

EGU24-13733, updated on 19 Jul 2024

<https://doi.org/10.5194/egusphere-egu24-13733>

EGU General Assembly 2024

© Author(s) 2024. This work is distributed under the Creative Commons Attribution 4.0 License.



## Greenhouse gas emissions and mitigation in the global solar photovoltaic industry chain

Shi Chen<sup>1</sup> and Xi Lu<sup>2</sup>

<sup>1</sup>Carnegie Institute for Science, United States of America (schen10@carnegiescience.edu)

<sup>2</sup>Tsinghua University, China (xilu@tsinghua.edu.cn)

Against the backdrop of the rapid global rise of solar photovoltaic (PV) energy, its supply chain from manufacturing to installation has gradually exhibited dynamic spatial evolution, yet the spatiotemporal distribution of greenhouse gas emissions and mitigation throughout the entire PV industry chain has not received sufficient attention. The pathways to enhance the net mitigation benefits of PV through international collaboration across the entire industrial chain remains in its initial stage. This presentation will outline the author's systematic accounting of global supply chain carbon emissions and mitigation, combining spatiotemporal dynamic lifecycle assessments and scenario analyses. The analysis explored the spatiotemporal evolution of net greenhouse gas mitigation from 2009 to 2060 within the global PV industry. The study reveals that optimized collaboration between manufacturing and installation globally could increase the net mitigation effects of the entire industrial chain by 97.5 Gt carbon dioxide equivalent, equivalent to 1.9 times the global GHG emissions in 2020. This finding provides theoretical and empirical support for enhancing international strategic cooperation to enhance global greenhouse gas mitigation.