



Report 2022

# Task 28

*Photo: AzmanJaka/Getty Images Signature-Canva.*

## Social Science of Wind Energy Acceptance (SoSWEA)

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**As wind energy deployment continues to grow in both established and emerging markets, Task 28's work on the social science of wind energy and the human and community perspectives continues to address crucial societal challenges and benefits associated with rapid buildout.**

Local opposition can be a key constraint for development, and protests can halt permitting and construction, regardless of a country's climate goals or industry innovation. **The network of international researchers associated with Task 28 is dedicated to defining challenges and applying solutions to align with communities at local, regional,**

**and national levels. Their purpose is to conduct research and share findings with stakeholders.** Task members collaborate with partner organisations, such as NGOs and universities, as well as industry, to advise governments and disseminate material for decision-makers, researchers, and energy planners, among others.

In 2022, Task 28 primarily focused on studying residents who live in close proximity to wind energy sites and contributed to research on new topics such as increased turbine sizes, equity, and turbine recycling, as well as gamification [1,2,3,4,5,6].

Objectives and Outcomes:

- Ensuring diverse participation from a larger number of countries and a variety of researchers and social scientists interested in the responsible and appropriate deployment of wind projects.
- Adopting new methods of knowledge-sharing based on more proactive involvement of Task participants.
- Maximising the value of the Task outputs through the engagement of end users and broad systems thinking.
- Exploration into increasing the Task's reach to emerging economies and its role in the global energy transition.

## Introduction

The rapidly increasing scale and concentration of wind turbines occupying the landscape presents challenges and opportunities for people who live near wind farms. [8] If the geographic distribution of wind energy (and other renewables, transmission, and storage) must expand to meet climate and energy goals, the need to carefully consider the impacts on society also increases. Local opposition can be a key constraint for development, and protests can halt permitting and construction, regardless of a country's climate goals or industry innovation.

**Task 28's network of international researchers defines challenges and applies solutions that align with local, regional, and national communities. Task participants conduct research and share findings** with partner organisations (such as NGOs and universities) as well as industry. Furthermore, Task 28 advises governments and disseminates material for a range of stakeholders, including decision-makers, researchers, and energy planners.

Task 28 research concerns how attitudes to installed technology

change over time and how communities react to larger, more modern turbines. [2, 6] New literature on the "second stage" of the energy transition after technologies become mature) focused on the benefits of different deployment schemes, such as community choice in wind farm design, local ownership of projects or state ownership of wind rights [7]. Additionally, as technology, innovation, and policies increasingly enable existing turbines to remain in service through repowering, communities and policymakers must revisit original expectations that land used for wind energy generation would be temporary [6, 7].

In Phase IV, Task 28 has taken a holistic systems approach towards the social science of wind energy acceptance so information can be useful to a wider audience. Participants continue to disseminate findings and advise governments and industry on current and best practices for community engagement in wind energy projects and processes. For example, University of Exeter Professor, Patrick Devine-Wright, provides submissions for the UK Government about community engagement and consent. He served as a member of the Steering Group of the Sustainable Energy

**Table 1. Task 28 Participants.**

	COUNTRY	INSTITUTION
1	Ireland	Sustainable Energy Authority of Ireland
2	United States	Colorado State University National Renewable Energy Laboratory
3	Germany	Federal Ministry for Economic Affairs and Climate Action (BMWK)
4	Switzerland	Swiss Federal Office of Energy
5	Japan	National Institute of Advanced Industrial Science and Technology
6	Denmark	DTU Wind and Energy Systems Department of Wind Energy
7	Canada	Western University, Canada
8	Sweden	Swedish Energy Agency

Authority of Ireland's Renewable Electricity Support Scheme Community Measures Evaluation. Dr. Yasushi Maruyama from Nagoya University in Japan works with the wind industry to advise on establishing a code of conduct for the Japanese Wind Power Association and serves as an advisor on zoning to his prefecture.

## Progress and Achievements

The final phase (IV) of Task 28 has been successfully underway since May 2020 and is on schedule in regard to its planned deliverables and activities. During Year 3 (May '22-April '23), several important meetings and collaborations have taken place with many publications, presentations, and dissemination to governments, industry, and communities hosting or in proximity to wind farms. Social acceptance and community alignment of wind energy is becoming increasingly important as countries try to reach their climate and clean energy goals. For example, each state in Germany must identify its contribution to a national requirement, which states that 2% of the country's total land mass be designated for wind energy use by 2032. Communities can benefit from learning how wind energy technology may change over

time through factors such as size, scale, and repowering. Furthermore, how common issues among communities, such as noise and shadow flicker, can be resolved by industrial and technological innovation. Increased collaboration and co-creation between developers, industry, policymakers, and communities is necessary to align wind energy planning and deployment with local goals and shared benefits, and to address existing concerns.

The value of international collaboration increases as wind deployment advances around the globe. Task 28 has proved that wind energy developments and social science intersect in different ways and between different stakeholders such as local town boards and municipalities, utility providers, energy planners, and state regulators. As an example, Task research has highlighted the differences in stakeholders between on and offshore wind projects and between different international jurisdictions and cultures. Notably, effective approaches in the EU or North America may not be effective in Asia.

The Task has become and will continue to be a globally recognised source of social science expertise for wind energy. It is an expertise that can

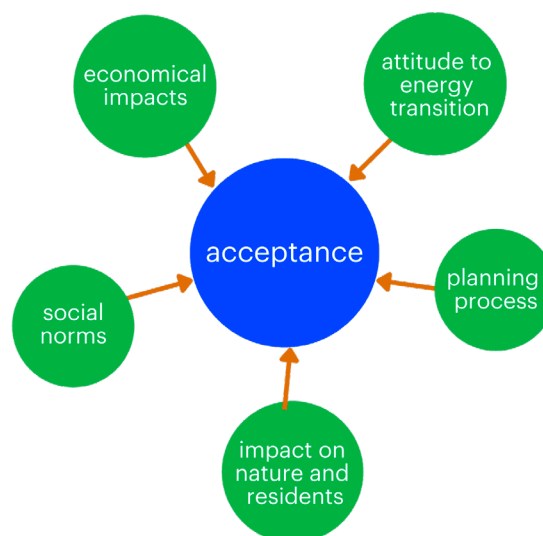
and will be made available to other IEA renewable energy programmes such as solar and hydropower. As mentioned above, each member works with industry and the government in their respective country. Task members additionally produce fact sheets, reports, and webinars, as well as take part in meetings to communicate findings. Research from the past year has been communicated on social media and planning for gamification of wind energy planning [9].

## Highlights

### Highlight 1: A New Integrated Acceptance Model.

Local acceptance of wind energy is highly relevant to foster the green energy transition. As simple solutions like setback distances do not reflect the issue's complexity, social scientists in Germany incorporated acceptance factors and interdisciplinary research into a new Integrated Acceptance Model (IAM). **The following five most relevant acceptance factors were derived by a regression analysis: economic effects, impacts on residents and nature, attitudes towards the energy transition, trust in local actors and the planning process as well as social**

Figure 1: Overview of most relevant acceptance factors in Germany.



Source: Hübner, G., Leschinger, V., Müller, F.J. Y. & Pohl, J. (2023). Broadening the social acceptance of wind energy - An Integrated Acceptance Model, *Energy Policy*, 173, 113360, <https://doi.org/10.1016/j.enpol.2022.113360>.

**norms substantially explained**

**locally.** German researchers will work with the industry, government, and other researchers to learn from these results.

**Highlight 2: Technical Experts Meeting in Boulder, CO, USA.**

The International Grand Challenges of Wind Meeting was held in Boulder, CO in February as a cross-cutting convention to bring many IEA Wind Tasks together to provide an update on the previous wind challenges publication and facilitate a knowledge exchange. Social Science Track discussions focused on the pressing need to rethink how social science is positioned in research and decision-making on wind energy development. To re-envision these dynamics and bolster opportunities for win-win outcomes, the group explored three critical issues for researchers and implementers: 1) Creating just processes, 2) Valuation of benefits, effects and burden, and 3) Acknowledging the transformational nature of rapid, large-scale wind energy development. [8].

These findings inform collaboration with other Tasks and with ExCo. It will also inform the U.S. Department of Energy and other government strategies going forward [8].

**Outcomes and Significance**

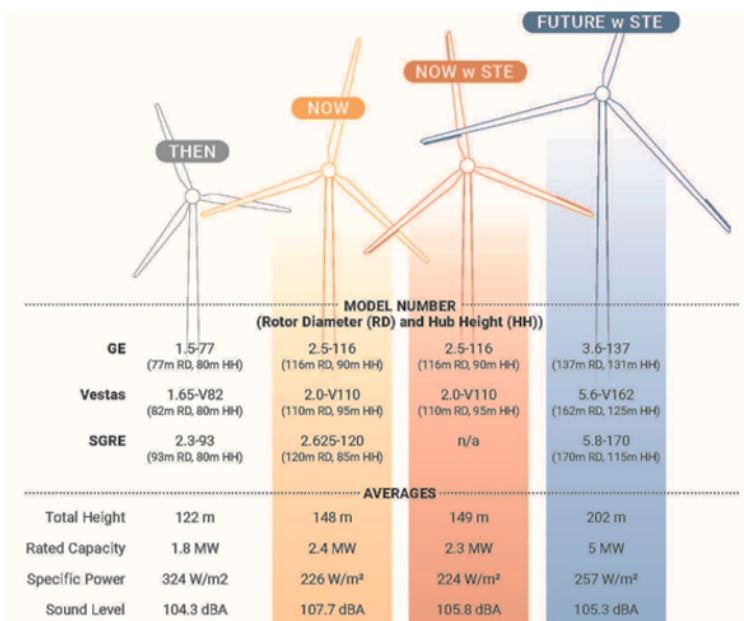
Debates surrounding wind energy projects in the field show that social acceptance is a topic that requires a higher degree of understanding if targets for renewable energy production are to be reached. Individual projects require public approval, and collaboration between proponents and opponents is needed to improve projects. **Industry, government, and research institutions are becoming increasingly interested in these topics. Therefore, the interdisciplinary and international approach of Task 28 is crucial for achieving long-term acceptance of wind power.**

In addition to the collaboration of Task 28 members listed above, Professor Gundula Huebner and her colleagues work with the German wind industry to assess host community perceptions

of annoyance from their nearby wind farm, understand issues, and ascertain mitigation methods, such as slowing turbine speeds. Dr. Jan Hildebrand, from Germany, is advising the Ministry of Energy from the Federal state of Saarland on the development of a new law on public participation in wind energy projects. He also works with municipalities and energy agencies on community benefits agreements including presenting to various stakeholders. He presented this work to the French Ministry for Ecological Transition, and the work will be translated for German-French collaboration.

In the UK, Neil Farrington works with industry and government at Celtic Sea Power. He has direct industry engagement through the now-established Celtic Sea Cluster. Following extensive engagement with seven developers and over 150 close neighbours, John Aston from Ireland is developing the Earning Local Support Academy (ELSA) to enable and advance relationships between communities, developers, and local authorities.

**Figure 2:** From the U.S., this image shows the size and scale of old vs. current vs. new wind turbines. The report by various authors focuses on the social implications of turbine size and scaling.



Source: Hoen, B., Darlow, R., Haac, R., Rand, J., & Kaliski, K. (2023). Effects of land-based wind turbine upsizing on community sound levels and power and energy density. Applied Energy, 338, 120856. <https://doi.org/10.1016/j.apenergy.2023.120856>

## Next Steps

Task 28 members discussed the importance of adding participants to the IEA Wind TCP from emerging economies in places like Africa, Asia, and South America. If global climate goals are to be met and energy demand continues to increase dramatically in these parts of the world, they will have the opportunity to leapfrog to modern technology and deployment processes. In addition to the upcoming deliverables, Task 28 met online and in person in May of 2023 to start preparing the next Tasks to propose on the topic of social science and wind energy.

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