

Carbon Footprints on my Doorstep: Investigating the relationship between scope, spatial characteristics, and willingness to pay for carbon capture and storage in Denmark

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Abstract

Carbon capture and storage (CCS) constitutes a key technology to achieve emissions reduction targets and mitigate climate change. However, the effective implementation and large-scale deployment of CCS crucially depend on public support and preferences for such low-carbon energy technologies. Based on nationally representative household survey data and detailed geospatial information at the individual level, this paper investigates the effect of geographical characteristics of existing energy infrastructure on people's willingness to pay (WTP) for CCS in Denmark. The stated preference study applies two CCS-specific valuation scenarios involving annual emission reductions of 5 and 10 million tons (Mt) of CO₂, respectively.

The empirical findings indicate different dynamics in the relationship between people's spatial exposure to distinct energy systems and their WTP for CCS, depending on the scope of the underlying CCS-related emissions reduction scenario. Specifically, living in an area with a high density of renewable energy sources, i.e., wind turbines, negatively affects people's WTP, especially considering CCS with smaller CO₂ reductions. Exposure to polluting industries and energy plants positively and significantly influences the WTP for CSS only in the 10 Mt CO₂ reduction scenario. Furthermore, the findings suggest prompted information spillover effects regarding the distance to existing gas storage facilities and WTP for large-scale CCS deployment: Informed respondents living close to operating gas storage facilities exhibit significantly stronger preferences for CCS deployment than their non-informed counterparts.

The study highlights important socio-economic and geographical factors relevant to the efficient development of CCS projects. The findings can inform policymakers in designing and implementing socially acceptable CCS deployment strategies, promoting the socio-technical low-carbon energy transition.