

## Societal Acceptance of Emerging Energy Technologies in the Context of the Energy Transition

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### INTRODUCTION

The German energy transition is an ambitious societal project, with decarbonization and increased sustainability being the major targets of this transformation [1]. The energy system transformation relies on new and emerging technologies, which facilitate the integration of renewable energy sources and ensure a stable provision of energy to industry and society. As these new technologies have economic, ecological and social impacts, an assessment from a systemic perspective is needed. To study the social impacts, the public acceptance of technologies is investigated. In general, studies show that the public is in favor of the energy transition and new energy technologies. However, resistance sometimes arises when concrete projects are to be realized, such as in the case of power lines or wind farms. This discrepancy between general acceptance of renewable energy facilities and local resistance to technology implementation is often referred to as the “not in my backyard” (nimby) phenomenon. In light of this, the presented study focused on studying the general and local acceptance of three energy technologies: hydrogen refueling stations, stationary battery storage systems, and biofuel production plants [2].



### SURVEY

A quantitative survey was distributed via the open scientific survey panel “SoSci Panel” [3] and social media, with 1247 people surveyed (about 1/3 for each technology). The public’s attitude toward accepting these technologies was examined at a general level (general acceptance) and in the context of a nearby siting of the technology to respondents’ homes (local acceptance). Explored factors included public concerns, knowledge about the technologies, perceived problems of the current energy system, trust in industry and municipality, and environmental self-identity (a measure of respondents’ general environmental concerns).

### RESULTS & DISCUSSION

The influence of the factors examined in the study were modeled with the help of structural equation modeling (see figure on the right). The analysis showed all social-psychological factors to be relevant for acceptance of emerging technologies in Germany. However, the impact differed for each technology and depending on whether general or local acceptance was the focus (see [2]).

#### Hydrogen fuel stations (HFS):

trust in municipality had no effect on general acceptance of HFS but had a significant effect on local acceptance. Trust in industry had a significant effect on both general and local acceptance. Environmental self-identity had a positive effect on general acceptance but a negative one on local acceptance [2].

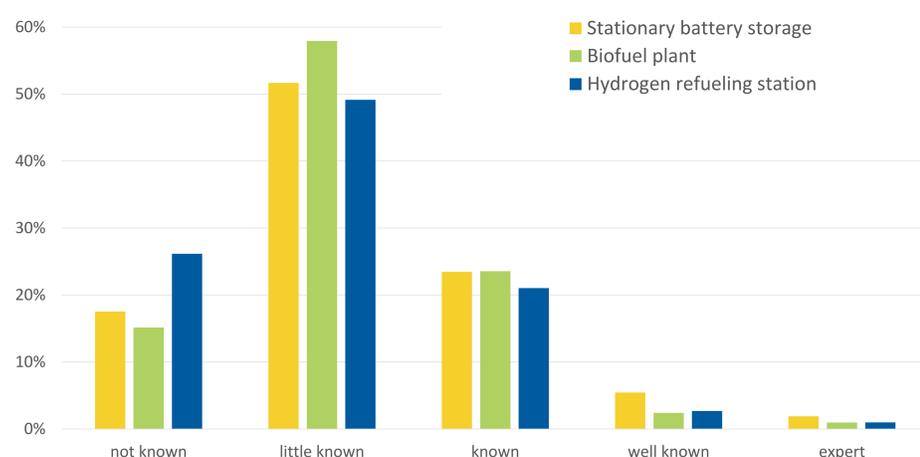
#### Biofuel Production Plants (BPP):

trust in industry showed no significant effects, whereas trust in municipality had both positive and negative opposing effects. Surprisingly, given past activism against biomass-related deforestation, no significant effects were found for environmental self-identity. The perceived problems of the current energy system had a significant effect on local and general acceptance; overall, this factor was important at a general level for all technologies, but only had a local effect for BPP [2].

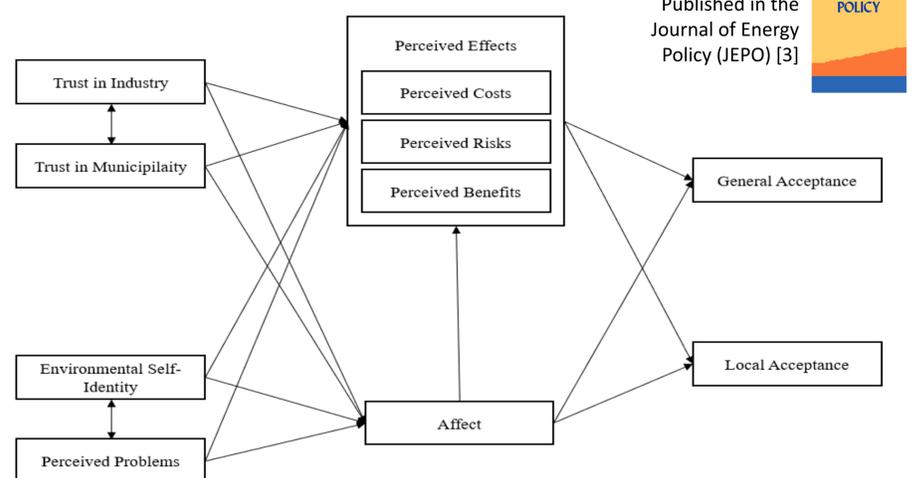
#### Stationary battery storage facilities (SBS):

environmental self-identity showed no significant effects on general or local acceptance for SBS. On the local level, acceptance is solely explained by trust in municipalities and industry [2].

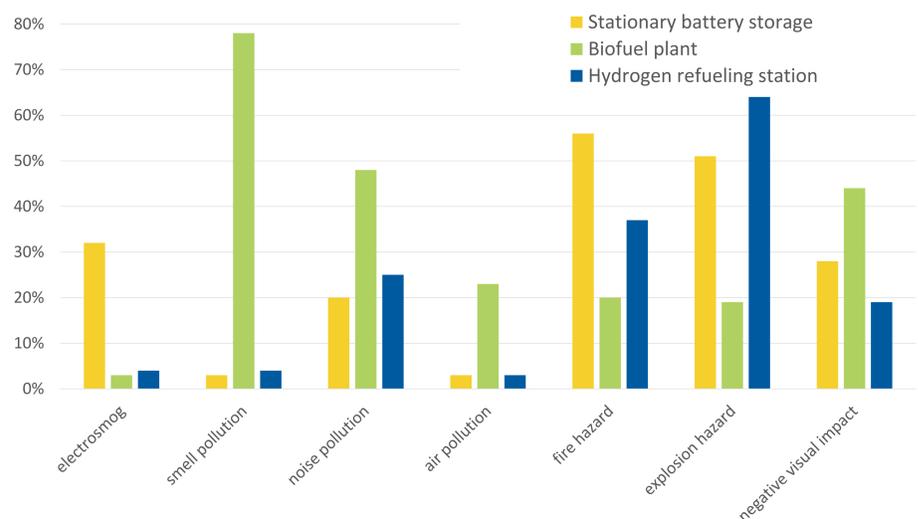
#### Knowledge about energy technologies (Baur et al., in preparation)



#### The conceptual model (Emmerich et al., 2020)



#### Public concerns (Baur et al., in preparation)



### CONCLUSION

The current study provides insights into the relative importance of determinants of acceptance, thereby responding to the need for a more comprehensive approach to studying sustainable energy technology acceptance. The data suggests that raising awareness about the problems with the current energy system as well as building trust in stakeholders may help to foster acceptance, which could incentivize industry and government to invest further in their development. However, it needs to be stressed that these suggestions should not be considered as a “quick fix” or easy remedy for acceptance problems.

#### Literature

- [1] Energy System 2050: [https://www.helmholtz.de/en/research/energy/energy\\_system\\_2050/](https://www.helmholtz.de/en/research/energy/energy_system_2050/)
- [2] Emmerich, P., Hülemeier, A.-G., Jendryczko, D., Baumann, M. J., Weil, M., & Baur, D. (2020). Public acceptance of emerging energy technologies in context of the German energy transition. *Energy Policy*, 142, 111516.
- [3] SoSci Panel: <https://www.sosciopanel.de/>
- [4] Baur, D., Emmerich, P., Baumann, M.J., & Weil, M. (in preparation). Assessing the social acceptance of key technologies for the German energy transition.