systems in the energy transition context. This framework is tested in Estonia's transitioning fossil fuel oil-shale-based energy system based on four focus group discussions, ten expert interviews, and document analysis. We innovatively pinpoint pathways, including feedback loops, through a causal loop diagram (CLD) impacting inhabitants' health and well-being from the interplay between energy and health and well-being systems. The analysis indicates that protecting and promoting health and well-being has been a challenge not only due to disruption created by the energy transition process but also due to the accumulated problems regarding socioeconomic conditions, environmental health impacts, and well-being at the local level. The compound effects of multiple existing and emerging issues, including the divergent interpretations of health and the lack of holistic support mechanisms for inhabitants to navigate the changes in sociocultural and economic space, can harm locals' health and well-being. The developed conceptual framework provides an important theoretical background for studying the impacts on the mental and physical health, including social health and well-being, of the inhabitants living in the fossil-fuel-based industrial area. The CLD developed using this framework demonstrates the interacting points to avoid unintended consequences of energy transition.

Keywords: climate change action, just energy transition, social and environmental impacts, health and well-being impacts, people in a vulnerable situation, causal loop diagram