WENDY aims at unravelling the factors triggering social acceptance of wind farms through an in-depth analysis at three dimensions: social sciences and humanities, environmental sciences and technological engineering.

D5.2: Co-definition of the WENDY turbines-communities co-existence roadmaps

WP5, T5.1

Task 5.1 partners

Leading partner: WR
Participants: CIRCE, EGP, NOWC, MEC, CBS, Q-PLAN

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Technical Preferences

Project Acronym	WENDY
Project Title	Multicriteria analysis of the technical, environmental and social factors triggering the PIMBY principle for Wind technologies
Project Coordinator	CIRCE FOUNDACION CIRCE CENTRO DE INVESTIGACION DE RECURSOS Y CONSUMOS ENERGETICOS jperis@fcirce.es
Project Duration	Oct. 2022 – Sep. 2025 (36 months)

Deliverable No.	D5.2
Dissemination level*	PU
Work Package	WP5 – Pool of use cases for integrated validation to retain low environmental impact and enhance social engagement
Task	T5.1 – Awareness raising, stakeholder engagement, and social ownership models exploration through outreach activities
Lead beneficiary	2 (WR)
Contributing beneficiary/ies	1 (CIRCE), 4 (EGP), 5 (NOWC), 6 (MEC), 7 (CBS), 9 (Q-PLAN)
Due date of deliverable	30 April 2024
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- Classified R-UE/EU-R – EU RESTRICTED under the Commission Decision No2015/444
- Classified C-UE/EU-C – EU CONFIDENTIAL under the Commission Decision No2015/444
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WENDY project's abstract

WENDY aims at unravelling the factors triggering social acceptance of wind farms through an in-depth analysis at three dimensions: social sciences and humanities, environmental sciences and technological engineering. For that, the project will implement a series of local actions promoting the wider adoption of the project solutions, including guidelines, reports and handbooks which will be created to boost the understanding of wind farms decision making processes and enhance energy citizenship. This will be supported by the spatial multi-criteria WENDY toolbox. A tool able to identify the optimal turbines' siting with the minimum environmental impact and highest social acceptance likelihood. All developed models, methods, guidelines and tools will be implemented within 10 wind projects spread across 4 countries. These have been selected considering: geography (north vs. south Europe), maturity stage (viability phase / planning phase / short-term operation phase / long-term operation phase); type of wind energy (onshore / offshore – floating, fixed-); and co-existence with other activities (agriculture, fisheries, energy communities). In these locations, outreach activities tailored to their specificities will be performed, creating the WENDY Knowledge Hubs which will incorporate citizens, local authorities, business owners and value chain actors of wind energy. WENDY Hubs will serve as a baseline for the WENDY Knowledge Exchange Platform, a forum that will be developed to facilitate the exchange of knowledge between decision makers and key stakeholders within wind farms planning processes. For a successful implementation of the project activities, all the value chain and the best-in-class expertise is involved in the project consortium including 9 partners from 6 European countries: 1 Large Company (EGP), 2 SMEs (WR, Q-PLAN), 1 University (CBS), 2 RTO (CIRCE, NINA), 1 Energy Community (MEC), 2 Non-profit organisations and associations (NOWC, APPA).

List of the WENDY's consortium partners

No	Full name	Short name
1	FUNDACION CIRCE CENTRO DE INVESTIGACION DE RECURSOS Y CONSUMOS ENERGETICOS	CIRCE
2	WHITE RESEARCH SRL	WR
3	STIFTELSEN NORSK INSTITUTT FOR NATURFORSKNING NINA	NINA
4	ENEL GREEN POWER SPA	EGP
5	MARIN ENERGI TESTSENTER AS	NOWC
6	ENERGEIAKI KOINOTITA ANATOLIKIS KRITIS	MEC
7	COPENHAGEN BUSINESS SCHOOL	CBS
8	ASOCIACION DE EMPRESAS DE ENERGIAS RENOVABLES - APPA	APPA
9	Q-PLAN INTERNATIONAL ADVISORS PC	Q-PLAN

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List of abbreviations

Abbreviation	Full name
CA	Consortium Agreement
DoA	Description of Action
EC	European Commission
ESA	European Surveillance Authority
GA	Grant Agreement
GW	Giga Watt
INN	Innovation
KPI	Key Performance Indicator
kW	kilo Watt
n.d.	no date
NECPs	National Energy Climate Plans
O&M	Operation & Maintenance Department
PhD	Doctor of Philosophy
Q&A	Questions & Answers
RES	Renewable Energy Source
WP	Work Package

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Executive summary

This document presents the outcomes of the co-creation workshops and the development of the roadmaps for the coexistence of turbines and communities in the WENDY pilot cases. The main objective of these roadmaps is to outline the key steps and actions that improve social acceptance and community engagement for wind farm projects.

The methodology applied for the D5.2 activities included the organisation of one (1) co-creation workshop in each WENDY pilot case: Spain, Italy, Norway and Greece. In these workshops, a wide range of stakeholders — from local government and energy producers to local communities and environmental associations — were engaged in a structured dialogue to co-define the roadmaps. This approach was designed to ensure that local needs and challenges were included and fully taken into account.

The workshops produced insightful results that are specific to each pilot area. For the Spanish and Italian pilot case, the focus was on strengthening community engagement and addressing environmental concerns through educational initiatives and equitable benefit-sharing mechanisms. For the Norwegian and Greek pilot case, great emphasis was placed on participatory processes from the starting point in the planning of new wind farm projects, to ensure transparency and community involvement. Common themes across all pilot cases included the need for improved communication strategies, more robust stakeholder engagement processes and the integration of digital tools for greater transparency and feedback.

The roadmaps developed propose strategic measures to address the challenges and needs identified under Task 2.4. Some indicative measures are: the introduction of advanced digital platforms for stakeholder engagement, tailored education programs to increase awareness and community support, and structured benefit-sharing mechanisms aligned with local socio-economic goals, to name a few.

To effectively implement these roadmaps, some key recommendations are:

- Continuous monitoring and evaluation of the roadmap implementation to adjust strategies as needed.
- Expansion of digital tools to enhance participatory planning and community feedback.
- Advocacy for policy changes that support streamlined permitting and community-beneficial regulations.
- Ongoing capacity building for local champions and stakeholders to sustain engagement and support.

The roadmaps developed as part of Task 5.1 serve as a blueprint for promoting harmonious coexistence between wind farms and communities with the aim of improving both social acceptance and environmental sustainability.

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1. Introduction

1.1. Background and Context

Based on the description of Task 5.1 "Awareness raising, stakeholder engagement, and social ownership models exploration through outreach activities" of the Grant Agreement (GA), the turbines-communities co-existence roadmaps will be co-defined by holding a co-creation workshop in each pilot area. The main objective of these workshops is to facilitate collaborative sessions where local authorities, turbines developers and citizens work together with the WENDY pilot partners to support the co-definition of the WENDY roadmaps for turbine and community coexistence, taking into account the unique characteristics of each hub.

During the co-creation workshops, the hubs will be guided by the WENDY pilot partners to navigate from their local challenges and needs (Task 2.4) to the co-definition of the WENDY turbines-communities co-existence roadmaps.

The workshops will be organised as follows:

- (1) co-creation workshop in the use case of **Spain** – Responsible partner: **CIRCE-EGP**
- (1) co-creation workshop in the use case of **Italy** - Responsible partner: **EGP**
- (1) co-creation workshop in the use case of **Norway** – Responsible partner: **NOWC**
- (1) co-creation workshop in the use case of **Greece** - Responsible partner: **MEC**

1.2. Objectives of D5.2

The main objective of the Task 5.1 co-creation workshops is to help hubs navigate from their local needs/challenges identified in Task 2.4 to a harmonious turbines-communities co-existence roadmap. In general, a roadmap (Daim et al., 2012) is a strategic plan that defines a goal or desired outcome and includes the key steps or milestones required to achieve that goal. It can serve as a communication tool, a high-level document that helps to clarify the strategic thinking behind the goal and the steps to achieve it.

The co-designed roadmaps will:

- detail the local vision and objectives.
- identify the sequence of steps required for either: (i) enhancing participation in- and improving co-existence settings around turbines or (ii) planning new wind farm projects by employing participatory process from the starting point.
- further explore the role of regional authorities in supporting citizens' involvement and the ongoing innovations and digitalisation of the energy system as means to increase the energy citizenship.

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1.3. Relation to Task 5.1 and WP2 Outcomes

The first part of Task 5.1 aimed to strengthen social engagement and develop ownership models for wind energy projects. This task focused on adapting awareness-raising strategies to the different regional and stakeholder needs, based on the outcomes of Work Package 2 (WP2). WP2 provided a multidimensional analysis from a social science, environmental science and technological perspective and identified factors influencing the social acceptance of wind farms.

Specifically, the initial activities under Task 5.1 were directly informed by the insights gathered in WP2, particularly in relation to barriers to social acceptance, such as public perception, environmental impact concerns and the complexity of stakeholder engagement, to name but a few. The Task 5.1 strategies employed, including local "warm-up" events and the establishment of WENDY knowledge hubs, were designed to address these specific challenges by promoting informed community involvement and showcasing the benefits of wind energy projects.

Some of the key activities carried out under Task 5.1 up to this point were:

- Identifying local champions: Engaging community leaders who are respected and influential in their community to act as promoters for the wind energy projects.
- Organizing warm-up events: Holding two events in each pilot area to introduce the WENDY project and engage with the community, which helped to understand and alleviate local concerns, as highlighted in WP2.

These activities have been designed to capitalise on the findings of WP2 and ensure that the engagement strategies are not only theoretically sound, but also practically applicable and appropriate to the local context and challenges.

The link between the empirical findings of WP2 and the strategic implementations of Task 5.1 has shown a clear and effective way to improve social acceptance and stakeholder engagement in wind farm projects. Future activities under Task 5.1 will build on these foundations and continuously adapt to new findings and stakeholder feedback to optimize the impact of the WENDY project.

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2. Methodology

2.1. Workshop Planning and Design

The co-creation workshops were initially planned for M15 (December 2023) of the WENDY project. To ensure higher participation and facilitate the organization based on local needs, while avoiding the relevant risks associated with the Christmas break, the co-creation workshops were organized between M16 (January 2024) and M19 (April 2024) of the project. The pilot partners who organised the workshops collaborated with task leader (WR) for the analysis of the results and the development of the final roadmaps.

2.1.1. Time duration of the workshop

The duration of the workshops was mainly determined by the format of the workshops and the final agenda, which was set by each hub. Another aspect that influenced the duration of the workshops was the number of participants and their time availability. Taking these aspects into account, as well as the structure of the workshop and the methods used, the WENDY pilot partners (CIRCE, EGP, NOWC, MEC) determined the appropriate duration of the workshops. The maximum duration of a workshop was 3 – 3.5 hours.

2.1.2. Number and type of participants

A total number of about 10 to 15 participants per workshop were expected. The targeted stakeholders for the WENDY project were based on the GA “regional and national key actors of the wind farm value chain”. Such key actors are presented, but are not exclusive, in the following list:

- Representative of inhabitants near wind farms
- Local government/authorities
- National government/authorities
- Representative of wind energy producer
- Representative of Wind Energy Cooperative
- Energy distributors
- Wind Energy providers
- Farmers / fishermen
- Regional policy Makers
- Wind farm installation companies
- Wind farm developers

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Representatives of these stakeholder groups participated in the co-creation workshops. A mix of different stakeholder groups was sought, as this increased the benefit of sharing experiences between participants. In addition, participants were based in the WENDY Knowledge Hubs as this gave them the opportunity to share their knowledge and experience of local needs and challenges.

2.1.3. Format of the workshop

The structure of the workshop comprised three stages and was as follows:

- **1st stage - Introductory session:** A session in which the pilot partners (a) presented the WENDY project and its core concepts and (b) presented the main findings of Task 2.4.

- **2nd stage – Co-definition session:** During this session, participants collaborated to co-define the roadmaps for harmonious turbines-communities coexistence in their pilot area.

- **3rd stage – Concluding session:** This was the last part of the workshop where the facilitators presented its results and informed the participants about specific follow-up activities/actions.

Figure 1: Schematic of the workshop's structure

2.1.4. Supporting material

Before a co-creation workshop, organisers had a package of supporting material. This package included:

- **Training session material:** the methodology training presentation, a list of questions for the main workshop session and the organisational guidelines document.
- An **agenda template** that was adapted by each pilot partner to fit the schedule of the particular workshop.
- A **presentation for the introductory session** that included:
  - Slides about the WENDY project.
  - Presentation of T2.4 outcomes.
- **Tools needed for both online and physical co-creation sessions**, such as material to print out, etc.

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- The **reporting template** that all responsible pilot partners completed at the end of the workshop and sent to WR.

Table 1 provides a comprehensive overview of the material needed for each workshop format, which was shared with partners in the WENDY Teams repository.

Table 1: List of co-creation workshop material

Material	Online workshop	Physical workshop
Training session presentation	X	X
List of guiding questions	X	X
Organisational guidelines	X	X
Agenda template	X	X
Introduction, Task 2.4 findings	X	X
Support plans (for print)		X
Reporting template	X	X

2.2. Roadmap Development Approach

The co-definition session (2nd stage) focused on the active engagement of participants in the co-definition of the roadmaps for the coexistence of WENDY turbines and communities. Building on the outcomes of Task 2.4, this session aimed to use participants' collective expertise and ideas to ensure that the roadmaps detail the local vision and set out the sequence of steps needed to either (i) *increase participation around turbines and improve coexistence*, or (ii) *plan new wind farm projects by using a participatory process from the starting point*. Participation in wind farms (Loukogeorgaki et al., 2022) refers to the involvement of citizens in the development, planning, and decision-making processes of wind farms. In addition, participatory processes in wind farms (Gonyo et al., 2021) refer to the methods and strategies used

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to promote public participation in these processes. Participatory processes are essential for the successful development of wind farms as they promote transparency, trust, and open dialogue between stakeholders.

During the co-creation session, participants had the opportunity to share their thoughts, ideas and suggestions on how regional authorities can support citizen participation and ongoing innovations and digitalisation of the energy system to increase energy citizenship. This interactive and participatory approach ensured that the WENDY roadmaps are tailored and aligned with local needs and challenges to ensure maximum impact and relevance.

The role of regional authorities for wind farms in the EU

The regional authorities for wind farms in the EU are primarily the administrative authorities at national, regional and municipal level. The permitting of wind farms in the EU (*Permitting*, n.d.) is a complex process with several administrative authorities at different levels. In most EU countries, there is still no single point of contact, and the procedures are often lengthy due to the involvement of different authorities at national, regional, and municipal level. As a result, the permitting and regulation of wind farms in the EU is managed by a combination of national, regional, and local authorities.

The European Commission (EC) has also proposed measures to create accelerated renewable energy areas and enforce permitting deadlines to speed up the approval of wind projects. Specifically, Directive (EU) 2018/2001 (Official Journal of the European Union, 2018) was and is a key element in the development of renewable energy in the European Union. The Directive creates the basis for promoting the use of renewable energy and underlines the importance of citizen participation and social acceptance in this sector. It serves as a basic framework to guide Member States in the implementation of renewable energy policies and practices. Based on the desk research of D4.4 (*WENDY 2023, Deliverable No. D4.4*) "Consenting process and community development schemes", to support these efforts, the EU has introduced National Energy Climate Plans (NECPs), which provide a framework for Member States to set their targets, policies and measures for renewable energy. In addition, with Regulation (EU) 2022/2577 (*Regulation - 2022/2577 - EN - EUR-Lex*, n.d.), Europe has committed to simplifying the approval and repowering procedures for renewable energy projects. Therefore, Europe has established guidelines and action procedures to promote renewable energy, including the effectiveness of public participation. As shown in the interview results of WENDY D2.2 (*WENDY Project, 2024*) "Regional and EU framework conditions affecting turbines' social acceptance", public participation in wind energy projects is essential as it allows the interests and views of stakeholders to be adequately taken into account.

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To facilitate the session, organizers presented, guided and coordinated the discussions. They used various techniques and methods to stimulate brainstorming and promote constructive dialogue among participants.

Co-creation methodology approaches

One approach for co-creation included in the methodology training presentation was brainstorming, possibly with fuzzy cognitive mapping. This method is usually carried out in a group and accompanied by a facilitator who guides the process. In this method, the participants focus on a problem area, brainstorm and then create a cognitive map if necessary. This map is essentially a graphical representation of the key factors and their interrelationships, showing where relationships or influences exist between them. The benefits of this approach include increased creativity and organization, as well as a clear visual representation of ideas, which can be particularly beneficial for understanding and communication. However, there are also disadvantages to this method, such as the challenges that arise when trying to organize and manage a large number of ideas, which can become complex and unwieldy.
A second possible approach to co-create is open panel discussions. A moderator leads a discussion in which the participants are actively involved. This method focuses on a group of experts who exchange and discuss ideas on a specific topic in the presence of an audience. The audience is not just a spectator, but is encouraged to participate by asking questions and taking part in a Q&A format. This approach is particularly effective in smaller groups as it allows all voices to be heard. Although the benefits are clear, there are also significant drawbacks, such as logistical difficulties in time management and ensuring equal participation, i.e. a single participant cannot monopolize the dialog. It can also be difficult to ensure that everyone has the opportunity or feels comfortable enough to express their opinion.

Facilitators encouraged active participation and ensured that every voice was heard and valuable insights were gained. In this session, an online board tool was used for the online workshops, while for the on-site format, the support plans were printed and used instead. To guide the discussions, WR had produced a list of guiding questions (Annex 7.5) which is also available on the project repository.
It is important to note that the methodology and format chosen for this session (i.e. Brainstorming vs. Open Panel methods; online vs. offline formats) was determined by the organising partners, taking into account the preferences and logistical considerations of their region. WR provided comprehensive guidelines for physical and online formats to ensure a consistent and inclusive experience for all participants.

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3. Overview of Co-creation Workshops

3.1. Workshop Preparations and Logistics

3.1.1. Pilot case in Spain

In Zaragoza, Spain, four onshore wind farms have been in operation since 2019, focusing on coexistence with agricultural practices and currently in the short-term operational phase. The Primoral wind farm, which was commissioned in 2019, operates 11 turbines generating a capacity of 39.6 MW. Campoliva I and Campoliva II, which were both commissioned in the same year, operate 17 and 15 turbines with a capacity of 36 MW and 39 MW respectively. In addition, the Motilla del Palancar wind farm in Cuenca, which was commissioned in 2020, has 17 turbines with a capacity of 51 MW. The El Campo wind farm, which was also built in Zaragoza in 2019, contributes with 6 turbines and a capacity of 20 MW. These farms face environmental challenges, including impacts on birds, habitat loss and fragmentation, impacts on vegetation and landscape, and a reduction in land available for crop cultivation. To mitigate these issues, the environmental authorities have mandated the installation of bird avoidance, monitoring and deterrence systems at all sites. Furthermore, the technologies developed and validated in these wind farms are promising for replication. They are designed to detect avifauna in real time during the operational phase. They can be used to minimise wildlife mortality in the planning and pre-construction phases, improving wind farm siting and habitat management strategies.

Figure 2: The El Campo wind farm

The co-creation workshop for the co-definition of the roadmap in Spain was held on February 2, 2024, utilizing an online format hosted on Teams. Organized by CIRCE, this workshop employed a methodology that combined a meeting/brainstorming format,

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designed to facilitate an engaging and productive discussion among the participants. The audience comprised 8 individuals, who were introduced to the main objective of the workshop through a presentation of the topics followed by a thorough discussion. This co-definition session was part of a series aiming to create a comprehensive roadmap, integrating insights from these discussions into the broader strategy for Spain's wind energy development.

3.1.2. Pilot case in Italy

In Calabria region, Bagaladi and Maida-San Floro are two onshore wind farms, built prioritising coexistence with agricultural practices. The Bagaladi wind farm, which has been in operation since 2012, is home to 33 turbines that generate 28 MW of power. The Maida and San Florio wind farms, which have been in operation since 2010, together have 32 turbines generating a total output of 64 MW. These sites are in the vicinity of an important migratory route during the spring and autumn migration periods. The land around these farms serves two purposes: Bagaladi site is mountainous agricultural land with natural vegetation, while the land in Maida and San Florio site is a mixture of agriculture and natural environment. Addressing the challenges of this dual use and the impact on migratory birds during key seasons remains a major concern. However, the technologies selected and tested here have the potential for wider application in other onshore wind projects. These technologies can detect avifauna in real time during the operational phase to avoid/minimize the potential fatalities of birds and/or bats in the wind farms and help to evaluate the risks to wildlife during the pre-construction phase. This approach not only improves site selection, but also helps in the planning of habitat management strategies.

Figure 3: The Maida wind farm

The co-creation workshop organised by EGP for the roadmap in the WENDY pilot case in Italy took place on 29th January 2024 via video conference on Teams. With a methodology based on brainstorming and a number of participants of 7 people, the

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workshop aimed to dive deep into the intricacies of the WENDY project, focusing in particular on the results of WP2 that highlight the needs and challenges of the Italian use case. In addition to the common agenda and the slides provided, the content included an overview of the structure of the event, an introduction of the participants and a presentation (in Italian) presenting the project and its results in detail. The co-definition session fostered an open discussion to explore different areas of concern, followed by a selection of ideas that emerged during brainstorming to outline the roadmap.

3.1.3. Pilot case in Norway

In Norway, the planning phase for two commercial large offshore wind energy projects is underway, one where bidding was recently completed (Sørlig Norsjoen, bottom fixed, up to 3000 MW), and the second one (Utsira Nord, floating, 1500 MW) which is currently delayed due to ongoing discussion between the Norwegian government and the European Surveillance Authority (ESA), regarding the level of governmental support as well as the "scoring system" for bids. Both projects have had a focus on prioritising coexistence with fisheries. The third Norwegian site, Hywind Tampen was completed and came into production last year, making it (currently) the largest floating offshore wind farm in the world. It has 11 turbines, each with a capacity of 8 MW and provides electricity to nearby oil and gas installations and is not connected to the mainland.

For the Norwegian pilot case, the 'Social aspects offshore wind - co-creation workshop II' was a digital event organised by NOWC on 3 April 2024. It was held as a panel discussion via a Teams meeting with 13 participants. The local champion and one of the developers gave a verbal update, followed by a panel discussion focussing on coordination and development of a road map moving forward.

3.1.4. Pilot case in Greece

The Minoan Energy Community (MEC), which was founded in 2019 in the small town of Arkalochori in Crete, Greece, has quickly become the largest energy community in the country. In just over 4.5 years, MEC has grown to more than 1000 individual members, alongside ten municipalities and the Regional Authority of Crete, which holds the majority of the capital shares. Currently, MEC manages three photovoltaic parks with a capacity of 405 kW, 1 MW and 1 MW each and is preparing to expand its renewable energy portfolio to include wind energy. There are plans for the development of one commercial wind farm with a total capacity of 12 MW, which currently has been designed and studied and is waiting for a new call for the licensing of new projects from the Regulatory Authority of Energy. Also, the design and the licensing process for a small wind turbines station of 120 kW has been initiated. In addition, there is an ambitious proposal for a large-scale hybrid power plant combining

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a pumped storage system with wind farms, aiming for a total capacity of over 90 MW. Despite the broad local participation and familiarity with social participation in renewable energy projects, the MEC anticipates some opposition to the wind farm initiatives, particularly from organised groups. Allaying these concerns about social acceptance remains a challenge. Looking to the future, the MEC would like to utilise the experience and results of the WENDY tool to potentially extend its model to other Greek islands. The island of Sifnos, which participates in the "Clean Energy for EU Islands" initiative, is a potential site for replication, although concerns about environmental impact and aesthetic degradation remain.

The co-creation workshop for the Greek WENDY pilot case took place on 30 March 2024 in a live setting. Organised by MEC, the workshop used an open panel discussion method to engage the audience, which consisted of 87 participants. The content of the workshop was adapted based on the common agenda and the slides provided. In addition, it included a presentation by MEC on the results of WENDY Task 2.4 and several oral presentations from local stakeholders.

3.1.5. Participant Selection

The following tables provide a detailed list of participants in each of the co-creation workshops led by the WENDY pilot partners. Each table includes two important pieces of information about each participant: 1) the organization represented and 2) the respective stakeholder group, as defined in Section 2.1.2 (on the number and type of participants). The pilot partners endeavoured to select participants from the stakeholder groups relevant to their pilot case in order to co-define the roadmaps.

Table 2: List of participants and stakeholder groups in the Spanish co-creation workshop

List of participants	
Participant's organisation	**Specific stakeholder group**
EGP (O&M)	Wind Farm operator
EGP (INN)	Wind Farm operator
Handwha	Wind Farm developer
Handwha	Wind Farm developer
Handwha	Wind Farm developer
Handwha	Wind Farm developer
ENERGAIA	University Institute
CIRCE	Technological Center

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Table 3: List of participants and stakeholder groups in the Italian co-creation workshop

List of participants	
Participant's organisation	**Specific stakeholder group**
EGP	Renewable energy producer
EGP	Renewable energy producer
EGP	Renewable energy producer
EGP	Renewable energy producer
Enel	Electricity and gas company
Citizen	Representative of inhabitants near wind farms (Local Champion)
University of Pisa	University and National Research Centre
Citizen	Representative of inhabitants near wind farms

Table 4: List of participants and stakeholder groups in the Norwegian co-creation workshop

List of participants	
Participant's organisation	**Specific stakeholder group**
Utsira Offshore Wind Centre	Representative of inhabitants near wind farms (Local champion)
Utsira municipality	Local government/authorities
Norwegian Offshore Wind	Wind Energy cluster organisation (industry representative)
Marine Energy Test Centre	Wind energy producer/ inhabitants/ energy testing facility
Deep Wind Offshore	Wind farm developer
University of Stavanger	Academia
Byanthropologene	Consultant/ local inhabitants
NORCE	Research
University of Agder	Academia
NTNU	Academia

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SINTEF	Research
Fred Olsen Wind	Wind farm developer/ installer

Table 5: List of participants and stakeholder groups in the Greek co-creation workshop

List of participants	
Participant's organisation	**Specific stakeholder group**
Citizen	Other
E-Synergy	Energy Community
Mechanical Engineer / Self employed	Energy Community
Citizen	Other
Rethimno Municipality	Local Government
neamatia.gr	Other
Citizen	Other
Mechanical Engineer	Other
DEYA Minoa Pediadas	Local Government
Hellenic Mediterranean University	Other
DEYA Heraklion	Local Government
Citizen	Energy Community
Citizen	Other
Hellenic Mediterranean University	Other
Hellenic Mediterranean University	Other
E-Synergy	Other
Mechanical Engineer	Energy Community
Lasithi Perfecture / Development Directorate	Local Government
Citizen	Other
Technical Chamber of Eastern Crete	Regional Policy Makers
Psiloritis Geopark	Local Government-Other

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Minoan Energy Community	Energy Community

3.1.6. Materials and Resources

3.1.6.1. Pilot case in Spain

Support materials for the workshop included: 1) the document T5.1 Guidelines for the preparation of co-creation workshops, 2) a template for the co-definition session, 3) a template for reporting on co-creation workshops and 4) a video on participation in WENDY's networks. Promotional activities for the workshop included sending emails and phone calls, running the workshop itself and an email asking for consent to include ideas in the template. Feedback indicated that although participants were interested in the workshop, their busy schedules made it difficult to fully participate.

3.1.6.2. Pilot case in Italy

For the pilot case in Italy, a PowerPoint presentation on the WENDY project and the results of WP2 was provided, as well as a template for a co-definition session with regards to the roadmap development. To promote the event, invitations were sent out by email explaining the purpose of the event and presenting the WENDY project in detail. Feedback showed that only 7 guests were able to attend the event.

3.1.6.3. Pilot case in Norway

Supporting materials for the workshop and related dialogues were comprehensively prepared, including a notification about delays in the concession process, a general introductory presentation of WENDY, and detailed presentations on specific results of the WENDY project and contributions from "IMPACT WIND" by NORCE, as well as a presentation by FME Northwind user case by Fred Olsen, byanthropologene, and SINTEF. Additionally, valuable background information was sourced from previous internal workshops held on the island, although not directly associated with the WENDY project, but deemed highly relevant for the roadmap discussions.

3.1.6.4. Pilot case in Greece

The supporting materials used during the Greek co-creation workshop were carefully curated to enhance the participant experience and included an agenda and a presentation detailing WENDY findings.

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3.2. Execution of Workshops

3.2.1. Engagement Methods

3.2.1.1. Pilot case in Spain

In the pilot case in Spain, the first contacts for inviting participants were made two months before the event, both by telephone and by e-mail. Inviting government representatives proved to be particularly difficult. An email was sent out a week before the event summarising the objectives, explaining the topics to be discussed and asking some preliminary questions.

3.2.1.2. Pilot case in Italy

The organiser of the event invited around 15 people to the event by e-mail, selected based on their own network, and also contacted university scholars with publications on the energy transition and social aspects.

3.2.1.3. Pilot case in Norway

In preparation, a workshop entitled "Digitalt verksted: Brukercase 'Folk om havvind' i FME NorthWind og FME NTRANS", was carried out which was not organised directly by the WENDY project but was instrumental in improving the dialogue with stakeholders. A number of actions were taken, including a joint meeting with academic partners on Teams on 28 February 2024, which formed the basis for in-depth discussions.

Promoting actions were taken to engage academic partners and stakeholders through various forums, including discussions at the ERRA Deepwind meeting in Trondheim, NOWC's annual cluster meeting in Stavanger and a "Science meets Industry" event with the University of Agder focussing on the "WindReg" project. A presentation at the "ImpactWind" project partners meeting in Bergen further facilitated this engagement. Customised direct invitations were then sent out based on the feedback and interactions from these preparatory activities.

The feedback from these initiatives was overwhelmingly positive. Academic partners strongly endorsed the workshop, appreciated the WENDY initiative and emphasised the importance of local actions and outcomes alongside analytical work. However, it was a challenge to involve a wider range of developers, mainly due to the constraints imposed by the ongoing concession process, despite NOWC's efforts through its Developer Forum to include all consortia planning developments on the Norwegian shelf.

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3.2.1.4. Pilot case in Greece

In preparation for the workshop, MEC engaged in several key actions, starting with contacting local stakeholders and keynote speakers to extend invitations for them to present at the event. To promote the workshop effectively, MEC utilized a multifaceted approach that encompassed direct contact with potential attendees through email and telephone, as well as broader publicity through various channels on the internet. The efforts paid off, as the workshop was well received by most of the participants, reflecting positively on the efficacy of the organiser's preparatory and promotional strategies.

3.2.2. Activities and Discussions

The following subsections describe in detail the activities and discussions that took place in the co-creation workshops. These activities and discussions started after the presentation of the organisers about the WENDY project in general and its objectives, followed by a presentation T2.4 of the findings about the local challenges and needs for each pilot case. The co-definition sessions also included some questions at the beginning to understand the local challenges and needs in each pilot case and to help the participants brainstorm for the following co-creation questions of the roadmaps.

3.2.2.1. Pilot case in Spain

The workshop began with the workshop facilitator presenting the WENDY project and its objectives. The focus was placed on engaging discussions. All attendees were familiar with the project, having participated in previous workshops held in June 2023.

The co-definition session adopted a discussion format to delve into local needs, challenges, and set objectives. Key focus areas included:

Debunking Myths

A critical discussion aimed to dispel three prevalent myths associated with wind farms in rural settings:

- The challenge of adapting to change among the elderly population and the perceived intrusion of new industrial activities.
- The misconception that wind energy threatens agriculture and livestock farming, rather than supporting economic growth through benefits like increased irrigation and improved energy access.
- The need for a more inclusive approach to benefit sharing, acknowledging not just landowners but also neighbouring communities affected by the wind farms.

Addressing Opposition

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Strategies to manage dissenting voices, primarily those outright denying the project's merits, were discussed.

Promoting Benefits and Mitigation Measures

The importance of clearly communicating the positive impacts and mitigations efforts of the wind farm project was emphasized. Highlighted actions included improvements to community facilities, such as the football pitch and petanca areas, and the necessity to clarify tax implications to ensure broad understanding and acceptance.

Enhancing Participation and Co-existence

The workshop underscored the need to foster environments of participation and coexistence through measures like educational visits for schoolchildren and virtual tours of the wind farms.

Planning New Wind Farm Projects

Considerations for future projects focused on understanding the socio-economic context of areas, including income levels and unemployment rates. The impacts on non-participating villages and all potentially affected citizens, such as those experiencing indirect effects like noise or visual intrusion, were also highlighted. Informal pre-announcement discussions and the establishment of a "Compensation Board" for equitable benefit distribution were suggested as key strategies.

Regional Authorities and Support for Citizen Participation

The role of clear communication processes and the early involvement of local authorities were emphasized as critical for anticipating and addressing official requirements and community concerns. Collaboration with local stakeholders was identified as essential for effectively mitigating potential risks.

Innovation and Digitalization

Digital strategies proposed included:

- Developing a website for transparent information dissemination on energy production and carbon reduction efforts.
- Implementing a suggestion box to encourage community feedback.
- Utilizing Key Performance Indicators (KPIs) for ongoing project monitoring and problem identification.

Monitoring and Adaptation

Monitoring strategies involved measuring the participation and acceptance rates of community activities and the social integration of wind farm staff in local settings. Updating KPIs was recommended for tracking improvements and making necessary adjustments.

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Workshop Conclusions

The workshop concluded with a summary of discussions and the dissemination of notes, photos, and a video via email, encouraging participants to join the WENDY Network of Interest for ongoing engagement. The potential for future participation was left open, reflecting a commitment to continuous community involvement and feedback.

3.2.2.2. Pilot case in Italy

The co-creation workshop kicked off with a presentation led by a facilitator who introduced the WENDY project and its findings from WP2, utilizing a PowerPoint presentation for clarity. Following this introduction, the facilitator encouraged an open discussion among participants, focusing on identifying local needs and challenges related to the wind farm project.

During the co-definition session, by utilizing a brainstorming method, participants engaged in a deep dive into the local community's challenges and concerns regarding the establishment of a wind farm in their area. Key discussion points included:

Local Needs and Challenges

Concerns about the impact on the landscape and natural ecosystems were raised as significant issues in Italy, alongside worries about noise and traffic impacts during construction, especially in areas with a strong focus on tourism and agribusiness.
The dual role of renewable plant promoters in pursuing both the energy transition and profit generation. At the same time, this dual role was identified as a source of ambiguity which triggered opposition from local authorities and administrators.
The need for transparent communication about compensation measures for economic and environmental benefits was emphasized, noting that agreements with local entities are often not well communicated to citizens.

Local Vision and Objectives

Participants expressed a growing openness to renewable energy sources and the development of new plants, driven by the global energy crisis. There was a strong consensus on the need for clear national strategies for decarbonization and a transition to renewable energy, with wind energy playing a key role, provided it respects the local landscape and returns economic benefits to the community.

Citizen awareness

The discussion highlighted the necessity of raising community awareness about the energy transition and climate change, advocating for participatory processes in

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decision-making, and creating working groups to inform and engage citizens in areas of strong local opposition.

Enhancing Participation and Co-existence Settings

Questions about how to actively involve local residents in wind farm projects and the role of regional/municipal authorities in facilitating this involvement led to actionable insights. Strategies for creating informative and engaging platforms, as well as leveraging planning tools for better project integration within local communities, were discussed. The potential of participatory processes, such as public enquiries, to improve project outcomes and empower stakeholders was also highlighted.

Innovation and Digitalization

The conversation turned to the use of digital technologies and innovation to enhance communication and transparency between stakeholders and the community. Ideas included organizing public meetings with digital tools for visual impact assessments and implementing technological solutions to mitigate environmental impacts, such as systems to prevent collisions with local avifauna.

Planning New Wind Farm Projects

Discussions on planning new projects underscored the importance of conducting thorough community research and engaging the public from the early stages. The development of digital platforms for project information and community consultation was suggested to ensure inclusive participation and feedback.

Monitoring

The role of monitoring progress and outcomes was acknowledged, with suggestions for implementing a digital one-stop shop to facilitate project requests and monitor community engagement, reflecting a commitment to transparency and best practice dissemination.

Workshop Conclusions

The workshop concluded with reflections on successful case studies, such as the ecological transition in Peccioli, a small town in Tuscany, demonstrating the potential for harmonious integration of wind farms into local environments. The need for comprehensive community information on the benefits of wind farms and mitigation measures was emphasized, along with the importance of ongoing communication and engagement throughout the project lifecycle.

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3.2.2.3. Pilot case in Norway

The activities and discussions during the co-creation workshop kicked off with introductions from the participants, providing background on themselves, as well as on past and current projects relevant to the discussion. Following these introductions, a series of presentations were given by various projects, with a Q&A session held after each presentation. The discussion was guided by a predetermined outline, yet was flexible enough to allow for deviations, ensuring the conversation flowed naturally without being overly constrained. The presentations commenced in a planned sequence, featuring Project Windreg by UiA, Project ImpactWind by NORCE/UiS, and FME Northwind's user case on "people and offshore wind" by SINTEF and Byanthropologene, among others. Local representation (through the local champion) and industry developers also provided focussed inputs before the general discussions.

The workshop employed an open panel discussion as its primary method of engagement, chosen due to the careful selection of participants following initial scoping activities in coordination with other projects. This format fostered a dynamic and inclusive dialogue among the attendees.

Avoiding Community "Fatigue"

A significant topic of discussion revolved around preventing "fatigue" within the local community of 150 people amid the high-profile planned development. It was emphasized that assumptions about the community's collective sentiment should be avoided, with a preference for concrete, positive outcomes over mere discussions and "empty promises." The local champion highlighted the ongoing issue of coordination with larger mainland events and the community's efforts to secure representation in relevant forums, a task made challenging by limited resources. This discussion also touched on the broader implications for small coastal communities in Norway, particularly in light of the national goal to achieve 30 GW by 2040.

Concession Process Delays

Another key topic was the recent delay in the concession process and its impact on local residents (and developers). This delay has introduced increased uncertainty and frustration, exacerbated by a lack of transparency in the process. Concerns were raised about the potential implications of the delay on local content requirements and the possibility of international consortia overlooking the local community especially if ESA removes requirements for "local content" due to concerns over European competition.

Research Project Coordination

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The workshop also discussed possible synergies between four active research projects related to offshore wind farms. It is important to harmonise the research needs related to these projects (if possible) in order to reduce the burden on small communities. This can be achieved through coordinated efforts and an open exchange of information.

Local Authority Capacity and Opportunities

Lastly, the capacity of the local authority to leverage this opportunity was debated, particularly in light of the business development director position's contract ending. The discussion explored the need for resources to ensure positive outcomes for the community, the potential role of the WENDY project in offering non-financial support, and the idea of developing a more agile entity to navigate the processes involving local government, developers, and business interests.

Workshop Conclusions

Overall main conclusions from the workshop discussions:

- The islands citizens overall remain positive to the development, but the latest delay in the concession process continues the feeling of uncertainty. Both politicians and senior managers from the industry have “promised” outcomes for the community, which still are a long way off from being realised. They continue to view the development as an opportunity to address the islands population decrease through the provision of on-site jobs and business development.
- There is a growing realisation that the local authority (6 persons in total) simply does not have the capacity to follow up on all of the enquires / initiatives / projects / developers without any extra funding. They have lost their business development director (unusual to have in the first case for a municipality of this size) after 2 years. This needs to be a key part of the roadmap moving forward, how to maximise benefit through some kind of private-public partnership outside of the constrains of the local authority.
- There will be a continued need for the stakeholders, and project partners from the relevant active projects to maintain contact and coordinate efforts.

3.2.2.4. Pilot case in Greece

The event included a presentation of the WENDY project and the research findings and also 10-minute oral positions from representatives of the Technical Chamber of East Crete, Industrial Chamber of Crete, Geotechnical Chamber of Crete, the Region of Crete. Each of them addressed and informed their unique perspective regarding the state of Wind energy developments and RES projects in general and their significance and importance to the development of Crete economy, environment and culture.

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Understanding Local Needs and Concerns

The discussion kicked off with an exploration of the local community's apprehensions about wind turbines in Crete. Concerns ranged from environmental impacts, such as harm to wildlife and the landscape, to social and economic inequities, highlighting fears that the benefits of renewable projects were not fairly distributed. Additional worries included the adequacy of the local grid, potential loss of local control, negative effects on the economy and lifestyle, and perceived inadequacies in the legal and regulatory frameworks. Despite these challenges, the community recognized the potential for wind turbines to contribute positively to local development, energy independence, and environmental sustainability. The conversation underscored a desire for a transition that is equitable, respects the local culture and environment, and actively involves the community in decision-making processes.

Defining Local Vision and Objectives

The local vision for energy and sustainability in Crete emphasizes a balanced approach to adopting renewable energy while safeguarding local interests. Wind turbines are seen as a means to achieve energy independence, stimulate economic development, and reduce carbon footprints, provided they align with community-driven objectives. These objectives focus on equitable resource distribution, promoting energy democracy, supporting local energy communities, overcoming infrastructural limits, and preserving the environment and cultural heritage.

Steps for Progress

Identifying actionable steps, both short and long-term, was pivotal. Short-term actions included conducting environmental assessments, fostering community engagement, and auditing the equitable distribution of benefits. Long-term strategies aimed at developing local energy plans, strengthening legal frameworks, investing in infrastructure upgrades, and ensuring local participation in renewable projects. Prioritizing these actions involves regulatory updates, stakeholder engagement, pilot projects, and comprehensive energy planning.

Stakeholder Engagement and Participation

Enhancing participation calls for educational initiatives, participatory workshops, and transparent decision-making processes. Successful examples from other regions, like Sifnos and Tilos, illustrate the benefits of community engagement and investment opportunities.

Planning and Support

Early community engagement, transparent information sharing, and consideration of environmental and social impacts are essential in planning new wind farm projects.

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Regional authorities play a crucial role in facilitating public involvement and adapting policies to promote energy citizenship.

Leveraging Innovation

Innovation and digital technologies could improve stakeholder communication and project transparency. Engaging the community in digitalization efforts and innovative solutions can enhance environmental co-existence and foster a sense of ownership.

Monitoring and Adaptation

Effective monitoring and adaptive strategies are vital for assessing progress and responding to new challenges. Establishing measurable goals, regular stakeholder involvement, and a flexible approach to roadmap adjustments can ensure the initiative remains aligned with community needs and sustainability objectives.

Workshop Conclusions

The workshop concluded with a call for action, urging for immediate steps to prioritize renewable energy projects led by energy communities and local governments. It proposed specific policy recommendations, including the prioritization of energy communities in licensing, financial incentives, and the acceleration of permitting processes for renewable energy projects led by community and societal actors.
A lot of participants strongly believed that the outcomes should be communicated to the public through school visit, community educational sessions.

3.3. Post-Workshop Analysis

As soon as the co-creation workshops were completed, a critical phase began with the post-workshop analysis. This phase is important to gain meaningful insights from the discussions, activities and feedback gathered during the workshops. It comprises two main processes: 1) Data collection Methods and 2) Data Analysis and Synthesis. Both play a crucial role in understanding the outcomes of the workshops and how they can be used to develop the roadmaps.

3.3.1. Data Collection Methods

Data collection in the post-workshop phase was methodically planned to capture a wide range of inputs and interactions that took place during the co-creation workshops. Workshop facilitators compiled their observations, including detailed notes on discussions, participant engagement and immediate feedback received. If digital platforms or interactive tools were used during the workshops, data was collected from these platforms (e.g. poll results, shared documents, brainstorming

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outputs). The combination of these methods ensures a rich and diverse collection of data ready for in-depth analysis to gain actionable insights.

3.3.2. Data Analysis and Synthesis

The process of data analysis and synthesis transforms the collected data from the co-creation workshops into coherent, actionable insights. This phase involved several steps. First, the data was categorised based on the co-creation template. This categorisation enabled a targeted analysis. Next, the qualitative data was analysed to identify common themes, differences and patterns. The results of the qualitative analyses were synthesised to obtain a coherent understanding of the workshop outcomes. In this synthesis, the various findings were brought together to highlight key findings, areas of consensus, divergent views and suggested actions. The final step was to turn the summarised findings into actionable recommendations for the roadmaps. These recommendations are directly linked to the objectives of the workshops and the broader goals of the WENDY project and provide a clear direction on how to address the identified needs, challenges and opportunities.

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4. Development of Co-designed Roadmaps

4.1. Overview of the roadmap development process

In the following subsections, the roadmaps derived from the co-creation workshops are described in detail for each pilot case. In particular, the co-defined roadmaps describe the local vision and objectives and set out the sequence of steps to:

i. increase participation around the turbines and improve coexistence, or
ii. plan new wind farm projects in a participatory process from the starting point.

For the WENDY pilot cases in Spain and Italy, the main steps of their roadmap revolved around improving citizen participation and the harmonious coexistence of wind turbines, as these pilot cases are already in the operational phase. The roadmaps for the Norwegian and Greek pilot cases, on the other hand, focused on the planning of wind farm projects, as these pilot cases are still in the planning phase.
In addition, the key steps of each roadmap and their corresponding actions were categorised according to the pilot case. In particular, the key steps and measures for the Spanish and Italian WENDY pilot cases have been categorised into 1) short, 2) medium and 3) long term, as these pilot cases are in the operational phase.
On the other hand, the key steps of the roadmaps for the Norwegian and Greek WENDY pilot projects were divided into 1) before the planning phase, 2) during the planning phase and 3) in the initiation phase of the project, as these cases are currently still in the planning phase.
In all roadmaps, the pilot partners have considered how regional authorities can support citizen participation and how the ongoing innovation and digitalization of the energy system can be used as a means to empower energy citizenship in their pilot case.

4.1.1. Roadmap for Pilot Case in Spain

The development of a roadmap for the pilot case in Spain, based on the information gathered in the co-creation workshop, includes a series of strategic steps aimed at moving from local needs/challenges to a harmonious coexistence of turbines and communities. In particular, this roadmap outlines a holistic approach for the wind farm pilot case in Spain to achieve harmonious coexistence with the local community. The focus is on education, transparency, equitable benefit-sharing and the use of digital tools for engagement and monitoring. Each step aims to address specific issues, promote understanding and foster collaboration between the community, regional authorities and project developers. By following these steps, the Spanish pilot case aims to build a sustainable, mutually beneficial relationship between wind energy developers and rural communities.

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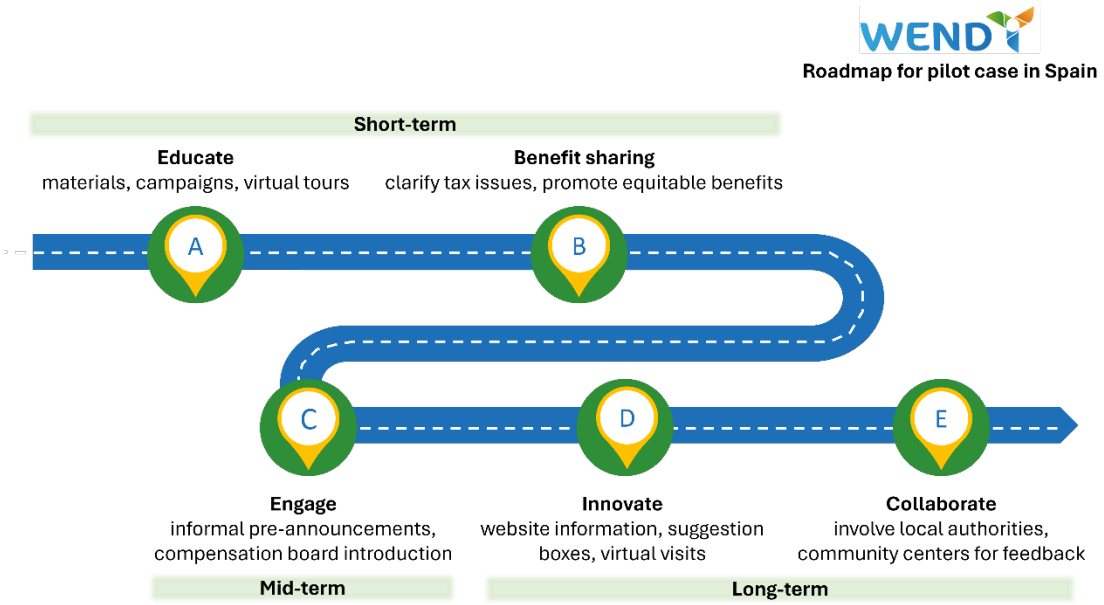

Figure 4: Roadmap figure for the WENDY pilot case in Spain.

In the short term, the focus in Spain will be on education and ensuring fair distribution of benefits from wind farms. One way to promote wind farms is by encouraging school visits and offering virtual tours inside the turbines. Additionally, brochures and other materials can be produced to promote wind farms in nearby towns. Another important measure is to explain to citizens how wind farms contribute to the community through taxes paid and to work towards an equitable distribution of the benefits.
In the mid-term, compensations measured will be studied, while in the long-term, innovative technologies will be applied, and local authorities and community centres will participate in feedback actions.

Debunking Myths and Misunderstandings

Objective: Eliminate common misconceptions about wind farms in rural areas, focusing on adaptation to change, coexistence with agriculture and livestock and equitable benefit sharing.

Actions:

- Launch awareness-raising campaigns to communicate facts about wind energy and show how it complements traditional agriculture and benefits the community.
- Introduce transparent benefit-sharing mechanisms to ensure that not only the landowners but also the communities affected by the presence of the wind farm receive fair compensation.
- Training sessions and dissemination of wind energy in schools. Thus, creating future generations familiar with and followers of wind energy.

Managing Opposition and Promoting Benefits

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Objective: Tackle opposition from dissenting groups and highlight the positive impacts of wind farms on local communities.

Actions:

- Publicize mitigation measures implemented to minimize the wind farms' adverse effects.
- Utilize local improvements (e.g., football pitch enhancements) as examples of the project's benefits.
- Clarify tax implications and promote active participation and coexistence through initiatives like school visits and virtual tours of the wind farm.
- Early identification of opposition groups and development of a mitigation plan prior to project development

Enhancing Regional Authority Involvement

Objective: Strengthen the role of regional authorities in supporting citizen participation and ensuring project transparency.

Actions:

- Foster clear communication channels between project developers, local authorities, and the community from the project's outset.
- Work closely with local stakeholders to identify and mitigate potential risks and hazards.
- Clear rules to follow for the local government.

Leveraging Innovation and Digitalization

Objective: Utilize digital tools to improve information dissemination, transparency, and community engagement.

Actions:

- Develop a website to provide clear, accessible information about the wind farm's energy production and environmental benefits.
- Introduce a suggestion box for community feedback and use Key Performance Indicators (KPIs) to monitor and address issues promptly.
- Preparation of citizens using virtual reality to familiarize them with the wind farm prior to construction

Monitoring and Adapting Community Engagement

Objective: Establish indicators to monitor community engagement and acceptance, adjusting strategies based on feedback and outcomes.

Actions:

- Monitor participation rates in community activities and the local treatment of wind farm staff as indicators of community acceptance.

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- Regularly review and adjust KPIs to reflect progress and identify areas for improvement.

Besides of these measures, the performance of the local authorities is also important. The local authorities are responsible for facilitating the issuance of final construction permits and collecting taxes. When a wind farm is established in a municipality, a large majority in favour is needed within the consortium of the city council. The authorities are also responsible for guiding citizens and disseminating information. The information they provide must be positive and unbiased. Additionally, they should be transparent about the income they receive from the wind farm and the investments they make to ensure that all citizens perceive the benefits of a wind farm.
New technologies have revolutionized how citizens communicate with projects. Digitalization and innovation enable citizens to understand the projects before their construction. The virtual visualization provides feedback from the citizens improving the acceptance of a project during the development phase. Moreover, intelligent methods of bird protection can be implemented by monitoring their flights or detecting them in wind farm areas. Besides, new technologies make it easier for citizens to participate in projects, thus fostering a sense of ownership and belonging.

4.1.2. Roadmap for Pilot Case in Italy

Creating a roadmap for the harmonious coexistence of turbines and communities following the outcomes of the co-creation workshop in Italy requires a careful approach that progressively takes into account the various aspects of the Italian WENDY pilot case. In the following subsections, the reader will find key action points for a specific intervention area that can support the Italian pilot case to address its local needs and challenges and achieve its local vision and objectives. However, this roadmap should be seen as a living document that can be adapted to new insights, feedback from the community and evolving project needs. It is important to maintain open communication, review progress regularly and be prepared to adjust strategies to ensure the project aligns with community values and achieves its sustainability goals.

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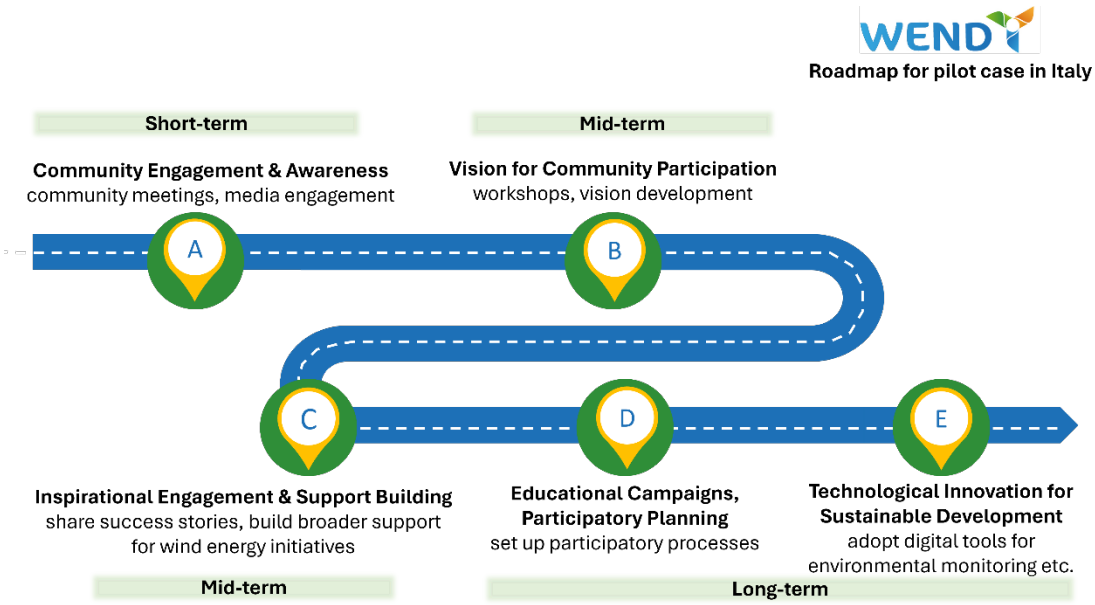

Figure 5: Roadmap figure for the WENDY pilot case in Italy.

Understanding Local Needs and Challenges

Objective: Identify and address the main concerns of the local population regarding the impact of the wind farm.

Actions:

- Conduct community meetings to openly discuss concerns about the landscape, impacts on the natural ecosystem, noise, traffic during construction and economic interests vs. energy transition.
- Use the media and public debates to raise awareness of climate change and the need for the energy transition.

Defining Local Vision and Objectives

Objective: Develop a clear, long-term vision for energy and sustainability in the local community highlighting how wind turbines can contribute.

Actions:

- Organise workshops to gather community input on a vision for renewable energy use, emphasising decarbonisation and the role of renewables.
- Promote understanding of the economic benefits of wind energy projects for the community.

Identifying Sequence of Steps

Objective: Outline concrete steps to overcome challenges and achieve the vision and objectives of the community.

Actions:

- Sensitise the community to the requirements of the energy transition through education and media engagement.

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- Establish participatory processes for environmental impact assessments and project discussions and ensure broad community participation.
- Set up working groups to share information on energy, circular economy and the benefits of wind energy, creatively dealing with local opposition.

Innovation and Digitalization

Objective: Utilize digital technologies and innovative solutions to improve communication, transparency, and environmental co-existence.

Actions:

- Host public meetings using digital tools for landscape visual impact evaluations.
- Introduce technological innovations like HD camera systems for bird detection to mitigate environmental impacts.

Enhancing Participation and Co-existence Settings

Objective: Encourage active community participation in wind farm projects and secure the support of regional/municipal authorities.

Actions:

- Develop digital platforms for community engagement, offering information, Q&A with experts, and project updates.
- Regularly update the community on project progress, incorporating feedback into ongoing development.
- Share inspirational stories of wind farm co-existence development to illustrate potential benefits and transformative power of wind energy and environmental projects.

4.1.3. Roadmap for Pilot Case in Norway

To create the Norwegian pilot roadmap for harmonious coexistence between turbine communities and their environment based on the results of the co-creation workshop, a structured approach was followed to take into account the main comments and discussions from the workshop.

Since the community of Utsira is very small, it is understandable that residents can easily feel overwhelmed by planned development. At a regional level, development is often concentrated where most people live, namely on the mainland. At the national level it was previously clear that the needs of the Utsira had been largely overlooked during the early planning phases (they were not involved). Collectively this means that Utsira must continuously work to be heard, and to attempt to influence processes and hopefully outcomes. From the perspective of the WENDY project, the roadmap needs to ensure that attention is maintained on the local community so that they can benefit appropriately. As mentioned previously there is a real possibility that concession changes required by the EU will result in a fatigue situation for the local community.

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This was the case in the recent auction for Sørlig Norsjoen II, where changes required by the EU reduced focus on sustainability and inclusion of so-called local content. The local community at Utsira is not able to influence this process, but must instead remain positive and continue to engage with potential developers and other stakeholders for local benefit.

Regional authorities must understand the importance to include Utsira island when developing their own large-scale plans for associated business development such as ports, land- based infrastructure, operations and maintenance, and safety preparedness etc. Funding is also required in order for the community to capitalise on the potential for innovation including digitalisation. In many ways the roadmap for Utsira can become the roadmap for other small coastal communities in Norway which will face similar issues for new developments in the coming years, in order to meet the ambitious governmental target of 30 GW installed by 2040.

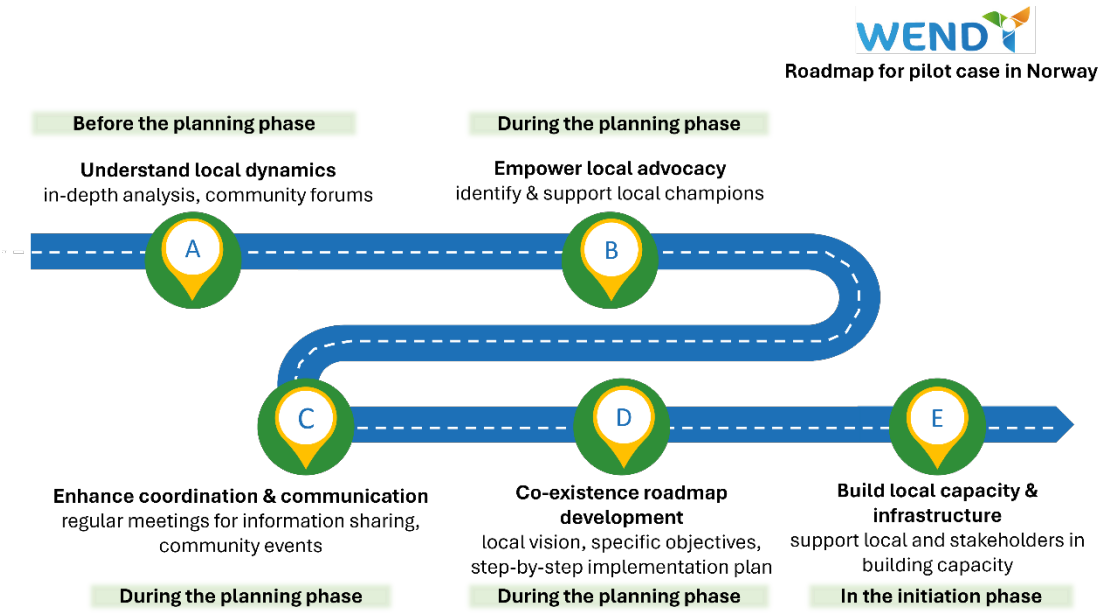

Figure 6: Roadmap figure for the WENDY pilot case in Norway.

Understanding Local Dynamics

Objective: To comprehensively understand and document the specific needs, challenges, and aspirations of the local community regarding wind farm projects.

Actions:

- Conduct an in-depth analysis to gather detailed insights into local perceptions and concerns.
- Organize community forums and surveys to capture a broad spectrum of local opinions.

Empowering Local Advocacy

Objective: To enhance the role and effectiveness of local champions in advocating for the community's interests in wind farm developments.

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Actions:

- Identify and support local champions through training and resources.
- Create platforms for these champions to present community views to stakeholders.

Enhancing Coordination and Communication

Objective: To improve the coordination among different stakeholders involved in wind farm projects and related research activities.

Actions:

- Establish regular inter-project meetings for information exchange and alignment.
- Plan integrated community events that ensure substantive local involvement beyond logistical roles.

Navigating Legal and Policy Frameworks

Objective: To mitigate uncertainties and advocate for favourable policies related to wind farm development, particularly around concession processes and local content rules.

Actions:

- Facilitate ongoing dialogues between the community, developers, and authorities.
- Prepare strategic responses to potential regulatory changes affecting local content and sustainability practices.

Building Local Capacity and Infrastructure

Objective: To strengthen the local community's ability to benefit from and influence wind farm projects.

Actions:

- Assist local authorities in capacity-building efforts for maximizing benefits from wind farms.
- Explore the formation of a company to facilitate effective collaboration among local government, developers, and businesses.

Promoting Innovation and Sustainability

Objective: To ensure that wind farm projects incorporate innovative approaches and sustainability practices that align with local and national goals.

Actions:

- Leverage digital technologies to increase community engagement and participation.
- Advocate for the incorporation of sustainable (including social) development principles in project planning and execution.

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Implementing Participatory Planning

Objective: To employ participatory processes in the planning and development of new wind farm projects, ensuring they reflect the community's perspectives and needs.

Actions:

- Utilize open panel discussions and other participatory methods as standard practice in project planning.
- Focus on converting dialogue into concrete actions and outcomes that address community needs.

Further specialization of the measures outlined in this roadmap

Objective: To outline a clear vision, objectives, and a sequence of steps for achieving harmonious coexistence between wind farms and the local community.

Actions:

- Articulate a local vision and set specific objectives for wind farm contributions to the community.
- Define a step-by-step plan for implementing projects, incorporating community feedback and participatory planning processes.

Continuous Monitoring and Adaptation

Objective: To establish a system for ongoing evaluation and adaptation of the roadmap, ensuring it remains responsive to community needs and project outcomes.

Actions:

- Set up feedback mechanisms for continuous community input and project assessment.
- Regularly review and adjust the roadmap based on feedback and evaluations of project impacts.

4.1.4. Roadmap for Pilot Case in Greece

The creation of a roadmap for the Greek WENDY pilot case based on the information gathered in the co-creation workshop involves summarising the key findings, challenges, objectives and actions in a structured plan. This roadmap will support the pilot partners in facilitating the transition towards a harmonious coexistence of turbines and communities in Crete and ensuring an equitable, participatory and sustainable development of wind farm projects. The roadmap is divided into several phases, each with specific steps, actions and considerations to address the identified local needs and challenges.

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Regional authorities are instrumental in enhancing citizen involvement in energy innovations and digitalization, critical for advancing energy citizenship. By mediating between citizens and energy projects, regional authorities facilitate educational sessions and consultations, thereby integrating public insights into energy planning and execution. This engagement ensures that developments align with local preferences and requirements. Additionally, authorities support Energy Communities, empowering residents through legal, technical, and financial resources, thus democratizing energy production and ensuring equitable benefits distribution. Moreover, leveraging digital tools could potentially enhance transparency, is to use platforms that monitor energy projects. This could increase visibility and enhance and foster public trust. These strategies not only tackle local and regional challenges but also contribute to enhancing broader sustainability and succeeding energy independence goals, illustrating the pivotal role of regional authorities in fostering a participatory approach to energy system transformation.

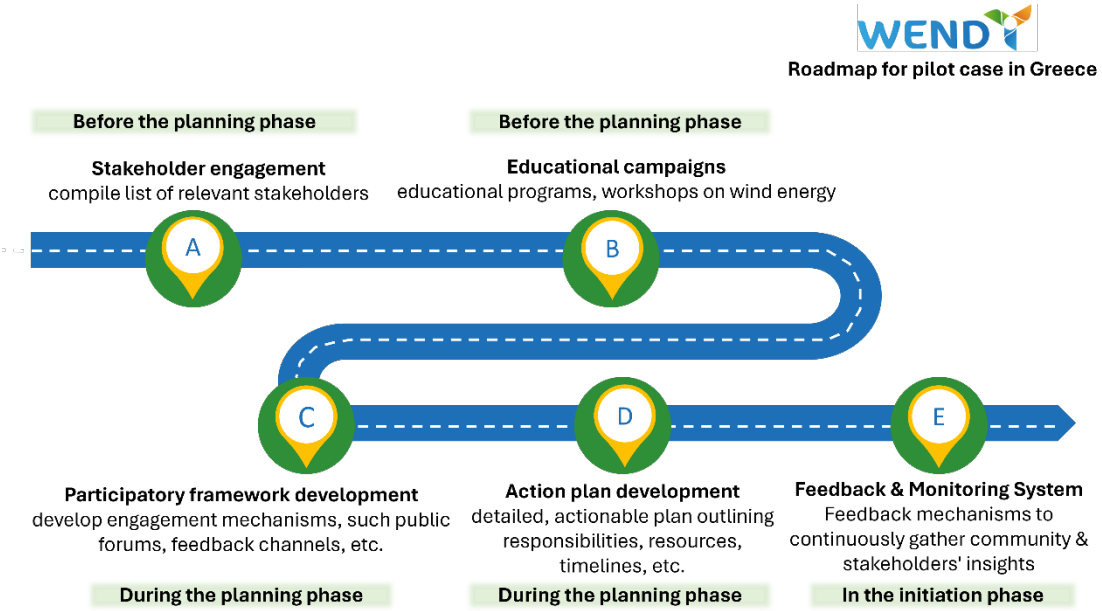

Figure 7: Roadmap figure for the WENDY pilot case in Greece.

Stakeholder Engagement

Objective: To ensure inclusive and comprehensive involvement of all relevant stakeholders in the co-creation process.

Actions:

- Compile a list of stakeholders including local communities, government bodies, private sector, and civil society.
- Establish clear, accessible communication channels for stakeholder dialogue and collaboration.

Educational Campaigns

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Objective: To increase awareness and understanding of wind energy benefits and challenges among stakeholders.

Actions:

- Launch educational programs and workshops on wind energy, sustainability, and participatory decision-making.
- Organize site visits to existing wind farms to demonstrate best practices and discuss potential impacts.

Participatory Framework Development

Objective: To create a structured and transparent framework for ongoing community engagement in wind energy planning.

Actions:

- Develop engagement mechanisms such as public forums, workshops, and feedback channels.
- Implement community surveys and other tools to gather continuous input and feedback.

Community Visioning Workshops

Objective: To articulate a shared vision for sustainable energy and environmental protection within the community.

Actions:

- Conduct workshops to discuss and define the community's long-term sustainability and energy goals.
- Agree on specific, measurable objectives for the integration of wind turbines into the local energy system.

Action Identification and Prioritization

Objective: To identify key actions needed to address challenges and achieve objectives, prioritizing these actions based on impact and feasibility.

Actions:

- List short-term and long-term actions, focusing on areas such as regulatory updates, community engagement, and environmental assessments.
- Prioritize actions, starting with regulatory and policy adjustments, followed by stakeholder engagement and pilot project initiation.

Action Plan Development

Objective: To develop a detailed, actionable plan that outlines responsibilities, timelines, and resources for each prioritized action.

Actions:

- Specify timelines and assign responsibilities for implementing each action.

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- Ensure the plan includes mechanisms for investment, decision-making transparency, and community benefits.

Pilot Project Implementation

Objective: To launch and manage pilot projects to test strategies, engage the community, and refine project approaches.

Actions:

- Initiate community-involved pilot projects to model broad implementation and refine engagement strategies.
- Monitor pilot projects for community engagement levels, environmental impacts, and alignment with objectives.

Feedback and Monitoring System

Objective: To implement a system for ongoing evaluation and feedback to adapt strategies and ensure the project remains aligned with community needs.

Actions:

- Establish feedback mechanisms to continuously gather community and stakeholder insights.
- Regularly review and adjust the strategy based on feedback and monitoring outcomes.

Outcome Evaluation

Objective: To conduct comprehensive evaluations to assess progress towards objectives and the impact of wind energy projects.

Actions:

- Evaluate the outcomes of pilot projects and overall initiatives against established benchmarks.
- Share results transparently with all stakeholders to maintain trust and accountability.

Roadmap Adaptation

Objective: To refine and adjust the roadmap based on evaluation outcomes and stakeholder feedback to ensure continued alignment with community aspirations.

Actions:

- Use evaluation findings to adapt and refine objectives and strategies.
- Ensure the adaptation process is inclusive, with active stakeholder involvement in decision-making.

This roadmap provides a structured approach to move from local challenges to a harmonious coexistence of wind turbines and communities in Crete, emphasising

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participatory processes, equitable development and sustainability goals. Continuous engagement, adaptation and collaboration between all stakeholders are key to achieving the community's vision and goals for renewable energy and sustainability.

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5. Conclusions and Next Steps

The co-creation workshops conducted as part of D5.2 have successfully demonstrated the effectiveness of co-definition sessions in developing roadmaps for the coexistence of turbines and communities. These roadmaps, co-created by stakeholders in the four different WENDY pilot cases in Spain, Italy, Norway and Greece, provide a strategic plan for improving the social acceptance of wind farms. Each roadmap is tailored to the specific challenges and needs in each region and reflects a deep understanding of the nuanced dynamics at play.

In particular, the roadmaps outline clear, actionable steps to promote community engagement, transparency and equitable distribution of the benefits of wind energy projects. Above all, these roadmaps emphasise the importance of ongoing dialogue, education and the inclusion of local challenges and needs in the planning and implementation process. This approach will lead to greater alignment between wind energy projects and community expectations, thereby increasing social acceptance.

The following steps are recommended for the future in order to build on the successes achieved and overcome the ongoing challenges:

- **Monitoring and evaluation:** establish robust feedback mechanisms, such as public forums, to continually evaluate the effectiveness of implemented strategies and make necessary adjustments. This will ensure that roadmaps continue to be aligned with evolving community needs and project objectives.
- **Expand digital tools:** Utilize digital technologies to improve communication, streamline participation, and increase transparency of wind energy projects. This includes developing online platforms that enable real-time feedback and participation.
- **Scaling and replication:** exploring opportunities to replicate (as for example in Task 6.4 “Identification of future areas for deployment - Replication Handbook” of WENDY) the successful strategies identified in the pilot cases in other regions, adapting them to local conditions. This includes disseminating lessons learned and best practices through the WENDY Knowledge Exchange Platform.
- **Policy advocacy:** Working with policy makers to incorporate the findings from the co-creation workshops into regional and national energy policy. These findings can also be used in Task 6.3 “Guidelines to enhance wind energy citizenship and policy recommendations for a turbines- communities harmonious co-existence”. This will help to streamline approval procedures and support frameworks that promote the development of renewable energy at the municipal level.
- **Capacity building:** Continue to build capacity among local champions and stakeholders to maintain engagement and support for current and future wind

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energy projects. This can also be linked to the webinars that will be developed as part of the activities of task 5.1 of WENDY.

With these steps, the WENDY project aims not only to improve the coexistence of wind turbines and communities, but also to promote a model for renewable energy development that is sustainable, inclusive and accepted by all stakeholders involved.

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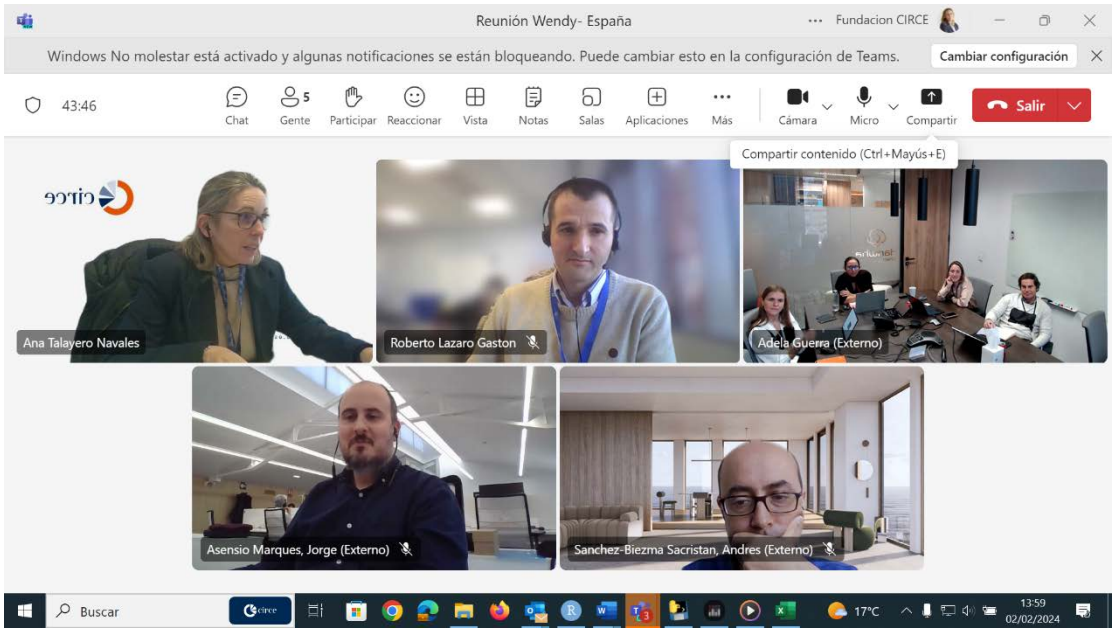
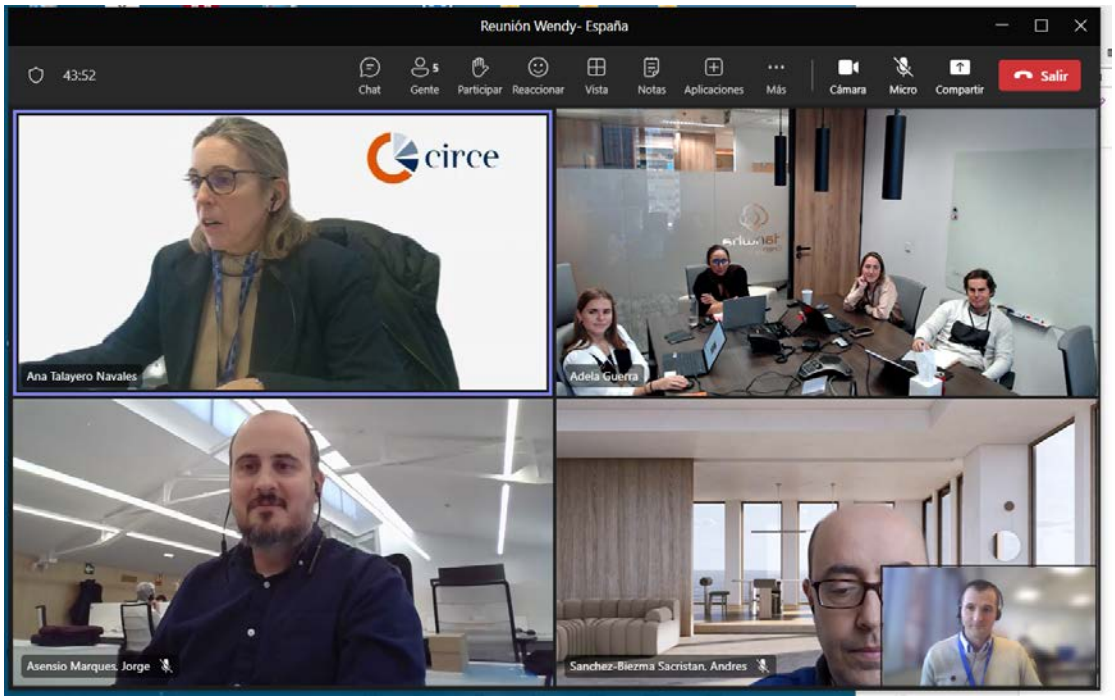
7. Appendix

7.1. Screenshots from the online Spanish co-creation workshop





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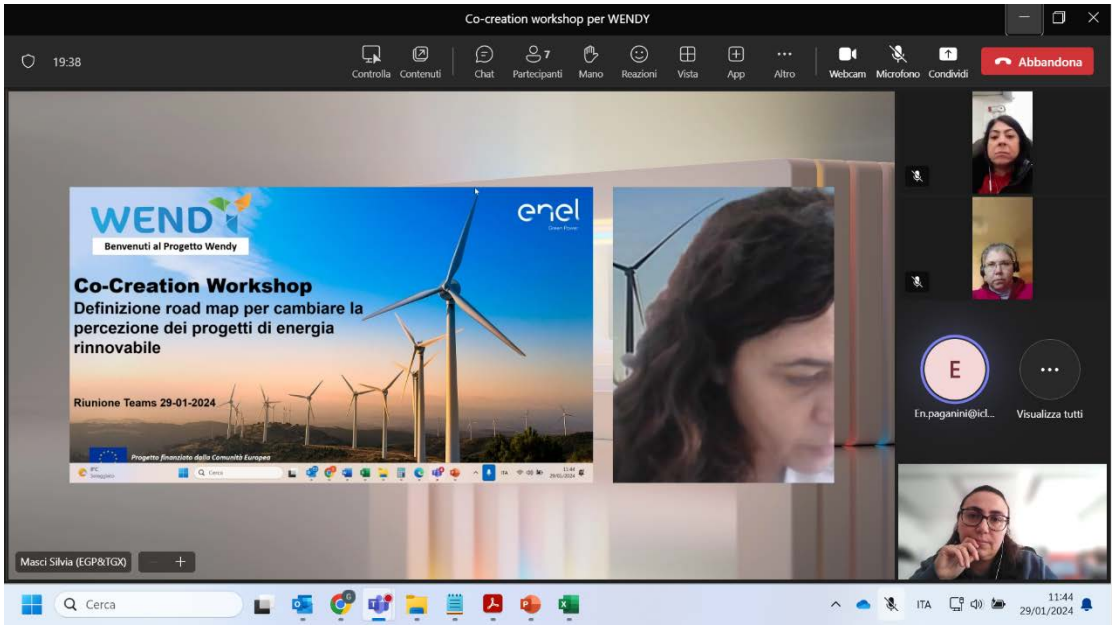
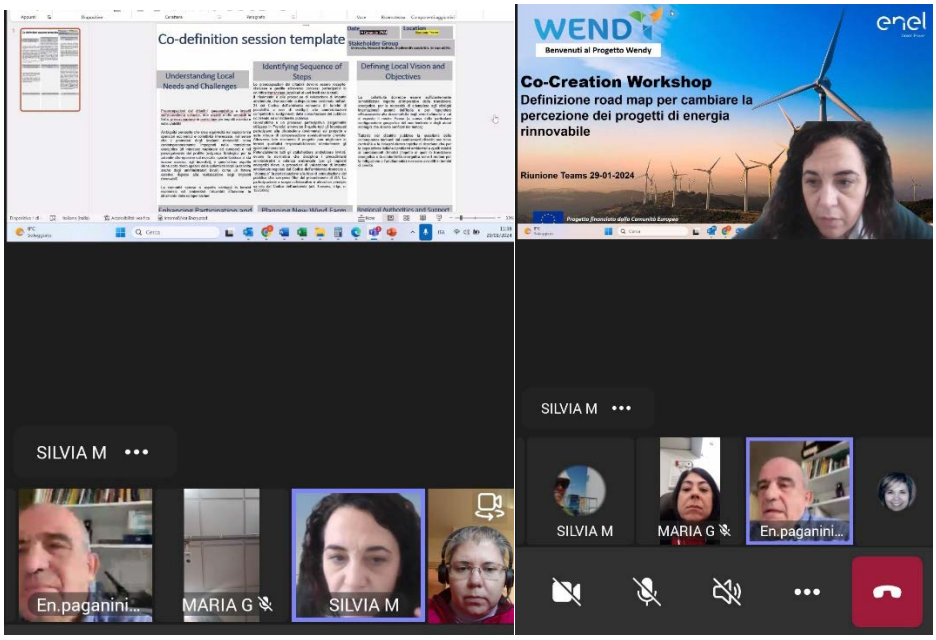
7.2. Screenshots from the online Italian co-creation workshop





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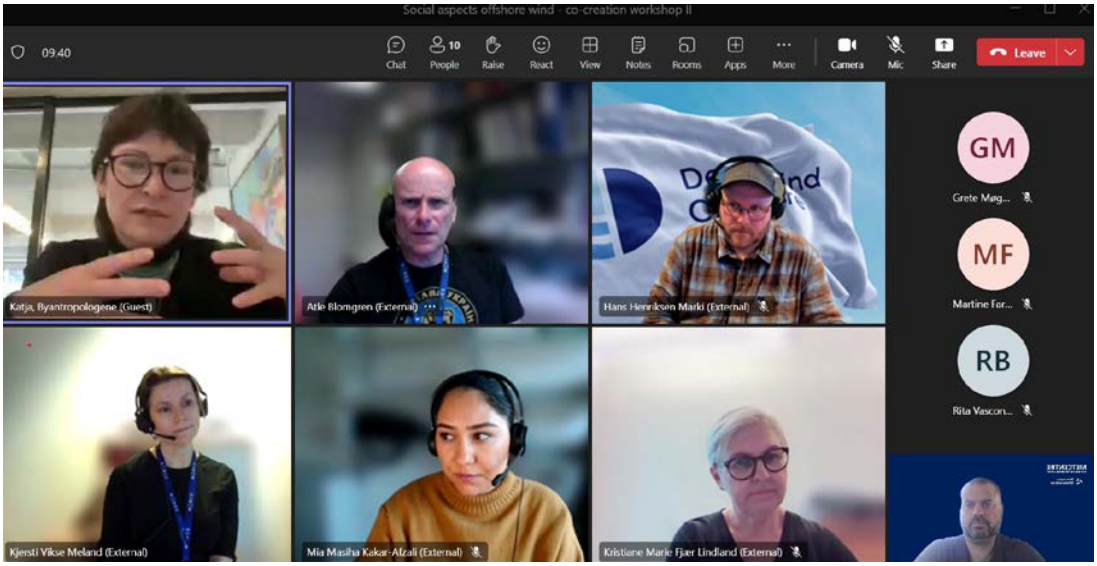
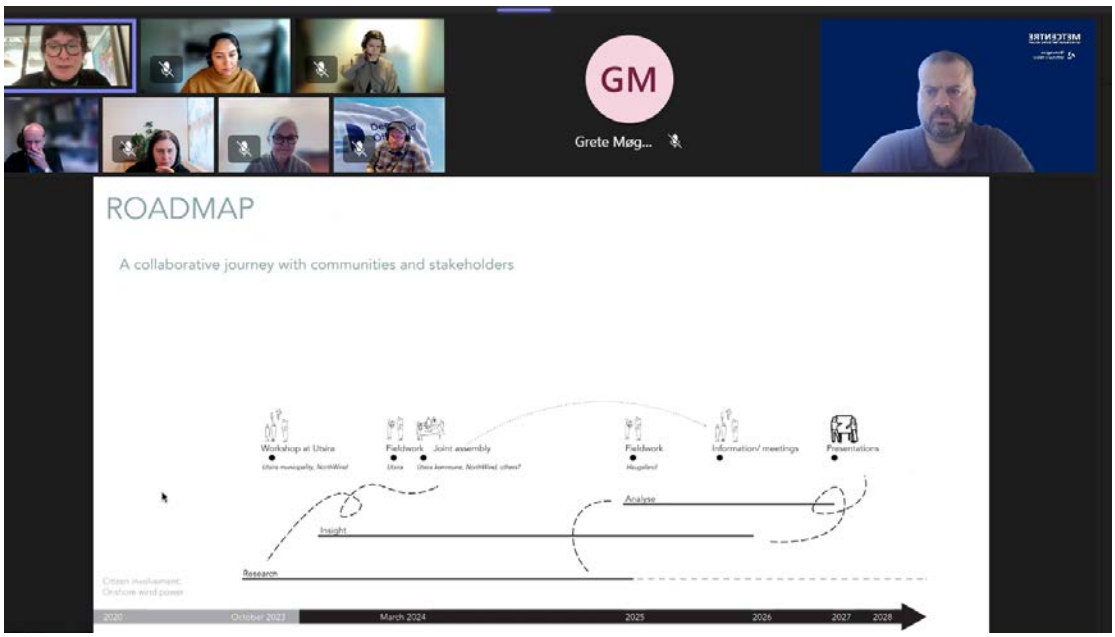
7.3. Screenshots from the online Norwegian co-creation workshop





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7.4. Photos from the physical Greek co-creation workshop

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7.5. List of guiding questions for the co-creation workshops

Below are some guiding questions that the partners responsible for organising the co-creation workshops used to guide participants in co-designing a roadmap for the harmonious co-existence of wind turbines, divided into 8 key steps:

Step 1: Understanding Local Needs and Challenges

1. What are the specific challenges and concerns that the local community has regarding wind turbines in their area?
2. How do these challenges align with the broader energy and sustainability goals of the community?
3. Are there any potential benefits the community envisions in co-existing with wind turbines?

Step 2: Defining Local Vision and Objectives

4. What is the long-term vision for the local community in terms of energy and sustainability?
5. How can wind turbines contribute to achieving this vision?
6. What are the specific objectives the community wants to accomplish through co-existence with wind turbines?

Step 3: Identifying Sequence of Steps

7. What are the short-term and long-term actions that need to be taken to address the identified challenges and achieve the objectives mentioned previously?
8. How can we prioritize these actions to create a roadmap?
9. Who are the stakeholders and organizations that need to be involved in these steps, and what are their roles?

Step 4: Enhancing Participation and Co-existence Settings

10. How can local residents be actively involved in the co-creation process to ensure their perspectives are heard and valued?
11. What mechanisms can be put in place to enhance community engagement in wind farm projects?
12. Are there examples from other regions where participation and co-existence have been successful?

Step 5: Planning New Wind Farm Projects

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13. If planning new wind farm projects, how can the participatory process be initiated from the beginning?
14. What should be the criteria for selecting suitable locations for new wind farms to maximize community support?
15. How can the community have a say in the design and development of new wind farm projects?

Step 6: Regional Authorities and Support for Citizen Involvement

16. What role can regional authorities play in supporting and facilitating citizen involvement in energy decisions?
17. How can regional policies and regulations be adapted to promote energy citizenship and co-existence?
18. Are there best practices from other regions where regional authorities have successfully supported citizen engagement?

Step 7: Innovation and Digitalization

19. How can digital technologies and innovation be leveraged to improve communication and transparency between wind energy stakeholders and the community?
20. What innovative solutions can enhance the co-existence of wind turbines and the local environment?
21. How can the community be involved in the ongoing innovations and digitalization of the energy system?

Step 8: Monitoring and Adaptation

22. How will progress and outcomes be monitored and evaluated over time?
23. What mechanisms will be in place to adapt the co-existence roadmap as needed to address changing circumstances or new challenges?

These guiding questions helped structuring a co-creation workshop that facilitated meaningful dialogue and collaboration between local communities, regional authorities, and energy stakeholders to develop a harmonious co-existence roadmap for wind turbines in each pilot area.

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7.6. Co-creation workshop reporting template

General information of the workshop

Table 6: General information about the co-creation workshop

Workshop details	Description
Title	*XXX*
Date	*XXX*
Format	*XXX*
Venue (if online)	*XXX*
Methodology	*XXX*
Organiser	*XXX*
Audience (number of participants)	*XXX*
Content (besides what was presented as part of the common agenda and slides provided)	*Briefly describe the content presented to the participants (max 300 characters): if the presentation was translated in your regional language it should be included as an annex to the email, but we ask you here to summarize the main points addressed.*
Keynote speaker	*If a keynote speaker was present, briefly describe what was presented. If not, leave this cell empty.*

Table 7: Support staff and roles during the co-creation workshop

No.	Moderator's name and organisation	Moderator's role (e.g. facilitator, tech support, note taker etc.)
1	*XXX*	XXX
2	XXX	XXX
3	XXX	XXX

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Participants

Table 8: List of participants and stakeholder groups

List of participants	
Name and/or organisation	**Specific stakeholder group**

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Preparatory actions, supporting material, implementation remarks

Please briefly describe the preparatory actions that you followed for organising and promoting the workshop (e.g., co-organising with other entities).

Please provide a list of the supporting material used during the workshop implementation.

Please also provide a list of the promoting actions.

Preparatory actions:

List of supporting material:

1)

2)

3)

List of promoting actions:

1)

2)

3)

Feedback:

-
-

Detailed Remarks from the Workshop's Sessions

Introductory Session

Please provide a description of the process followed and the main remarks from your event's introductory activities (e.g. Project overview presentation, Open discussion, notes kept from opinions expressed). If extra topics were presented, compared to the general presentation shared by WR, please provide the name of the presenter, as well as the goal and theme of the presentation. If there were any other deviations or

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enhancements to the common agenda, please mention it briefly here or in the relevant section.

Main remarks from your event's introductory activities *(1-2 paragraphs)*

Co-definition Session: Techniques, Questions and Answers

Here, a report on the results of the main co-creation session follows: including the questions posed and a description of the given answers per theme. Please provide details with regard to the method implemented during your workshop (e.g., Brainstorming vs Open panel). Please also note if the participants were split in different groups that worked in parallel. If your brainstorming approach was not included in the Workshops' Guidelines, please describe the following process in detail.

e.g. Method used: Open panel *Main Remarks that have been discussed - Topic of discussion:*
…….
…….
…….
Main Remarks that have been discussed - Topic of discussion:
…….
…….
…….
Main Remarks that have been discussed - Topic of discussion:
…….
…….
…….
Main Remarks that have been discussed – Topic of discussion:
…….

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…….
…….

Closing Session

Please provide a brief description and main remarks of the workshop's closing session.

Your paragraphs should give answers to the following questions:

- Did participants provide any final remarks on the conclusions of the main sessions?
- Did participants provide any overall suggestions about the workshop?
- Were participants informed of future activities? If so, did they seem to be willing to participate in WENDY's future activities?

Main remarks from your event's closing activities *(1-2 paragraphs)*

Material and multimedia produced during the activities

Please, attach any digital or printed supporting material that was used before or during the workshop. Please also include pictures of your event (e.g. whiteboard with ideas, participants brainstorming, photos of the posters/screenshot of the material produced online, etc.). They should include the participants (Note: only those who gave us their consent; otherwise, the material needs to be 'anonymised').

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7.7. Exploitation potential of D5.2 results and findings

The results and findings from D5.2 of the WENDY project, which focused on co-creating roadmaps for the coexistence of turbines and communities, hold significant potential for exploitation in different sectors related to wind energy development. This section outlines the exploitation potential, the protection of intellectual property, possible exploitation routes and how the partners intend to use the knowledge gained.

Analysis		
1	Exploitation Potential	D5.2 has significant exploitation potential within the wind energy sector and beyond. The co-created roadmaps for turbines-communities co-existence provide a versatile framework that can be adapted to various geographical and cultural contexts, promoting social acceptance and sustainable integration of wind farms. Key stakeholders who can benefit include: **Wind Energy Developers** - Utilize engagement strategies to enhance project acceptance. **Local Governments** - Implement community-inclusive planning policies. **Community Groups** - Leverage findings to negotiate better outcomes from wind energy projects. **Environmental Organizations** - Promote and ensure environmentally responsible practices in new projects.
2	**IP protection**	The intellectual property developed through D5.2 activities, primarily in the form of methodologies and engagement strategies, should be protected through appropriate measures. This includes the use of non-disclosure agreements during collaborations and potentially filing for copyrights on unique processes or models developed. These steps will secure the integrity and exclusivity of the innovative approaches used in the project.
3	**Potential exploitation pathways**	Several pathways exist for the exploitation of the D5.2 results: **Educational workshops and seminars** - To train stakeholders on applying the roadmaps in their projects. **Integration into policy recommendations** - For government bodies looking to improve regulations and support for community-engaged wind projects. **Publication in industry journals** - To disseminate findings and establish thought leadership. **Adaptation for other renewable energy projects** - Such as solar or biomass, where community engagement is critical.
4	**Partners' plans**	Partners within the WENDY consortium plan to incorporate the findings from D5.2 into their ongoing and future projects. This includes: i) enhancing their community engagement strategies based on the roadmaps, ii) using the roadmaps as case studies in educational programs and consultancy services, iii) seeking additional funding to extend the research and apply the roadmaps in diverse settings.
5	**Other**	There is also potential for these findings to influence sectors beyond renewable energy. For example, large infrastructure projects that require extensive community engagement could benefit from the methodologies developed. Additionally, the results could serve as a model for international development projects where community involvement is crucial for sustainability. Further collaborations could be explored with academic institutions for continuous improvement and validation of the co-creation methods.

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