Master's Thesis

Analysis of the photovoltaic energy supply chain for Europe and its key players

Background

General awareness of climate change and its strong link to fossil energies has forced industries and governments to take action to meet this challenge. One of the most important responses is the so-called "energy transition," defined as a long-term structural change in energy systems. The share of fossil and conventional energy sources in energy systems is decreasing, leading to a reduction in CO2 emissions. However, to achieve CO2-neutral systems, it is necessary to include all processes along the entire supply chain from raw material extraction to final waste treatment. This is relevant for both conventional energies as well for renewable energy technologies; therefore, a good understanding of the PV supply chain and the roles of the market stakeholders is a first step towards comprehending the true path to the decarbonization of its production processes.

Goals

The goal is to build a representation of the global value chain supplying Europe of solar photovoltaic technologies. The need for a net zero electricity generation is the main driver for the energy transition, nevertheless there are emissions and impact associated with the production of renewable energy technologies. What we want to understand is how the supply chain of this technology is, and how the embedded emissions and energy change, once there is a further penetration of renewable energies in other economic sectors and the world regions that produce such technologies.

Examine the technology’s supply chain and determine:

- The main component suppliers
- The main mineral suppliers
- The main critical material suppliers
- Recyclability rates of the components
- Evolution of the recyclability rates of the components/minerals in Europe

Contact

Cristina de la Rúa Lope, Andrea Cadavid Isaza
cristina.de-la-rua@tum.de, andrea.cadavid@tum.de
Chair of Renewable and Sustainable Energy Systems
(Prof. Dr. rer. nat. T. Hamacher)