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Wind energy in the natural and social environment

Research and Innovation action (RIA)

WIMBY

Wind in My Backyard: Using holistic modelling tools to advance social awareness and engagement on large wind power installations in the EU

Grant Agreement No. 101083460

Starting date: 1st January 2023 – Duration: 36 months

Deliverable D6.5

Plan for results exploitation

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SHORT ABSTRACT FOR DISSEMINATION PURPOSES

Abstract This document outlines the strategy for the exploitation of WIMBY's results. It presents the strategy towards optimising the project's influence and commercial viability. It unveils a roadmap enlisting key elements, incorporating strategic activities and a methodical approach to formulate a comprehensive exploitation plan, aligning with both the project and partners' requisites. The document outlines the main aspects that will be taken into consideration for exploitation. Regular updates will be made according to the project's advancements and the evolving needs of Consortium members.

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LIST OF PARTNERS

No	Logo	Name	Short Name	Country
1		**VRIJE UNIVERSITEIT BRUSSEL (PROJECT COORDINATOR)**	VUB	Belgium
2		DANMARKS TEKNISKE UNIVERSITET	DTU	Denmark
3		INTERNATIONALES INSTITUT FÜR ANGEWANDTE SYSTEMANALYSE	IIASA	Austria
4		UNIVERSITÄT FÜR BODENKULTUR WIEN	BOKU	Austria
5		UNIVERSITETET I OSLO	UiO	Norway
6		NAZKA MAPPS BVBA	NAZKA	Belgium
7		KELSO INSTITUTE EUROPE GEMEINNÜTZIGE GMBH	KIE	Germany
8		DEEP BLUE SRL	DEEP BLUE	Italy
9		UNIVERSITEIT UTRECHT	UU	Netherlands
10		POLITECNICO DI TORINO	POLITO	Italy
11		UNIVERSITÀ DEGLI STUDI DI PALERMO	UNIPA	Italy
12		APREN-ASSOCIAÇÃO PORTUGUESA DE ENERGIAS RENOVAVEIS	APREN	Portugal
13		MULTICONSULT NORGE AS	MCN	Norway
14		EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZÜRICH	ETH Zürich	Switzerland
15		PAUL SCHERRER INSTITUT	PSI	Switzerland
16		UNIVERSITY COLLEGE LONDON	UCL	United Kingdom

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ABBREVIATIONS

Acronym	Description
CC BY-NC 4.0	Creative commons license
CLCA	Consequential life cycle assessment
EOL	End of life
EU	European Union
GPL	General Public License
HRB	Horizon Results Booster
HRP	Horizon Results Platform
IPR	Intellectual property rights
KER	Key Exploitable Results
kWh	Kilowatt per hour
LCA	Life cycle assessment
MIT	Permissive free software license originated by Massachusetts Institute of Technology
MPL	Multi Pilot License
NCP	National Contact Points
NEWA	New European Wind Atlas
NGO	Non-governmental organisation
PESTEL analysis	Political, Economic, Societal, Technological, Environmental, Legal analysis
SOA	State of the art
SUMP	Sustainable Urban Mobility Plan
SWOT	Strengths, Weaknesses, Opportunities, Threats analysis
TRL	Technology Readiness Level
UI	User interface

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EXECUTIVE SUMMARY

D6.5 – The Plan for results exploitation delineates and elaborates on the exploitable assets within the WIMBY project, outlining a strategy for exploitation that complements communication and dissemination activities. Specifically, this document provides a more detailed description of the Key Exploitable Results (KERs) of the WIMBY project, sourced from the project's results outlined in the Grant Agreement and from the respective KER owners. At this project stage, the deliverable provides a preliminary framework for potential future utilization.

Within this document, the most pertinent end-users and their level of interest and influence on future uptake and impact are outlined. Comprehensive insights derived from the PESTEL drivers and barriers, and SWOT analyses conducted on the various Key Exploitable Results (KERs) are presented. This strategic approach aims to navigate the intricate landscape of project outcomes, ensuring an impactful exploitation plan aligned with the project and partners' requirements.

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1. PROJECT RESULTS AND POSITIONING

In WIMBY we follow a five-stage approach to determine an exploitation strategy. In this initial phase, partners commenced by delineating the project's Key Exploitable Results (KERs) and then proceeded to identify the KERs specific to each partner. Subsequently, an analysis of key stakeholders and target end-user groups to effectively channel our project outcomes for optimal exploitation was conducted. Following a comprehensive assessment of our resources and the project's ecosystem, the consortium delved into PESTEL and SWOT analyses to uncover barriers, drivers, strengths, weaknesses, external opportunities, and challenges. These insights served as the foundation for formulating a three-phase exploitation strategy to be executed over the project's three-year duration.

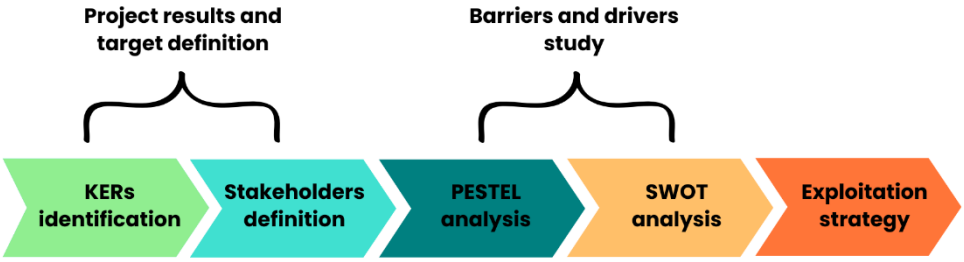

Figure 1 - Exploitation flow chart

1.1 Key Exploitable Results (KERs)

Key Exploitable Results (KER) in a project are those tangible and intangible outputs with significant potential for exploitation. Identifying and highlighting KER exploitation potential as soon as their preliminary versions are available is crucial as it directs the focus toward impacts. This plan serves as a roadmap, guiding efforts, and resources to maximize the project's impact potential at all levels. By specifying KERs, the WIMBY framework ensures a targeted approach, allowing stakeholders to recognise and uptake relevant achievements. This emphasis on key results enhances the project's visibility, societal impact, and successful integration into wider contexts.

The main project KERs which hold exploitation potential for the project are listed in Table 1. Each KER can be leveraged for various purposes, such as commercialisation, dissemination, or further research.

Table 1 - Project KERs

Id	KER type	KER name	KER description

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KER1	Framework	Environmental impact assessment	Evaluation of the impacts on biodiversity (terrestrial and marine fauna), estimation of wind resources availability and their consequences on land and sea use.
KER2	Framework	Societal impact assessment	Evaluation of how wind farms affect the local communities and addressing issues concerning governance, regulation, health, safety, and landscape impacts.
KER3	Framework	Wind power potential deployment assessment	Identification of the best areas for wind power farms deployment, while assessing through validated models how wind turbines impact on the local environment and identify methods to foster social acceptance.
KER4	Methods	Validation of wind installation modelling tools	Validation of modelling tools and development of guidelines to deliver clear overviews of the cumulative impacts of wind installations and facilitate the identification of future areas of deployment (local, regional, national, and European level).
KER5	Tool	Web-GIS interactive forum	Web-GIS interactive forum where stakeholders and local communities can exchange information, ideas, and inputs to contribute to the planning of new wind turbines and wind parks.
KER6	Tool	Immersive 3D environment development	An immersive 3D environment that allows stakeholders to visualise and better understand

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			the impacts and the trade-offs of wind energy development in their communities, to promote social awareness and early citizens' engagement.
KER7	Framework	Wind farm methodological framework development and validation	Wind farm planning framework including guidelines for participatory processes based on the interaction across end-users exchanged on the Web-GIS forum, which will be directly accounted for in decision making.

Table 2 below presents the Consortium KERs, a specific output within a project with significant exploitation potential for one or more individual partners involved in its development. It signifies a result or achievement that a partner can leverage for commercial, societal, or strategic gains. Identifying partner KERs is crucial in the context of collaboration, as it allows each partner to recognise and harness the unique value they bring to the project.

Table 2 - Consortium KERs

Id	KER type	KER name	KER description
KER8	Framework	WIMBY map code	Code of WIMBY application of the online interactive map. On the map, most of the project results are provided as actionable content. The map allows high-level planning of wind parks by taking into consideration constraints and local wind conditions. It also presents multiple impacts (positive and negative) of the wind park to population and environment. This is one of the key results of the project.

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KER9	Prototype	WIMBY map prototype	Final mock-ups of the WIMBY map
KER10	Framework	Updates to Nazka Mapframe	Code of Nazka Mapframe that is part of the WIMBY application
KER11	Software	WINDISCH v2.0	A Python package that allows to conduct a prospective life cycle assessment for any wind turbine at a given location.
KER12	Scientific publication (peer-reviewed, incl. datasets)	Correlation material/rated power	Correlation models derived from literature to identify the relationship between materials used per component and the turbines rated power
KER13	Methodology	Consequential life cycle assessment	Consequential life cycle assessment of EU energy system built on high penetration of wind turbines
KER14	Methodology	EOL scenarios for wind turbines	Outlining potential scenarios for future End-of-Life treatment of wind turbines
KER15	Dataset	Landscape quality	A developed methodology to estimate the scenicness of the landscape using related parameters, such as naturalness, human impact, remoteness, ruggedness, and more. In addition, the resulting dataset (raster data) will inform on landscape scenicness for selected sites in Europe.
KER16	Dataset	Habitat suitability data	A dataset which shows habitats suitable for specific species in the pilot region Styria, Austria.

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KER17	Scientific publication (non-refereed)	Multi-taxa habitat models for specific species in the pilot region Styria, Austria	A report that describes the background and method for why and how the habitat suitability data were generated.
KER18	Scientific publication (refereed)	Multi-taxa habitat suitability and connectivity maps for specific species in the pilot region Styria, Austria	A scientific publication that describes the background and method for why and how the habitat suitability data were generated.
KER19	Software/ Model	Augmented highRES-Europe	An updated and further developed version of the highRES-Europe model.
KER20	Scientific publication (referred)	Potential environmental impacts of offshore wind farm development at the Island of Pantelleria	Environmental impact assessments regarding marine environmental impact of offshore wind farms and regarding ecological niche models of target species in Pantelleria case study.
KER21	Methodology	Wind farms safety and health risk assessment methodology	Safety and health risk assessment methodology related to wind farms development.
KER22	Methodology	Social Acceptance Framework	Social Acceptance Framework and methodologies related to wind energy and renewable energy in general.
KER23	Framework	General Forum code and user interface	General Forum code and user interface linked to the interactive map.

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KER24	Methodology	Communication and dissemination skills	Tailored communication and dissemination skills to be used in further energy research projects and consultancy services.
KER25	Dataset	Energy demand projections	Long term energy trajectories with JRC-EU-TIMES model under Net-zero scenarios
KER26	Scientific publication (peer-reviewed)	Net-zero scenario with various degrees of wind	Understanding of the impact of more wind energy on the rest of the energy system under Net-zero scenarios.
KER27	Dataset	Collision risk maps	Maps showing collision risk for European birds and bats.
KER28	Public report (not peer-reviewed)	Collision risk maps report	A report that describes the background and methods for the obtention of the collision risk maps.
KER29	Scientific publication (peer-reviewed)	European birds and bats collision risk maps	Collision risk maps results for European birds and bats.
KER30	Dataset	Regulation on wind turbine siting in 10 EU MS (up to NUTS2)	1) distance to residential buildings 2) distance to motorways 3) distance to coast 4) distance to shoreline 5) buffer around airports 6) buffer to transmission lines 7) buffer to railways 8) buffer to military areas
KER31	Policy report	Policy review of wind energy regulation in AT, IT, PT and NO	Detailed policy review divided into the following chapters: 1) regulatory framework for wind power (AT, IT, PT + NO) 2) governance models in the wind energy industry

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			3) financing resources in the wind energy industry
KER32	Dataset	Analysing misperceptions in the wind energy sector spread on Twitter (X) and news	A data set containing tweets, headlines, and full-text news regarding wind energy in Germany, Austria, Ireland, Italy, France, Norway, Denmark, and Switzerland from 2010 to 2022 with the goal of conducting different text analyses.
KER33	Scientific publication (peer-reviewed)	Planning highly renewable net-zero electricity systems for Europe: the trade-offs between social, environmental and energy systems	A study focusing on the planning of future European electricity systems that account for, and trade-off, the social and environmental impacts of wind power.
KER34	Software	Shadow flicker calculator	Software package (.conda) containing system-level libraries and other components needed to calculate shadow flicker of individual wind turbines and parks for worst case and realistic cases.
KER35	Scientific publication (Refereed)	Shadow flicker model description	Shadow flicker model description and methodology.
KER36	Taxonomy	Taxonomy of wind power impacts	Taxonomy of the types of impacts from wind power coming from surveys
KER37	Software	WIMBY - Job creation model	Software package (.conda) to estimate job creation of individual wind parks.

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KER38	Scientific publication (Refereed)	Job creation review and model	Job-creation model description, methodology and review.
KER39	Framework/ software	3D Environment toolset and interactive planning tool	A codebase (published on git) to process comprehensive geodata to generate a geopackage for immersive visualisations at the case study level to support collaborative wind park planning processes. Recommendations and methods for geodata enhancement and processing to utilize large-scale geodata for realistic 3D models. Contributions to new digital approaches for game-based planning and collaboration.
KER40	Software	Region-specific wind power plant LCOE model	Software package (.conda) to estimate a region-specific LCOE model.
KER41	Dataset and Scientific publication (Refereed)	Updates to New European Wind Atlas model	Data set containing up to date (including extra years 2019-2023) wind resource estimates and time series for all Europe. The data set will also include a new improved microscale downscaling including new geo datasets and the effects of atmospheric stability.
KER42	Software	Updates to TOPFARM	New models (e.g. shadow flicker model and LCOE model) integrated into the public distribution of TOPFARM.
KER43	Scientific publication	Interactive modelling	Understanding the stakeholder insights obtained

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(peer-reviewed)	results in pilot site	from the interactive modelling in the pilot site Rogaland.

1.2 Main actors in the field

Table 3 lists the closest existing related or competing actors/tools in the field that have been identified for the various KERs, as well as what sets them apart from what is envisioned in the WIMBY project. KERs for which a competitor does not exist or has not been identified yet have been left out of this table.

Table 3 - Closest competitors in the field and differences with them

Id	KER name	Closest competing/ related actors	Differentiator
KER 8	WIMBY map code	• Code of New European Wind Atlas	• Integrated wind farm simulation tool • Impacts and exclusion zones
KER 9	WIMBY map prototype	• Low fidelity prototype of WIMBY map	• Interactive high-fidelity prototype
KER 10	Updates to Nazka Mapframe	• Mapping libraries like Mapbox, Leaflet, Maptiler, Maplibre • Open Layers	• Framework around the map • Embed version
KER 11	WINDISCH v2.0	• Prospective life cycle assessment • Open-source method to calculate life cycle inventories for any wind turbine at a given location • Sister projects: JustWind4All (UAB), WENDY	Extension of Wind_LCA_DK (a well-known tool for evaluation of climate change impact of the Danish wind fleet) to a European level/conversion into a prospective life cycle assessment tool for wind turbines

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		• Other research on LCA of wind turbines	
KER 12	Correlation material/ rated power	• Correlation based on published life cycle inventories of life cycle assessment studies about wind turbines • Universitat Autònoma de Barcelona • Other researchers interested in the material composition of wind turbines	Especially the correlations can be helpful for (LCA) scientists interested in the material composition of wind turbines.
KER 13	Consequential life cycle assessment	• Researcher interested in national evaluation of energy systems • Consequential life cycle assessment of an EU energy system with high wind penetration • Aalborg University, Department of Sustainability and Planning	No such evaluation has been done before on such a large scale.
KER 14	EOL scenarios for wind turbines	• Fraunhofer (Germany) • DTU, etc • Different scenarios for end-	Mapping different, potential futures of EoL of wind turbines is still linked to a lot of uncertainties. Presenting possible

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		of-life treatment of wind turbines • University of Pforzheim • Policymakers • Turbine manufacturer • Turbine commissionaires	scenarios summarizes current discussions and could serve as a guidance for researchers.
KER 15	Landscape quality	• Wind park developers, at the stage of selecting the future wind park location • Policymakers • Research groups working on the micro-level energy systems analysis	• No such analysis was done on such a large scale • The data (the results of the study) will be publicly available
KER 19	Augmented highRES-Europe	Other high resolution electricity system modelling teams	Our collaboration, as part of WIMBY, with a broad range of researchers gives us access to highly novel data on the impacts of wind power across multiple areas, e.g. birds and bats, noise, landscape visual impact.
KER 21	Wind farms safety and health risk assessment methodology	Standard safety and health risk impact assessment methodologies (e.g. OSHA, ISO 45001)	Integrate site-specific variables for risks
KER 22	Social Acceptance Framework	Other social acceptance frameworks are not	Social acceptance framework covering end-users' propensity towards wind turbines in their

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		focused on wind power or renewable energies.	vicinities, supported by interactive maps and 3D environment as informed decision-making tools.
KER 23	General Forum code and user interface	Energy-focused online discussion fora and citizens' feedback platforms (e.g. for SUMPs and urban planning)	Direct integration with informative map layers; high usability and intuitive UI.
KER 24	Communication and dissemination skills	Other organisations offering communication and dissemination support to research Consortia.	User-centred and multidisciplinary approach focused on targeted stakeholders; expert team with background knowledge about the European energy, climate adaptation and socio-economic context.
KER 30	Regulation on wind turbine siting in 10 EU MS (up to NUTS2)	Wind park developers, as they must collect the data for their projects (e.g. Vattenfall, Orsted)	• the data will cover at least 10 EU MS (as of now, data is usually scattered) • the data will be publicly available (as of now, most datasets are not publicly available) • users will be able to use it in an interactive map which makes it appealing to "play" with it (as of now, the data has not been used in such an interactive way)

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			• the dataset provides links to the national websites (as of now, most datasets are missing links to the source which makes it difficult to check whether the data still is up to date)
KER 31	Policy review of wind energy regulation in AT, IT, PT and NO	• research institutes working in the field of renewable energy • wind park operators who depend on the data as well	• the policy report will be public; • the analysis also includes justice elements (e.g. role of citizens in permitting procedures + other measures to raise acceptance vis-à-vis wind energy, such as financial participation)
KER 32	Analysing misperceptions in the wind energy sector spread on Twitter (X) and news	Similar research has been conducted using text analysis to investigate wind energy, both utilizing newspaper materials and social media data. Some examples include: - Dehler-Holland, J., Okoh, M., & Keles, D. (2022). Assessing technology legitimacy with topic models and sentiment analysis – The case of wind power	Previous research has been limited to specific locations or short time periods. Our database encompasses an extensive time frame and various locations, including a much larger sample than has been previously studied by any research. The database enables comparisons between different periods and countries regarding the topics of misperception and, due to

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		in Germany. In Technological Forecasting and Social Change (Vol. 175, p. 121354). - Jeong, D., Hwang, S., Kim, J., Yu, H., & Park, E. (2023). Public perspective on renewable and other energy resources: Evidence from social media big data and sentiment analysis. In Energy Strategy Reviews (Vol. 50, p. 101243).	its scope and comparability, allows for much more robust analyses and a range of possibilities such as sentiment analysis, text frequency analysis, topic modelling, and other text analysis methodologies. The way the data was collected makes the content easily manipulable and usable, being readily accessible to researchers who were not involved in the initial data collection process.
KER 33	Planning highly renewable net-zero electricity systems for Europe: the trade-offs between social, environmental and energy systems	Other electricity system modelling teams working across Europe	As for KER19, we have access to novel data on a range of wind power impacts giving us a competitive edge.
KER 34	Shadow flicker calculator	WINDPRO is the standard in the industry. Very little information is available about their model, their implementation or their validation.	The software is open source, and the explanation and code are fully available for any other person/user. Validation is limited since only cross-validation with

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			WINDPRO is feasible when taking into consideration the resources available.
KER 35	Shadow flicker model description	WINDPRO is the standard in the industry. Very little information is available about their model, their implementation or their validation.	The software is open source, and the explanation and code are fully available for any other person/user. Validation is limited since only cross-validation with WINDPRO is feasible when taking into consideration the resources available.
KER 36	Taxonomy of wind power impacts	Probably does not exist yet. If there were something comparable there would be no point in creating one.	Rather bottom up, it has been created from scientific literature but also surveying non-scientists in multiple countries.
KER 37	WIMBY - Job creation model	A model presented in grey literature, "calculating global energy sector jobs: 2015 methodology update" from Rutovitz et al. 2015.	WIMBY builds up on their work, the data are more up to date, and this specific development is for the individual wind park level.
KER 38	Job creation review and model	A model presented in grey literature, "calculating global energy sector jobs: 2015 methodology update" from Rutovitz et al. 2015.	WIMBY builds up on their work, the data are more up to date, and this specific development is for the individual wind park level.
KER 39	3D Environment toolset and interactive planning tool	Commercial Wind Park planning software Planning offices Energy providers	• Using open data and software enables collaborative development and utilisation of the 3D environment.

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			• Serious game elements allow the involvement of a broad range of stakeholders and actors • Suitable for educational purposes
KER 40	Region-specific wind power plant LCOE model	Many competitors exist, but many are not geographically dependent or deal with offshore wind farms.	The new LCOE model will be applicable to land and offshore, using up-to-date parameters and be geographically explicit.
KER 41	Updates to the New European Wind Atlas model	Wind resource maps and time series are available from Copernicus and other pay companies (e.g., Vortex or EMD).	In WIMBY, the datasets will already be integrated into the wind farm calculation. This is a clear advantage for the public and small wind developers who don't have the funds to buy commercial products. Also, there is full transparency of how the product is created and what the underlying errors are.
KER 42	Updates to TOPFARM	Competitors exist (e.g., WINDPRO and WindFarmer).	The TOPFARM software is open source and much faster than GUI-based commercial counterparts.
KER 43	Interactive modelling results in the pilot site	Not been identified yet.	Not been identified yet.

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2. STAKEHOLDER GROUPS ANALYSIS

2.1 Target stakeholders

The identification of stakeholders builds on the work done by NAZKA in the context of Task 5.3. This included an in-depth analysis of stakeholder groups interested in using the WIMBY Interactive map. With support from all WP leaders, a broader stakeholder identification analysis has been set up to identify all potential WIMBY KERs adopters. The results are presented in Table 4.

Table 4 - Stakeholder groups identification

TARGET STAKEHOLDER GROUP 1	
Education	Teachers (convey information) & students (understand on their own)
Expected benefit	Access to WIMBY results (especially the interactive map, the 3D environment and the General Forum) as an educational resource, offering a comprehensive exploration of the facets of renewable energy and sustainable development. The project aims to provide an array of materials, reports, and interactive tools, creating a dynamic learning experience. Using computer-based gaming approaches new methods can be developed for learning and education. By entering the complexities of social acceptance, environmental impact, and governance in wind energy projects, profound insights that contribute to a holistic understanding of these critical subjects can be gained.
TARGET STAKEHOLDER GROUP 2	
Specialised users	TSO, non-wind researchers
Expected benefit	Gain access to cutting-edge analyses, innovative methodologies, and advanced models centred on social acceptance and sustainable governance in wind energy projects. WIMBY provides the expertise and insights needed to navigate the complexities of onshore and offshore wind development successfully.
TARGET STAKEHOLDERS 3	

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Interested audience	Landowners, local energy communities, and other impacted communities
Expected benefit	By fostering a deeper understanding of wind power deployment, the innovative tools invite diverse stakeholders to actively engage in collaborative evaluations of impacts, conflicts, synergies, and social innovation potential related to wind energy. This participatory approach not only enhances knowledge-sharing but also facilitates informed decision-making and empowerment, including bottom-up wind power deployment initiatives (e.g. driven by landowners, energy communities, neighbourhood groups etc.). WIMBY addresses societal concerns and facilitates community involvement, offering comprehensive information to most impacted groups.

2.2 Stakeholders' relevance analysis

Recognising the unique strengths each stakeholder brings to the table is crucial, especially concerning the exploitation phase. This comprehensive understanding guides the consortium in strategically directing efforts towards areas that promise maximal impact in terms of dissemination activities. Analysing the influence and interest of each stakeholder group based on potential end-users' interviews will highlight how they can benefit from the project results. Figure 2 presents the visual board used during the workshop attended by all partners, which facilitated the identification of the dynamics of influence and interest of specific stakeholders and a better understanding of the measures to be taken to promote project results' adoption and uptake.

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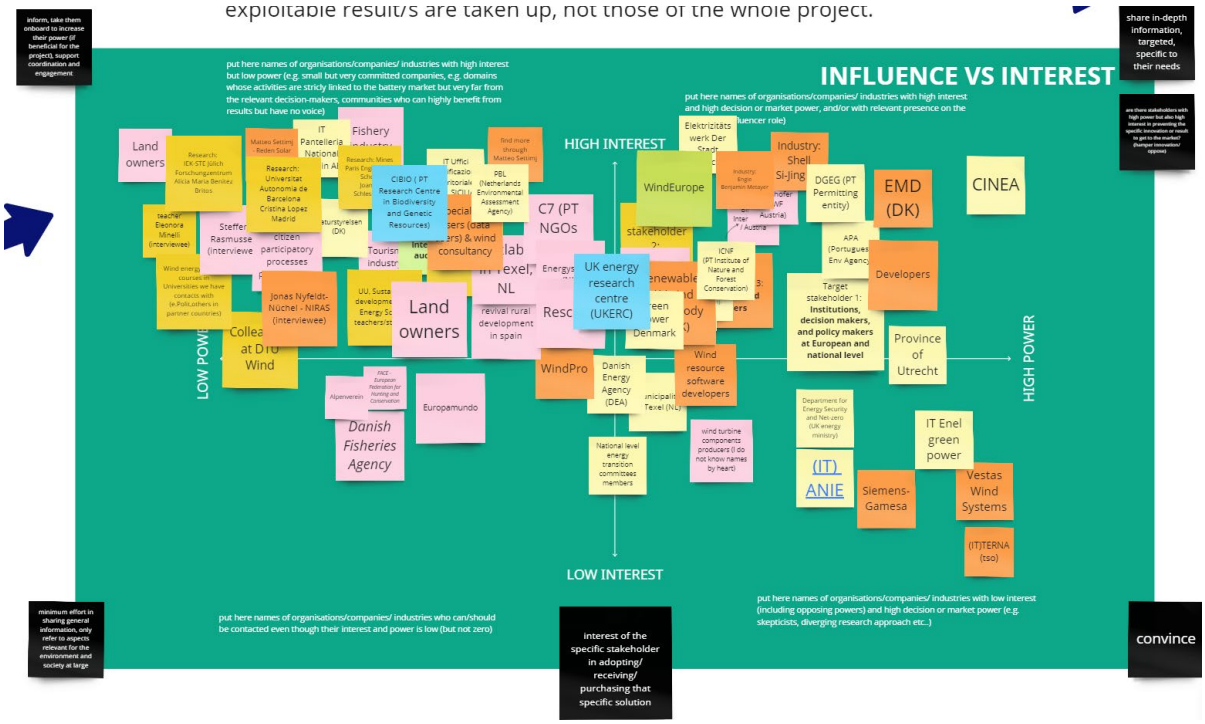

Figure 2 - Influence vs Interest analysis

3. BARRIERS AND DRIVERS

3.1 PESTEL analysis

The PESTEL analysis serves as a comprehensive framework for evaluating the external factors that can significantly influence the trajectory of the WIMBY project and its outcomes. Each component of the acronym — Political, Economic, Social, Technological, Environmental, and Legal — provides a lens through which we can scrutinise the macro-environmental landscape around the WIMBY project and the renewable energy field. In the context of WIMBY, this analysis is important for a nuanced exploration of project results, especially in the intricate domain of wind energy acceptance. Political considerations, understanding regulatory frameworks and government policies help navigating legal landscapes, while economic factors shed light on funding opportunities and financial viability. Social elements delve into community attitudes and stakeholder perceptions, crucial for acceptance strategies. Technological aspects encompass the innovative tools and platforms developed by WIMBY, placing them in the broader tech context. Environmental considerations address the impact of wind energy on ecosystems, and legal factors guide compliance.

By conducting a PESTEL analysis, WIMBY obtains a holistic understanding of the external and internal drivers and challenges (sometimes acting as barriers), fostering a strategic approach to project exploitation. The first part

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of the PESTEL workshop took place during the second project General Assembly held in Vienna on the 24th and 25th of January 2024, and it was finalised during an online session on the 15th of March 2024. The results are presented in Table 5.

Table 5 – PESTEL Analysis

Political		
• What is the level of political will and commitment towards the development of WIMBY and how does it influence the project outcomes? • How can the local, regional, and national political bodies foster the WIMBY project outputs?		
Drivers	**Challenges**	**Actions**
• EU through the Commission's development plans for wind power	• High implication on the EU side, it deteriorates at smaller spatial scales • Problem of conflict of competencies between entities	• Participate actively in workshops • Need for uniformity in regulations • Good arguments for why we need more wind • Blueprint/toolbox on how to get higher public acceptance • National and regional governance can make use of the WIMBY tools or modify regulations • Recommend use of WIMBY tools for participatory intentions
Economic		
• What are the potential economic benefits of implementing WIMBY results? • What are the potential economic risks or challenges the WIMBY results could bring forth?		

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- How can WIMBY integrate economic considerations into the design of business plan and market launch strategies, ensuring that the affordability and accessibility of the project's outcomes align with the needs and expectations of end-users in the community involved?

Drivers	Challenges	Actions

• Motivate investments
• Mitigation of climate change impact
• Cost reduction due to:
  • faster planning
  • less consultancy for wind power development plans
  • system integration of wind power
• Commercialisation of WIMBY tools and technologies
• Cost reduction and reduced opposition
• Co-ownership
	• increased opposition
	• financial risks / financial sustainability
		• Quantifiers/ predictors of the economic compensation or reduced cost or income for landowners
		• Communication of the actual cost of wind projects

Societal

- What are the potential socio-cultural barriers or predictable resistance to change that could slow down or even block the implementation of WIMBY results? How can they be overcome?
- How can the inclusion of local communities and stakeholders contribute to the social acceptance of WIMBY results?

Drivers	Challenges	Actions
• Need for information	• Unspoilt nature	• Transparent and clear

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• Tourism in the Alps • Community ownership • Financial benefits • Communities feel they are part of the process • Participation tools are public	• Perception: Wind power is not needed • People might not trust the WIMBY results • Disrespecting cultural norms • Low usability/ accessibility • Fear that community needs won't be respected • Difficulty in combine/reach different stakeholders • Language barriers	communication towards local communities and citizens • Community participation in decision-making processes • Initiating social learning process • Local demonstration (similar to the ones the project will do for the pilot sites)

Technological

- What technological infrastructure and advancement are necessary to support the implementation of WIMBY results?
- Which emerging technologies can be integrated into WIMBY to enhance adoption and uptake by the end-users?
- To what extent do you anticipate technological accessibility challenges impeding the implementation of WIMBY tools?

Drivers	Challenges	Actions
• Existence of high-quality open access or paid databases. • Increasing knowledge around web-GIS tools in the industry and academia. • Increasing level of knowledge	• Risk of slow data access while bringing together tools and data • Low digital skills of farmers, they are very relevant stakeholders • Low digital skills related to WIMBY's digital tools	• Good and detailed documentation to guide users in different languages • Developing an IOS or android app for guided tour of WIMBY • Community VR-enabled design proposals

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about layered maps by the general public thanks to route planning and weather forecast services. • Increased use of VR for educational purposes	• VR can be a barrier to certain groups (fear, isolation)	• Let them elaborate siting options themselves • Community in the leap siting tool > an aesthetic model (the 3D tool) • Automatic collection of community feedback or let them decide in the first place

Environmental

- How does the implementation of WIMBY contribute to reducing the NIMBY effect and contribute to the EU decarbonisation goal?
- What are the potential environmental risks and challenges associated with the introduction of WIMBY results?

Drivers	Challenges	Actions
• Showing that wind park operators care about nature and people will help to build trust and increase acceptance - we shall ensure all audiences, especially local communities, take up this message • Potential increase of biodiversity/safe corridors/areas/no hunt/no predators on some species provided by wind turbine developments,	• Low understanding of actual visual impacts / Understanding visual impact • Low understanding of multi-layered/complex impacts and the need to consider trade-offs (since 0 impact is not possible if we want renewable energy) • Results might be too general and not region specific	• Better community engagement • Taking consideration of concerns of local communities • Show important ecological areas in forests will help reducing the NIMBY effect • Show visual impacts will help reducing the NIMBY effect • Low understanding of how environmental impacts are measured/assessed and mitigated

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both onshore and offshore		• Increase scientific understanding of environmental impact • Show environmental trade-offs between options • Stakeholder engagement • Showcase positive biodiversity impacts beyond decarbonisation

Legal

- What are the existing legal frameworks and regulations ruling over the wind energy field?
- Are there political regulations and policies that need to be addressed or modified to accommodate the introduction and implementation of WIMBY results?
- How can legal mechanisms take advantage to foster collaboration among different stakeholders within the wind power field and more widely in the green energy ecosystem?

Drivers	Challenges	Actions
• Environmental impact assessment process • AcceleRES - RepowerEU - REC directives • Habitat directive, binds directives, biodiversity conventions, NECP's	• Heterogeneity across countries in Europe - difference included within WIMBY • Mandate common data standards • Planning and permitting are high-priority issues and needs reforming • Every update to targets in EU	• Mandate at least an open data for specific subsets (when evaluating investments) • WIMBY will provide recommendations (WP4 - 4.3) • Acknowledge / facilitate developers who inquiry local communities before decisions are taken • Acknowledge citizens who

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	countries would speed it up • Legal obligations	promote bottom-up wind development in specific (feasible) area

3.2 SWOT analysis

A SWOT analysis is a useful tool in dissecting the internal strengths and weaknesses, as well as external opportunities and threats that shape the landscape for WIMBY's endeavours. This strategic assessment enables a nuanced understanding of the project's intrinsic capabilities and limitations. Internally, strengths highlight competitive advantages, such as innovative methodologies and cross-disciplinary expertise within the consortium. Identifying weaknesses offers an opportunity for targeted improvements, ensuring a more robust approach to project goals. Externally, opportunities encompass avenues for growth and collaboration, such as potential partnerships or emerging trends in renewable energy acceptance. Threats, on the other hand, signal potential challenges that demand proactive mitigation strategies especially related to the complexity in the adoption of delivered results by certain user categories (e.g. low-digital skills users and interested users not familiar with GIS tools in the legal and regulatory domain). In the context of WIMBY, conducting a SWOT analysis becomes instrumental in crafting an exploitation strategy that leverages internal strengths, mitigates weaknesses, seizes external opportunities, and safeguards against potential threats, ultimately optimising the project's impact and sustainability in the short, medium, and long term. In Figure 3, we see the graphical representation of the SWOT analysis conducted collaboratively with the consortium using an online board. Each partner contributed their insights via digital sticky notes, and through the dot voting activity, the consortium identified the key aspects to prioritise. Conversely, Table 6 provides a textual summary of the board's contents.

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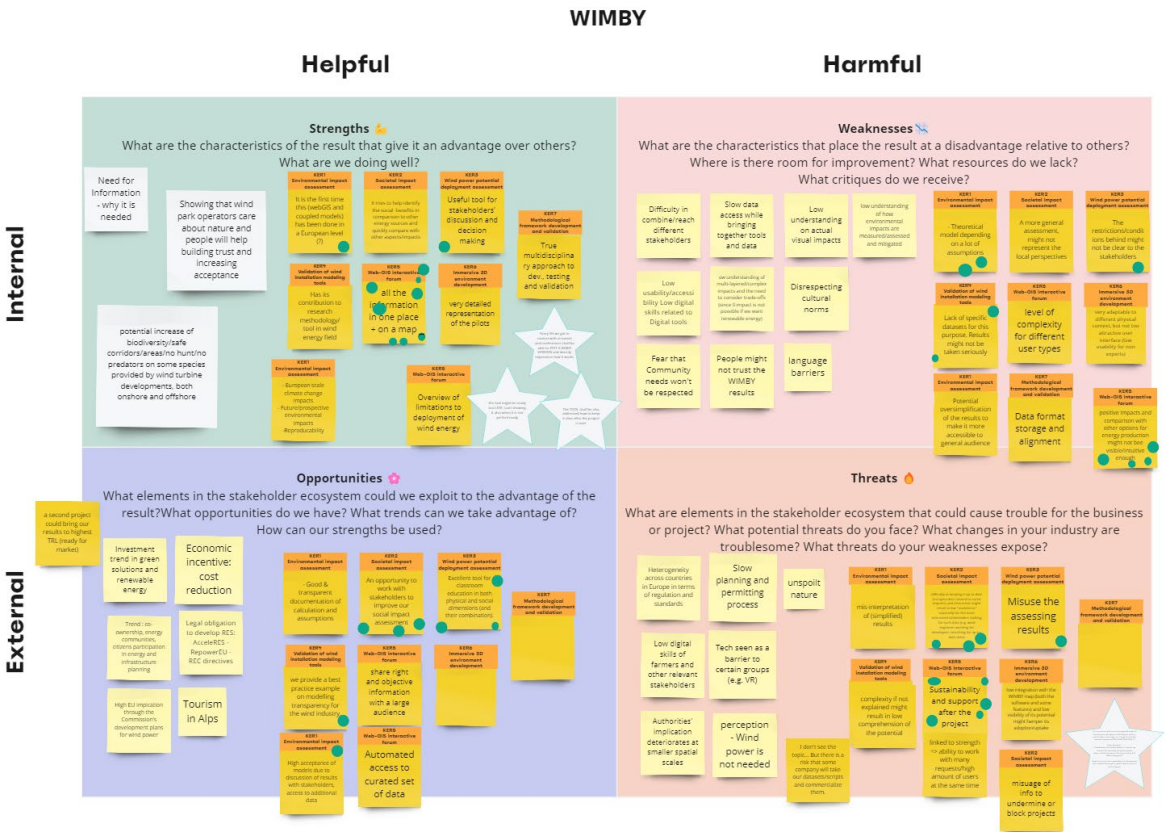

Figure 3 - Graphic representation of the SWOT Analysis

Table 6 - SWOT analysis

Strengths	Weaknesses
KER1: It is the first time this (web-GIS and coupled models) has been done at a European level; European scale climate change impacts; Future/prospective environmental impacts; Reproducibility; potential increase of biodiversity/safe corridors/areas/no hunt/no predators on some species provided by wind turbine developments, both onshore and offshore. **KER2:** It tries to help identify the social benefits in comparison to other energy sources and quickly compare with other aspects/impacts; showing that	**KER1:** Theoretical model depending on a lot of assumptions; Potential oversimplification of the results to make it more accessible to the general audience; Low understanding of how environmental impacts are measured/assessed and mitigated. **KER2:** A more general assessment might not represent the local perspectives. **KER3:** The restrictions/conditions behind might not be clear to the stakeholders. **KER4:** Lack of specific datasets for this purpose. Results might not be taken seriously.

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wind park operators care about nature and people will help build trust and increase acceptance. **KER3:** Useful tool for stakeholders' discussion and decision-making. KER4: Has its contribution to research methodology/ tool in the wind energy field. **KER5:** All the information in one place and on a map; Overview of limitations to the deployment of wind energy. **KER6:** Very detailed representation of the pilots. **KER7:** True multidisciplinary approach to develop, test, and validate.	**KER5:** Level of complexity for different user types; Positive impacts and comparison with other options for energy production might not be visible/intuitive enough; Low digital skills related to Digital tools; language barriers. **KER6:** Very adaptable to different physical contexts, but not too attractive user interface (low usability for non-experts); Low understanding of actual visual impacts. **KER7:** Data format storage and alignment; Slow data access while bringing together tools and data;
Opportunities	**Threats**
KER1: Good & transparent documentation of calculation and assumptions; High acceptance of models due to discussion of results with stakeholders, and access to additional data. **KER2:** An opportunity to work with stakeholders to improve our social impact assessment. **KER3:** Excellent tool for classroom education in both physical and social dimensions (and their combination). **KER4:** Offer a best practice example on modelling transparency for the wind industry; Economic incentive: cost reduction. **KER5:** Share right and objective information with a large audience;	**KER1:** Misinterpretation of (simplified) results. **KER2:** Difficulty in keeping it up to date (no open data related to social impacts) and interactive might result in low "usefulness" especially for the most interested stakeholders looking for such data (e.g. wind engineers working for developers searching for up-to-date data); misuse of info to undermine or block projects. **KER3:** Misuse the assessing results; Heterogeneity across countries in Europe in terms of regulation and standards **KER4:** Complexity if not explained might result in low comprehension of the potential.

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Automated access to a curated set of data. **KER6:** Trend: co-ownership, energy communities, citizen participation in energy and infrastructure planning; Investment trend in green solutions and renewable energy. **KER7:** High EU implications through the Commission's development plans for wind power.	**KER5:** Sustainability and support after the project; ability to work with many requests/high numbers of users at the same time. **KER6:** Low integration with the WIMBY map (both the software and some features) and low visibility of its potential might hamper its adoption/uptake; Tech is seen as a barrier to certain groups (e.g. VR). **KER7:** the risk that some companies will take WIMBY's datasets/scripts and commercialize them.

3.3 Barriers to dissemination and exploitation

In the pursuit of effective communication and dissemination strategies within the WIMBY initiative, understanding the unique challenges and opportunities presented by diverse target groups is needed. Table 7 delves into the barriers and mitigation strategies associated with the three defined stakeholder groups. Recognising the intricacies of each stakeholder group allows WIMBY to tailor outreach efforts and optimize the conveyance of the project's insights. From bridging knowledge gaps to addressing concerns over complex jargon, the analysis presented in the table shows how we plan to navigate these hurdles, ensuring that the communication, dissemination, and exploitation strategies are effective across varied stakeholders.

Table 7 - Barriers to dissemination and exploitation of stakeholders

Stakeholder group	Description	Barriers and mitigations
Education	Targeting educational institutions and students is crucial for fostering awareness and understanding of wind energy, contributing to future sustainable practices.	**Barriers:** Limited access to specialised wind energy educational resources, insufficient integration of practical aspects in curricula, low subject knowledge, digitalisation limitations, and difficulties in

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		understanding technical information. **Mitigation:** Develop tailored educational materials, collaborate with institutions, offer hands-on learning experiences, provide a first impression of wind energy. WIMBY could serve as a tool for teaching with an easy-to-use interface for easy understanding of complex topics.
Specialised users	Reaching professionals, researchers, and policymakers is essential for validating WIMBY tools, obtaining expert feedback, and ensuring practical applicability and impact in the field.	**Barriers:** Technical complexities, resistance to change in established practices, and potential conflicts in integrating WIMBY tools. **Mitigation:** Offer comprehensive training, demonstrate the practical value of WIMBY tools, and establish collaborative platforms for knowledge exchange.
Interested audience	Engaging the general public creates a broad network for information dissemination, building support, involving diverse perspectives in wind energy discussions, and opportunities to stimulate a bottom-up	**Barriers:** Information overload, scepticism, lack of awareness about wind energy benefits, NIMBY effect, difficulty in recognising wind industry jargon, challenges in understanding

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	approach to wind farm projects (neighbours/energy communities that team up to start a wind project).	information in daily life terms. **Mitigation:** Implement targeted communication strategies, provide clear and concise information, and showcase positive examples of wind energy projects, offer unbiased and trustworthy information, ensure easy comprehension of the impacts of specific wind projects, and deliver information that would otherwise be costly to obtain. With clear and transparent communication, the interested public can understand how to benefit from wind energy projects and use the knowledge gained as a fact checking tool.

4. EXPLOITATION STRATEGY

4.1 Strategy for knowledge management and protection

Any details concerning the access rights to background and foreground IP are defined in the Consortium Agreement signed by all the partners in the consortium. Partners will only use the products, information, source code, or other protected items owned by another partner in the WIMBY project when the licensing conditions have been clearly communicated by the holder. The holistic approach of the project is reflected in the multitude of data that are required and that are generated throughout the project. These data are key for the tools and assessments to be developed in WIMBY as well as for the dissemination strategy and the project's expected impact. WIMBY strives to

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make data and other outputs open while following FAIR principles and INSPIRE guidelines. Specific details and arrangements on the exchange and use of data within the WIMBY project are presented in deliverable D7.3 - Data management plan.

- **IP Ownership:** Foreground IP shall be owned by the project partner carrying out the work leading to such Foreground IP. The General Assembly will coordinate patent issues: if any Foreground IP is created jointly by at least two project partners and it is not possible to distinguish between the contributions of each of the project partners, such work will be jointly owned by the contributing project partners.

- **Confidentiality:** Information from other partners will be treated as confidential unless public.

- **Ownership of Knowledge:** Knowledge is owned by the partners who carried out the work generating it or on whose behalf such work was carried out. If a partner wishes to assign any knowledge to a third party, it should inform the other partners and request their consent, which should not unreasonably be withheld.

- **Access Rights:** The Consortium will pay specific attention to IPR of the exploitation of the project results. The partners will reach a full agreement, complementing the EC contract, on pre-existing intellectual property rights excluded from WIMBY and user licences in this agreement. The agreement will detail rights to exploit project results for commercial purposes; each partner will, however, maintain the right to use the project outcome for internal use. During the lifetime of WIMBY, the implementation of these IPR principles will comprise the following main tasks: a) Updating of foreground knowledge, b) Management of the WIMBY knowledge portfolio, c) Knowledge projection, d) Joint Exploitation Agreement maintenance and evolution.

4.2 Individual exploitation plans

Completing an individual exploitation plan, as presented in Table 8, is essential for each partner for several reasons. First and foremost, it serves as a strategic roadmap for the partner, outlining how they intend to leverage

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and capitalise on the KERs generated within the project. The individual exploitation plan provides a structured framework for partners to articulate their specific goals, target audience, and intended outcomes, fostering clarity and alignment with the overall project objectives.

Additionally, the individual exploitation plan enhances coordination and collaboration among partners by ensuring a harmonised approach to disseminating project outcomes. It enables partners to identify synergies, share resources, and avoid duplicative efforts.

Furthermore, the individual exploitation plan serves as a proactive measure for partners to address potential challenges and risks associated with dissemination and exploitation activities. By anticipating obstacles and strategizing mitigations in advance, partners can navigate complexities more effectively and optimise the success of their individual exploitation endeavours.

Table 8 - Partners' individual exploitation plans

KER6	3D ENVIRONMENT FRAMEWORK
Target stakeholder	Education, specialised user, interested audience, bottom-up initiatives
Stakeholder benefit	New methods and approaches for state-of-the-art visualisation and a framework for collaborative RE planning
Barrier/ risks	Funding for service after launch
Owner and beneficiary(s) involved	BOKU-ILEN

KER8	WIMBY MAP CODE
Target stakeholder	Education, specialised user, interested audience, research and academia
Stakeholder benefit	Getting the information about potential wind power projects; ability to create own wind power project plans with limited knowledge and resources; understand the consequences and advantages of local deployment of wind power. With the additions of the results from the energy system modelling

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Barrier/ risks	Funding for service after launch. Low uptake of result.
Owner and beneficiary(s) involved	NAZKA

KER9	**WIMBY MAP PROTOTYPE**
Target stakeholder	Education, specialised user, interested audience
Stakeholder benefit	Specific needs of stakeholders are checked during user interviews
Barrier/ risks	Limits on interactivity
Owner and beneficiary(s) involved	NAZKA

KER10	**UPDATES TO NAZKA MAPFRAME**
Target stakeholder	All users of NAZKA maps
Stakeholder benefit	Further development of map frame for future projects
Barrier/ risks	N/A
Owner and beneficiary(s) involved	NAZKA

KER11	**WINDISCH v2.0**
Target stakeholder	Research and academia
Stakeholder benefit	Updated methodology to prospective life cycle assessment, generation of a flexible python package to calculate environmental impacts of any wind turbine at any given location
Barrier/ risks	None
Owner and beneficiary(s) involved	VUB - PSI

KER12	**CORRELATION MATERIAL/ RATED POWER**
Target stakeholder	Research and academia
Stakeholder benefit	Utilisation for data to build inventories of wind turbines, use review to get an overview of SOA literature on LCA of wind turbines

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Barrier/ risks	None
Owner and beneficiary(s) involved	VUB

KER13	**CONSEQUENTIAL LIFE CYCLE ASSESSMENT**
Target stakeholder	Research and academia
Stakeholder benefit	First CLCA on EU energy system, it shows methodological integration of micro-level LCA versus macro-level LCA on a system level and shows how LCA and energy system models can be further harmonized/brought together
Barrier/ risks	None
Owner and beneficiary(s) involved	VUB - PSI

KER14	**EOL TREATMENT WIND TURBINE**
Target stakeholder	Research and academia
Stakeholder benefit	Mapping potential EOL futures for wind turbines and showing the integration in WINDISCH 2.0
Barrier/ risks	None
Owner and beneficiary(s) involved	VUB

KER15	**LANDSCAPE QUALITY**
Target stakeholder	Research and academia
Stakeholder benefit	The scenicness data can be used to determine potential wind farm locations. The data can be visualized using the WIMBY interactive map.
Barrier/ risks	On one hand, due to the lack of scenicness data, the landscape model has to be trained on a limited number of data samples. On the other hand, scenicness of the landscape is a highly subjective parameter, which can be perceived differently by different individuals. The general public may not fully grasp these limitations of the data and model assumptions. As a result, the general public

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	may mistakenly believe that the outcomes are 100% accurate.
Owner and beneficiary(s) involved	ETH

KER16	**HABITAT SUITABILITY DATA**
Target stakeholder	Research and academia, and general public
Stakeholder benefit	The data can be used to determine whether potential wind farm sites overlap with habitats that are suitable for specific species. The data can be visualized using the WIMBY interactive map.
Barrier/ risks	Limitations of data and model assumptions might not be fully understood by the general public. This in turn might make them assume the results are 100% accurate. In addition, only certain species are analysed, thus, the data do not cover the entire biodiversity in the region.
Owner and beneficiary(s) involved	BOKU

KER17	**MULTI-TAXA HABITAT MODELS FOR SPECIFIC SPECIES IN THE PILOT REGION STYRIA, AUSTRIA**
Target stakeholder	Research and academia, and general public
Stakeholder benefit	Stakeholders can get a better insight into limitations of data and model assumptions.
Barrier/ risks	Limitations of data and model assumptions might not be fully understood by the general public. This in turn might make them assume the results are 100% accurate.
Owner and beneficiary(s) involved	BOKU

KER18	**MULTI-TAXA HABITAT SUITABILITY AND CONNECTIVITY MAPS FOR SPECIFIC SPECIES IN THE PILOT REGION STYRIA, AUSTRIA**
Target stakeholder	Research and academia

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Stakeholder benefit	Stakeholders can get a better insight into limitations of data and model assumptions.
Barrier/ risks	Limitations of data and model assumptions might not be fully understood by the general public. This in turn might make them assume the results are 100% accurate.
Owner and beneficiary(s) involved	BOKU

KER19	**AUGMENTED HIGHRES-EUROPE**
Target stakeholder	Academia, industry and policymakers
Stakeholder benefit	Modelling future electricity systems for Europe that account for the trade-offs between nature, society and energy
Barrier/ risks	None
Owner and beneficiary(s) involved	UCL - UiO

KER20	**POTENTIAL ENVIRONMENTAL IMPACTS OF OFFSHORE WIND FARM DEVELOPMENT AT THE ISLAND OF PANTELLERIA**
Target stakeholder	Research and academia
Stakeholder benefit	Information about potential siting, minimization of environmental impact.
Barrier/ risks	None
Owner and beneficiary(s) involved	UNIPA

KER21	**WIND FARMS SAFETY AND HEALTH RISK ASSESSMENT METHODOLOGY**
Target stakeholder	Industry, research and academia
Stakeholder benefit	Safety and health risks can be easily and promptly compared with site-specific data (external factors influencing exposition and or severity e.g. population density, extreme weather events etc…).

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Barrier/ risks	Low reliability and granularity of available accident database at the EU level may impact final TRL.
Owner and beneficiary(s) involved	DBL

KER22	**SOCIAL ACCEPTANCE FRAMEWORK**
Target stakeholder	Industry, Research and Academia, Institutions and decision-makers, Highly innovative organisations, and businesses
Stakeholder benefit	Validated framework to assess uptake and acceptance of energy-related innovations, scalable and customisable depending on the targeted communities and stakeholders; expertise and commitment to user-centredness and transitional justice in diverse socio-economic contexts.
Barrier/ risks	Not foreseen
Owner and beneficiary(s) involved	DBL

KER23	**GENERAL FORUM CODE AND USER INTERFACE**
Target stakeholder	Industry, Research and Academia, Local and Regional Institutions, NGOs, Wind power developers and consultants, Energy Communities.
Stakeholder benefit	Direct feedback option, quick access to a diverse community of end-users, horizontal knowledge sharing.
Barrier/ risks	Low interest/Low engagement
Owner and beneficiary(s) involved	DBL

KER24	**NEW COMMUNICATION AND DISSEMINATION SKILLS**
Target stakeholder	Industry, Research and Academia, Institutions and decision-makers, Highly innovative organisations, and businesses

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Stakeholder benefit	Qualified services in energy-related research and consultancy projects, scalable and customisable depending on the targeted stakeholders; expertise and commitment to user-centredness and end-user engagement.
Barrier/ risks	Not foreseen
Owner and beneficiary(s) involved	DBL

KER25	**ENERGY DEMAND PROJECTIONS**
Target stakeholder	Industry, Research and Academia
Stakeholder benefit	Not been identified yet
Barrier/ risks	Not foreseen
Owner and beneficiary(s) involved	PSI

KER26	**NET-ZERO SCENARIO WITH VARIOUS DEGREES OF WIND**
Target stakeholder	Industry, Research and Academia
Stakeholder benefit	Not been identified yet
Barrier/ risks	Not foreseen
Owner and beneficiary(s) involved	PSI

KER27	**COLLISION RISK MAPS**
Target stakeholder	Research and academia, general audience
Stakeholder benefit	The maps can be used to visualise spatial patterns of collision risk for European birds and bats. The maps can be integrated to the WIMBY interactive Web-GIS application.
Barrier/ risks	Modelling assumptions and modelling limitations might not be fully understood by the public.
Owner and beneficiary(s) involved	IIASA

KER28	**COLLISION RISK MAPS REPORT**

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Target stakeholder	Research and academia, general audience
Stakeholder benefit	The report describes the methodology behind the obtention of the collision risk maps for European birds and bats.
Barrier/ risks	The methodology might not be well understood by a non-specialist audience.
Owner and beneficiary(s) involved	IIASA

KER29	**EUROPEAN BIRDS AND BATS COLLISION RISK ASSESSMENT**
Target stakeholder	Research and academia, general audience
Stakeholder benefit	The assessment contains the species-level estimates of collision risk for European birds and bats.
Barrier/ risks	The estimates are species-level averages and might not capture intraspecific variation well.
Owner and beneficiary(s) involved	IIASA

KER30	**REGULATION ON WIND TURBINE SITING IN 10 EU MS (UP TO NUTS2)**
Target stakeholder	• energy communities • citizens • municipalities • policy maker • wind park developer
Stakeholder benefit	• energy communities: can see whether construction of wind turbine in their vicinity possible • citizens: can check the regulation on wind energy construction is in their area • municipalities: can check the regulation on wind energy construction is in their area • policy maker: can compare the regulations with other areas

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	• wind park developer: can see whether the construction of a wind park in a certain area is legally possible
Barrier/ risks	• data will be outdated quite fast **mitigation**: some links are added, so users can check themselves and compare, whether the information in the legal text has changed. Perhaps the dataset can be updated every 6 months internally. A barrier will be the lack of funds.
Owner and beneficiary(s) involved	KIE

KER31	**POLICY REVIEW OF WIND ENERGY REGULATION IN AT, IT, PT AND NO**
Target stakeholder	policy report relevant for all stakeholders (citizens, municipalities but also industry) interested in the current regulations governing wind energy; various business models for wind energy projects and possible funding opportunities for wind energy projects in the EU
Stakeholder benefit	• citizens: profit from getting a better understanding of the governance model in the wind energy industry and their opportunity to get active themselves (e.g. by funding a renewable or a citizen energy community); they can also learn from the listed best-practice models. • municipalities: see above • government: can get a better understanding of how other countries manage wind energy production (e.g. use of wind energy zones or not; mandatory financial participation or not; etc.); they can also learn from the "mistakes" other countries have made in their development of a wind energy governance model (e.g. moratorium in

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	NO) and prevent it by, preferably, including stakeholders from the beginning • wind park operators: can get a better understanding of how to design their wind energy project in a more inclusive manner and learn from best practices in other countries
Barrier/ risks	• data will be outdated quite fast **mitigation**: some links can be added, so users can check themselves and compare, whether the information in the legal text has changed. Perhaps the dataset can be updated every 6 months internally. A barrier will be the lack of funds.
Owner and beneficiary(s) involved	KIE

KER32	**ANALYSISNG MISPERCEPTIONS IN THE WIND ENERGY SECTOR SPREAD ON TWITTER(X) AND NEWS**
Target stakeholder	The dataset itself can be used not only by the consortium researchers but also be of interest for academia, researchers, professors, and students interested in the subject matter to develop research with the extensive material collected. The database should also interest researchers in the private market and consultants with knowledge of text and data analysis tools. However, due to its extensive and multifaceted analytical potential, the results of the analysis may interest a range of stakeholders involved in the planning and implementation of wind energy projects such as project managers, policymakers, civil society organizations, and energy companies. The different analysis possibilities allow their results to be utilized and benefit different

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	sectors based on the use and hypotheses and research formulations raised.
Stakeholder benefit	With the misperceptions dataset, it is possible to understand the main topics of misperceptions filtered by geographic location; how these misperceptions change over time; how a location, a region, or a country covers the implementation of wind energy projects; what the main topics discussed in a country's social networks; who are the main opinion leaders in social networks regarding wind energy. Questions such as what the sentiment of Twitter users regarding wind energy change over time is, or what is the sentiment regarding a specific work or project can also be answered. The myriad uses of the dataset, depending on the period, coverage, topic of interest, and location, allow for a clearer understanding of how misperceptions regarding wind energy occur and, finally, how policymakers, energy companies, and civil society can work together to combat misinformation on the subject.
Barrier/ risks	To fully exploit the potential of the database, it is essential for researchers to be familiar with text analysis mechanisms in software such as R or Python and to have complete mastery of them. These methods are becoming increasingly popular as more researchers take an interest in the field and acquire the necessary skills to use them. However, it still requires some previous knowledge and training to do so. Given the extent and scope of the database, a complete understanding of how the data was collected and how the consortium researchers conducted the initial research is also necessary. For the dissemination of the dataset, we recommend

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	the development of documentation that facilitates understanding not only for consortium researchers but also for potential collaborators and users of the misperception dataset. Additionally, training in the tools used along with consortium researchers is recommended for a full understanding of the database and learning how to analyse it.
Owner and beneficiary(s) involved	KIE

KER33	**PLANNING HIGHLY RENEWABLE NET-ZERO ELECTRICITY SYSTEMS FOR EUROPE: THE TRADE-OFFS BETWEEN SOCIAL, ENVIRONMENTAL AND ENERGY SYSTEMS**
Target stakeholder	Academic, industry, policymakers, and civil society
Stakeholder benefit	An understanding of the trade-offs necessary in the design of European electricity systems with high shares of wind power
Barrier/ risks	Not been identified yet
Owner and beneficiary(s) involved	UCL-UIO

KER34	**WIMBY - SHADOW FLICKER CALCULATOR**
Target stakeholder	Energy system modelers, wind power planners, spatial planners, and interested audience.
Stakeholder benefit	All of them can make calculations of shadow flicker for free and there is an opportunity to understand what exactly is taken into consideration and how.
Barrier/ risks	Compared to WINDPRO no UI is provided, therefore some minimum knowledge of python is required to use it. The objective is that it can be also used via the WIMBY interactive map, which partially addresses the lack of UI. It is only partially because we do not think that the model will be fully tuneable from

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	the interactive map (many parameters will be kept to the default.)
Owner and beneficiary(s) involved	UU

KER35	**SHADOW FLICKER MODEL DESCRIPTION**
Target stakeholder	Energy system modelers, wind power planners, spatial planners, and interested audience.
Stakeholder benefit	All of them can make calculations of shadow flicker for free and there is an opportunity to understand what exactly is taken into consideration and how.
Barrier/ risks	Compared to WINDPRO no UI is provided, therefore some minimum knowledge of Python is required to use it. The objective is that it can be also used via the WIMBY interactive map, which partially addresses the lack of UI. It is only partially because we do not think that the model will be fully tuneable from the interactive map (many parameters will be kept to the default.)
Owner and beneficiary(s) involved	UU

KER36	**TAXONOMY OF WIND POWER IMPACTS**
Target stakeholder	IEA, interested audience, the scientific community.
Stakeholder benefit	It would help to speak a common language about the impacts of wind power.
Barrier/ risks	It is not clear how many stakeholders know about the taxonomies that the DTU/IEA have created. **mitigation**: we can promote them via the web page, an associated scientific publication and dissemination channels of WIMBY/UU.
Owner and beneficiary(s) involved	UU

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KER37	WIMBY – JOB CREATION MODEL
Target stakeholder	Interested audience, research and academia, education, policymakers
Stakeholder benefit	Quick but detailed estimation of job creation potential of a single wind park.
Barrier/ risks	No UI, therefore some minimum knowledge of Python is required to use it. The objective is that it can be also used via the WIMBY interactive map, which partially addresses the lack of UI. It is only partially because the user will be required to deal with many other parameters for other topics not related to job creation before getting the job creation estimation.
Owner and beneficiary(s) involved	UU

KER38	JOB CREATION REVIEW AND MODEL
Target stakeholder	Interested audience, research and academia, education, policymakers
Stakeholder benefit	Quick but detailed estimation of job creation potential of a single wind park.
Barrier/ risks	No UI, therefore some minimum knowledge of Python is required to use it. The objective is that it can be also used via the WIMBY interactive map, which partially addresses the lack of UI. It is only partially because the user will be required to deal with many other parameters for other topics not related to job creation before getting the job creation estimation.
Owner and beneficiary(s) involved	UU

KER39	3D ENVIRONMENT TOOLSET AND INTERACTIVE PLANNING TOOL
Target stakeholder	Professionals, researchers, and other specialised user

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Stakeholder benefit	A workflow (codebase) to manage complex and diverse geodata for visualisation and analysis
Barrier/ risks	Funding for service after launch
Owner and beneficiary(s) involved	BOKU-ILEN

KER40	**REGION-SPECIFIC WIND POWER PLANT LCOE MODEL**
Target stakeholder	Interested audience, research and academia, education, policymakers
Stakeholder benefit	Quick but detailed estimation of LCOE for a specific wind farm in Europe
Barrier/ risks	No UI, therefore, some minimum knowledge of Python is required to use it. The objective is that it can be also used via the WIMBY interactive map and TOPFARM, which partially addresses the lack of UI. Without updating cost-specific parameters, the model can become obsolete.
Owner and beneficiary(s) involved	DTU + ETH, to be discussed further with project partners.

KER41	**UPDATES TO THE NEW EUROPEAN WIND ATLAS MODEL**
Target stakeholder	Interested audience, research and academia, education, policymakers.
Stakeholder benefit	Updates to the already popular NEWA dataset including more recent years. Also, updated microscale modelling that will result in more accurate results.
Barrier/ risks	Due to the large size of the dataset, the data download speed is always a problem. Also how to support further updates once the project ends.
Owner and beneficiary(s) involved	DTU

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KER42	UPDATES TO TOPFARM
Target stakeholder	Interested audience, research and academia, education, policymakers.
Stakeholder benefit	New models make TOPFARM attractive because optimisation based on quantities other than AEP can be carried out.
Barrier/ risks	Without updating cost-specific parameters, the model can become obsolete.
Owner and beneficiary(s) involved	DTU

5. EXPLOITATION PLAN TIMELINE

5.1 Initial project phase (M01-M15)

A strategic approach to define and analyse the existing background IP, the initial patent landscape, opportunities, and risks of sharing knowledge is carried out in this section of the deliverable. Through iterative workshops and discussions, the exploitation strategy has taken shape over time, while preliminary results were drafted. Stakeholder groups were outlined, PESTEL and SWOT analyses were conducted, and the data helped to create a solid plan to exploit the results of WIMBY. This strategic work lays the foundation for a targeted and impactful exploitation path in the evolution of the WIMBY project.

5.2 Core project phase (M15-M24)

During the core project phase, the joint and individual exploitation strategies and pathways will be further refined. This includes identifying the possible IP ownership arrangements and related responsibilities, including possible joint ownership (e.g. patents, joint IPR agreements, etc.). Moreover, the Consortium will keep track of possible outcomes not originally foreseen, to promptly evaluate their potential exploitation. Similarly, market needs or stakeholder interests change, therefore Consortium members will be periodically invited to reconsider planned exploitation activities. In particular, a dedicated session will be organised during the 4th General Assembly around January 2025 (M25), when the first versions of the WIMBY interactive map (D5.1) and 3D Environment (D5.2) will be already deployed and upcoming updates from WP2 and WP4 could also be considered.

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5.3 Final project phase (M25-M36)

Once the project approaches its end, the focus of exploitation activities will shift towards the sustainability and legacy of WIMBY. The team will strive to ensure a smooth transition from the dissemination of results towards their practical applications and will continue to foster partnerships to maximise long-term impact. The goal is to maintain the relevance of WIMBY's findings, foster industry growth, and contribute to the realisation of a sustainable energy transition in Europe.

6. EC EXPLOITATION SERVICES

If the needs emerge, the WIMBY Consortium will refer to the available EC services related to exploitation, namely:

1. the **Horizon Results Booster (HRB)**[1], which offers free consultancies, as well as support for the exploitation of results.
2. the **Horizon Results Platform (HRP)**[2], where Key Exploitable Results, are available for all interested stakeholders and bi-directional engagement among beneficiaries and potential end-users is provided, directly or through National Contact Points (NCPs).
3. The **European IP Helpdesk**[3], supporting beneficiaries of EU-funded projects to manage their Intellectual Property in the context of EU research and innovation programs.

7. CONCLUSIONS

DBL has the leadership of task T6.4 - Exploitation of project results. All partners are responsible for preparing their individual and joint exploitation plans and providing input to the task, deliverables, and materials. If needed, a detailed joint Exploitation Agreement will be defined among partners to establish clear commercial routes, publication policies, and rights to exploit, finally providing fair commercial opportunities for all. This Agreement will refer to this Exploitation Plan, specifying the activities that the partners are committed to carry out before and after the end of the project to guarantee exploitation. Each Agreement will be signed by all involved partners, by the

[1] https://ec.europa.eu/research-and-innovation/en/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform/repository/horizon-results-booster

[2] https://ec.europa.eu/research-and-innovation/en/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform/repository/horizon-results-platform

[3] https://intellectual-property-helpdesk.ec.europa.eu/services/horizon-ip-scan_en

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project Coordinator and shared with the full Consortium for approval. As for the Communication and Dissemination plan, this document shall also be considered a living one, meaning that it will undergo several content updates, while the project advances. All partners can propose updates which will be jointly evaluated during project meetings and general assemblies.

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