International Energy Agency (IEA)

Implementing Agreement for Co-operation in the Research and Development of Wind Energy Systems (IEA Wind TCP)

Phase IV Work Plan (2020-2024)

Task 28: Social Science of Wind Energy Acceptance

May 2020 – 30 April 2024

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I. Scope

As suggested by the international Institute for Energy Economics and Financial Analysis, 2019 could be known as the year of the tipping point "when global capital markets accepted the technology-driven inevitability and grid parity cross-over from polluting thermal coal and the increased uptake of sustainable clean renewable energy."[1] Across the globe, coal plants and coal mines are closing earlier than planned due to lower cost natural gas and renewable energy generation and technological innovation of renewable energy.[2] For the transition to a cleaner energy economy to be fully realised, wind power and other renewable energy sources must be responsibly developed, taking human and ecosystem impacts into consideration at early planning stages. The IEA Wind TCP recognizes this need and has included social impacts as a main priority and strategic objective[3] for 2019-2024.

During phases I – III, IEA Wind Task 28 was called the Social Acceptance of Wind Energy. In 2020, we propose broadening the title to the Social Science of Wind Energy Acceptance, acknowledging that the goal is not for societies to accept all new wind power development, but for the wind power deployment process to include proactive community-focused strategies based on numerous systems (economic, cultural, political, ecological, technical, etc.) working together to reach agreement on energy planning for the good of the host communities and others.

Wind energy forms an important part of energy policy goals in IEA member countries as they strive to meet their renewable energy obligations or to provide low cost, environmentally sound energy options. However, many onshore, offshore, and distributed wind projects meet with host community concern and in some cases opposition, with implications for cost, time delays, and overall ability to deploy wind energy. To achieve energy policy objectives, the social science of wind energy acceptance needs to focus on the relevant stakeholders such as policy makers, regulators, developers, local communities, and special interest groups. Task 28 remains a group of international experts who focus on these topics and in Phase IV we propose to increase our member numbers to include additional countries and partners.

Results from a survey of Task 28 members (see Appendix A) revealed a range of priority research areas to expand the state of knowledge in the social science of wind energy acceptance. These are priorities not only for the research community but were derived with input from energy program managers from government agencies within the member countries. Those identified priorities form the structure of proposed Phase IV work packages described below. In Phase IV, we propose to not only synthesize the state of knowledge in these priority research areas, but also to focus on identifying gaps where further research is needed. Further, we seek to improve communication and information dissemination activities, and to enhance engagement and exchange to ensure that social science becomes more thoroughly integrated across the traditionally disparate disciplines of wind energy science and engineering. We will present more webinars that can be tailored for use in member countries and hold more web-based meetings and will host social science panels and/or tracks at global and regional energy conferences. Task 28 will include onshore and offshore wind energy, in today's larger context of energy transition and climate change.

[1] Institute for Energy Economics and Financial Analysis. December 2019. Accessed May 31, 2020. https://ieefa.org/wp-content/uploads/2019/12/Global-Renewable-Energy-Leaders-Outperform-on-Global-Equity-Markets_December-2019.pdf

[2] There are still countries building new coal plants in 2020, such as China and India, but many analysts believe that trends show they will not be economical in the near future.

[3] https://community.ieawind.org/about/about-iea-wind

II. Introduction

Within the participating countries and elsewhere, social and community acceptance[4] continues to be a key constraint for the development of wind energy projects. In the face of the intensifying and dynamic challenge of social acceptance of wind energy in most parts of the world, there is and will continue to be added value in continuing Task 28 and learning how researchers around the globe are defining challenges and applying solutions at local, regional, and country-wide levels. Social scientists and others participating in this task conduct research in their own countries with their own funding and then share findings to increase the knowledge base among Task 28 members. They collaborate with partner organizations and disseminate high quality data and analyses for decision-makers, researchers, planners of energy projects, and others.

Task 28 was highly productive and successful in its first three phases, but significant work remains, while the value of international collaboration only increases as wind deployment advances around the globe. We have learned that the wind energy developments and social science intersect in many different areas (local town boards and municipalities, utility providers, energy planners, state regulators, etc.).

For Phase IV, the task will take a more holistic systems view of social science of wind energy acceptance, so information can be useful to a wider audience. As the global energy supply transitions to lower carbon energy sources, such as solar and wind, Task 28 research can be useful for any community experiencing an energy transition whether that be the closing of a coal power plant or the opening of a wind farm. Local practitioners can learn from parallels in perceived procedural fairness, for example.

Task 28 has become and will continue to be a globally recognized source of social science expertise for wind energy, an expertise which can and will be made available to other IEA renewable energy programmes such as solar and hydropower.

Task 28's focus is on social science acceptance but is closely linked with environmental and economic impacts as well as communication, education, and stakeholder engagement, so it can help inform IEA members and audiences on these topics. Moreover, our community of scientists believes that social concerns and opportunities could be communicated more effectively to engineers and others that design and assess the technology and systems. Although Task 28 has been active for many years, we propose a new scope which works to address current community challenges to wind development, largely brought on by expanded deployment over the last decade. Task 28 members are also pursuing additional participant country membership. A survey (See Appendix A) conducted by Task 28 in December 2019 supported this view, and this Task 28 Phase IV document is endorsed by existing participants.

Since Phase III commenced in 2017, the number of Task 28 participants increased from five to nine; Denmark, Portugal, Canada and Finland joined Task 28; representatives from Sweden, Netherlands, Norway and UK have expressed strong interest in joining and are currently making representations in this regard to their respective national authorities.[5] This large increase in national participation demonstrates the importance of this topical area within National and IEA Wind TCP efforts. There will be an ongoing endeavor to attract new participant countries.

The Work Packages presented here are ambitious, with expanded scope and reach. To address this scope, joint Operating Agents will coordinate the work of Task 28 Phase IV, 2020-2024.

The main priorities of this proposed effort are:

[4] For the purposes of the task we defined social acceptance as '*a favourable or positive response (including attitude, intention, behaviour and – where appropriate – use) relating to proposed or in situ technology or social technical system by members of a given social unit (country or region, community or town, household, organisation'* (Upham, 2015, p107))

[5] In 2019, Portugal lost funding for Task 28 participation.

- build on past work and scientific insights from while identifying knowledge gaps;
- focus on the application of research including a wider and more coordinated dissemination of results;
- engage more with industry and community engagement practitioners;
- incorporate systems thinking so that social science is integrated into traditional wind energy science and engineering disciplines, and so results are useful to a broader audience;
- expand task scope and reach to other industries and other tasks within IEA; and
- encourage increased cooperation and communication/collaboration between related IEA Wind Tasks (e.g., IEA Tasks 34, 11).

III. Objectives and Expected Results

Value of Topics for T28 Phase IV (2020-2024)

The value of the Task will come from these objectives and expected results:

- Ensuring diverse participation from a larger number of countries and a variety of social scientists;
- Adopting new methods of knowledge sharing based on more proactive involvement of Task participants and new online webinar and meeting tools;
- Greater emphasis on maximising the value of the Task outputs through engagement of end users and broad systems thinking;
- Exploration of increasing the Task's reach to emerging economies;
- Increasing the profile and awareness of Task 28 by proactive outreach and on-line dissemination to and through wind and other renewable energy stakeholders globally.
- Outputs should be conceived and executed in a manner that will enhance our understanding of social acceptance while supporting the work of policy-makers, developers and other stakeholders in the global wind industry as they seek to define and build new energy infrastructure at levels consistent with the perceived needs and goals for their respective country. Collaborations further increase country capacity through networking and access to new resources.

IV. Overview of Work Packages 1-5 (2020-2024)

The two tracks for Task 28 research and dissemination are: *Research Synthesis and Gap Analysis* and *Research Dissemination, Facilitation and Knowledge Exchange.* The tracks align with the division of past Task 28 efforts and participant country priorities for the task. (For Task 28 member country priorities, please see the survey results in Appendix A). They are broken down as follows:

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?
2. Understanding costs associated with community engagement and opposition

3. New and emerging issues in wind energy acceptance (including supersized turbines, decommissioning/repowering, floating offshore systems)

Track 2: Research Dissemination, Facilitation, and Knowledge Exchange

4. Increased global engagement and knowledge exchange of wind energy acceptance and social science
5. Offshore Wind Working Group on Social Acceptance: expert convening and information dissemination

Track 1 (T1): Research Synthesis and Gap Analysis

T1 Work Package 1:
Innovations in value additions and benefit schemes from wind projects

WP1 Joint OA Oversight: Suzanne Tegen
WP1 Lead: TBD - Denmark or Germany will start the initial conversation (Jan Hildebrand)
WP1 Participants: Denmark, Germany, Japan, US, Canada, Ireland.

Problem: With increasing frequency, wind projects proposed and built today are offering innovative value additions that may influence social acceptance. Fairness and justice are principles invoked to explain why benefits and their distribution are so critical for societal acceptance. For example, local grid infrastructure upgrades, monitoring equipment (such as weather and science stations), ice-plants for commercial fishermen, aquaculture or artificial fishery reefs, road improvements, associated wildlife sanctuaries, and more. Rand and Hoen (2017) reported that projects with non-monetary community benefits may be better received and create less community conflict when compared to direct compensation (i.e., neighbor payments); and innovative monetary schemes are also being used and can be studied. But it is not well known how frequently these offerings are available, how effective they are at influencing public opinion, and the relative developer costs of such offerings.

We must also better understand ownership models with respect to benefits. An OECD (2012) study of 16 regions across Europe and North America demonstrated that energy projects owned by local communities receive a number of benefits including: new revenue sources (including tax base for improving service provision in rural communities); new job and business opportunities if a large number of actors, are involved and are embedded in the local economy; innovations in products, practices, and policies in rural areas; capacity building and community empowerment; and affordable energy locally.[6]

Potential Solution: Participating countries will synthesize research on social impacts provided by individual wind projects. This is needed to understand the relative costs of these offerings and how (and whether) they influence public attitudes toward wind projects. We will identify gaps in research for future initiatives. We will also research non-profit models that preserve the value created in the local community (Sperling & Mathiessen, 2015).

Deliverables:

T1 WP1 Deliverable (DV) 1: A short report and online briefing about innovations in socially beneficial value additions provided by wind energy projects, and their role in influencing acceptance. Because communities may prefer non-monetary benefits (e.g., school, roads,

[6] OECD (2012). Linking Renewable Energy to Rural Development. ISBN Number: 9789264180420 Sperling, K., & Mathiesen, B. V. (2015). Landvindmøllernes lokale økonomiske effekter i Billund Kommune. Aalborg Universitet. ISP-Skriftserie, No. 2015-1

infrastructure), this WP will improve understanding about the menu of options and potential additions (e.g., aquaculture and artificial reefs).

Benefits: If such value additions are shown to have a net benefit to social acceptance of wind energy projects, this is useful information for developers as well as community planners who can negotiate about local value-added features before a project is approved.

T1 Work Package 2:
Understanding costs associated with community engagement and opposition

WP2 OA Oversight: Suzanne Tegen
WP2 Lead for initial discussion: US or Ireland (Joe Rand)
WP2 Participants: US, Japan, Ireland, Sweden, Switzerland, Finland.

Problem: Despite the large volume of literature on drivers to public acceptance, it is unclear how community opposition and developers' community engagement influence the levelized cost of energy (LCOE). Robust and successful community engagement strategies incur costs, but those costs are not well understood. Moreover, the cost of *failed* projects due to lack of community support are not known. As well, the timing of investments in community engagement may influence their efficacy and relative value – for example, $1M in the very early development stages of a project is quite distinct from the same amount very late in the permitting stage. A better understanding is needed of the costs, risks, and associated factors of community engagement strategies.

Potential Solution: Collaborative analysis of existing global research on this topic. Member countries will seek their own individual funding to conduct an international data collection effort on developers' reported time and monetary costs of (a) community engagement strategies, (b) delays due to community opposition, and (c) permit rejections (project failures), due to community opposition.

Deliverables:

T1 WP2 DV1: This work package will begin with a literature review, with input from multiple member countries.

T1 WP2 DV2: The literature review will be summarized into a briefing (document and online).

T1 WP2 DV3: If participants can obtain funding, Task 28 T1 participants will develop a presentation (for conference or webinar) resulting from an international expert elicitation of personnel responsible for community engagement and relations at wind development firms. At least one participant in the work package will present the information.

Benefits: A better understanding of the costs and risks of public acceptance relative to other costs and risks in the development pipeline would be valuable to the wind industry and stakeholders. This might allow developers to gauge whether higher expenditures early on are strongly related to a decrease in failure rates, all else being equal. Additionally, international wind technology researchers and funders could have access to quantitative data showing the importance of (and uncertainties around) host community engagement.

T1 Work Package 3:
New and Emerging Issues in Wind Energy Acceptance

WP3 Joint OA Oversight: Garry Keegan

WP3 Lead: TBD - Denmark could lead initial discussion (Tom Cronin)
WP3 Participants: US, Japan, Ireland, Germany

Problem: Wind energy technology has evolved rapidly over the past decade. Turbines are getting much larger by every measure (e.g., hub height, rotor diameter, rated capacity), floating offshore wind turbines have entered the market, and increasing numbers of turbines are reaching their end of life, leading to decommissioning or repowering. Similarly, hybrid (wind+solar or wind+battery) and distributed (<20 MW) wind projects may play a role in the future global wind energy landscape. This evolution results in new and emerging issues, concerns, and contexts with respect to social acceptance.

The next decade will see the installation of supersized turbines (5+ MW, for onshore; 12+ MWfor offshore) with increasingly large rotors and low specific power, necessitating increased inter-turbine spacing and – potentially – on-site manufacturing and/or innovative (e.g., airship) delivery of blades. Floating offshore wind will enter the mainstream, wind turbines will expand into lower wind resource regions, and on-site storage and hybrid projects could become increasingly common. To date, wind energy acceptance research has focused on currently-available wind technologies – typically less than 3 MW and 500 ft. in total height. The technological advancements expected over the next decade will result in unique visual (viewshed and shadow flicker), sound, land-use, economic, political, and other social impacts from the turbines of today. Large turbines can also be deployed as single turbines or small wind parks (as can new smaller turbines). The nature of wind project development is also changing through the use of hybrid projects, distributed wind projects, and new and innovative ownership structures. The social acceptance implications of these changes are not currently understood – and are not being widely considered in the R&D circles developing new turbine technologies.

Additionally, very little research has examined the end-of-life phase with respect to human impacts and acceptance. As early wind projects across the globe age and retire, questions around decommissioning, repowering, “abandoned” turbines, loss of tax or lease revenue, recyclability of components, and landfill waste have become especially pertinent to social acceptance, and are rising to the forefront of discussions among communities considering hosting new wind projects. A lack of data, transparency, and experience regarding this phase of wind projects can result in heightened concerns and misinformation.

Potential Solution: Several Task 28 members have external funding to research the types of emerging issues outlined in this work package (e.g., large turbines, waste/recycling, ownership models), but work is needed to synthesize these disparate efforts. This work package will be focused on uniting the findings of ongoing research related to the emerging issues discussed above in order to produce novel fact sheets and webinars, led by Task 28 members.

If additional funding allows, participants in this work package will review the available literature that pertains to these new, emerging, and future trends of wind energy and social acceptance to identify the state of the art and research gaps. Joint funding opportunities may be pursued by some member countries, to conduct collaborative and mixed-methods research to understand community responses and impacts to new and emerging issues. Methods may include the use of modeling, surveys, visualization dome focus groups (e.g., modeled after Germany’s method), trends analysis, and choice experiments to reveal societal preferences and what communities are willing to accept. Data could be gathered and analyzed to better understand end-of-life trends, including decommissioning volume, actual prevalence of “abandoned” turbines, repowering trends, recycling, and waste.

Deliverables:

T1 WP3 DV1: Report and briefing on social dynamics and considerations of future wind turbine technologies (on subjects such as the social acceptance of very large turbines, hybrid projects,

distributed turbines, floating offshore, and end-of-life issues involving host communities or other social science-related topics).

T1 WP3 DV2: If funded, Task 28 could facilitate an international web-based convening (collaborating with industry) to ascertain current options and costs related to end-of-project practices and potential innovations.

Benefits: As the current trends in turbine technology and deployment continue, it is vital to know how host communities will respond. Communities are already concerned with visual impacts, sound disturbance, potential property value decreases, and other impacts. It would benefit the wind industry, R&D organizations, host communities, and decision-makers to have a better understanding of public acceptance before the future technology is introduced and deployed, at the local level. Depending on identified community concerns, different design and technology innovation decisions could be made to limit or reduce identified concerns, reducing overall development costs though active mitigation and minimization.

Similarly, communities potentially hosting wind energy projects are seeking information on the potential impacts across the project's lifecycle. Decision makers also increasingly ask about what happens to "clean technology" at the end of its life and have seen examples of small towns with big fines for wind turbine blades in their landfills. This research would answer important questions and provide solutions about potential social impacts.

T2 Work Package 4:

Increased Global Engagement and Knowledge Exchange of Wind Acceptance and Social Science

WP4 Joint OA Oversight: Suzanne Tegen (through 2021) then Garry Keegan
WP4 Lead: Suzanne Tegen through 2021. Then Ireland with help from Wind Europe (possibly John Aston)
WP4 Participants: All

Problem: Task 28's research scope and, by extension, audience, has been limited to the (highly developed global north) countries historically engaged in the Task (e.g., US, EU, Japan). Clean energy is seeing rapid global expansion, and non-member emerging economies (e.g., in Asia, Africa, and South America) can learn from and offer new insights to the Task. Research into impacts, constraints, and benefits in emerging economies could enable leapfrogging of past mistakes, help reduce global barriers to wind deployment, and offer important insights to industry and policymakers considering wind projects.

Furthermore, while there is a vast literature on wind energy acceptance, that literature can seem disconnected, overwhelming, or difficult to find for practitioners. Various efforts (e.g., Rand and Hoen 2017; Ellis and Ferraro 2017) have made efforts to organize tabular worksheets to house previous research, but those efforts are not combined, updated, and expanded to represent the state of the art of global peer-reviewed social acceptance research.

In addition, other renewable energy technologies – such as utility-scale solar and hydropower – also face public acceptance barriers, as do communities that are reliant on traditional generation sources or fuels – like coal – for jobs and livelihoods. These communities are experiencing significant socio-economic upheaval under the current energy transition. The issues they're confronting have parallels to socio-economic concerns raised around the development of wind energy. Although social science research into

process fairness and host community economic benefits are similar across various technologies, there is little cross-technology research or exchange to assess and cooperate on shared challenges and opportunities.

Potential Solution: A "research map" (internal to IEA Wind, at first) that outlines who is currently working on which topics. Increased participation of and engagement with researchers and practitioners in non-IEA member countries, along with research into unique constraints, concerns, and social impacts of wind energy in the developing world.

Task 28 members can work with global conference organizers to have social acceptance and social science dimensions of wind energy included as a featured topic or track of their technology, engineering, or otherwise focused conference. Another potential solution is increased dialogue and potential partnership with other IEA technology research tasks and international energy transition experts, to identify shared challenges and opportunities.

Deliverables:

T2 WP4 DV1-3: Three invited webinar/meetings featuring presentations. Webinars will be recorded and made available on the Task 28 website. Webinars can also be adapted for each country's needs (e.g., show or narrate the webinar with an introduction and question/answer session for the host country, in their language).

T2 WP4 DV4: In year 2 (2021-22), have a track or session dedicated to the social science of wind energy acceptance. The importance of this is to have social science included in the ongoing dialog at engineering and other renewable energy conferences (not just the singular session).

T2 WP4 DV5: In year 3 (2022-23), have multiple sessions at a technology or engineering conference focus on the social science of wind energy. The importance of this is to have social science included in the ongoing dialog at engineering and other renewable energy conferences (not just the singular session).

T2 WP4 DV6: In year 2 or 3, hold a joint meeting between IEA Wind Task 28 and other groups. These groups could include IEA Solar PV Task 1 (strategy and communication) or Task 15 (PV for the Built Environment) or other groups focusing on the energy transition (e.g., Just Transition Research Collaborative[7]) to discuss social acceptance challenges in the transition to wind, solar, and other forms of clean energy.

T2 WP4 DV7 (optional): Possible fact-sheet or joint webinar to follow, if other parties are interested.

T2 WP4 DV8: If funded, a structured, sortable, annually updated and geographically expanded tabular dataset of peer reviewed literature on the social science of wind energy acceptance. This dataset will be in Excel format and available for download online. There could be links to other IEA Wind task databases, such as Tethys (Task 34). This could be expanded to an online searchable database if funding allowed, in future years.

Benefits: This work could include summarizing what Task 28 member countries have learned about wind power's social acceptance that can benefit less developed countries whose clean energy industries are younger. As those markets strengthen, this might help the global community reach clean air, climate, and energy goals while minimizing negative social impacts and community conflict. Scientists studying the social science challenges and host community benefits of energy transition and deployment for any technology will benefit from shared knowledge. The transition from fossil fuels will continue around the

globe, and other energy transitions will follow, so it behooves us to be proactive and provide information to help create best practices for a successful, flexible, and transparent transition process for today and for the future.

In addition, a single, up-to-date, internationally inclusive spreadsheet of peer reviewed literature on these topics will benefit all social science and other researchers, decision-makers, and practitioners seeking answers and best practices and history of the social science of wind energy.

T2 Work Package 5:

Offshore Wind Working Group on Social Science and Wind Energy Acceptance Issues: Expert Convening, Exchange and Information Dissemination

WP5 Joint OA Oversight: Garry Keegan
WP5 Lead: Garry Keegan
WP5 Participants: Ireland, Canada, Japan, UK, Denmark, Norway, Netherlands, Germany, U.S.

Problem: Some countries have a strong track record in the deployment of offshore wind farms. Five countries account for over 90% of all offshore wind capacity connected in Europe. The UK has the largest amount of installed offshore wind capacity in Europe, representing over 40% of all installations. Germany follows with approximately 34%, Denmark 8%, Netherlands 7% and Belgium 6%.

Many other countries such as Ireland, Portugal, Norway, Finland, France, Canada and the USA are in their infancy of offshore wind farm development but have plans to significantly grow this sector, as have Australia and many countries throughout Asia, notably Japan, China and Taiwan. Community acceptance has been a key constraint to the development of onshore wind projects. Offshore wind projects throughout Europe also experience resistance among coastal communities.

Potential Solution: Research performed for this work package will be compiled from individual member countries. The combined results will make a constructive contribution to the future deployment of offshore wind farms. Offshore projects are becoming more feasible due to decreasing costs, however, unless there is more knowledge and data in the area of community/stakeholder impact issues and stakeholder identification and engagement, this industry will encounter more of an uphill struggle than needs to be the case. The timely production of a research based best practice guide, informed by best practice international case studies, will benefit deployment and potential of this renewable energy source. In achieving a greater appreciation of the many benefits to local supply chains, industrialization of ports and local stakeholders in sectors such as fishing and tourism, countries new to offshore deployment will be in a position to communicate a more informed and positive message to local stakeholders.

Stakeholders for offshore are quite different to onshore developments i.e. ports, shipping, marine, fishing, military, air traffic control, coastal communities, tourist sector and so forth. Social, in particular community, acceptance issues have the potential to be a key constraint to the development of offshore. This project represents an opportunity to recognise and address this constraint.

Proposed Deliverables:

T2 WP5 DV1: Publication of best practice guidelines on Offshore Wind Farm Project Community Acceptance and Stakeholder Engagement, from participating member countries. It will be available to an international audience, such as governments, researchers, developers, and organizations working on offshore wind energy.

T2 WP5 DV2-8: Presentation of findings internationally at workshops, seminars, conferences and promoted in industry publications. Organisations such as the International Energy Agency, Wind Europe, Renewables Grid Initiatives, ENTSO (E) and EU Commission and Parliament will facilitate dissemination.

T2 WP5 DV9-14: If feasible from member countries, fact sheets with global examples on community impacts, such as: social, recreation, visual, tourism, economics, and health.

Benefits: This project will contribute to a more harmonious local societal and community environment and will facilitate procedural and distributive justice matters of offshore wind energy projects, and indeed environmental mediation when some projects inevitably end up being involved in such a process.

This work package will create a resource which will increase the likelihood of success of projects through the design, planning, construction and operational phases. It will also help identify the social and economic benefits for local stakeholders (port communities/businesses, fishermen, etc.), potential benefits/ opportunities they may not be aware of or have realised. The development of offshore is unlikely to succeed, within planned cost and time parameters, in a hostile local stakeholder environment. This in turn would result in reputational & investment damage for the offshore industry.

V. Chronogram & Key Dates

Table 1: Chronogram & Key Dates

Year	2020 (start 1st 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										
Work Package 2:							DV1		DV2								DV3	
Work Package 3:												DV1			DV2			
Work Package 4:						DV1		DV8	DV4	DV2		DV5 DV8		DV3	DV6	DV 8	DV4	
Work Package 5:					DV1	DV2		DV3 DV9		DV4 DV10		DV5 DV11		DV6 DV12		DV7 DV13		DV8 DV14
T28 In-Person Meetings																		
T28 Virtual Meetings																		

T28 Meetings (Given COVID restricted travel, it is possible all meetings will be web-based): *Dublin Q4 2020; Japan Q2 2021 (followed by JOA's attending Exco Japan); Wind Europe Global Conference (with T28/Social Science Stream Q4 2021; 2022 & 2023 in-person meeting locations TBC subject to participant countries offering to host, planning to coincide with Exco country locations and Autumn location of Wind Europe Global Conferences as T28 hope to form large part of Conference Social Science Stream.*

T28 Virtual Meetings: *These will take place every quarter when there is not a T28 in-person meeting, therefore two in-person meetings per year and two virtual meetings per year. Given restrictions, all meetings may be moved online.*

Red boxes*: Deliverable Dates*

Yellow boxes*: Work Package progress*

Blue boxes*: Task 28 Meetings*

VI. Reports, Deliverables and Dissemination of Results

Task 28 will work to bring together experts to exchange information and experience in the areas covered by this Task. Former activities of the Task have not adequately incorporated project developers, policy makers and regulators. The T28 group will agree on communication tools, such as thematic workshops, peer-review processes, conference calls and webinars to ensure the necessary exchanges take place and outcomes from the Task efforts have broad usability. Outcomes will be publicly available on new Task 28 website/platform. In addition, findings will be presented at international conferences and meetings where appropriate. Webinars and direct outreach to government regulatory organizations, along with the research, wind development, and host communities, will be conducted when appropriate.

Task 28 has observed the vast range of organizations and platforms involved in communicating news and research for wind and other renewable energy technologies. We need to establish where we fit and what our role among these is, along with creating both an awareness of the work we do disseminating results. Strategic alliances and relationships can be established with many of these platforms and organizations which can include speaking at each other's meetings, working groups, and conferences. This will involve collaborating with universities, research institutes, industry representative organizations and media outlets globally.

Table 2: Planned Deliverables and Schedule

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 Web-based 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, Norway, 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, Norway, 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, Norway, Netherlands, Germany.	Q4, 2021; Q2 & 4, '22, '23; Q2, 2024

VII. Methods of Review & Evaluation of Work Progress

Table 3: Meeting Schedule for Task 28 Progress Review

	Review and Evaluation of Work Progress	Contributors	Month Due
Meeting 1	T28 Meeting #1 Agree upon work plan and approach; Begin WP4, begin WP 5	Members involved in WP 4, 5	6
Meeting 2	T28 Meeting #2 Review global literature database and discuss contributions	All (lead = US)	12
Meeting 3	T28 Meeting #3 Social science session review and lessons learned after September 2021 Wind Europe Conference	All members who attend Wind Europe	18
Meeting 4	T28 Meeting #4 Review of Phase IV deliverables and progress; recommendations and future work and any updates/ changes to work plan	All	24

At least on a biannual basis, one of the Work Package Leads or Operating Agents will consult each project Participant on the progress made in relation to the plan. Based on input from these regular consultations, the Operating Agents will prepare a status report that summarizes the progress of the Task work plan and budget plan and deliver it to the IEA Wind Executive Committee twice per year. In addition to in-person and virtual meetings, regular conference calls will be critical to maintaining participant engagement and investment.

VIII. Obligations and Responsibilities

The success of Task 28 is directly attributable to the collaborative nature of the Task and the contributions of all Participants. The general obligations and responsibilities of the Joint Operating Agents and Participants are described in this section.

The outputs developed through this Task are available equally to all Participants; final products will be posted to new Task 28 website. While in development, outputs of this Task and/or each work package will not be available externally until the Task is complete or until all Participants agree to their dissemination. New entrants will be encouraged / actively pursued throughout the Task and will be obligated to contribute to specific activities as identified after they have joined. Participants who wish to withdraw from this Task after it begins will be obligated to complete contributions to which they committed for the year in which they wish to withdraw.

Joint Operating Agent:

In addition to the requirements outlined in Article 5 of the IEA wind agreement, the Joint Operating Agents shall:

- Prepare a detailed program of work in cooperation with the other Participants and submit for approval by the Executive Committee
- Coordinate work of the Participants (e.g., meetings, reports, website)
- Monitor the agreed-on schedules for work to be done, as well as deliverables
- Report each year to the Executive Committee on the progress and results of the work performed under the program of work
- Provide input to the annual IEA wind report
- Keep the Executive Committee secretary informed of planned meetings so they can be listed on the Executive Committee calendar
- Collaborate with Task Members to disseminate research and information on IEA website and many other channels, including webinars.
- Arrange for a public Web presence for the Task strategy and results either on IEAWind.org or a site that can be linked to or from IEAWind.org
- Provide the Executive Committee with a final report summarizing the findings of the Task for the Committee's approval and transmittal to the agency within six months after all work defined in the work program is complete.
- Share responsibility for T28 budget in line with agreed policies and actions and provide budgetary updates at each Task meeting.
- Facilitate collaboration between T28 participants and co-ordinate outputs.

The responsibilities of the Joint Operating Agents relate to the international cooperation in Task 28. The Operating Agent shall not be liable for the national efforts of the Participants even if the national efforts are in relation to the Task 28.

Participants

In addition to any obligations listed in the IEA wind agreement, Task Participants will adhere to the following obligations and responsibilities:

- Each Participant shall bear its own cost for research work, including travel expenses.
- The host country shall bear the costs of workshops and meetings of experts.
- Each Participant shall submit presentation materials and reports presented at the Task meetings to the Operating Agent for posting on the Task website. The Participants shall be given the opportunity to agree on the format of these materials.
- Each Participant will contribute to editing and reviewing T28 outputs—as determined by the Participants—along with the Task final report.

The planned effort from each participating country is estimated as follows:

Table 4: Planned effort (in hours) for each member country for each year

Country	Start: 01.05.2020	2021-22	2022-23	End: 30.04.2024	Total
Ireland	420	420	420	420	1,680
United States	420	420	420	420	1,680
Germany	120	120	120	120	480
Finland	120	120	120	120	480
Japan	120	120	120	120	480
Denmark	120	120	120	120	480
Switzerland	120	120	120	120	480
Canada	120	120	120	120	480
Norway	Observer	120	120	120	360
Sweden	Observer	120	120	120	360
Netherlands	Observer	120	120	120	360
U.K.	Observer	120	120	120	360
Portugal	120	0	0	0	120
Wind Europe	Observer	Observer	Observer	Observer	Observer
Total	1680	2160	2160	2160	8,160

Participating countries are asked to commit a reasonable amount of hours per month across all four work packages/plans. In addition, members must pay own travel costs to attend at least one in-person meeting each year. Joint Operating Agent (JOA) labour costs are reflected separately in Section 10 – Budget Plan. To complete table, JOA has estimated that each participant country will spend 10hrs / month therefore 120 hours per year. JOA estimates 300 hours per year based on an average of just over 6 hours per week for 48 weeks per year. This excludes extra time spent travelling to and attending meetings, and additional participant countries joining this Task.

Some countries have more people involved in the Task and therefore will most likely expend more than 120 hours in total per year. Also excluded here is time spent by observer participants in 2020. At the time of writing this document (March 2020), the JOA's understand Norway and Sweden have given a commitment to change from observer to full participant status from Jan 2021. The JOA's objective is to achieve full participant status of the U.K. & Netherlands from Jan 2021 (both have had observer status during most of Phase III). It is also hoped Portugal will decide to continue as a full-participant from 2020, it was a full participant for Phase III 2017 & 2018, and reverted to observer status for 2019. Task 28 is delighted to have Wind Europe as an observer, it is proposed they will continue as an observer for all of Phase IV. No fee will be charged to Wind Europe. Our experience to date is that Wind Europe have a great interest in the work of Task 28, have made and will continue to make a valuable and constructive contribution to the work of Task 28. It is envisaged they will in particular contribute to Task 28 being an integral part of Wind Europe Conference Social Science Stream, potentially starting with its autumn 2021 Global Wind Energy Conference.

IX. Types of Funding and Joint Operating Agents

The research Tasks completed and underway during this phase are all Task-shared, where the work is shared among the countries. The Joint Operating Agent acts as the coordinator of the research Task. Each Participant shall bear their own costs for carrying out the agreed on Task work packages, including travel-related expenses for participating in in-person meetings each year. The host country for in-person meetings shall bear the costs of workshops and meetings convened in conjunction with this Task.

The Joint Operating Agent who will invoice and receive task member payments will be Garry Keegan of IPC/CSS, 114 Greenlea Road, Terenure, Dublin 6w, Republic of Ireland. Telephone: 00 353 86 235 8913 gkeegancss@gmail.com, garry.keegan@irishrail.ie, gmk@ipc10.com 50% of income received will then be passed onto Joint Operating Agent Suzanne Tegen, USA.

X. Budget Plan

The total estimated cost of the Joint Operating Agents for coordination, management, and reporting is approximately €396,000 over a projected four-year period. The table below shows the estimated costs for the Joint Operating Agent activities, which include coordination, management, reporting, and travel. The annual contribution per participant country is €8,000 based on at least 9 participants contributing for 2020 and 13 for each subsequent year. Should the Task successfully attract more participating countries, the cost per country for the next period may decrease – although not in direct proportion as the administrative and supportive work also increases with each participating country and extra activities and deliverables may be decided upon due to extra participants.

Please see section 8 for estimated hour contributions. Estimated costs for Joint Operating Agent activities:

Table 5: Budget Plan

Costs

Costs (in €)	Avg. Yearly Budget (€)
Labour (400-600 hours/JOA);	€84,000
Travel, Accommodation, Subsistence;	€10,000
Other costs (reports, website, dissemination activities, administration, printing, finance mgmt.)	€5,000
Total	€99,000

Revenues

Country Revenues	Avg. Invoiced (/yr over 4yrs)
Total (Euro)	€99,000

XI. Management of the Task

The management of Task 28 shall be consistent with other IEA Wind Tasks, with the Joint Operating Agents taking a key role in organizing and coordinating meetings, circulating the agenda, providing meeting notes, and supporting the coordination of Task-specific documents and outputs. The Joint Operating Agents will use the group of Work Package leads to establish an executive advisory group from the task to help advise and plan the work. For frequency of meetings, please see section 5 (Chronogram and Key dates). Each country member will be supported with their own research funds. Data will be transferred between Task 28 members by email. Methods of communication among participants include email, web-based meetings, phone calls, and in-person meetings.

XII. Organisation

Joint Operating Agents: Garry Keegan and Suzanne Tegen. For more information, please see their bios in the appendices B & C.

For Task 28 researcher information, please see section XIV. Each member is financed by their listed institution unless otherwise noted. Task 28 includes several members from some countries, and these researchers make up the Task 28 working group. Occasionally, Task 28 will meet with collaborators who are not members of the task but are social scientists interested in topics covered by Task 28 (e.g., the North American Wind Energy Academy, WindEurope conferences).

XIII. Information and Intellectual Property

Executive Committee's Powers. The publication, distribution, handling, protection and ownership of information and intellectual property arising from activities conducted under this Task, and rules and procedures related thereto shall be determined by the Executive Committee, acting by unanimity, in conformity

with the Agreement.

Right to Publish. Subject only to copyright restrictions, the Task Participants shall have the right to publish all information provided to or arising from this Task except proprietary information.

Proprietary Information. The Joint Operating Agents and the Task Participants shall take all necessary measures in accordance with this paragraph, the laws of their respective countries and international law to protect proprietary information provided to or arising from the Task. For the purposes of this Task, proprietary information shall mean information of a confidential nature, such as trade secrets and know-how (for example computer programs, design procedures and techniques, chemical composition of materials, or manufacturing methods, processes, or treatments) which is appropriately marked, provided such information:

(a) Is not generally known or publicly available from other sources;

(b) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and

(c) Is not already in the possession of the recipient Participant without obligation concerning its confidentiality.

It shall be the responsibility of each Participant supplying proprietary information, and of the Operating Agent for arising proprietary information, to identify the information as such and to ensure that it is appropriately marked.

Use of Confidential Information. If a Participant has access to confidential information which would be useful to the Joint Operating Agents in conducting studies, assessments, analyses, or evaluations, such information may be communicated to the Operating Agents but shall not become part of reports or other documentation, nor be communicated to the other Participants except as may be agreed between the Operating Agent and the Participant which supplies such information.

Acquisition of Information for the Task. Each Participant shall inform the other Participants and the Joint Operating Agents of the existence of information that can be of value for the Task, but which is not freely available, and the Participant shall endeavor to make the information available to the Task under reasonable conditions.

Reports of Work Performed under the Task. Each Participant and the Joint Operating Agents shall provide reports of all work performed under the Task and the results thereof, including studies, assessments, analyses, evaluations and other documentation, but excluding proprietary information, to the other Participants. Reports summarizing the work performed and the results thereof shall be prepared by the Joint Operating Agent and forwarded to the Executive Committee.

Arising Inventions. Inventions made or conceived in the course of or under the Task (arising inventions) shall be identified promptly and reported to the Joint Operating Agents. Information regarding inventions on which patent protection is to be obtained shall not be published or publicly disclosed by the Joint Operating Agents or the Participants until a patent application has been filed in any of the countries of the Participants, provided, however, that this restriction on publication or disclosure shall not extend beyond six months from the date of reporting the invention. It shall be the responsibility of the Joint Operating Agents to appropriately mark Task reports that disclose inventions that have not been appropriately protected by the filing of a patent application.

Licensing of Arising Patents. Each Participant shall have the sole right to license its government and nationals of its country designated by it to use patents and patent applications arising from the Task in its country, and the Participants shall notify the other Participants of the terms of such licenses. Royalties obtained by such licensing shall be the property of the Participant.

Copyright. The Joint Operating Agents may take appropriate measures necessary to protect copyrightable material generated under the Task. Copyrights obtained shall be held for the benefit of the Task Participants, provided however, that the Task Participants may reproduce and distribute such material, but shall not publish it with a view to profit, except as otherwise directed by the Executive Committee, acting by unanimity.

Inventors and Authors. Each Task Participant will, without prejudice to any rights of inventors or authors under its national laws, take necessary steps to provide the co-operation from its inventors and authors required to carry out the provision of this paragraph. Each Task Participant will assume the responsibility to pay awards or compensation required to be paid to its employees according to the law of its country.

XIV Participant Contact Details

Task 28 participation has increased from 5 to 9 participants (Portuguese funding ended in 2019). In addition to existing participants, Sweden and Norway have given commitments to join at the beginning of Year 2, becoming Observers for Year 1. The UK and Netherlands retain their Observer status, both are currently applying for funding to become participant countries.

Table 6: Task 28 Participants

	Country	Lead Participant	Organization	Commitment	Contact Email
1	Ireland	Garry Keegan (JOA) Geraint Ellis, Queen's University Belfast	www.ipc10.com Sustainable Energy Authority of Ireland	Yes Yes	gmk@ipc10.com g.ellis@qub.ac.uk
2	United States	Suzanne Tegen, Center for the New Energy Economy (JOA) Joe Rand, Lawrence Berkeley National Laboratory	Colorado State University 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	Federal Ministry for Economic Affairs and Energy	Yes	gundula.huebner@psych.uni-halle.de
		Jan Hildebrand, IZES gGmbH, Saarbrucken	Federal Ministry for Economic Affairs and Energy	Yes	hildebrand@izes.de
4	Switzerland	Pascal Vuichaurd (through 2020)	Swiss Federal Office of Energy	Yes	Pascal.vuichard@unisg.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
7	Canada	Jamie Baxter	Western University, Canada	Yes	jamie.baxter@uwo.ca
8	Finland	Lasse Peltonen	Akordi	Yes	lasse@akordi.fi

The Member country priority survey (Appendix A) is not included in this document.

Appendix B: Garry Keegan, Joint Operating Agent

Garry M. Keegan, Ph.D., CEO www.ipc10.com

Garry is one of Ireland's leading conflict intervention experts. The majority of his consultancy is in the area community impact and stakeholder engagement for utilities and urban infrastructure development projects. Apart from his environmental mediation and multi-party public policy work, Garry also lectures extensively and conducts training courses internationally.

Garry holds a PhD at the National University of Ireland Galway, an MBS in Marketing from University College Dublin and an MA in Mediation from the National University of Ireland Maynooth.

Garry has been the Operating Agent for Task 28 Phase III 2017-2019.

Appendix C: Suzanne Tegen, Joint Operating Agent

Suzanne Tegen, Ph.D. Assistant Director, Center for the New Energy Economy

Suzanne Tegen is the Assistant Director of the Center for the New Energy Economy with expertise in energy economics and policy, and a Ph.D. in Energy Policy from the University of Colorado. At the Center, she works on clean energy policy, research, and solutions for decision-makers including state legislators, governors, state energy offices, and others. Her current work also includes research on the equitable transition from coal power in rural America. Suzanne came to CNEE from the National Renewable Energy Laboratory (NREL) where she spent 14 years as an energy analyst, researcher, and manager of the Technology, Engineering, and Deployment group for wind and water power. She spent one year at the Department of Energy in Washington D.C., as the NREL liaison to the Wind and Water Power Office.

She has authored or co-authored over 50 reports focused on domestic renewable energy jobs, stakeholder engagement, and the levelized cost of wind energy. She co-wrote a report on clean energy policies for the Clean Energy Ministerial's Clean Energy Solutions Center and received the Ministerial's C3E Mid-career award in 2016. She represents the United States in the International Energy Agency's wind energy social acceptance task and has made countless presentations on responsible renewable energy development across the country. Before graduate school, Tegen worked for the U.S. Antarctic Program at the South Pole and McMurdo stations and for the Center for Resource Solutions in San Francisco.

Beyond her job requirements, she is passionate about mentoring and energy education, diversity, and inclusivity. She is a founding member of Women of Renewable Industries and Sustainable Energy and served on their Executive Committee for 9 years.