



IEA Wind TCP

IEA Wind Task 28 Annual Progress Reports for IEA Wind TCP ExCo Meeting 92

Task 28: Social Science of Wind Energy Acceptance (SoSWEA)

Date: 3 October 2023

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1 Background and Goals

Task Description: Social Science of Wind Energy Acceptance, May 2020-April 2024

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. **Task 28 network of international researchers define challenges and apply solutions to align with communities at local, regional, and national levels. We conduct research and share findings.** Task members collaborate with partner organizations (such as NGOs and

universities) and industry, advise governments, and disseminate material for decision-makers, researchers, energy planners, and others.

In 2022, we focused on hearing directly from residents who live in close proximity to wind energy sites and added research on newer themes such as increased turbine sizes, equity, and turbine recycling, as well as gamification. In 2023, this applied work has continued, and task members are increasingly taking part in government and industry advisory councils (e.g., UK, Sweden, Japan, Ireland).

Objectives and Goals:

- Ensure 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;
- Adopt new methods of knowledge-sharing based on more proactive involvement of Task participants;
- Maximize the value of the Task outputs through engagement of end users and broad systems thinking; and
- Explore increasing the Task's reach to emerging economies and help with the global energy transition.

Subtasks (Work Packages) and their leaders

Track 1: Research Synthesis and Gap Analysis

1. Innovations in value additions and benefit schemes from wind projects – what have we learned from Phases 1-3, and where are current gaps in research? *Led by Jan Hildebrand, Germany*
2. Understanding costs associated with community engagement and opposition *Led by Joe Rand, USA*
3. New and emerging issues in wind energy acceptance *Led by Mathilda Kreider, USA*

Track 2: Research Dissemination, Facilitation, and Knowledge Exchange (ensuring research is shared globally)

4. Increased global engagement and knowledge exchange of wind energy acceptance and social science. *Led by Suzanne Tegen*
5. Offshore Wind Working Group on Social Science and Wind Energy Acceptance Issues: expert convening exchange and information dissemination. *Leadership of this task is shared among Task 28 participants.*

Task Time Plan and Milestones:

Figure 1. Milestone Table: Work Plan Milestones, Contributors, and Due Dates

Deliverable (DV) No.	Deliverable	Contributors	Quarter Due
T1 WP1 DV1	Report & Online Briefing	JOA, and Denmark, Germany, Japan, US, Canada, Ireland.	Q4, 2021
T1 WP2 DV1	Literature Review	JOA and US, Japan, Ireland, Sweden, Switzerland, Finland	Q3, 2021
T1 WP2 DV2	Online Briefing Document	JOA and US, Japan, Ireland, Sweden, Switzerland, Finland	Q1, 2022
T1 WP2 DV3	Report and Presentation for Conference or Webinar	JOA and US, Japan, Ireland, Sweden, Switzerland, Finland	Q1, 2024
T1 WP3 DV1	Report and Briefing Document	JOA and US, Japan, Ireland, Germany	Q4, 2022
T1 WP3 DV2	International convening (collaborating with industry)	JOA and US, Japan, Ireland, Germany	Q3, 2023
T2 WP4 DV1-3	Webinars and In-Person Meetings	JOA and all participants	Q2, 2021, '22 & '23
T2 WP4 DV4	Conference Social Science Track or Session	JOA and all participants	Q3, 2021
T2 WP4 DV5	Multiple Tracks / Sessions at Engineering and technology Conferences	JOA and all participants	Q4, 2022
T2 WP4 DV6	Joint Meetings with IEA Solar & other Renewables	JOA and all participants	Q4, 2022
T2 WP4 DV7	Fact-sheet and/or Joint Webinar	JOA and all participants	Q4, 2023
T2 WP4 DV8	Peer Reviewed Social Science of Wind Energy Acceptance Database (Excel-based)	JOA and all participants	Q4, all years
T2 WP5 DV1	Best Practice Publication	JOA and Ireland, US, Canada, Japan, UK, Denmark, Netherlands, Germany.	Q1, 2021
T2 WP5 DV2-8	Present at International Workshops, Seminars, Conferences. Awareness Building via Industry Publications	JOA and Ireland, US, Canada, Japan, UK, Denmark, Netherlands, Germany.	Q2 & 4, '21; Q1, 2 & 4, '22 & 23; Q2, '24
T2 WP5 DV9-14	Fact-sheets	JOA and Ireland, US, Canada, Japan, UK, Denmark, Netherlands, Germany.	Q4, 2021; Q2 & 4, '22, '23; Q2, 2024

Red boxes: Deliverables not yet completed, but that will be completed

Light blue boxes: Delivered

Black boxes: Deliverable will not be accomplished.

Schedule/Chronogram

Year	2020 (start 1 st May)				2021				2022				2023				2024		(end 30 April)				
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2					
Work Package 1:								DV1								Final							
Work Package 2:							DV1		DV2										DV3				
Work Package 3:																DV1			DV2				
Work Package 4:						DV1			DV8	DV4	DV2					DV5			DV3	DV6	DV 8	DV4	
Work Package 5:									DV3		DV4					DV5			DV6		DV7		DV8
					DV1	DV2			DV9		DV10					DV11			DV12		DV13		DV14
T28 In-Person Meetings									mini		mini					12 Oct			May		mini		
ExCo or T28 Virtual Meetings																Late Oct			May		Oct		

Red boxes: Deliverables not yet completed

Yellow boxes: Work Package progress

Dark blue boxes: Upcoming Task 28 or ExCo Meetings

Light blue boxes: Delivered

Light grey boxes: Past meetings

Black boxes: Missing deliverable

Milestones for past 6 months:

All milestones for the past 6 months were achieved on time. Please see our publication list at the end of this report for more information on publications.

U.S. members and colleagues presented [results](#) about energy density, turbine scaling, and community (sound) impacts, in May of 2023. This research spanned Task 28 and Task 39 topics.

Many of our task members work on solar energy deployment as well, and Dr. Rand and his colleagues presented at the RE+ conference in the U.S. to an international audience of researchers, developers, academics, and industry. The focus was their recent survey of wind and solar developers, with questions about community engagement and opposition. The final publication of this work will be published at the end of 2023.

A new report was published by our Swedish colleagues called *Coexistence of offshore wind power with commercial fishing, aquaculture and nature conservation: A synthesis of knowledge about preconditions and measures*.

2 Progress Toward Goals

Progress: The technical progress in relation to the Task objectives, milestones, and deliverables is on track. There are two deliverables that were contingent on additional funding (Work Package 3, deliverable 1 and Work Package 4, deliverable 8). Neither one received additional funding from any country. The deliverables that remain for this task are fact sheets for Work Package 4. The current status, as of October 2023 is that John Aston from Ireland is working with a company to record interviews with Task 28 practitioners and researchers about their community engagement case studies. Interview results will be made accessible in short PDF format to be read by community members and decision-makers.

The final phase (IV) of Task 28 has been successfully underway since May 2020 and is on programme in terms of 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/parks. The social acceptance and community alignment of wind energy are 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 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 (size, scale, repowering) and how issues (like noise and shadow flicker) that communities have experienced can be resolved by industry/technology innovation. Increased collaboration and co-creation between developers, industry, policymakers, and communities is necessary to better align wind energy planning and deployment with local goals, shared benefits, and to address existing concerns.

The value of international collaboration increases as wind deployment advances around the globe. We have learned that wind energy developments and social science intersect in many different areas (local town boards and municipalities, utility providers, energy planners, state regulators, etc.). For example, research has highlighted the differences in stakeholders between on and offshore wind projects, and between different international jurisdictions and cultures (what works in the EU or North America may not in Asia).

The Task has become and will continue to be a globally recognized source of social science expertise for wind energy, 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 government in their respective country. We also produce fact sheets, reports and webinars as well as take part in meetings to communicate findings. There is research from the past year on social media and planning for gamification of wind energy planning.

Recent Results and Collaboration:

- In Finland, multiple countries are involved in a national Strategic Research Council proposal called "Just Energy Transition Governance." The broader framework

builds transition management research, and a multi-level approach ranging from geopolitical/ security issues to local implications of the clean energy transition, including conflict analysis. The proposed work is led by Finnish Environment institute (PI Paula Kivimaa) and Task 28 representative, Lasse Peltonen is leading a work package titled “conflict and justice” with a focus on wind energy and critical minerals in Finland.

- In Germany, two percent of the land area is required to be made available for wind power, so our Task 28 members are working with local and state governments and communities on issues surrounding the acceptance and approval of new wind deployment that fits for local host communities.
- U.S. researchers are working on surveys of community members who live near wind and solar installations. They are assessing impacts to property values, among other topics. Results will be published by the end of December 2023. NREL recently completed year one of a five-year research project focused on community benefits. Upcoming work will involve expanding this sample and identifying demographic and geographic patterns in the usage of community benefits; later years of research will involve identifying multi-directional relationships between community benefits, social acceptance, and perceptions of equity. NREL has developed a guide to community benefit mechanisms for land-based and offshore wind energy, to be published in October 2023.

NREL is developing an informational guide to offshore wind for communities and the general public, encompassing many major aspects of offshore wind: project anatomy and siting, leasing and project development, regulation and policy, supply chain and workforce, tribal considerations, community impacts, economic impacts, and public engagement. This guide is slated for publication in early 2024.

- Please see our list of publications and webinars at the end of this report for other recent results.

3 List of Participants

	Country	Lead Participant	Organization	Commitment	Contact Email
1	Ireland	John Aston John McCann		Yes Yes	john.aston@astoneco.com john.mccann@seai.ie
2	United States	Suzanne Tegen, Center for the New Energy Economy (JOA) Joe Rand, Lawrence Berkeley National Laboratory	Colorado State University LBNL, U.S. Department of Energy	Yes Yes	Suzanne.tegen@colostate.edu jrand@lbl.gov
3	Germany	Gundula Huebner, MSH Medical School Hamburg & University Halle-Wittenberg Jan Hildebrand, IZES	Federal Ministry for Economic Affairs and Energy Federal Ministry for Economic Affairs and	Yes Yes	gundula.huebner@psych.uni-halle.de hildebrand@izes.de

		gGmbH, Saarbrücken	Energy		
4	Switzerland	Saskia Bourgeois	Swiss Federal Office of Energy (BFE)	Yes	Saskia.bourgeoisstoeckli@bfe.admin.ch
5	Japan	Yasushi Maruyama, Nagoya University	National Institute of Advanced Industrial Science and Technology	Yes	ym@nagoya-u.jp
6	Denmark	Kristian Borch Tom Cronin David Rodolph	DTU Wind Energy Technical University of Denmark Department of Wind Energy	Yes	kristianb@plan.aau.dk tochr@dtu.dk dpru@dtu.dk
7	Canada	Jamie Baxter	Western University, Canada	Yes	jamie.baxter@uwo.ca
8	Finland	Lasse Peltonen	Akordi	No	lasse@akordi.fi
9	France	Magali Collin as of 2022	Total Energies	Starting in 2023	magali.collin@totalenergies.com
10	Sweden	Amanda Ross as of 2023	Swedish Energy Agency	Yes	amanda.ros@energimyndigheten.se
11	United Kingdom	Patrick Devine-Wright	University of Exeter	No	p.g.devine-wright@exeter.ac.uk

4 Statement of Accounts and Value of Contributions

Status of accounts:

Expenses:

Costs (€)	Budget yearly	Actual (year)
Labour	35,256	35,256
Travel	5,000	5,000
Overhead costs	15% NREL 26% CSU	9,600 14,144 23,744 total overhead 40,256 actual budget
Other		
Total	~64,000	64,000

Revenues

Revenues	Invoiced (year)	Actual received (year)
Country totals (8,000 x 8)	64,000	64,000
Total	64,000	64,000

Cost of participating: € 8,000 per member country x 8 countries = € 64,000

Value of in-kind activities. The monetary value of in-kind contributions should be displayed to the best of the OA’s ability. This total value of the Task to participants is important for illustrating the value of cooperative research and the multiplied benefit to participants. ExCo Members say that this information helps explain the benefits of participation.

The presentation of budget status should include an accounting of in-kind labour hours and facility usage. The monetary value of these in-kind contributions should be displayed to the best of the OA’s ability.

Estimated In-Kind Labour in hours

Country/Year	In-Kind Labour**	
	2022-23	#people
Ireland	120	2
United States	500	2+
Germany	120	2
Finland	20	0
Japan	300	1
Denmark	700	3
Switzerland	120	1
Canada	100	1
France	90	1
Sweden	140	1
Netherlands	200	1
Total hours	2,410	

This table was filled out by estimating hours of effort directly related to Task 28 per active partner. These numbers were known for the OA; however many of her hours are paid, so this table includes all U.S. members’ in-kind time. Japan hosted the Task 28 in-person meeting in May.

5 New Developments Since Last Report

There are no new concerns except that our Task is ending, and we would like to propose working on a new task that falls within the social science realm. The topic of community alignment and approval for projects has become more contentious and uncertain as developers have built out remote areas and are building closer to people and wildlife. The social aspects of deployment will only become more important as countries strive to reach their climate and energy goals.

Future Milestones

Plans and Deliverables for the Coming Year. List and add to standard milestone table from Task Work Plan

Deliverables Table Example

#	Deliverable	Month Due	Status
WP4 DV7	Factsheet and/or Joint Webinar about social science of	December	Has

	wind energy	2023	begun
None	Proposal to the ExCo for a future plan based on social science but distinct from Task 28	?	Members have started discussing

6 Plan for coming year

The North American Wind Energy Academy will hold their meeting in Broomfield, Colorado, USA this October 30-November 2. This satisfies the second (Q3) deliverable for Work Package 2 – an international meeting in collaboration with industry. Participants are from industry, academia, research institutions, and government in the U.S., Canada, Denmark, and other countries in Europe. One track of the conference is dedicated to social science, and there will be a Task 28 meeting directly following the conference, in the same location. We are also holding a joint meeting between Task 28 and Task 34 – Environmental Science where we will discuss the Grand Challenges of Wind Energy. Our main focus at the Task 28 meeting will be wrapping up Task 28 and looking forward to future social science work.

The final deliverable for this task (Work Package 4, deliverable 7 - fact sheet or joint webinar) will begin in October 2023. Our Irish member, John Aston, has worked together with the Operating Agent, Suzanne Tegen, and a consultant who will interview Task 28 members about their recent case studies. Interviews will include stories about working with developers, local governments, and host (and potential host) communities. The compilation of interviews will be documentation that tells the stories of how vital it is that wind developers proactively work closely with communities and local authorities to ensure appropriate and equitable deployment. The project is called *Earning Local Support for Renewable Energy Projects – International Case Studies*. The goal is to showcase examples that community – developer collaborations where neither side loses and both sides win are possible, so both communities and developers across the world can learn and seek inspiration for their own country and region. This is to help promote the importance and key messages of the Task 28 participants and to provide case studies for training, coaching, communicating, and educating.

Task 28 will finish its final Phase (IV) in April of 2024. Suzanne Tegen, Operating Agent, will create and circulate to members the final Task 28 report. The task members, their colleagues, and IEA Wind ExCo members will have discussions about what is most needed from social scientists in the near future. The members of Task 28 will propose a brand new task, distinct from Task 28, but still reliant on the social science expertise of some of the task members.

7 Publications, presentations, dissemination

1. Webinar by NREL (US): *Offshore Wind and Communities: Perspectives on Local Impacts*. June 8, 2023. [Offshore Wind and Communities: Perspectives on Local Impacts \(energy.gov\)](https://www.energy.gov/offshore-wind-and-communities-perspectives-on-local-impacts)
2. Gooding, Luke, P. Devine-Wright, M. Rohse, R. Ford, H. Devine-Wright. 2023. [The best-laid plans: Tracing public engagement change in emergent Smart Local Energy Systems](#)

- [Energy Research & Social Science](#) 101(4):103125 DOI:[10.1016/j.erss.2023.103125](#)
3. Ryder, Stacia, C. Walker, Susana Batel, F. Sherry-Brennan. 2023. [Do the ends justify the means? Problematizing social acceptance and instrumentally-driven community engagement in proposed energy projects](#). April 2023. *Socio-Ecological Practice Research* 5 (2): 1-16.
 4. Florian, J., Y. Müller, V. Leschinger, G. Hübner, J. Pohl. 2023. Understanding subjective and situational factors of wind turbine noise annoyance. *Energy Policy*, Volume 173, February 2023, 113360 1.
 5. 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>
 6. Hübner G. V. Leschinger F. Müller J. Pohl 2023. Broadening the social acceptance of wind energy – An Integrated Acceptance Model.
 7. Bjornstadt, Jonas. Swedish Agency for Marine and Water Management. 2023. [Coexistence between offshore wind power and nature conservation: a synthesis of knowledge about preconditions and measures](#). 2023-08-14.
 8. Haac, R., R. Darlow, K. Kaliski, J. Rand, and B. Hoen (2022). *In the shadow of wind energy: Predicting community exposure and annoyance to wind turbine shadow flicker in the United States*. **Energy Research and Social Science** Volume 8; Number 102471. Download from: <https://emp.lbl.gov/publications/shadow-wind-energy-predicting>
 9. Elkjaer, L.G., D. Rudolph, M. Horst. 2023. [Different pasts, contested, presents and desired futures: local narratives and identities in the co-production of a shared wind energy ownership model](#). Accepted in [Local Environment](#).
 10. Russel A. and Firestone J., (2022) More Than a Feeling: Analyzing Community Cognitive and Affective Perceptions of Ocean Renewable Energy Infrastructure. *Renewable Energy*, 193: 214-224.
 11. Bingaman, S., Bidwell, D., and Firestone, J. (2022) Winds of Change: Examining Attitude Shifts Regarding an Offshore Wind Project, *Journal of Environmental Policy & Planning*, Vol. 25, 1, 55-73.
 12. Kreider, M. 2023. Wind Energy End-of-Service Guide: An informational resource for communities to better understand repowering or decommissioning processes for wind turbines and related infrastructure. U.S. Department of Energy Website: <https://windexchange.energy.gov/end-of-service-guide>. Accessed 20. April.2023.
 13. MacDonald, S. Forthcoming. Summary of the Social Science Track for the IEA Wind TCP Technical Experts Meeting 109: The Grand Challenges of Wind, in Boulder, CO, USA February 2023.
 14. Maruyama, Y. and C. Doedt. 2023. *The mega solar Twitter discourse in Japan: Engaged opponents and silent proponents*. *Energy Policy*, 2023, vol. 175, issue C. https://econpapers.repec.org/article/eeeene/pol/v_3a175_3ay_3a2023_3ai_3ac_3as0301421523000800.htm

Industry participation

In all of our member countries, researchers collaborate with industry. Some Task 28 members work directly for or with industry, such as Marielle deSain (Netherlands) and John Aston (Ireland). German and American members have collaborated on projects with industry, writing guides and providing information about how to best deploy wind projects. In Japan, our representative, Yasushi Maruyama advises local governments and industry on topics such as offshore wind and aquaculture.

Task 28 members also belong to other IEA Wind tasks. Prof. Gundula Huebner, for example, sits on the IEA Wind task (Task 39) about sound, where researchers collaborate closely with industry to find solutions for noise annoyance by working with technology experts, turbine designers, developers, local authorities, and community members.