PLANNING AND ENGAGEMENT ARENAS FOR RENEWABLE ENERGY LANDSCAPES PEARLS

PROJECT PLENARY FORUM REPORT
7th September 2023, Syracuse, Italy

Marie Skłodowska - Curie Actions (MSCA)
Research and Innovation Staff Exchange (RISE)
H2020-MSCA-RISE-2017 – 778039 - PEARLS

Prepared by PEARLS Steering Committee
September 7th, 2023

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PEARLS
EMPOWERING LANDSCAPES

COORDINATOR PROGRESS REPORT

(Period: October 18th, 2019 – September 7th, 2023)

Project Number	778039	Project Acronym	PEARL*S*
General information			
Project title	**P**LANNING AND **E**NGAGEMENT **A**RENAS FOR **R**ENEWABLE ENERGY **L**ANDSCAPE***S***		
Start date	01/07/2018		
End date	31/12/2023		
Duration in months	48 // 66		
Call (part) identifier	H2020-MSCA-RISE-2017		
Topic	MSCA-RISE-2017 Research and Innovation Staff Exchange		
Fixed EC Keywords	Human, Economic and Social Geography, Social Studies of Science and Technology, Spatial and Regional Planning, Energy collection, conversion and storage, Renewable Energy		
Free keywords	Renewable Energy Landscapes, Spatial Planning, Population Engagement, Social Innovation, Energy Behaviour		

Consortium Partnership:					
No	**Short name**	**Country**	**Representative on the Partnership Board**	**Entry month**	**Exit month**
1	USE	Spain	María-José Prados	1	48
2	UHU	Spain	Mª Ángeles Barral	13	66
3	UPO	Spain	Ricardo Iglesias	13	66
4	CLANER	Spain	Antonia Molina	1	48
5	Territoria	Spain	Michela Ghislanzoni	1	48
6	ICSUL	Portugal	Ana Delicado	1	48
7	ENERCOUTIM	Portugal	Marc Rechter	1	48
8	COOPERNICO	Portugal	Ana Rita Antunes	1	48
9	UNITN	Italy	Rossano Albatici	1	48
10	HABITECH	Italy	Marcello Curci	39	66
11	E4g	Italy	Giuseppe Macca	45	66
12	AUTH	Greece	Eva Loukogeorgaki	1	48
13	GSH	Greece	Vasiliki Charalampopoulou	1	48
14	CONS	Greece	Nikolaos Antoniou	1	48
15	CONS Geo	Greece	Georgios Tsakoumis	1	48
16	BGU	Israel	Na'ama Teschner	1	48
17	SP Interface	Israel	Hagit Ulanovsky	1	48

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1. Introduction

This Progress Report contains general information about the progress made in the *PEARLS* project between 18th October 2019 and 4th September 2023. Its main goal is to review the actions that have been undertaken by the consortium during this period for the Mid Term Meeting to be held. Article 19 ofthe Grant Agreement states that it is the coordinator's duty to organise a 'mid-term review meeting' between the beneficiaries, partner organisations, entities with a capital or legal link and the Agencybefore the deadline for the submission of the report for Reporting period 1 (RP 1). Article 20 statesthe obligation to submit reports, specifying that the coordinator must draft and submit the technicaland financial reports to the Agency. The reporting periods are RP1: from month 1 to month 24 (July2018 to June 2020) and RP2: from month 25 to month 48 (July 2020 to June 2022). The Consortium Agreement details that the Coordinator should be in charge of Project Plenary Forum (PPF). PPF conference must be organised upon the conclusion of the project and during the period of the final consortium meeting, thus giving the entire staff involved in the network, the Advisory Board experts and the networking group, the opportunity to provide a contribution of their experience in the project to a broad and select group of multisectoral and international experts from the Mediterranean area. Also, Consortium Agreement details that the Coordinator shall use its share of the funding for organise and cover the expenses related to the Project Meetings in addition to the PEARL*S* Project Plenary Forum (PPPF).

This Coordinator Progress Report contains general information about actions undertaken to carry out the secondments, financial aspects, and delivery of deliverables. It also explains/summarises the work carried out by all beneficiaries and linked third parties during this period and gives a broad overview of the progress towards the project objectives, justifying the differences between the work expected and the work performed, should there be any. Finally, it offers information about the progress made in the activities and the future plan until the project´s end December 31th 2023. As this working document that the PEARL*S* consortium has drafted for the PPPF also contains detailed information aboutthe progress made by each of the work packages, the Coordinator Progress Report does not make any detailed references to these to avoid unnecessary repetitions and/or duplications.

2. Purpose and main content of the project

The purpose of the PEARL*S* project is to reinforce the population's commitment to secure, clean, and efficient energy. With a Social Sciences approach, the project targets its analysis at Renewable Energy Landscapes (REL), with REL regarded as spaces where renewable energies change the population's relationship with energy and their landscape perception. PEARL*S*' goal is to contribute to the generation of a step-change in the way that REL are theorised, detected and addressed and so provide crucial support for the Pan-European Energy Challenge. Its main purpose is to radically transform scientific knowledge on how to best implement REL across Europe. Despite all efforts, resistance to REL lingers on in Europe/the U.S., while the reasons for strong social acceptance in Mediterranean and South American countries are still unknown. Thus, PEARL*S* will focus on Southern Europe and Israel due to their wealth of renewable energy resources and citizens' deep engagement with REL.

The consortium is underpinned by international, intersectoral and multidisciplinary collaboration as the nexus of a five-country holistic pool of universities and research centers in close cooperation with non-academic sectors. The partnership is composed of seven universities and ten non-academic beneficiaries (companies, private consultancies, cooperatives and business associations) (see table above). They all possess expertise and experience in working with renewable energy, energy policy, REL, spatial planning and social innovation through the internationalisation of applied research and training for capacity development. Their work and collaboration in the project are organised around seven work packages. Three of these are focused on aspects relating to organization, ethical commitment, and communication/dissemination. The four remaining work packages address content to research into the way to enforce renewable energy best practice to contribute to the Energy Challenge.

General information						
WP Number	**WP Title**	**Lead beneficiary**	**Activity Type**	**No. persons-Month**	**Start month**	**End month**
WP1	PEARLS INTERACTION PLATFORM	1 – USE	Communication and Dissemination	(not applicable)	4	65
WP2	SUSTAINABLE IMPLEMENTATION: POLICIES AND PRACTICES	1 – USE	Research and Training	26	3	56
WP3	SOCIAL BEHAVIOUR TOWARDS RENEWABLE ENERGIES	2 – CLANER	Research and Knowledge Transfer	13	7	63
WP4	SPATIAL PLANNING AND ANALYSIS	8 – AUTH	Training and Research	32	6	66
WP5	SOCIAL INNOVATION AND PUBLIC ENGAGEMENT	4 – ICSUL	Training and Research	19	6	60
WP6	PEARLS PROJECT MANAGEMENT	1 – USE	Management	(not applicable)	1	66
WP7	ETHICS REQUIREMENTS	1 – USE	Ethics	(not applicable)	1	66

Work Packages 2 and 4 compare related policies and practices in depth. Their purpose is to gain a better understanding of legal frameworks (energy policy, land use planning and landscape practice regulations) and daily practice in REL implementation. The focus of WP4 is critical knowledge transfer and skills enhancement relevant to spatial analysis and planning (GIS and multi-criteria analysis), landscape analysis and spatial database management. Work Packages 3 and 5 are focused on the individual and social dimensions of renewable energy development and REL implementation. Energy behaviour analyses to increase people's awareness of energy efficiency and renewable energies help overcome existing barriers to change in energy consumption. The social dimension in renewable energy development explores how resources from social research can be used to enhance the involvement of communities, to tap into local knowledge to create innovative solutions and defuse the potential causes of conflict around the cultural values that REL face. Work Packages 1 and 6 are designed to develop PEARLS communication and dissemination strategies together with project management activities. These are being achieved by the PEARLS multifunctional website and the Intranet to support internal daily activities. Lastly, WP7 guarantees compliance with the project's ethical commitments.

3. Secondments and financial statement of PEARLS Project

The project works via secondments, staff exchange and collaborative inquiry. PEARLS is executed on the basis of 59 secondments that are undertaken during the project's four years' duration, i.e., a total of 90 months. These secondments correspond to three staff profiles. The Experienced Researcher ER profile requires being in possession of a doctoral degree or having at least four years of research experience. A total of 22 secondments have been allocated to ER, from month 7 (January 2019) to month 65 (November 2023). Secondly, Early Stage Researchers ESR must be in the first four years of their research careers and not have a doctoral degree. A total of 21 secondments applies in this case, starting in month 13 (July 2019) and lasting until month 64 (October 2023). Finally, the Technical Staff TS profile is aimed at administrative, managerial or technical staff supporting research and innovation activities as part of the action, with 16 secondments carried out from month 3 (September 2018) to month 66 (December 2023). The first secondment began on September 24th, 2018 and the last is envisaged for month 66, December 2023.

The table below that summarises the secondments is organised around the work packages. The columns on the left-hand side of the table show the status of the 59 secondments that are currently being carried out. The first 47 secondments in the 4 work packages have been completed, 7 are ongoing, and 4 are pending commencement. The right-hand side of the table shows secondments by number of months. This means that 76 months of stay have been completed of the 90 months envisaged in the project, 10 months are pending finalisation and 4 months remain to be done.

State of execution of secondments by work package								
	Secondment				Months			
WP No.	Completed	In progress	Pending	Total	Completed	In progress	Pending	Total
WP2	13	3	4	20	19	3	4	26
WP3	6	2	1	9	10	2	1	13
WP4	16	0	1	17	30	0	2	32
WP5	11	2	0	13	16	3	0	19
TOTAL	46	7	6	59	75	8	7	90

Partner number	Partner short name	Country	EU/AC or TC	Academic sector	Total Number of secondments	Total Researcher Months Overall	Total Researcher Months (%)	Months Completed	Months In progress	Months Pending	Secondment Completed	Secondment In progress	Secondment Pending
1	USE	Spain	EU/AC	Yes	8	8	8,89%	6	1	1	6	1	1
2	CLANER	Spain	EU/AC	No	4	4	4,44%	4	0	0	4	0	0
3	Territoria	Spain	EU/AC	No	1	4	4,44%	4	0	0	1	0	0
4	ICSUL	Portugal	EU/AC	Yes	7	10	11,11%	6	3	1	4	2	1
5	Enercoutim	Portugal	EU/AC	No	1	1	1,11%	1	0	0	1	0	0
6	Coopernico	Portugal	EU/AC	No	4	4	4,44%	3	0	1	3	0	1
7	UNITN	Italy	EU/AC	Yes	8	12	13,33%	11	0	1	7	1	0
8	AUTH	Greece	EU/AC	Yes	6	14	15,56%	14	0	0	6	0	0
9	GSH	Greece	EU/AC	No	6	17	18,89%	16	1	0	5	1	0
10	Consortis	Greece	EU/AC	No	1	1	1,11%	1	0	0	1	0	0
11	Consortis Geospatial	Greece	EU/AC	No	1	1	1,11%	1	0	0	1	0	0
12	UH	Israel	EU/AC	Yes	0	0	0,00%	0	0	0	0	0	0
13	SP Interface	Israel	EU/AC	No	1	1	1,11%	0	0	1	0	0	1
14	BGU	Israel	EU/AC	Yes	2	2	2,22%	1	1	0	1	1	0
15	UHU	Spain	EU/AC	Yes	4	5	5,56%	3	0	2	3	0	1
16	UPO	Spain	EU/AC	Yes	3	3	3,33%	2	1	0	2	1	0
17	HABITECH	Italy	EU/AC	No	1	1	1,11%	0	1	0	0	1	0
18	E4g	Italy	EU/AC	No	1	2	2,22%	2	0	0	0	1	0
TOTAL					**59**	**90**	**100,00%**	75	8	7	45	8	6

Budget Distribution and Execution								
Partner	FUNDING				AMOUNTS PAID			
	Secondment	PART A 2,000€/unit	PART B 1,250€/unit	Total	Secondment	PART A 2,000€/unit	PART B 73%total	Total
USE	8	16,000.00€	10,000.00€	26,000.00€	8	16,000.00€	7,300.00€	23,300.00€
UHU	5	10,000.00€	6,250.00€	16,250.00	5	10,000.00€	4,562.50€	14,562.50€
UPO	3	6,000.00€	3,750.00€	9,750.00€	3	6,000.00€	2,737.50€	8,737.50€
CLANER	4	8,000.00€	5,000.00€	13,000.00€	4	8,000.00€	3,650.00€	11,650.00€
TERRITORIA	4	8,000.00€	5,000.00€	13,000.00€	4	8,000.00€	3,650.00€	11,650.00€
ICSUL	10	20,000.00€	12,500.00€	32,500.00€	10	20,000.00€	9,125.00€	29,125.00€
ENERCOUTIM	1	2,000.00€	1,250.00€	3,250.00€	1	2,000.00€	912.50€	2,912.50€
COOPERNICO	4	8,000.00€	5,000.00€	13,000.00€	4	8,000.00€	3,650.00€	11,650.00€
UNITN	12	24,000.00€	15,000.00€	39,000.00€	12	24,000.00€	10,950.00€	34,950.00€
HABITECH	1	2,000.00€	1,250.00€	3,250.00€	1	2,000.00€	912.50€	2,912.50€
E4g	2	4,000.00€	2,500.00€	3,250.00€	2	4,000.00€	1,825.00€	5,825.00€
AUTH	14	28,000.00€	17,500.00€	45,500.00€	14	28,000.00€	12,775.00€	40,775.00€
GSH	17	34,000.00€	21,250.00€	55,250.00€	17	34,000.00€	15,512.50€	49,512.50€
CONS	1	2,000.00€	1,250.00€	3,250.00€	1	2,000.00€	912.50€	2,912.50€
CONS Geo	1	2,000.00€	1,250.00€	3,250.00€	1	2,000.00€	912.50€	2,912.50€
BGU	2	4,000.00€	2,500.00€	6,500.00€	2	4,000.00€	1,825.00€	5,825.00€
SP Interface	1	2,000.00€	1,250.00€	3,250.00€	1	2,000.00€	912.50€	2,912.50€
TOTAL	90	180,000.00€	112,500.00€		90	180,000.00€	82,125.00€	262,125.00€
COORDINATOR			112,500.00€					

The secondments form the basis for the calculation of the budget allotted to the project and for its distribution among the consortium partners. Section 7 of the Consortium Agreement contains the Financial Statement regarding financial provisions and the Distribution of Financial Contribution establishes the criteria for the distribution of funding. This distribution was affected because of the entry of four new partners. The maximum amount to be financed is 405,000€. The Commission will send four payments and these will form the basis for the time distribution of payments to beneficiaries. A first payment of 243,000€ has been received from the Commission to date, made

in July 2018, when the first payments were also made to the beneficiaries. The first payment to beneficiaries was made up of costs for seconded Staff Membersfor secondments to be undertaken in the Project's first year (PART A) and 65% of the costs corresponding to training and networking costs and management and indirect costs (PART B) of all the secondments that the beneficiary will undertake during the whole Project. A second payment was made to partners in July 2019 that included the costs for seconded Staff Members during the second year of the Project (PART A).

Section 7.1.4. of the Consortium Agreement details budget allocations by partner, starting with the amounts allocated (right-hand side of the table), and giving the final distribution of the amounts paid. So, the table shows the total amount to be received by each of the beneficiaries and the total paid by the coordinator to each of the beneficiaries. The last column gives the percentage of total funding currently paid in.

In relation to the Coordinator's expenses, it should be stated that prior to the Mid Term Meeting amounts have been justified for the Project's July 4th Kick off Meeting in Seville (5,496,24€) and the first in-person meeting of the Steering Committee Meeting-Lisbon 2019 (2,220.61€). Afterwards, the Trento meeting took place and later on the meeting of the Consortium: KOM Seville 2018, the MTM Malaga 2019 and Syracuse as final meeting in September of 2023. There were also expenses for the doctoral course and the Greek course, field work and other meeting. Other expenses include hiring of personnel, creating the WEB, it is maintenance and computer equipment to carry out all this work. The creation of the website and its maintenance have been co-funded by the 6th Research and Transfer Plan at a cost of 4,365.69€. The amount justified and charged to the PEARL*S* Project for the Internal Communication Platform is 1,578.75€.

4. Deliverables and Milestones

The coherence and appropriacy of the work plan involve both the deliverables and the milestones. The timetable of the former clearly indicates that all team members will include the reporting sequence, dates, and formats of the expected deliverables across all the Work Packages. The PEARL*S* Project offers as part of the results the list of deliverables indicated in the table. There are 25 deliverables corresponding to the various milestones of the seven work packages. The distribution of deliverables by WP is quite balanced in the case of those of a thematic nature related to the objectives and tasks of each, with between two and three deliverables on average. The deliverables of the last two WP, 6 and 7, are mandatory according to the European Research Agency's MSC-RISE programme.44% of the deliverables on this list are available for public consultation. They are very diverse in nature. On the one hand, there are means for project communication and dissemination, such as the Project Website (D.1.1 y D.4.3), the Plenary Forum Project (D.1.3) and two Seminars or Workshops on REL Spatial Planning and Social Innovation Techniques (D.2.3 and D.5.2) as part of WP5. Some working documents are also public. Their purpose is to serve as a guide to reinforce the population's commitment to secure, clean and efficient energy. This is the case of the Strategies, Statements and/or Working Schemes Reports of WP 1 (D.1.2) and WP 3 (D.3.2, D.3.3), and the Project's Data Management Plan (D.6.2). Lastly, WP 2 (D.2.2) reports on interviews to relevant experts and the case studies that are communicated in the Online Atlas (D.5.1) are also available to public access.

Deliverables				
D No	**Title**	**WP No**	**Type**	**Dissemination level**
D1.1	Project website.	WP1	Website	Public
D1.2	Digital Marketing Strategies and follow-up questionnaires.	WP1	Report	Public
D1.3	Project Plenary Forum.	WP1	Other	Public
D2.1	Research reports.	WP2	Report	Confidential
D2.2	Interviews.	WP2	Report	Public
D2.3	Research Seminar.	WP2	Report	Public
D3.1	Market Segmentation, Key Actor Maps, Indicator Analysis.	WP3	Report	Confidential
D3.2	Statement Supporting Renewable Energy Efficiency.	WP3	Report	Public
D3.3	Crowdsourcing Working Schemes	WP3	Report	Public
D4.1	Best Current Practices.	WP4	Report	Confidential
D4.2	Sustainable Energy Planning methodologies.	WP4	Report	Confidential
D4.3	Web-GIS Platform.	WP4	Other	Public
D5.1	Cases Studies.	WP5	Other	Public
D5.2	Training	WP5	Other	Public
D6.1	Internal Communication.	WP6	Websites	Confidential
D6.2	Data Management Plan (Open Research Data Pilot).	WP6	ORDP	Public
D6.3	Progress report I.	WP6	Report	Confidential
D6.4	Progress report II.	WP6	Report	Confidential
D6.5	Mid-term meeting.	WP6	Other	Confidential
D7.1	H-Requirement No.3.	WP7	Ethics	Confidential
D7.2	H-Requirement No.4.	WP7	Ethics	Confidential
D7.3	POPD-Requirement No.5.	WP7	Ethics	Confidential
D7.4	POPD-Requirement No.6.	WP7	Ethics	Confidential
D7.5	POPD-Requirement No.10.	WP7	Ethics	Confidential
D7.6	NEC-Requirement No.14.	WP7	Ethics	Confidential

The remaining 14 deliverables are confidential and, therefore, can only be accessed by Consortium members. In very general terms, their profile corresponds to deliverables that consist of empirical research material, for example, research reports (D.2.1), indicator analysis (D.3.1), methodologies (D.4.2) and practices (D.4.1). The Internal Communication Platform (D.6.1) and the documents and deliverables of the Mid Term Meeting (D.6.5) are also confidential. Dissemination of the Progress Reports and the Ethics Requirements is restricted in all cases. The Grant Agreement states that the coordinator must submit a 'progress report' within 30 days of the end of each year.

Eleven deliverables have been delivered prior to the holding of the Mid Term Meeting and D.2.1 comes due in two weeks' time followed by D.6.5. For the most part, these have consisted of preparatory materials for kicking off the Project in implementing the research and duringits initial stages.

Deliverables Delivered				
D No.	**Title**	**WP No**	**Leader**	**Due Date**
D1.1	Project website.	WP1	USE	October 2018
D7.6	NEC-Requirement No.14.	WP7	USE	October 2018
D7.1	H-Requirement No.3.	WP7	USE	November 2018
D7.2	H-Requirement No.4.	WP7	USE	November 2018
D7.3	POPD-Requirement No.5.	WP7	USE	November 2018
D7.4	POPD-Requirement No.6.	WP7	USE	November 2018
D7.5	POPD-Requirement No.10.	WP7	USE	November 2018
D6.1	Internal Communication.	WP6	USE	December 2018
D6.2	Data Management Plan.	WP6	USE	January 2019
D4.1	Best Current Practices.	WP4	AUTH	June 2019
D6.3	Progress report I.	WP6	USE	July 2019
D2.1	Research reports.	WP2	USE	October 2019
D6.5	Mid-term meeting.	WP6	USE	December 2019
D3.1	Market Segmentation, Key Actor Maps, Indicator Analysis.	WP3	CLANER	July 2020
D2.3	Research Seminar.	WP2	USE	October 2022
D3.3	Crowdsourcing Working Schemes.	WP3	CLANER	November 2022
D6.4	Progress report II.	WP6	USE	January 2023
D2.2	Interviews.	WP2	USE	February 2023
D4.3	Web-GIS Platform.	WP4	AUTH	April 2023
D5.1	Cases Studies.	WP5	ICSUL	June 2023
D5.2	Training.	WP5	ICSUL	April 2023
Deliverables not delivered				
D No.	**Title**	**WP No**	**Leader**	**Due Date**
D3.2	Statement Supporting Renewable Energy Efficiency.	WP3	CLANER	September 2023
D1.2	Digital Marketing Strategies and follow-up questionnaires.	WP1	USE	October 2023
D1.3	Project Plenary Forum.	WP1	USE	October 2023
D4.2	Sustainable Energy Planning methodologies.	WP4	AUTH	December 2023

The remaining deliverables go more fully into the challenges of excellence, impact, and project dissemination and communication. As the secondments are executed and progress is made in the scientific objectives of the research, there will be an improvement in the PEARL*S* reach and contribution to the strengthening of European research, innovation, and knowledge transfer structures.

A general overview of the progress towards the objectives of the PEARL*S* Project also includes the milestones. No milestones have been reached to date, as their due dates are not in the reported period. Despite this, some of those that are in process are indicated. In conjunction with compliance with the deliverables timetable, and assuming that there have been no demands or delays in information, this enables an evaluation to be made as to whether the Project is developing in line with the envisaged work and execution plan.

Milestones				
M No	**Title**	**WP No**	**Leader**	**Due Date**
MS1	Expert recruitment/selection of Mediterranean countries	WP1	USE-UNITN	64
MS2	Fieldwork on EIA	WP2	USE-HU	52
MS3	Preliminary Agreements	WP3	CLANER	63
MS4	Website design	WP4	AUTh	58
MS5	Background to training activity	WP5	ICSUL	60
MS6	Financial Management	WP6	USE	65

5. Project changes

Project execution involves the rigorous schedule stated in sections 3 and 4, risk and financial management, and embedding quality assurance into all processes. The coordinator together with the Steering Committee is responsible for guaranteeing that the project's goals are met and for foreseeing and avoiding risks. Two of the risks originally foreseen have had to be contended with. Firstly, the delay in planned split secondments is addressed through ongoing dialogue between the Coordinator and affected team members in order that they are finalised as soon as possible and the plan adjusted accordingly (Risk number 1). It is a usual occurrence that when an initial concrete proposal is made for a secondment agenda for the four years of a Project's duration, changes occur that must be borne with flexibility so that the finalisation of the programmed tasks is guaranteed without neglecting professional commitments and striking a balance between work and personal life. Secondly, a travel and secondment protocol had been devised (R no. 9) due to Israel's involvement in the project as a third country. This document, TRAVEL RECOMMENDATIONS TO ISRAEL, is posted on the website for anyone who is interested to see (http://pearlsproject.org/wp-content/uploads/2019/06/Travel-Recommendations-to-Israel-4.pdf). In addition, another document was prepared regarding these recommendations entitled PEARLS PROJECT SECONDMENT PROTOCOL. Its main objective is to act as a guide to secondments and guarantee that all the required administrative and communication issues are addressed for them to cometo a successful conclusion. This information is available at http://pearlsproject.org/wp-content/uploads/2019/06/Secondment-Protocol.pdf. The document entitled SECONDMENT STATEMENT is a stencil for project secondees. This information is available at: https://pearlsproject.org/wp-content/uploads/2023/07/Secondment_statement.pdf Lastly, with respect to the possibility of a Project Gender Imbalance (R no. 10), it needs to be highlighted that it again falls to the Project Coordinator and the Steering Committee to ensure that both secondment and involvement in other PEARLS Project tasks address balanced gender representation in all staff categories. As there is most women (eleven organisation representatives) over men (six representatives) in the Consortium and given that this might result in the creation of networks with respect to the selection of the secondments, special care has been given to balanced participation in stays. To date, 27 women and 14 men have taken part in the 59 secondments; this means that from the 90 months 57 has been done by women and 33 by men. Their vision and contexts no doubt are enriching for compliance with the objectives. To conclude, for 9 months the project has been able to count on collaboration from a research technician from a Youth Employment plan for Young Researchers. This has enabled the inclusion of a mentally impaired person whose dedication, commitment and engagement have without doubt greatly enriched the consortium of the project.

His figure focused on carrying out support activities and documentation management for the correct functioning of the tasks as well as an intermediary between institutions and researchers. There were also changes in the administrative team since Almudena Arrabal left the project and Arturo José Labat joined in his place, who, in the same way, performs administrative and economic tasks.

Project execution also involves changes not originally envisaged. Although initial changes are of minor importance, this does not mean that they should not be mentioned here. Dr Teschner changed his job and moved from Haifa University to the Ben-Gurion University of the Negev and was thus the first person to withdraw from the PEARL*S* Consortium. Due to his retirement, Prof. Bruno Zanon has handed the baton over to Dr Albatici.

But these were not the last modifications. After the pandemic, with the second amendment in 2021, the project was resumed and at this time the project included three new beneficiaries: the University of Huelva and the Pablo de Olavide University, both from Spain and from the academic field, and Habitech, which is an Italian company. In this way, the project managed to expand its fields of study and, in turn, bring together professionals from different areas.

Finally, in 2023, the Italian company Ethic for Growth entered the project, thus closing the list of beneficiaries involved in the project. His entry, in addition to helping the project work on different WPs, was a great support for the final meeting (PPPF).

Critical Implementation risks and mitigation actions			
R No	**Description**	**WP No**	**Proposed risk-mitigation measures**
1	Delay/Non-execution of planned secondments.	WP2 to WP5	Affected teams seek dialogue with the project coordinator as soon as possible and adjust their plans accordingly
2	Delays in deliveries.	WP6	From the beginning of the project, quality control and close communication are needed between partners and the Steering Committee.
3	Delays in providing inputs by partners for reports, dissemination.	WP2 to WP6	Clear deadlines and guidelines are needed (e.g., length of reports). If any modifications arise during the project, all partners are informed by the Steering Committee as soon as possible.
4	Lack of available data for research activities.	WP2 to WP6	Intranet communication from researchers to the Steering Committee suggesting alternative data to promote homogeneous comparative research analysis.
5	Lack of comparability of reports.	WP2 to WP5	Collaboration with non-academic partners is crucial in this respect and will be sought early in the project. If this approach is unable to yield results, further networks and multipliers will be activated to identify appropriate organisations.
6	Difficulty in determining `successful´ practices for case studies.	WP2 to WP5	Collaboration with non-academic partners is crucial in this respect and will be sought early in the project. If this approach is unable to yield results, further networks and multipliers will be activated to identify appropriate organisations.
7	Failure to display the values of the teaching tool in practice.	WP2 to WP5	Close cooperation and involvement will be required of non-academic partners and their specific needs for a teaching tool. At the end of the project, their communication channels will be useful for disseminating the teaching tool and driving its application.
8	Poor dissemination/no take-up by stakeholders, practitioners or the media.	WP6	A dissemination strategy will be developed at an early stage. From the beginning of the project, communication tools have to be used by all partners. Efforts include the presence of project partners in the media, in local networks and at (inter)national conferences.
9	Travel risks.	WP2 to WP5	The University of Seville has a policy and an associated centrally-managed-risk assessment instrument which all staff are compelled to complete. The Steering Committee will be responsible for ensuring that all partner participants have their need for insurance cover addressed.
10	Project gender imbalance.	WP1 to WP6	The Project Coordinator and the Steering Committee will ensure that both secondments and involvement in other PEARLS project activities will entail balanced gender representation in all staff categories.
11	Current fluctuations	WP6	The University of Seville has a financial approach that allows for such contingencies and effectively indemnifies the project against occurrences of this type.

Other important changes have not been a risk to the objectives being achieved and tasks being carried out, but they also need to be mentioned. The first of these is the difference in funding awarded for secondments. Given that the amounts allocated for each of the secondments stands at 2000 Euros/person/month irrespectively of the distance travelled from the place of work, co-funding has been required when beneficiaries must split their secondments or have to travel by plane. Due to agenda and life balance requirements, many of the secondments take place during the summer months, which also contributes to raising the cost of travel and accommodation. Due to the temporal Covid-19 restrictions and the recent Russia invasion of Ukraine in an escalation of the Russo-Ukrainian War, prices and trips have been altered. Also, the inflation rate has increased worldwide, in an inflationary environment, unevenly rising prices inevitably reduce the purchasing power of some people. ECo- funding has been essential in some cases. Secondly, implementing the WP1 Follow-Up Questionnaire is turning out to be another imponderable. This had to be sent

to a select list of experts in the field of spatial planning and public engagement on REL during the months of August and September 2019. In the month of July, both the list of experts and the questionnaire were ready to be implemented but could not be. Not all questionnaires were answered as some people have retired or changed jobs during this time, or they just have not send it yet, which makes it difficult to read the results. Observations relating to the security of the online platform and the need to count on the agreement of the Steering Committee led to delays that were attempted to be resolved as soon as they were heard from.

Thirdly, in relation to the deliverable 4.3 in the WP4, the project has included a GIS on its website. This tool is the result from Geosystems Hellas's work. This GIS collects many of the analysis that have been carried out throughout the project as well as their results, creating a visual and interactive space (http://pearls-webgis.geosystems-hellas.gr/).

Fourthly, a change has occurred in the secondments allocated todifferent beneficiaries from those who were initially assigned due to readjustments, the incorporation of new partners and the development of the tasks of each WP. These change requests begin with the communication to the Coordinator, who submits them to the Steering Committee for discussion and communicates them to the consortium for inclusion/reassignment. Subsequently, the Coordinator informs the Project Officer for approval. This will lead to adjustments being made and new allocations made to beneficiaries. This is already being attended to by many Consortiummembers.

6. New beneficiaries

Two new academic partners and two new non-academic partners have been incorporated. The Universities of Huelva and Pablo de Olavide in Spain have joined the consortium.

UHU - The University of Huelva (UHU) is a young institution It is part of the Campuses of International Excellence in agri-food industry (ceiA3), sea (CEIMAR) and environment, biodiversity, and global change (CEI CamBio). The OTRI (Research Results Transfer Office) is the responsible agency for promoting and managing the relationships between the university, public research organizations and sectors of the business environment. OTRI provides support services and technical assistance to research groups and businesses, promoting, collaborating, and participating in the management of the EU R&D Framework programme, projects funded under the INTERREG Community Initiative, Patents and Intellectual Property.

UPO - The Universidad Pablo de Olavide (UPO) is one of the newest public universities. UPO has actively participated in research funding programs at a European and International level since its creation. Most of the projects, belong to the EU R&D Framework programme. Proof of this research capacity are the numerous projects and research financed by the European Research Council or the presence of outstanding research centres. Within the specific theme of this project, the coordination from the CEI CamBio (Campus of International Excellence for the Environment, Biodiversity and Global Change) stands out.

The Italian companies Habitecht and Ethics 4 Growth have been incorporated in two different amendments carried out on 2022 and 2023 to strengthen the presence of companies from this country in PEARLS.

E4g – Ethics4Growth is a social innovation studio that offers coaching and other consulting services for social impact startups and companies that wish to innovate in the field, plus, the studio is involved in sustainable/social development projects for territories. They are offering services for sustainable entrepreneurship to support local youth to invest in the economic development of their territories.

They believe in a GLOCAL approach, thinking globally and acting locally. Within several projects, Ethics4Growth carries out future studies laboratories and workshops to support communities in co-planning and co-designing their territories and their projects on a long-term base.

HABITECH - the Energy and Environment District - is the Italian leading centre for green building, renewable energy and innovation. As a non-profit cluster organization, the company aims at creating business networks and production chains specialised in the fields of sustainable buildings, energy efficiency and smart technologies for managing the territory. It consists of 130 members (2021), including SMEs, large companies, research centres and public entities established in the Autonomous Province of Trento and elsewhere in Italy. Habitech is at the forefront in several regional, national, and European projects and initiatives which enhance the different dimensions of sustainability.

All these organisations have been selected for their diverse, complementary experience and expertise in planning and public engagement in renewable energy in Southern European countries. All are highly internationalised organisations in the Mediterranean Basin and have a proven ability to ‘go the extra mile’. Members have international reputations, have been widely published and possess a range of research experience and qualitative and quantitative competencies that include geographic information systems; urban and spatial planning; environmental impact assessment; case studies and observation of land use-land cover changes/comparative territorial analysis; interviews, surveys and focus groups; law and policy documentary analysis; and literature reviews.

WP1 PEARLS Interaction Platform:
2nd Periodic Report (Period: October 18th, 2019 – September 7th, 2023)

Lead beneficiary	1-USE, 12-BGU		Start month	September 2018	End month	February 2023
Participation per Partner						
1–USE	2–CLANER	3–Territoria	4-ICSUL	5 - Enercoutim	6-COOPERNICO	7-UNITN
8-AUTH	9-GSH	10-CONSORTIS	11-CONSORTIS Geo	12-UH	13-SP Interface	14-BGU
15-UHU	16-UPO	17-HABITECH	18-E4g			

Objectives

1. To communicate the project, its mission, progress and results, by including strategic and effective communication activities, such as the project website, press releases, written media of different types, oral communications and interactive social media.
2. To disseminate project results to the scientific and R&I community through publications, conferences, technological outputs and EC-H2020 channels.
3. To share expertise arising from research results with potential users from an international and multi-sectoral audience by providing targeted information to multiple audiences via two-way exchange channels.

Description of work and role of partners

The main goal of this WP is to strengthen external communication and to develop dissemination strategies during the execution of the PEARLS project and subsequently. Together with WP2 to WP5, WP1 will disseminate and communicate results to a wider audience via all currently available international standards.

Task 1. Establishment of project website (PW), data sharing platform and regular website updates to provide key information on the project and contact information for all partners. Implementation of a video channel to disseminate declarations and PEARLS project fieldwork and case studies WP2 - WP5. The public section of the project website will be implemented for communication to the public through social media (i.e., Facebook, Twitter, Instagram, Pinterest). (D.1.1)

Task 2. Together with WP6, a strategy framework will be established for the treatment of IP generated in the project. Projects results will be periodically reviewed for quality assurance by the Steering Committee. Development of Social Media and Digital Marketing Strategies (MS) to post online preliminary findings provided by WP2 to WP5 on specialised scientific production search engines (Google Scholar, World Wide Science, Academia.edu, ResearchGate, Dialnet, etc.) following IPR and quality assurance rules. (D.1.1)

Task 3. In relation to WP2 and 3, preparation of brief online follow-up questionnaires (F-Up Q) to interrogate an international multisectoral panel of experts about PEARLS progress with the aim of providing information cuts to the media and to disseminate results to a broad multidisciplinary scientific audience. (D.1.2)

Task 4. PEARLS Project Plenary Forum (PPF) for dissemination and communication of project end results by the whole consortium and the Advisory Board aimed at a broad and selected group of multisectoral, international experts from the Mediterranean area. Research and Training activities in WP2 and WP5. (D.1.3)

List of deliverables

D Nº	Title	Leader	Type	Dissemination	Due Date
D1.1	Project website	1-USE	Websites, patents filing, etc.	Public	October 2018
D1.2	Digital Marketing Strategies and follow-up questionnaires.	1-USE	Report	Public	October 2023
D1.3	Project Plenary Forum.	1-USE	Other	Public	October 2023

Schedule of relevant Milestones

M Nº	Title	Leader	Due Date	Means of verification
MS1	Expert recruitment /selection from Mediterranean countries	1-USE	October 2023	Commitment of partnership international companies and associations from outset

1. Introduction

The present document concerns the *2nd periodic report of WP1* aiming at describing the WP1 activities implemented during *October 18, 2019 – September 7, 2023.*

The WP1 aims to strengthen external communication during the execution of the PEARL*S* Project. The project, its mission, progress and results are disseminated using several tools. The main tool consists in the application and development of virtual Project communication and dissemination instruments via the Project website. The website helps partial PEARL*S* results to be optimally positioned in a range of formats (documents, articles, news, media statements, interviews, videos, etc.). Other means of communications are used such as press releases, written media of different types, oral communications, interactive social networks (i.e. Twitter) and video channels.

Moreover, in WP1 the partners are going to disseminate project results to the scientific and R&I community through publications, conferences, technological outputs and EC-H2020 channels. One of the main goal is to share expertise arising from research results with potential users from an international and multi-sectoral audience by providing targeted information to multiple audiences via two-way exchange channels.

All participants are involved in WP1.

During the reference period: ***(1)*** WP1 Task 1 (regarding the project website) has been furtherly implemented, new sections have been opened, the On-line Atlas has been upgraded; ***(2)*** the project results has been presented in several conferences, public meetings, papers in Journals; ***(3)*** the Follow-up Questionnaire has been re-submitted to the same target group defined in 2019 (panel of experts) in each participating country.

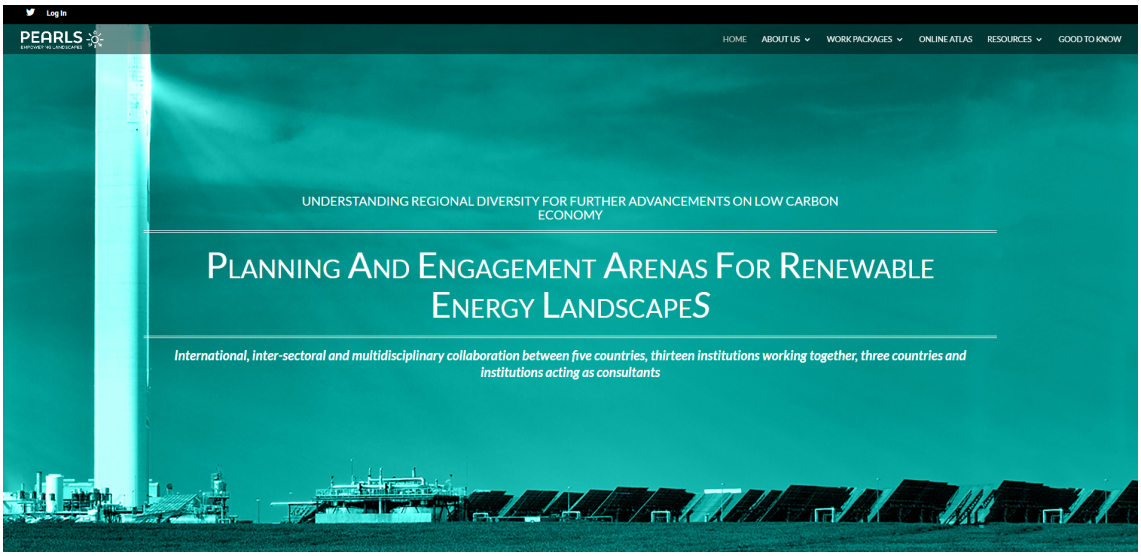
In the following sections, all the above items are described in detail.

2. Definition of WP1 Methodological Framework

The WP1 PEARL*S* INTERACTION PLATFORM engages public society in order to communicate to non-specialists the latest innovative ideas and results achieved within the Project. The main goal is to reduce the gap between research conducted by the scientific community and the public audience, and to provide evidence of the impact of research and innovation projects on society, academic and non-academic partnerships. Project rationale and outcomes are communicated through initiatives common to all participants in collaboration with local institutions and authorities in project partners' home countries. Several initiatives have been done (see chapter 4) and a "PEARLS Project Plenary Forum" (PPPF) event has been organized in Siracusa (Sicily – Italy on the 7-8 September 2023) to raise awareness of emerging issues and the project's main findings in the Mediterranean area. The PPPF has been co-organized by Ethics4Growth, an Italian non-academic beneficiary, whose objective is to offer coaching and other consulting services for sustainability-oriented start-ups and companies that want to impact in territorial development. The company offers services for sustainable entrepreneurship to support local youth to invest in the economic development of their territories. After a first session with the general presentation of PEARL*S* Project and its main results, a visit to Ferla Energy Community has been done as a relevant case study for the project. Experts and stakeholder representatives have been invited to take part in a round table discussion of the principal issues addressed by the project and to respond to questions from the audience.

3. Project website

The project website (https://pearlsproject.org/) has been furtherly implemented.



In particular:

- Concerning the Secondments´ statements: a new design has been proposed, considering information of the secondment activity and output per person; the layout of the content has been changed to a horizontal version for easier viewing. Here information is collected from each researcher and their experience of each secondment:

- The Web-GIS Platform tool is fully operational. Case studies in the participating countries have a minimum of common information and some common layers are included (based on the output of the WP4), even if the layers depend also on the characteristics of each case study. There is information about Greece, Israel, Italy, Portugal, Spain. In each section you can interact with different layers that are displayed on the map showing the results obtained.

- New study cases have been added to the On-line Atlas. In total they are 10 in Portugal, 4 in Italy, 3 in Spain, 3 in Greece and 3 in Israel.

- Research seminars: a new section considering dissemination with research seminars activity has been added.

- Good to know: the section about news and important matters on the Project output has been constantly implemented.

- About the project: in this section (about us) information regarding the work team and new companies/universities has been updated.

The PPW has been continuously updated following the project development.

4. Dissemination

Marketing strategies consist in two main actions:

- taking contact, also informal, with other projects, organizations or foundations that share PEARLS objectives, in order to reinforce future collaborations.
- considering WP2-WP5, publishing scientific and/or advertising papers/articles about the project.

4.1 Contacts with other projects, organizations or foundations

During the second part of the project, several contacts, both formal and informal, has been taken to share the projects activities and results (hereafter, only additional information to the ones already stated in the First periodic report are reported).

Contacts with projects sharing similar objectives:

- OCEANIDS: User-driven applications and tools for Climate-Informed Maritime Spatial Planning and integrated seascape management, towards a resilient & inclusive Blue Economy. HORIZON-MISS-2022-CLIMA-01-01 - GA preparation/ GAP-101112919.
- TOPIO: Towards Democratic Landscape Observation through Geoinformatics and Public Participation, proposal number SEP-210921656 - TOPIO submitted within the call HORIZON-MSCA-2022-SE-01 / GA preparation.

Contacts with organizations:

- Junta de Andalucía - Oficina de Ordenación del Territorio - Delegación Territorial de Cádiz, Consejería de Fomento, Infraestructuras y Ordenación del Territorio (Department of Territorial Planning in Cadiz) – Ms. Marta Rodríguez Clausell

Address: Plaza de Asdrúbal, 6, Cadiz, Spain

- Junta de Andalucía - Departamento de Planeamiento de Protección - Dirección General de Patrimonio Histórico y Documental (Protection Planning Department - General Directorate of Historical and Documentary Heritage) – Ms. Gema Aguilera Gómez

Address: c/ Levíes 27, 41004 Sevilla

- Territorial Análisis Territorial y Ambiental (Environmental Consulting agency) – Mr. Juan José González López

Address: PI Ctra. Isla C/ Hornos 2 · Sevilla

- Paros Municipality. Mr. Markos Kovaios, Mayor

Address: Parikia, Paros, Greece

http://dimosen.paros.gr/homepage/

- Technical Chamber of Greece / Section of Central Macedonia: Thessaloniki, Greece.

Address: 49 Megalou Alexandrou Av., 546 43 Thessaloniki, Greece

https://tkm.tee.gr/english-page/

- Centre for Renewable Energy Sources and Saving

Division of Renewable Energy Sources

Adress: 19th km Marathonos Ave, 19009, Pikermi Attiki Greece

http://www.cres.gr/kape/index_eng.htm

- ELECTRA ENERGY

Address: 7, Olympionikon Street, 16342, Athens, Greece

https://electraenergy.coop/

- Municipality of Komotini

Address: 1 Viziinoy Square, 69100, Komotini, Greece

https://www.komotini.gr/

- Municipality of Paeonia

Address: 75-77 M. Alexandrou str., 61200, Polykastro, Greece

https://paionia.gov.gr/

- Municipality of Kilkis

Address: 17 Kapeta str., 61100, Kilkis, Greece

https://www.e-kilkis.gr/

- Directorate of Development and Environment Prefectural Unity of Kilkis

Address: 3 A. Papandreou Str., 61100, Kilkis, Greece

- Attica Energy Community

Address: 14 N. Plastira, 14671 N. Erythrea, Attiki, Greece

https://atticaenergycommunity.gr/

- Energy cooperative: Miriam Rodríguez, Senior Manager and Dimitris Kitsikopoulos, Vice – President at "Electra. Energy Cooperative".

Address: 7, Olympionikon Street, Ilioupolis,Attica, Greece

http://electraenergy.coop/

- Energy cooperative: Apostolina Tsaltampasi, President of Energy Cooperative WenCoop

Address: 14, Olympiou Diamanti, 54626, Thessaloniki, Greece

wencoop.gr

- The Heinrich Böll Foundation: Michalis Goudis, Director and Kyriaki Metaxa, Coordinator of the Ecology Programme of Heinrich Böll Stiftung, Thessaloniki Office - Greece

Address: 3, Aristotelous Str., 54624, Thessaloniki, Greece

Heinrich Böll Stiftung - Thessaloniki Office (boell.org)

4.2 Publications

The following publications and communications to conferences have been issued (hereafter, only additional information to the ones already stated in the First periodic report are reported, listed in order by date of publication/presentation).

4.2.1 Scientific papers

- Codemo, A., Favargiotti, S., Albatici R. (2021). Balancing adaptation and mitigation strategies through an integrated approach. Climate responses in the human habitat, *SUSTAINABLE MEDITERRANEAN CONSTRUCTION*, v. 2021 Vol. 13, p. 123-129

- Codemo, A., Pianegonda, A., Ciolli, M., Favargiotti, S. & Albatici, R. (2021). Mapping pervious surfaces and canopy cover using vector data digital elevation models and high-resolution airborne imagery to support urban planning, *Sustainability*, v. 14, n. 10, p. 614901-614921. - URL: https://www.mdpi.com/2071-1050/14/10/6149 . - DOI: 10.3390/su14106149

- Codemo, A., Favargiotti, S., Albatici, R. (2021). Fostering the climate-energy transition with an integrated approach. Synergies and interrelations between adaptation and mitigation strategies., *TEMA*, v. 2021 Vol.14, n. 1, p. 5-20. - DOI: 10.6092/1970-9870/7157

- Spyridonidou S., Sismani G., Loukogeorgaki E., Vagiona D.G., Ulanovsky H. and Madar D. (2021). Sustainable Spatial Energy Planning of Large-Scale Wind and PV Farms in Israel: A Collaborative and Participatory Planning Approach, *Energies*, 14(3), 551; https://doi.org/10.3390/en14030551.

- Nagkoulis N., Loukogeorgaki E. and Ghislanzoni M. (2022). Genetic Algorithms-Based Optimum PV Site Selection Minimizing Visual Disturbance, *Sustainability*, 14(19), 12602; https://doi.org/10.3390/su141912602.

- Prados, M.J.; Iglesias-Pascual, R., Barral, M. A. (2022). Energy transition and community participation in Portugal, Greece and Israel: Regional differences from a multi-level perspective. *Energy Research & Social Science*, 87, 102467. https://doi.org/10.1016/j.erss.2021.102467

- Romov, E., Teschner, N. A. (2022). A Place under the Sun: Planning, Landscape and Participation in a Case of a Solar Powerplant in the Israeli Desert, *Sustainability*, 14(13), 7666.

- Spyridonidou S., Loukogeorgaki E., Vagiona D.G. and Bertrand T. (2022). Towards a Sustainable Spatial Planning Approach for PV Site Selection in Portugal, *Energies*, 15(22), 8515; https://doi.org/10.3390/en15228515.

- Codemo, A., Barbini, A., Mantouza, A., Bitziadis, A., Albatici, R. (2023). Integration of Public Perception in the Assessment of Licensed Solar Farms: A Case Study in Greece, *Sustainability*, 15(13):9899. https://doi.org/10.3390/su15139899

- Codemo, A., Favargiotti, S., Albatici, R. & Ghislanzoni, M. (2023). Hacia un enfoque paisajístico en la planificación energética local - Towards a landscape-approach to local energy planning, *PH*, n. 108. - DOI: 10.33349/2023.108.5274

- Delicado, A., Pallarès-Blanch, M., García-Marín, R., del Valle, C., Prados, M.J. (2023). David against Goliath? Challenges and opportunities for energy cooperatives in Southern Europe, *Energy Research and Social Sciences*, 103, https://doi.org/10.1016/j.erss.2023.103220 (Available online 26 July 2023)

4.2.2 Proceedings

- Delicado, A. (2020). Comunidades de energia renovável. In Pensar o Eco-bairro, pp. 23-26. Lisboa: Associação Eco-bairros do futuro. ISBN 978-989-33-1028-1

- Kontopoulos, C., Barral, M.A., Ruiz, A., Prados, M.J., Fidania, S., Tsakoumisc, G., Charalampopoulou, V. (2020). Planning and engagement arenas for renewable energy landscapes, Paros island example. Eighth International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2020), edited by K. Themistocleous, G. Papadavid, S. Michaelides, V. Ambrosia, D. G. Hadjimitsis Proc. of SPIE Vol. 11524, 1152416 2020 SPIE https://doi:10.1117/12.2571843

- Delicado, A., Pallarès-Blanche, M., Prados, M. J., Garcia, R., Del Valle, C. (2021). Cooperativas de energia renovável em Portugal e Espanha: David contra Golias?, XI Congresso Português de Sociologia Identidades ao rubro: diferenças, pertenças e populismos num mundo efervescente, org. Associação Portuguesa de Sociologia (online) March 2021, Proceedings: http://aps.pt/wp-content/uploads/XI_Congresso/Ambiente_XI-APS-38256.pdf
- Codemo, A., Ghislanzoni, M. and Albatici, R. (2022). Integrating public perception on the impact of photovoltaic applications in planning tools. A case study in Arcos de la Frontera, Roma: Gangemi Editore spa, 2022, p. 607-618. - ISBN: 978-88-492-4558-5
- Codemo, A., Favargiotti, S. & Albatici, R. (2022). Regenerating urban surfaces to achieve healthy and resilient neighbourhoods - A case study of Trento, Italy, PLEA, p. 771-776. - ISBN: 978-956-14-3069-3
- Codemo, A., Favargiotti, S. & Albatici, R. (2022). Climate sensitive urban regeneration: experimenting an adaptive and zero-energy approach in Trento, Italy, Oakland, CA (USA): Ecocity Builders, p. 97-105. - ISBN: 978-0-578-77618-7.
- Prados M. J. (2022): ¿De qué hablamos cuando hablamos de paisajes de las energías renovables? En Revista PH, 108, pp. 122-124 https://doi.org/10.33349/2023.108

4.2.3 Communications

- Delicado, A., Couto, J.S., Iglesias, R. (2020). From prosumers to communities: sharing renewable energy production. In International Seminar on Environment and Society. Org. Associação Portuguesa de Sociologia. ICS-Ulisboa. Lisboa, Portugal, March 2020
- Barral, M.A., Díez, A., González-López, J.J. (2021). Comparatıve study of the vısual impact of solar farms on Southern Spaın rural landscapes. Geography: Bringing the continents. XXXIV International Geographical Congress 2021. Istanbul, Turkey
- Delicado, A., del Valle, C., Prados, M.J., García, R., Pallarès-Blanch, M. (2021). Cooperativas de energia renovável em Portugal e Espanha: David contra Golias?. XI Congresso Português de Sociologia Identidades ao rubro: diferenças, pertenças e populismos num mundo efervescente 2021. Lisbon, Portugal
- Delicado, A., Truninger, M. Ghislanzoni, M., (2021). Social innovation in renewable energy: communities, cooperatives and other grass-root initiatives, 4S Annual Meeting, Toronto (online), October 2021
- Prados, M.J., Iglesias, R., Barral M.A., Ghislanzoni, M. (2021). Social innovation and Public Participation. New approaches on renewable energy landscapes (REL) from southern European Countries and Israel. 5th Energy & Society Conference 2021. Trento, Italy
- Codemo, A., Favargiotti, S. & Albatici, R. (2021). Climate-energy transition of the built environment: fostering an integrated approach to adaptation and mitigation. 5th Energy & Society Conference 2021. Trento, Italy
- Codemo, A., Ghislanzoni, M., Prados, M.J., Albatici, R. (2022). Towards integrated and accepted energy transition: sustainable energy planning in urban areas. 4th International Conference Smart and Sustainable Planning for Cities and Regions 2022 SSPCR. Bolzano, Italy
- Delicado, A., Truninger, M. (2022), Energias renováveis, paisagens e inovação social: o projeto PEARLS, Blogue SHIFT, https://ambienteterritoriosociedade-ics.org/2022/06/29/energias-renovaveis-paisagens-e-inovacao-social-o-projeto-pearls/
- Delicado, A., Truninger, M., Prados, M.J.,del Valle, C, Garcia R. (2023). "O que é que há, pois, num nome?": o conceito de comunidade em comunidades de energia renovável no sul da Europa, XII Congresso Português de Sociologia, Coimbra, April 2023

4.2.4 Others

- Codemo, A., Albatici, R., Zanon, B. (2020). Pianificazione, partecipazione e innovazione sociale nei paesaggi dell'energia rinnovabile, UNITRENTOMAGAZINE, p. 1-9. -
URL: https://webmagazine.unitn.it/ricerca/83501/l-accettazione-sociale-dei-paesaggi-dell-energia-rinnovabile

- Prados, M.J., Olcina, J. (2022). Transición energética, cambio climático y riesgos en la ordenación territorial. In Joaquín Farinós Dasí & Jorge Olcina Cantos (eds. y coords.), *Ordenación del Territorio y Medio Ambiente*, Valencia, Tirant Humanidades.
- Prados, M.J., Olcina, J. (2022). La sostenibilidad en transición. In M.P. Alonso, P. Benito del Pozo; M. Pallarés-Barberá; J.L. Sánchez *Geografía Económica: fundamentos, agentes y procesos*, Valencia, Tirant Humanidades.
- Barral, M. A., Ruíz, A., Prados, M. J., García, R., Delicado, A. (2023). Energías renovables y cambios en los usos del suelo en la Península Ibérica. Una lectura territorial de la política energética. *Boletín de la Asociación de Geógrafos Españoles 97* https://doi.org/10.21138/bage.3356

Furthermore, USE and UNITN have jointly worked on booklets to be distributed to the public to widely communicating the Project. The booklet has been issued in electronic form and published in the form of PEARL*S* Series:

- Prados, M. J., Albatici, R., Delicado, A., Loukogeorgaki, E., Romero Hierro, C., Teschner, N., & Zanon, B. (2021). Planning And Engagement Arenas For Renewable Energy LandscapeS: PEARLS series: 2018.1.
- Prados, M. J., Albatici, R., Delicado, A., Loukogeorgaki, E., Romero Hierro, C., Teschner, N., & Zanon, B. (2021). Planning And Engagement Arenas For Renewable Energy LandscapeS: PEARLS series: 2019.2.

4.2.5 Publications in progress and/or under review

The following publications are in progress and/or under review:

- Codemo, A., Ghislanzoni, M., Prados, M.J., Albatici, R. (nd) Including landscape integration and public perception of Renewable Energy Landscapes in the local planning tools: a case study in the Mediterranean countries. *Renewable and Sustainable Energy Reviews*

Under review

- Codemo, A., Ghislanzoni, M., Prados, M.J., Albatici, R. (nd) Towards landscape integrated and community accepted energy transition: sustainable energy planning in urban areas. *Journal of Environmental Planning and Management*

Under review

- González López, J.J., García Marín, R., Prados M.J. (nd) El papel de la evaluación ambiental en la transición energética: la construcción social del territorio. A. Delgado-Jiménez, J. Farinós & R. Álvarez-Fernández (eds.) *Transición energética y construcción social del territorio ante el reto del cambio climático y el nuevo marco geopolítico* Madrid, Aranzadi under review

- Prados, M.J., Ruíz, A. (nd): Cambio climático y transición energética en España. In R. Serrano, J. Martín-Vide & J. Olcina (eds.) Cambio Climático en España, Valencia, Tirant Humanidades.

Book chapters in progress

- Ruíz, A., Prados, M.J., Loukogeorgaki, E., Albatici, R., Delicado, A. (nd) Energy landscapes in Southern European Countries: new methodology for assessing the visual impact of renewable energy landscapes. *Applied Geography*

Paper in progress

4.2.6 Presentations to future conferences

- ECLAS 2023 - Labyrinth of the World. Landscape Crossroads., 10-13 September 2023, Brno – Lednice, Czech Republic

Codemo, A., Chioni, C., Barbini, A., Pianegonda, A., Renewable Energy Landscapes: investigating the public perception to support inclusive planning processes

- Sixth energy and Society - Energy, Environment and Societies in Crises, 6-8 September 2023, Trento, Italy

Codemo, A., Chioni, C., Barbini, A., Pianegonda, A., Public perception of renewable energy landscape in Greece: impacts and insights for energy planning

4.2.7 Dissemination: presentations given to and organizations of national and international seminars

1. Research seminar in Seville (year 2022):
   - A place under the sun: planning, landscape, and participation in a case of a solar powerplant in the Israeli desert

     Nama Teschner Department of Geography and Environmental Development - Ben-Gurion University of the Negev (Israel)

     https://www.youtube.com/watch?v=z1wIflYgcXk&list=PLDA1766DEA1DFE112&index=3
   - G/S-based multi-criteria decision analysis for renewable energy systems' site selection

     Eva Loukogeorgaki Department of Civil Engineering - Aristotle University of Thessaloniki (Greece)

     https://www.youtube.com/watch?v=DJZ8zAdh7AA&list=PLDA1766DEA1DFE112&index=2
   - Transition from research to operations, use of Downstream Space Technologies to ensure nature and climate-positive action

     Betty Charalampopoulou President and CEO in GEOSYSTEMS HELLAS - Athens (Greece) https://www.youtube.com/watch?v=JsIJeCuobVw&list=PLDA1766DEA1DFE112&index=1
2. Seminar Energy Communities in Southern Europe - WP5 Social Innovation, online seminar organized by ICSUL – Lisbon (Portugal), 20 June 2023
3. Training on methodologies for public engagement - WP5 Social Innovation, online seminar organized by ICSUL – Lisbon (Portugal), 27-29 March 2023

4. University of Thessaloniki (Greece) - Lecture about Energy Cooperatives in Europe – 2 May 2023

Ana Rita Antunes, Executive Coordinator of Coopernico, *Empowering the energy transitions, energy cooperatives and energy communities*

5. Winter school "One Health: unifying perspectives on climate change", Bertinoro (FC) – Italy, 23-26 November 2022

Presentation by **Bruno Zanon**, *Case Study: population resistance to renewable energy landscapes*

6. University of Trento (Italy) – Lecture for students of the degree in Building Engineering and Architecture (on line event) – 9 November 2022

Michela Ghislanzoni, Territoria, *Territorio vs indipendenza energetica: esperienze a confronto in Spagna*

4.3 Proposed research projects

The following projects have been proposed:

- Project title: "Rigenerazione urbana a prova di clima: strumenti di valutazione e monitoraggio per i processi di trasformazione urbana" (Climate sensitive urban regeneration: evaluation and monitoring tools for urban transformations)

Duration of the Project: 2023-11-01 to 2025-10-31

Call: Caritro postdoc 2023

Leader Partner Organization: University of Trento

Result: pending

- Project title: "Territorial and Social Innovation for the Energy Transition in the Iberian Peninsula" (STEP) -Reference: PID2021-123940OB-I00

Duration of the Project: 2022-09-01 to 2025-08-31

Call: Proyectos de Generación de Conocimiento 2021

Modalidad: Investigación Orientada Tipo B

Lead Partner Organisation: Universidad de Sevilla

PEARL*S* participants: Universidad de Sevilla-Instituto de Ciências Sociaias da Universidade de Lisboa; Territoria

Result: Accepted - on going

- Project title: "Towards a Democratic Landscape Observation through Geoinformatics and Public Participation" (TOPIO) -Reference: 101131109

Duration of the Project: 2023-2027

Call: HORIZON-MSCA-2022-SE-01-01

Lead Partner Organisation: IDRYMA TECHNOLOGIAS KAI EREVNAS - FOUNDATION FOR RESEARCH AND TECHNOLOGYHELLAS

PEARLS participants: Universidad de Sevilla – Geosystems Hellas

Result: Accepted - on going

- Research Proposal to HORIZON-MISS-2022-CLIMA-01 HORIZON RIA

Project title: "User-driven applications and tools for Climate-Informed Maritime Spatial Planning

and integrated seascape management, towards a resilient & inclusive Blue Economy" OCEANIDS.

Reference: 101112919

Duration of the Project: 2023-12-01 to 2025-10-31

Lead Partner Organisation: Geosystem Hellas (Greece)

PEARL*S* participants: Geosystem Hellas (Greece) Coordinator - University of Seville (Spain)

Result: Accepted - on going

Research Proposal to HORIZON-MISS-2023-CLIMA-CITIES-01 HORIZON IA

Project title: "Urban greening and re-naturing for urban regeneration, resilience and climate neutrality" DOUGHNUTLAND.

Reference: 101139529

Duration of the Project: under evaluation

Lead Partner Organisation: Business Innovation Centre BICSR Macedonia - REGIONAL BICSR, MACEDONIA (Greece)

PEARL*S* participants: Universidad de Sevilla & TERRITORIA

Result: Pending

4.4 Others

The information about the PEARL*S* Project is uploaded in the following websites, for advertising and marketing purposes:

- https://sites.google.com/view/naama-teschner/home
- https://www.consortis.gr/en/pearls
- https://www.consortis.gr/en/Participation-PEARL*S*
- https://www.consortis.gr/en/pearls-presentation

- The PhD thesis developed by Anna Codemo within the Doctoral Program in Civil Environmental and Mechanical Engineering – University of Trento (Italy) – curriculum D: Architecture, Planning and Landscape (years 2019-2022), with the title: "Adaptation strategies for climate-resilient, energy-efficient and RES-based urban eco-systems" is going to be discussed on the 2nd of October 2023.

- Summer school in Paros Island – 11-12 May 2023

The Spring School in Parikia, on the Greek island of Paros, took place between 11th and 12th May 2023. The event was organized by the company GeosystemsHellas S.A. in collaboration with the University of Seville. The activities included the participation of the Mayor of the Municipality of Paros. The main topics of the Spring School included citizen engagement and spatial planning in the context of energy transition. In this view, the main achievements of the PEARLS project were presented with a specific focus on the WP4 Case studies and outputs: web-GIS platform, visibility analysis and surveys on public perception. Within the presentations, the activities related to the wind farm of Paros developed during some secondments were shown: visibility assessment and questionnaire on public perception of the existing and planned wind farm.

Other initiatives of Communication and Networking (interviews, events, etc):

- Participation to the European Research Night, 2020 in Seville, Spain
- Interviews to Maria-José Prados (2020): Norvento Enerxía (https://www.norvento.com/blog/not-in-my-backyard/)
- Intervention of Maria-José Prados and Ricardo Iglesias-Pascual (2021) - Public Agenda (https://agendapublica.elpais.com/noticia/13523/participacion-local-comunitaria-gestion-renovables)
- Workshop´s proposal Energy Communities and Energy Cooperatives 2019. Environmental Department at Seville City Council, Spain
- RISE´S Champion projects (https://ec.europa.eu/eusurvey/)(Here link from the web site of PEARLS: https://pearlsproject.org/horizon-2020-platform-results-dissemination-against-global-climate-change/)
- US Magazine ("The magazine of the University of Seville; nº45, 2018" Here the link: https://www.us.es/sites/default/files/2019-02/us45_web.pdf)
- Guest lecture at Department of Environmental Studies at Tel-Aviv University, Israel (M.J. Prados, Energy transition and community participation: Regional differences from a multi-level perspective)
- PEARL*S* Project presentation at the Ministry of Energy in Jerusalem, Israel
- Project´s results at the Heschel Centre for Sustainability, Tel-Aviv Israel
- InfoSession MSCA Staff Exchanges 2022, Seville Spain
- Instituto Andaluz de Patrimonio Histórico: Debate *Paisaje y Energías Alternativas*

Main results can be also found at HORIZON 2020 Platform Results (https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-results-platform)

More can be found at: https://pearlsproject.org/news/

5. Follow-up Questionnaire

Considering WP2 and WP3, an on-line Follow-up Questionnaire has been designed using google modules, to interrogate an international multisectoral panel of experts about PEARL*S* progress with the aim of providing information cuts to the media and to disseminate results to a broad multidisciplinary scientific audience.

In 2019 the questionnaire was sent to a list of national experts (10 per country) coming from associations, private and public organizations as well as research centers, to form the international multisectorial panel. The idea was to proceed in in two steps, 2019 and then 2021, so to follow and to update the project developments and results. Due to the suspension of the project for the Covid 19 pandemia, the questionnaire has been sent again to the expert in July 2023. We worked on the questionnaire by collecting data and preparing it to send a request to those people who was selected to complete it again. The responses were positive although there were also absences for various reasons: retirement, company changes or simply no response.

The questionnaire can be found at the following webpage:

https://pearlsproject.org/work-p-1/2603-2

WP2 Sustainable Implementation: Policies and Practices
2nd Progress Report (Period: October 18th, 2019-September 7th, 2023)

Lead beneficiary	1-USE, 12-BGU		**Start month**	September 2018	**End month**	February 2023
Participation per Partner						
1–USE	2–CLANER	3–Territoria	4-ICSUL	5 - Enercoutim	6-COOPERNICO	8-AUTH
9-GSH	10-CONSORTIS	12-UHU	13-SP Interface	14-BGU	17-HABITECH	18-E4g

Objectives

1. To examine and compare national energy policy, land use planning and landscape practice schemes.
2. To analyse environmental impact assessment procedures to enable the inclusion of natural and cultural aspects. Constructing a return mechanism for policy makers
3. To research and develop tools to increase public participation in energy policy and renewable energy landscape implementation practices

Description of work and role of partners

This WP includes research and training together with supporting for dissemination on WP 1. Its core objective is to facilitate a better understanding of legal frameworks (energy policy, land use planning and landscape practice regulations) and daily practice in the implementation of REL.

Task 1. **Research reports** (**RR**) from participating countries relating to their national contexts for the construction of comparative energy policy, land use planning and landscape practice schemes. A common scheme will be established by the WP Lead for the reports. This enables references to legal documents, directives, strategies and programmes. Special importance will be given to identifying REL as specific concept in policies and practices. (D.2.1)

Task 2. **Interviews (I)** with national/regional policy makers and technicians to obtain direct information about the public participation system in renewable energies implementation. This task will provide information about assessment and effectiveness on incentive mechanism for public participation in projects (i.e., favourable, opposing, job creation, conservation of natural and cultural elements, landscape transformation, etc.) in close connection to WP 3 task 2. (D.2.2)

Task 3. This final task will consist on three types of outputs: a) to analyse environmental impact assessment procedures to enable the inclusion of natural and cultural aspects; b) to construct a return mechanism for policy makers; and c) fieldwork on real EIA specific cases. All these outputs will be analysed by WP 2 participants to provide emerging empirical knowledge as part of a) two co-authored papers on energy policy and REL spatial planning and b) a Research Seminar (RS) that will be held by the University of Sevilla (lectures by WP2 & 4 Leaders). (D.2.2, D.2.3.)

List of deliverables

D Nº	Title	Leader	Type	Dissemination	Due Date
D2.1	Research reports.	1-USE	Report	Confidential	October 2019
D2.2	Interviews.	1-USE	Report	Public	February 2023
D2.3	Research Seminar	1-USE	Report	Public	October 2022

Schedule of relevant Milestones

M Nº	Title	Leader	Due Date	Means of verification
MS2	Fieldwork on EIA	1-USE	October 2022	Field survey completed and data quality validated

1. Introduction

This Progress Report is an update on activities carried out as part of WP2 between 18th October 2019 and 4st September 2023. These activities are first contextualised in project objectives, tasks and deliverables included in the Grant Agreement; secondly, in the exchange of personnel during this period; and lastly, regarding the contribution that the WP makes to the PEARL*S* project beyond the initial commitments.

Work Package 2 analyses the sustainable implementation of policies and practices on renewable energy landscapes (REL). It aims to facilitate a better understanding of legal frameworks and daily practice in the implementation of REL. Legal frameworks included in WP2 are energy policy, land use planning and landscape practice regulations. These themes/topics are addressed through the exchange of staff among participating organisations; regular contact between academics and non-academics; the writing of research reports and interviews with experts in renewable energy landscape planning and implementation; and the training of researchers and technical staff. Exchanges allow us to go beyond the literature review in which these legal frameworks are usually set and go into territorial, landscape, cultural and natural differences in greater depth.

The GA establishes that the originality of the PEARL*S* project lies in its exploration of the productive liaison between the population and REL in southern European countries and Israel. Five countries are involved in this WP to optimise this liaison: Portugal, Spain, Italy, Greece and Israel. Eleven (Fourteen) beneficiaries are involved in all: ICSUL with the Enercoutim Company and Coopernico in Portugal; University of Huelva and University of Seville with CLANER and Territoria in Spain; Habitech and Ethics for Growth in Italy; Aristotle University of Thessaloniki in conjunction with Geosystem Hellas A.E. and Consortis as the representatives from Greece; and lastly, Ben-Gurion University of the Negev and SP-Interface for Israel. Although the common reference for the legal framework is the international agreements of the European Union and those signed in the differentcountries, daily practice rests on the choice of case studies. The comparative territorial analysis principle underlies and structures this task, its construction process, and related activities. This is essential for recognising the complementarity/counterbalance between different study areas and utilising each of these to build Pan territorial expertise within a transnational approach. The case studies will be made available in the On-line Atlas on the PEARL*S* website as progress is made in project tasks.

2. Definition of WP2 Methodological Framework

The PEARL*S* project investigates whether, and how, the transition to a low carbon economy is taking place in the great variety of REL focus areas on relation to energy behavior, spatial planning, and population engagement. Two Work Packages, numbers 2 and 4, compare related policies and practices in depth. The purpose of the first of these is to gain a better understanding of legal frameworks (energy policy, land use planning and landscape practice regulations) and daily practice in REL implementation.

WP2 studies aspects linked to current legislation and how it is implemented in relation to REL (Task 1). It is pertinent to enquire whether access to policy and spatial planning measures at the International level and within the national schemes and structures is dominated by companies or

by the population. To this end and for this first task, WP2 beneficiaries worked on specific Research Reports on renewable energy legislation and on each participant country's own particular context. These reports were presented at the Mid Term Meeting held in Malaga in September 2019 and constituted the first Deliverable of this work package (D 2.1), hence they are not part of this report.

A second task analyses aspects related to people's perceptions of REL has been studied through interviews (Task 2). Attitudes to REL are found to be highly variable, dynamic, and sometimes even contradictory. A common questionnaire has been used to interview national and regional policy makers and technicians from private and public sector in the PEARL*S* participants countries**.** The lack of integrated discussion and reflective discourse within broad, scientific policy and public responses has emerged, as well as the need to raise public participation in countries in southern Europe and Israel (D 2.2). To sum up, WP results has been analysed in a PhD seminar (Task 3). The Seminar was organised by PEARL*S* project and co-funded with the Doctoral Program on Geography by the University of Seville. The Seminar (D 2.3) included presentations; a field trip to a thermo-solar in the vicinity of Seville province; and a networking event for those who attended the Seminar.

The various tasks and their deliverables have been linked to the research questions that have to be answered to afford greater cohesion to the research and the training given to the personnel involved in this WP. The work methodology used for each task has also been detailed.

A brief description is given below of the objectives of the three WP2 tasks and the methodology used to produce their deliverables.

Research Question 1. *What are the policies and strategies for effective, efficient, and sustainable REL implementation in partner countries*	
Methods	• Search for and saving of RE related agreements, legislation, and recommendations at local, State, European and international level. (i.e., United Nations, International Energy Agency). • Drafting of an up-to-date report containing all legal aspects included in previously searched for legislation. • Search for and saving of administrative planning documents.
Research Questions 2 & 3. *Who are participating in this process? Where are REL located and why? How does the public accept REL implementation in light of people's energy behaviour and aspirations?*	
Method	Research-informed toolkits for Best Practices to raise public participation in spatial planning and renewable energy implementation processes.
Research Question 4. *What values shape the implementation of spatial planning tools for renewable energy development e.g., economic, social, cultural?*	
Method	Research Seminar for PhD students on 'Renewable Energy Landscapes and Spatial Planning: A Transnational Mediterranean Overview' at the International Doctoral Programme, University of Seville.

These tasks and deliverables have developed research concepts. These concepts are part of the project results in the form of a KEY TERMS GLOSSARY. The glossary includes a definition of each of these key terms, their authorship, and the sources used for their elaboration. The concepts used in WP2 have been the followed:

- Policy
- Regional Differences
- Renewable Energy Landscapes
- Spatial Planning
- Environmental Impact Assessment
- Territorial Impact Assessment

For more information check in the complete document available on the project website (https://pearlsproject.org/wp-content/uploads/2019/07/PEARLS-Key-Terms-Glossary-2019-07-30-version.pdf).

3. Research Reports (RR)

Policy and spatial planning analysis is based on a consolidated framework of international agreements on planning and renewable energies and EU & Israel reports being theorized through the spatial consequences of renewable energy implementation and landscape management. For this, WP2 engages with the growing body of literature on the sustainable implementation of REL policies and practices. Participating countries and beneficiaries are collecting information relating to their own national contexts and study cases. Particular attention is paying to key questions and key terms. The aim is to contribute to energy policy-making that is more open to society, geographical differences, and sustainable renewable energy landscapes.

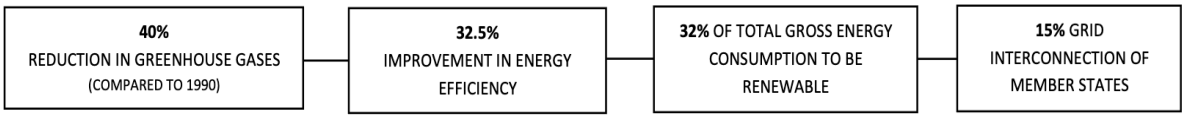
The Research Reports are documents that describe the countries' legal frameworks for developing and implementing renewable energy landscapes. With the goal of homogeneity, a blueprint has been constructed for the drafting of reports, drawn up, discussed, and revised by those involved. It contains four main sections. The first two analyse national contexts in legislation to promote renewable energies and their landscapes and the main figures for outcomes. The ResearchReport then focuses on spatial differences between the chosen case studies. The analysis spotlights real examples of REL in all the countries to obtain first-hand information about the implementation procedure and evaluation of the impacts on the landscape that result from renewable energy installations. The specific REL case studies with name, location, and type of renewable energy for them in each of the participating countries, as well as some figures relating toinstalled capacity, the total surface size of each installation and the date that installations came intooperation con be found at https://pearlsproject.org/online-atlas/

RESEARCH REPORT (RR) COMMON BLUEPRINT	
1. Situation of Renewable Energy ineach country and/or region	1.1. RE policy/legal framework 1.2. REL planning tools Revealing different territorial, economic and administrative circumstances
2. Data on Renewable Energy	2.1. Installed capacity 2.2. Energy produced 2.3. Occupied area/surface RE mapping / REL mapping
3. Focus Areas / Case Studies	3.1. REL planning tools 3.2. Revealing different territorial, economicand administrative circumstances 3.3. Data on Renewable Energy 3.3.1. Installed capacity 3.3.2. Energy produced 3.3.3. Occupied area/surface RE/REL mapping
4. Environmental Impact Assessment and EI Statement Analysis on Case Studies	4.1. Regulatory framework 4.2. EIA and SIA tools and procedures 4.3. Negotiation Social Impact Assessment

SPECIFIC REL CASE STUDIES					
Country	**Name and place**	**RE Type**	**Installed Capacity**	**Area size**	**Timeline**
PORTUGAL	Martim Longo	Concentrated Photovoltaic (CPV)	4MW	17has.	In operation since 2013
SPAIN	Cantalejos: Osuna,Seville	On-shore wind	14.00 kW	66 has.	2007
	Cantillana: Seville	Photovoltaic	4.86 MW	12 has.	2009
	Gemasolar: Fuentes de Andalucía, Seville	Thermo-solar	19.90 MW	195 has.	2010
	Sener: Mar de Ágata, Almería	Off-shore wind	300 MW	7000 has.	EIA rejected
GREECE	Paros island, Cyclades	On-shore wind	3 MW	11 has.	In operation
	Paros island, Cyclades	On-shore wind	72 MW	300 has.	Production license but not in operation
	Mixos - Voidolivado -Apelina, Agrafa Mountains	On-shore wind	40 MW	5 has	Installation license annulled
	Grammeni – Tourla - Karnopi, Agrafa Mountains	On-shore wind	46 MW	4 has.	Installation license annulled
ISRAEL	Ashalim power plant	Thermo-solar	121 MW	400 has.	In operation

To sum up its content, spatial planning has been analysed to identify the countries' structures and how they address public participation. The spatial planning tools for public participation must reinforce structure and enhance renewable energy implementation by providing participation and engagement among different actors and communities and catering for different scales. Events related to Russia's invasion of Ukraine and its effects in relation to an ongoing energy crisis have partly outdated its contents, while making this analysis essential. The geopolitical consequences in terms of energy supply have led to several regulatory changes for the "acceleration of renewable energy projects with the aim of accelerating decarbonisation and reducing energy dependence". The ongoing changes in European regulations and the corresponding adaptations by the member states are particularly relevant for the determined promotion of renewable energy production and for their implications for renewable energy landscapes. In this respect, Israel will to some extent see the consequences of this process even though it is not a member of the EU.

The European Commission has identified as the main constraint to the rapid deployment of renewables "barriers related to permitting and other administrative procedures" as slowing down projects, increasing uncertainty and costs, and deterring investors, putting "at risk the achievement of the EU's decarbonisation targets and the proposed 2039 renewable energy target" (European Commission, 2022). Council Regulation (EU) 2022/2577 of 22 December 2022 aims to mitigate the effects of the current energy crisis by introducing a key issue: the favourable presumption of renewable energy projects as activities of overriding public interest for the purposes of the relevant environmental legislation. The principle of energy solidarity and the promotion of renewable generation are central to this new approach.



European Union: Main binding targets for 2030

The result is administrative simplification and exemptions from certain assessment obligations laid down in environmental legislation. This is backtracking on the implementation of a fundamental tool for public participation in renewable generation projects. Basically, along the lines set out by the European Union, and, in the Environmental Impact Assessment tool, as the scope of application of the public participation mechanism. All of this highlights the need to address in a comprehensive and integrated manner the environmental and territorial (in short, landscape) effects of large renewable installations in the transition process. Firstly, because it is necessary to defend the EIA as an optimal tool that includes all social actors involved in the definition, implementation and control or monitoring of renewable energy installations. Secondly, because of the central position of citizen participation in promoting informed and responsible collaboration in decision-making under the principle of sustainability. And thirdly, because the transition process must be based on a well-informed and participatory society in which empowerment is a fundamental characteristic in its forms of organisation as users and consumers or prosumers through self-consumption.

4. Interviews on comparative analysis of Environmental Impact Assessment procedures

The research carried on the comparative analysis of environmental impact assessment procedures includes Portugal, Spain, Italy, Greece, and Israel as study cases. An analysis of policies and practices on renewable energy landscapes has been done. Its aim is to facilitate a better understanding of legal frameworks and daily practice in the implementation of renewable energy landscapes. Legal frameworks included in WP2 are energy policy, land use planning and landscape practice regulations.

These topics are addressed through the four countries' legal frameworks for developing and implementing RE including, i) national contexts in legislation to promote RE and their landscapes and the main figures for outcomes; ii) spatial differences between the chosen case studies in each country; and iii) spotlights to obtain first-hand information about the implementation procedure and EIA on the landscape that result from renewable energy installations.

The penetration of RE has been possible thanks to the impulse of international agreements in the fight against global climate change and global warming, mainly the Kyoto Protocol and more directly the Paris Agreements in 2016. The regulations introduced by the European Union have made it possible to develop frameworks for action in each country, with the establishment of objectives, action plans and monitoring of results with which to demonstrate the scope of these to the European institutions. The situation of RE about topics such as legal framework of RE policy and RE landscape planning tools are conditioned by territorial, economic, and administrative circumstances in each country. For instance, the development of a strong business RE activities in the Iberian Peninsula or the own roadmap of Israel being s a pioneering case because already in 1970, the Planning and Building Law directed all new residential buildings up to 9 floors to install thermal solar panels for domestic water heating.

Putting in common the situation in these countries, all of them have centralised administrative structures for the promotion of RE, with implementation formulas that start directly from the top down to the territories where these installations are implemented. So then, public opposition, mainly based on landscape concerns, is increasingly apparent, especially of residents, NGOs, and others. Anyhow, the locality factor should be enhanced while the role of citizens and local actors should be strengthened. The legal framework expresses the duty of encourage public participation that includes such associations as groups or organizations like NGOs working in environmental protection. Through this participative process of the public, they seek to appreciate the importance of social aspects in decision-making stage of projects. This is done by the expression of opinions and concerns that must be considered by the competent authorities. The modes of information and consultation to interested public has been analysed through the environmental impact assesment tool. The methodological procedure aims to provide information about public participation system in RE implementation through EIA procedure, to articulate similarities and point out significant differences. A common questionnaire has built to interview national and regional policy makers and technicians from private and public sector to compare the assessment and effectiveness of the incentive mechanism for public participation in RE projects.

Following the WP2 research reports presented in D.2.1, a common methodology has been constructed about different aspects regarding the procedure of EIA to know how public participation is taking place along land-use planning procedures related to the energy transition.

The procedure of carrying out this work was divided in four stages: i) elaboration of a common questionnaire; ii) selection of policy makers and technicians; iii) dissemination of the questioner; and iv) the analysis of answers and results tabulation. Consent forms and data protection forms were signed by each survey participant.

The main contents of this are shown on the table.

Block 1	SOCIO-DEMOGRAPHIC INFORMATION
Block 2	ENERGY TRANSITION PROCESS. PERSONAL OPINIONS WITHIN THE CONTEXT OF RESILIENCY AND RECOVERY AND TWIN TRANSITION
Block 3	RENEWABLE ENERGY ACTORS
Block 4	RENEWABLE ENERGY PROJECTS
Block 5	ENVIRONMENTAL IMPACT ASSESSMENTS FOR RENEWABLE ENERGY GENERATION PROJECTS
Block 6	TERRITORIAL/REGIONAL IMPACT ASSESSMENT AS A TOOL WITH AN INTEGRATED APPROACH

The analysis of the responses and interpretation of the results has been made by the University of Seville WP2 co-leader in Spain with the support of Ben-Gurion University of the Negev from Israel as co-lead of the WP. The results can be consulted as part of the deliverable D 2.2 (https://pearlsproject.org/wp-content/uploads/bp-attachments/3842/Deliverable-2.2.pdf).

The results shown the similarities in the stakeholders' perceptions about the energy transition overall as well as in the details of it that are pertaining to RE planning and installation. Most of the respondents believe that the energy transition toward renewable energies would mainly be based on wind and solar resources and on distributed installations. But distributed renewable energy did not bring about, yet a revolution in the way energy is planned, produced, and distributed, and that the government (local, regional, and national) is still the main actor in promoting and making decisions regarding renewable energy installations. On the other hand, developers, usually even large energy companies, are still the main initiators and promoters of projects. In centralized energy production model, participants indicated that energy demand patterns coupled with the physical values of the potential sites, should be the leading factors to consider. The capacity of residents, environmental NGOs, and the public to influence renewable energy planning processes remains vague. But public concerns were found are very similar: demanding more information about the planning projects, and is mostly worried over adverse environmental, landscape and health impacts. The answers strengthen the need of clearer information exchange along renewable energy planning procedures.

The presence of large renewable energy installations in open spaces, occupying agricultural land and affecting rural landscapes, is the basic rational for participatory environmental impact assessment. Their positive effects on the local economy call for extending this instrument, by incorporating the assessment of the renewable energy installations' territorial impact as well. The significant impact of these installations on the landscape, their capacity to transform pre-existing landscapes and give rise to new landscapes must be in the focus of the environmental impact assessment. The quality of the renewable energy landscapes may contribute to disseminating new energy behaviors and promoting energy saving, while at the same time they can reinforce the sense of community.

5. Research Seminar “"Renewable Energy Landscapes and Spatial Planning: A Transnational Mediterranean"

The Research Seminar was carried out in the Faculty of Geography and History of the University of Seville on 25 and 26 October 2022. These were enabling dissemination of the PEARL*S* project's objective, findings, and deliverables to wider audiences by the host institution. To reach this, the Research Seminar has been incorporated into the Doctoral Program in Geography of the International Doctoral School of the University of Seville. The activity included the content of the presentations made by the three lecturers during the first day of the seminar as well as the field trip made on the second day to the thermos-solar plants Valle 1 and Valle 2 in the municipality of San José del Valle (Cádiz) in the vicinity of Seville Province. To strengthen the relationships between the participants, a networking event was also organized for those attending the seminar who belongs from the PEARL*S* project.

The Seminar have the participation of those members of the project who were able to offer relevant results while opening their dissemination to a wider public. The activity was initially organised for PhD students participating in PEARL*S* as secondees, together with PhD students from the University of Seville not involved in the PEARL*S* project to date. This proposal fits perfectly into the Geography PhD Program of the University of Seville. Hence the proposal to organise this Research Seminar as part of this program.

The structure of the Seminar has comprised:

1. Three theoretical sessions given by the members of the project.

“A place under the sun: Planning, landscape, and participation in a case of a solar powerplant in the Israeli desert”

Speaker: Na'ama Teschner. Assistant Professor at the Department of Geography and Environmental Development of the Ben Gurion University in Israel and the head of external relations committee at the School of Sustainability and Climate Change (SSCC)

“GIS-based multi-Criteria decision analysis for Renewable Energy Systems’ site selection”

Speaker: Eva Loukogeorgaki. Associate Professor of Marine Structures in the Civil Engineering Department of Aristotle University of Thessaloniki (AUTh)

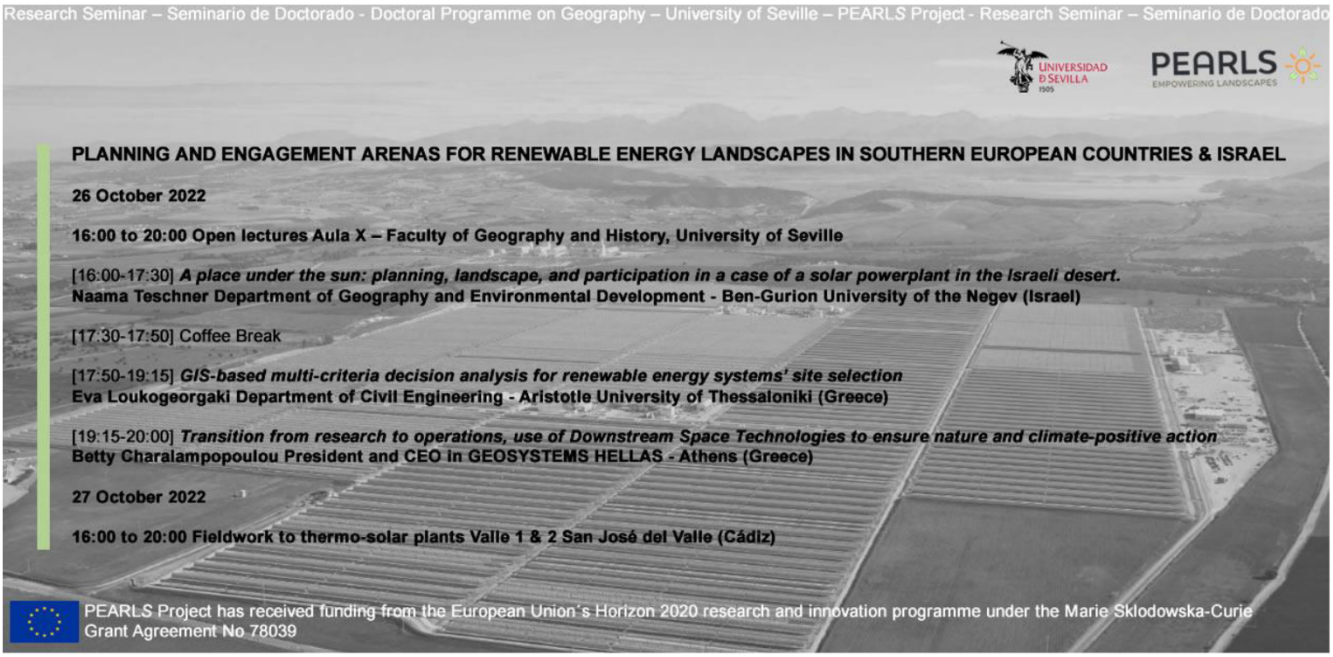
“Transition from research to operations, use of downstream space technologies to ensure nature and climate-positive action”

Speaker: Vasiliki (Betty) Charalampopoulou. President & CEO of GEOSYSTEMS HELLAS S.A.

2. A field trip to the solar thermal power plants Valle 1 and Valle 2 in San José del Valle, Cádiz, 120 km southeast of Seville https://www.energy.sener/project/valle-1-and-valle-2-plant

Speaker: Mr. Ignacio Grimaldi from SENER Group https://www.group.sener/

A networking event has taken place between the two activities. The aim was to find a common meeting place in which to strengthen the cohesion of the PEARLS project participants who took part in the Seminar. In this way, information on the day-to-day running of the project was shared by participants from the academic and non-academic sectors and to encourage the incorporation of new secondments as part of the exchange of knowledge, work schemes and training experiences.



Naama Teschner dissertation showed the results of a research about how perceived landscape impacts influence public willingness to accept changes in the landscape. Speaker examined the role of LAs in planning via the eyes of policymakers and experts and evaluated the capacity of current tools to influence the process. Additionally, the role (or lack thereof) of the public in LAs is presented. The presentation was focus on the unique—one of the largest in the world thermo-solar "tower" plant, located near a small desert village—exemplifies the place for landscape consideration in national-level mega-infrastructure. The same renewable energy technology and installation that was analysed during the fieldwork.

Eva Loukogeorgaki presented an innovative sustainable spatial energy planning framework for Israel. It has been developed at national scale for identifying and prioritizing appropriate, technically, and economically feasible, environmentally sustainable as well as socially acceptable sites for the siting of large-scale onshore Wind Farms and Photovoltaic Farms in Israel. It advances a collaborative and participatory planning approach by combining spatial planning tools (Geographic Information Systems) and multi-criteria decision-making methods (e.g., Analytical Hierarchy Process) with versatile participatory planning techniques to consider the opinion of three different participatory groups (public, experts, and renewable energy planners) within the site-selection processes.

The third presentation was carried on by Vasiliki (Betty) Charalampopoulou. She introduced the role of the non-academic sector in the PEARLS Project, showing cooperation projects with other companies with a strong research compromise. She played the role of the non-academic sector in the PEARLS Project, showing cooperation projects with other companies with a strong research compromise. Earth observation data together with multi-survey grade information facilitates to obtain GIS results by conducting appropriate field observations. While they can offer a direct service to renewable energies installations.

In connection to this approach the field work offered an opportunity for both, to check how renewable energy installations are transforming the landscape into renewable energy ones, and to know in deep the reality of the renewable energy works. The perspective of Ignacio Grimaldi from Sener Group was complete from the technical side by the time that, like company promoter, he also introduced the social approach from before and after renewable energy installations works.

To conclude, the networking event consisted of a two-hour session aimed at reinforcing communication between the secondments that had travelled to Seville beforehand and those who came expressly to participate in the results of the research seminar. In this way, personal contacts between all of them has been strengthened, helping to bring together perspectives and ways of dealing with future secondments in an atmosphere of collaboration and understanding. The networking event has been also considering as a challenge to project implementation, open to all participants from academic and non-academic sectors to share the consortium's internal network activities. Project implementation uncertainly due to the spread of coronavirus still needs some actions to avoid virtual means of communication.

6. Further lines of work

WP2 tasks and deliverables continue to be developed at good pace. In parallel with these tasks and the deliverables delivered, the results of WP2 are expected producing two research papers. Their aim will mapping key actors in UE/national energy policy and environmental impact assessment around the time of the policy shifts and how officials in charge constitute their own decisions for projects deployment. The idea is to complete a depth interview structure about environmental impact assessment tool on the new constrictions imposed by the EU regulations framework while the "acceleration of renewable energy projects to accelerate decarbonisation and reduce energy dependence" occurs. The research questions will be:

1. Why have ambitious targets for renewable energy become politically attractive?

2. Why are renewable energy deployment still unbalance both between EU Member States but also within Member States?

3. How could effective renewable energy projects be implemented against/thanks to officials in charge?

4. Why have the specific patterns of national RES officials need?

Participation has been proposed as a final task for the secondments pending. Doing fieldwork together with the previous research by secondees and the networks established during those will be the roots of the papers.

7. WP2 Secondments

Secondments involving five countries and a total of thirteen beneficiaries are envisaged in the development of this WP2. Table x lists the latest secondments and indicates the origin and host countries and organisations; secondment dates and duration in months.

Country	Beneficiary	Hosting	Start Date	Duration
PT	ENERC	USE	09/2018	2 months
SP	USE	SPI	06/2019	1 month
ISR	BGU	TERRITORIA	10/2020	1month
SP	USE	COOP	01/2022	1 month
GR	GSH	ICSUL	04/2022	5 months
GR	CONSORTIS	USE	06/2022	1 month
PT	COOP	AUTH	06/2022	1 month
SP	USE	CONSORTIS	06/2022	1 month
SP	USE	HABITECH	11/2022	1 month
IT	UNITN	ENERC	02/2023	1 month
GR	AUTH	CLANER	04/2023	2 months
SP	USE	HABITECH	06/2023	1 month
SP	USE	E4g	11/2023	1 month
PT	COOP	AUTH	10/2023	1 month
SP	USE	SPI	04/2020	6 months
GR	GSH	BGU	04/2020	2 months
GR	GSH	BGU	04/2020	2 months
GR	CONSORTIS	USE	02/2020	1 month
SP	SPI	USE	10/2020	1 mon th

8. References

PEARLS Project Online-Atlas https://pearlsproject.org/online-atlas/

PEARLS Project Key Terms Glossary

https://pearlsproject.org/wp-content/uploads/2019/07/PEARLS-Key-Terms-Glossary-2019-07-30-version.pdf

Prados, M.J.; Iglesias-Pascual, R., Barral, M. A. (2022). Energy transition and community participation in Portugal, Greece and Israel: Regional differences from a multi-level perspective. *Energy Research & Social Science*, 87, 102467. https://doi.org/10.1016/j.erss.2021.102467

Romov, E., Teschner, N. A. (2022). A Place under the Sun: Planning, Landscape and Participation in a Case of a Solar Powerplant in the Israeli Desert, *Sustainability*, 14(13), 7666. https://doi.org/10.3390/su14137666

Spyridonidou S., Sismani G., Loukogeorgaki E., Vagiona D.G., Ulanovsky H. and Madar D. (2021). Sustainable Spatial Energy Planning of Large-Scale Wind and PV Farms in Israel: A Collaborative and Participatory Planning Approach, *Energies*, 14(3), 551; https://doi.org/10.3390/en14030551

WP3 Social Behaviour to the Renewable Energies: 2nd Progress Report (Period: October 18th, 2018 – September 7th, 2023)

Lead beneficiary	2-CLANER		**Start month**	January 2019	**End month**	September 2023
Participation per Partner						
1–USE	2-CLANER	3-Territoria	5-ENERCOUTIM	6-COOPERNICO	7-UNITN	9-GSH
10-CONSORTIS	12-UH	13-SP Interface	14-BGU	17-HABITECH	18-E4G	

Objectives

01. Identify different key groups and his patterns of behaviours with the energy and his perception of the landscape.
02. Determine the barriers and the factors that prevent the commitment of the key groups with the renewable energies and the energetic efficiency.
03. Examine the strategy of the consumer of energy in different regions / states members.
04. To increase the consciousness of the key groups and the participation of the authorities, organisations and different parts interested with the renewable energy and the energetic efficiency.

Description of work and role of partners

The main aim of this package of work is to deepen in the behaviours of the population for the energetic challenge. To attain this challenge, is necessary to investigate the behaviours of the consumers of energy in his daily life together with the commitment of the consumer and the social innovation on the renewable energies in the WP 5. The main actions of this WP 3 have like aim identify the barriers to the change of energetic behaviours through the society and the space that confront the people that advance to technologies more sustainable for the development of landscapes of renewable energy. It will establish a representative frame of landscapes of renewable energy to select focal groups in each country / region participant. Inside this WP, will produce multisectoral discussions on which actions taken by the political authorities and the producers of energy could improve and establish relations more affordable between the consumers and the landscapes of renewable energy.

List of deliverables

D Nº	Title	Leader	Type	Dissemination	Due Date
D3.1	Key Actors map/ market segmentation and elaboration of relevant indicators.	CLANER	Report	Confidential	July 2020
D3.2	Renewables and Energy Efficiency statement.	CLANER	Report	Public	September 2023
D3.3	Report - crowdsourcing working schemes methodology.	CLANER	Report	Public	November 2022

Schedule of relevant Milestones

M Nº	Title	Leader	Due Date	Means of verification
MS2	Interviews	CLANER	September 2023	Use of WP5 social innovation tools for SSREE

1. Introduction

The present document exposes the ***report of progress of WP3*** centred in describing the WP3 activities implemented during ***October 2019 – September 2023*** (period of reference). During this period: ***(1)*** the WP3 methodological frame has been explicitly clear-cut, ***(2)*** activities of research were carried out for Tasks 1 and 2 ***(3)*** Some exploratory activities have been driven for Task 2

During front of the period of reference, three secondments have fulfilled. Some fieldwork for WP5 was also carry out during ICS to secondment), Enercoutim: Association of the Energy of Alcoutim (Portugal) low WP3.

WP3 secondments

Country	Sender	Host	Length	Month of start	Year	Personnel
SP	ICS	CLANER	1 month	April	2019	Ana Delicado
IT	CLANER	UNITN	1 month	July	2019	Carlos Rojo
PT	CLANER	ICS	1 month	August	2019	Antonia Molina
PT	CLANER	ICS	1 month	November	2019	Carmen Romero
PT	CLANER	UNITN	1 month	December-January	2019	Carmen Romero
SP	ICS	CLANER	1 month	January	2022	Ana Delicado
				April	2022	
SP	UNITN	CLANER	1 month	November	2021	Anna Codemo
			2 months	January	2022	
SP	AUTH	CLANER				

2. Definition WP3: Methodology

1. Identification of the segmentation of the market (MS) through map of key actors

In parallel with the task 1 CS in WP5, here recompile information on the behaviours of the energy. In the first place, the segmentation of the market (MS) will make through different groups of approach to analyst the behaviours of the energy. Second, it will elaborate a map of key actors (K) taking into account the notable information recompiled of each group of approach through direct surveys. The information will process and will analyst to create a group of notable indicators that will help to determine the barriers and the factors that prevent the commitment of the focal groups with the renewable energies and the energetic efficiency.

Questions of research

RQ1. Which Is the current state of the energetic market in the countries partners and own and affects to the spaces where the renewable energies change the relation of the population with the energy and his perception of the landscape?

RQ2. I know it can make a classification of key actors in this regard

Methods

- ***Review of literature*** (books and articles) and studios of market and new normative in this regard
- ***Creation of Database*** of key actors companies and notable entities that take part in the management of the renewable energies and in the application of the methods of current energetic consumption.

Deliverables:

D3.1. Key Actors map/ market segmentation and elaboration of relevant indicators.

2. Report of Best practices

Analysis of the indicators (IA) to establish the level of commitment and the existent barriers for the renewable energies and the energetic efficiency of the different key groups together with the WP5. Also it will examine the strategy of consumption of energy in different regions / countries. It will be crucial to identify practices that do that the consumers are had to change his energetic behaviours while they keep (increase) his quality of life with a supply of energy sure and affordable. Develop a report of Good Practices for the energetic behaviours that include a group of recommendations for the authorities and the producers of energy to produce a change in the behaviours of the consumer.

Questions of research

RQ1. Which are the spaces of work and governance where the renewable energies change the relation of the population with the energy and his perception of the landscape?
RQ2. I know it can make a classification of best practices in this regard?

Methodology

- ***Review of literature*** (books and articles) in implication of the different public entities and deprived in the process of installation of the renewable energies and contribute to the change of the relation of the population with the energy and his perception of the landscape?: ***Identification of best practices of information and public implication-sharing technical to the public (e.g. platforms of participatory web, questionnaires, open public meetings.)***
- ***Definition*** of the ***Studies of Case***: Based in the characteristics (country of hosting organization, length of secondments) of WP3 secondments.
- Definition of criteria for each Study of Case.
- Creation of actors for each Study of Case.
- Realization of interviews and reports of each study marry.

Deliverables:

D3.3. Under preparation

3. Commitment of adhesion/statement

To attain changes in the consumption of energy, is very important to have the participation of all the interested, included the authorities (to national international / level / regional and local), as well as different organizations, associations, companies, etc. The energy and the energetic efficiency (SSREE) will develop from the conclusions of the essay / inform of better practical on the energetic behaviors. The partners of different regions and countries (in particular the involved in the WP2) have to look for the maximum adhesion / support of the regional local / authorities / national and other parts interested.

Questions of research

RQ1. Which typologies of statements exist in the actuality

Methodology

- Review of literature (models, examples) ***Identification of models examples made in other countries.***

Deliverables:

D3.2. Renewables and Energy Efficiency statement.

D.3.3. Report - crowdsourcing working schemes methodology.

- Studies of Case. Proposed WP3.

Country	Of no.	Type of energy (indicative)	Town and entity that proposes it	Secondments For implementation
CS2	Spain	Solar	Carmona (Seville), CLANER	CLANER
CS3	Portugal	Solar	Évora, ICS	CLANER
CS4	Italy	Solar	Trento, University of Trento	CLANER

4. Publication of results

It has given diffusion to the project through the web of the CLANER, of his electronic bulletin to the associated and of the preparation of press releases for the media:

http://claner.es/2019/07/30/claner-aborda-proyecto-internacional-sobre-soluciones-paisajisticas-renovables-en-la-europa-mediterranea/

https://www.europapress.es/andalucia/noticia-claner-aborda-proyecto-internacional-soluciones-paisajisticas-renovables-europa-mediterranea-20190730102753.html

5. Conclusions

After the all secondments made and that have centred in the identification of Best practices to proceed to the realization of a study of back case of the same in the different regions of interest of the project. It has been of vital importance in work made in these secondments to determine the basic criteria of identification of best practices, the aims that pursue the same of particular and common way, the problems in legislative matter of each country. For finally determine that it will make a comparative study on the implantation of the solar energy to municipal and dependent level of the public management-deprived to be able to self-consumption the municipality partly or in his whole.

For this have identified to the following cases of study:

- Spain: Carmona (Seville)
- Portugal: Évora
- Italy: Trento, has made a previous work but has concluded that in Trento by legislative questions is not viable and is identified another zone to be able to develop the study.

Thanks to all the work done, it has been possible to conclude deliverable 3.3. of participatory techniques and 3.2. Renewables and Energy Efficiency statement which expresses the interest and relationships between public, private and citizen entities for the implementation and maximum benefit of renewable energies with the minimum impact on the landscape.

WP4 Spatial Planning and Analysis

2nd Progress Report (Period: October 18th, 2019 – September 7th, 2023)

Lead beneficiary	8-AUTH		**Start month**	December 2018	**End month**	December 2023
Participation per Partner						
1–USE	3–Territoria	7-UNITN	8–AUTH	9–GSH	10 –CONSORTIS Geo	13 –SP Interface
15-UHU						

Objectives

1. Transfer of knowledge and enhancement of skills related to Renewable Energy Source (RES) spatial planning/analysis and decision-making methods, processes and tools.
2. Development of advanced methodologies and tools in RES spatial planning/analysis and decision making incorporating public participation and involvement.

Description of work and role of partners

Task 1. Best Current Practices on REL spatial planning/analysis and decision-making methods (BCP). This task focuses on critical knowledge transfer and skills enhancement relevant to BCP spatial analysis/planning tools (e.g. ArcGIS, QGIS, EO monitorinG (xyz-time-4D) using Remote Sensing techniques) and methodologies (e.g., 3D mapping, multi-criteria analysis methods (AHP, TOPSIS)) and spatial database management (e.g., CAD files, terrestrial sensor input, UAV data) for REL. (D4.1)
Task 2: Advanced Methodologies in Sustainable Energy Planning (SPE). Enhancement of existing energy planning methodologies in terms of: (a) spatial criteria selection and inclusion of policy aspects (based on WP2 output) and (b) public engagement reinforcement (based on WP3 and WP5 output) in SEP. Spatial planning/decision making stages, where the public is anticipated to be most involved and public involvement best practices (e.g., web platforms, questionnaires, etc) will be identified. Integration/combination of the crowdsourcing concept within spatial planning tools. An online geographic information system (web-GIS) based on Service Oriented Architecture (SOA) will be designed and implemented in relation to WP1/tasl 1 & 2; and WP6 task 1). (D.4.2, D4.3)
Task 3: Web-GIS platform (W-GIS). Application of the methodologies/modules to specific Case Studies via the web-GIS platform. With the aim of demonstrating the versatility/efficiency of methodologies/tools irrespective of geographical, spatial and/or social factors, Case Studies with different characteristics will be defined (e.g., different country, different exploitation). The required spatial data will be collected, the methodologies/modules on enhancing public participation will be applied to specific public target groups and, finally, GIS tools including the web-GIS and decision-making methods will be applied for the sustainable planning of various renewable energy technologies in WP4 participant countries (D4.2, D4.3)

List of deliverables

D Nº	Title	Leader	Type	Dissemination	Due Date
D4.1	Best Current Practices	8 – AUTH	Report	Confidential, only for members of the consortium (including the Commission Services)	June 2019
D4.2	Methodologies in Sustainable Energy Planning	8 – AUTH	Report	Confidential, only for members of the consortium (including the Commission Services)	December 2023
D4.3	Web-GIS Platform	8 – AUTH	Other	Public	April 2023

Schedule of relevant Milestones

M Nº	Title	Leader	Due Date	Means of verification
MS4	Website design	8 – AUTH	April 2023	Website released and validated by WP4 user group

Prepared by PEARLS Steering Committee
September 7th, 2023

1. Introduction

This document presents the 2nd progress report of WP4 aiming at describing the WP4 activities implemented during October 18, 2019 – September 7, 2023 (reference period). During this period, WP4 Tasks 2 and 3 have been successfully implemented, the deliverable D4.3 has been prepared and submitted and the milestone MS4 (Website design) was achieved by releasing the PEARLS Web-GIS platform and validating it by WP4 users' group. During the reference period, 17 WP4 secondments have been implemented, while in 1 WP2 secondment research activities associated also with WP4 have been realized. Among those secondments, 15 are related with the WP4 Case Studies development and 3 with the Web-GIS platform development. In the following sections, all research activities related to WP4 Tasks 2 and 3 and the above secondments are described. Initially, an overview of the WP4 methodological framework is given. Next, information about the WP4 Case Studies used as a basis for developing the platform is cited, including a short description of the Case Studies' objective and relevant methodology as well as some indicative results. The main features of the Web-GIS Platform are then presented, while, finally, an overview of the WP4 activities' planning until the end of the project (December 2023) is provided.

2. WP4 Methodological Framework Overview

WP4 aims to reinforce Renewable Energy Sources (RES) spatial planning strategies by promoting relevant knowledge exchange and skills improvement between academic and non-academic organizations. It focuses on the enhancement of existing RES spatial planning approaches by developing and delivering integrated and advanced methodologies/tools, which are applicable to different Renewable Energy (RE) projects and relevant Renewable Energy Landscapes (REL), different spatial planning scales, different countries and for a variety of siting criteria, while at the same time they reinforce the public participation and engagement during the decision-making process. Within WP4 Tasks 2 and 3, a novel state-of-the-art technological tool, the PEARLS Web-GIS platform, has been developed and released aiming at: (i) assessing the effects (e.g., landscape effects) of existing RE projects and (ii) identifying potential sitting locations for new RE projects. For achieving objective (i), the platform enables the inclusion of thematic maps representing landscape effects as well as data related to the perception and the views of the public on RE projects. On the other hand, for achieving objective (ii), the Web-GIS platform includes thematic maps of various sitting criteria (representing technical, economic, legal, environmental, landscape-related and social factors) as well as thematic maps of areas identified suitable for RE projects' implementation. The platform, applicable to different RE projects and relevant REL, different spatial planning scales, different countries and for a variety of sitting criteria, has been developed using a bottom-up approach based on seven (7) Case Studies, established and evolved within WP4 Tasks 2 and 3. The main characteristics of those Case Studies have been defined (WP4 Task 3) in terms of: (a) demonstrating the versatility/efficiency of the PEARLS Web-GIS platform irrespectively of geographical, spatial and/or social factors and (b) filling relevant existing research gaps. At the same time, the country of the hosting organization and the duration of WP4 secondments have been taken into account.

For all Cases Studies spatial data and thematic maps have been produced and uploaded in the PEARLS Web-GIS platform (WP4 Task 3) by developing suitable integrated site-selection processes and methodologies, where the opinion and the views of the public have been also taken into account in the relevant decision-making process (WP4 Task 2). It is mentioned that all the above research activities related to WP4 Tasks 2 and 3 have been realized following the methodology defined during the 1st progress reporting period.

The PEARLS Web-GIS platform can be accessed through the project website (under the banner Web-GIS Platform) or directly at http://pearls-webgis.geosystems-hellas.gr/. For implementing the Web-GIS application only free and open-source libraries/tools have been utilized. PEARLS Web-GIS platform acts both as a dissemination platform for the PEARLS project results, but also as a public awareness tool upon the RE installation issues for all PEARLS WP4 Case Studies.

3. The WP4 Case Studies

The PEARLS Web-GIS platform has been developed using a bottom-up approach based on specific predefined Case Studies. Table 4.1 includes the main characteristics of those Case Studies.

Table 4.1 WP4 Case Studies main characteristics

Case Study ID	Country	Planning Scale	Renewable Energy Source Type	Secondments
CS1	**Israel**	**National**	**Onshore wind** & **Solar** (**new** RE projects)	AUTh to SP Interface (one 6M & one 1M secondment)
CS2a	**Spain**	**Local/Municipality** (Arcos de la Frontera)	**Solar** (**new** RE projects)	UNITN to Territoria (one 2M secondment)
CS2b	**Spain**	**Local/Municipality** (La Palma Del Condado)	**Solar** (**new** RE projects)	AUTh to Territoria (one 2M secondment)
			Solar (**social perception** on **existing & new** RE projects)	UNITN to Territoria (one 1M secondment)
CS3a	**Greece**	**Local/Municipality** (Paros island)	**Onshore wind** (**existing & new, already proposed** RE projects)	UHU to GSH (two 1M secondments)
			Onshore wind (**existing & new** RE projects – **social perception**)	UNITN to GSH (one 1M & one 1M secondments)
CS3b	**Greece**	**Regional** (Kilkis regional unit)	**Solar** (**new (licensed)** RE projects)	CONSORTIS Geo to UNITN (one 1M secondment)
			Solar (**new (licensed)** RE projects) – **visual impact analysis**)	UHU to CONSORTIS Geo (one 1M secondment)
			Solar (**new (licensed)** RE projects) – **social perception**)	UNITN to CONSORTIS Geo (one 2M & one 1M secondments)
CS4	**Portugal**	**National & local/municipality**	**Solar** (**new** RE projects)	AUTh to ENERCOUTIM (one 1M secondment)*
CS5	**Italy**	**National**	**Offshore wind** (**new** RE projects)	USE to HABITECH (one 1M secondment)

** This secondment has been realized under WP2.*

In total, seven (7) Case Studies (1 for Israel, 2 for Spain, 2 for Greece, 1 for Portugal and 1 for Italy) have been developed, with four (4) of them already deployed in the platform. Three (3) Case

Studies have been developed explicitly at local/municipality scale, one (1) at regional scale, two (2) at national scale, and one (1) at both national and local/municipality scale. Among those Case Studies, two (2) focus on onshore wind energy projects, five (5) on PVs projects and one (1) on offshore wind energy projects. Furthermore, six (6) Case Studies deal with new RE projects and one (1) with existing and new (already proposed) projects. Below, we cite for each Case Study its objective, a short description of the relevant developed methodology and some indicative results.

3.1. WP4 Case Study CS1

WP4 CS1 WP4 Case Study was developed and implemented successfully by Dr. Sofia Spyridonidou and Mrs. Georgia Sismani from AUTh (Greece) during their secondments at SP Interface (Israel) in September 2019-March 2020 (6M secondment) and February-March 2022 (1M secondment) respectively.

CS1 aims at the development of an innovative Sustainable Spatial Energy Planning (SSEP) methodological framework for Israel, in order to identify and prioritize appropriate, technically and economically feasible, environmentally sustainable as well as socially acceptable sites for the sitting of large-scale onshore wind farms and PV farms in the country. The framework (Figure 4.1) advances a collaborative and participatory planning approach by combining spatial planning tools (GIS) and Multi-Criteria Decision Making (MCDM) methods with versatile participatory planning techniques, in order to consider the opinion of three different participatory groups (Local Public (LP), Local Experts (LEs) and Renewable Energy Planners (REPs)) within the site-selection processes. A field investigation procedure is also introduced to verify the GIS suitability analysis results by performing direct field observations/on-site analysis, or by deploying alternative tools, such as Google Earth Pro, for sites that were inaccessible.

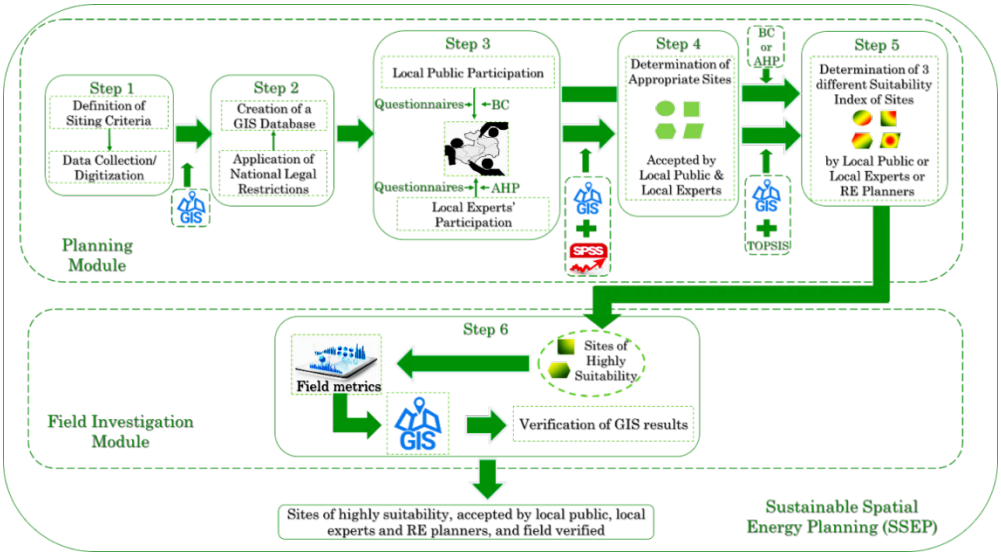


Figure 4.1 WP4 CS1 framework for large-scale wind farms' and photovoltaic farms' site-selection in Israel (Spyridonidou et al., 2021)

Some of the main results derived are the Wind Appropriate Sites (WAS) and the Solar Appropriate Sites (SAS). Indicatively, the Suitability Index (SI) spatial allocation of the WAS and SAS based on LP participation is presented in Figure 4.2. More details about the developed methodology and extensive results can be found at Spyridonidou et al. (2021).

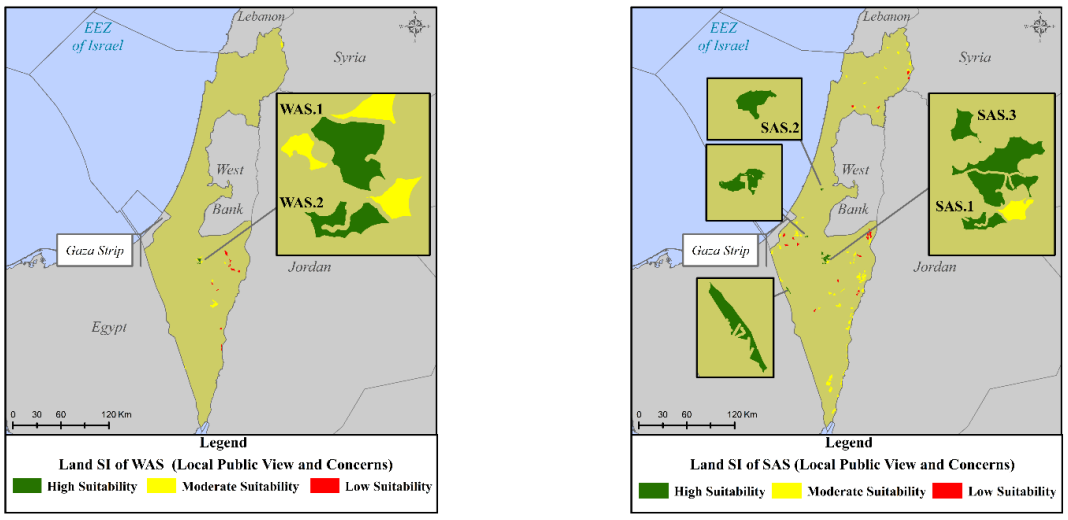


Figure 4.2 WP4 CS1 SI spatial allocation based on Local Public participation for: **(a)** WAS and **(b)** SAS (Spyridonidou et al., 2021)

3.2. WP4 Case Study CS2a

WP4 CS2a Case Study was developed and implemented successfully by Mrs. Anna Codemo from UNITN (Italy) during her 2M secondment at Territoria (Spain) in September 2021-November 2021.

CS2a aims at determining suitable locations for Solar Power Plants (SPPs) in the urban areas of the Municipality of Arcos de la Frontera in Andalusia, Spain, considering relevant sitting criteria and the citizens' and local experts' opinion. The structure of the proposed energy planning workflow is the result of an iterative process based on the insights of literature review and the considerations on the current planning tools emerged from the consultation with local experts. GIS technology is combined with MCDM techniques to identify levels of suitability for solar energy development. This methodology allows the combination of geographical data with qualitative considerations to obtain adequate information for spatial planning and includes three parts: (i) thematic maps for SPPs suitable location; (ii) interviews with citizens; (iii) interviews with local experts.
Regarding the **thematic maps**, those have been produced for various sitting/assessment criteria (e.g., environmental, technical, land use and cultural, visibility-related). Some thematic maps are shown in Figure 4.3. As for the **interviews with the citizens**, the methodology used to investigate their (citizens of Arcos de la Frontera) opinion is the visual Q methodology, evaluating pictures to define shared points of views. The selected pictures (36) included solar farms in different urban and rural land uses with different degrees of landscape or architectural integration quality. Non-experts with awareness of the existence of PV systems and experts in landscape planning or in solar energy were considered. A total of twenty-one (21) people responded to the survey (12 were experts and 9 non-experts). The resulting factors (points of view) are derived from a factor analysis carried on PQ Method software generating a correlation matrix between responses extracted with the centroid method and rotated with varimax. In general, positive feedback on the efforts for energy transition is detected, but there is a consensus against on-ground solar plants. Landscape with high scenic and agrological values should be carefully considered for SPPs implementation.

The use of roof surfaces in residential, commercial, and industrial areas should be prioritized compared to on-ground installations. Finally, regarding **interviews with experts**, the aim of those interviews is to investigate the opinion of local experts on the landscape transformations due to photovoltaic applications and on the tools to manage them. The interviews involved five (5) local experts. There was also a common agreement on the need of local planning tools to regulate the model of RES deployment to preserve the landscape and guarantee engagement and acceptance of the inhabitants. The interviewees revealed many insights related to tools for energy planning and design (e.g., it is important to define land use boundaries and suitable areas for RES deployment by municipalities). Finally, the participants assessed the examined sitting criteria. It is noted that CS2a Case Study led to two journal publications, currently under review.

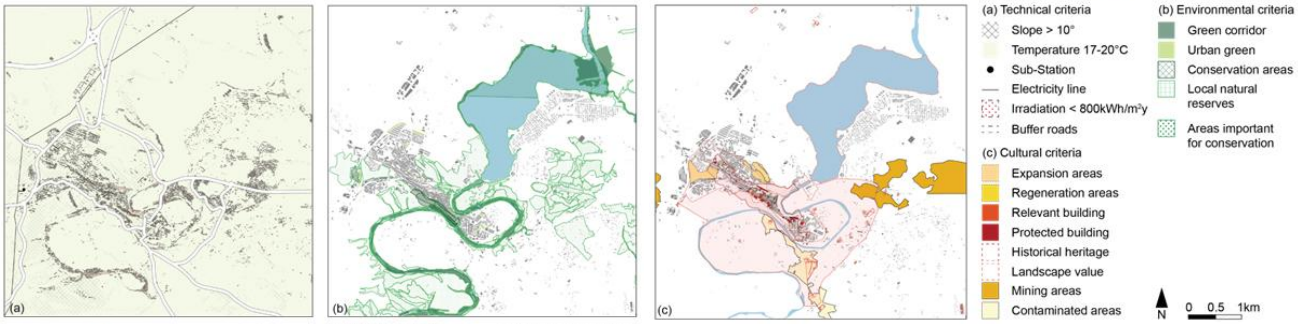


Figure 4.3 WP4 CS2a thematic maps of environmental, cultural, technical and legal criteria

3.3. WP4 Case Study CS2b

WP4 CS2b Case Study was developed and implemented successfully by Dr. Nikolaos Nagkoulis from AUTH (Greece) and Ms. Chiara Chioni from UNITN (Italy) during their secondments at Territoria in April-June 2022 (2M secondment) and November-December 2022 (1M secondment) respectively.

CS2b aims at: (i) identifying optimum areas for new PV plants at the La Palma Del Condado municipality that minimize the visual disturbance, while satisfying spatial constraints associated with land use, as well as environmental and techno-economic sitting factors and (ii) investigating the PV plants perception to support a technical consultancy service for the General Urban Development Plan's modification with respect to PV plants' installations on rural land.

Objective (i) was achieved during the secondment of Dr. Nagkoulis, who developed a relevant integrated methodology with application at the municipality of La Palma Del Condado located in the province of Huelva, Andalucia, Spain. The visual disturbance due to PV installations in the study area is quantified by introducing and calculating the "Social Disturbance" (SDIS) indicator, whereas optimum locations are determined for predefined values of two sitting preferences (maximum allowable PV locations – grid station distance, DG_{max}, and minimum allowable total coverage area of PV installations, $Area_{min}$). Thematic maps of appropriate selected exclusion criteria are produced, followed by a cumulative weighted viewshed analysis to calculate the SDIS indicator. Optimum solutions are then determined by developing and employing a Genetic Algorithms optimization process. By modifying the values of the two sitting preferences (DG_{max} and $Area_{min}$), different sets of optimum solutions are obtained (see for example Figure 4.4), using (remotely) the AUTh High Performance Computing Infrastructure and Resources.

More details about the developed methodology and extensive results can be found at Nagkoulis et al. (2022). The results of this research activity were also presented (after the end of the secondment) by Mrs. Michela Ghislanzoni, Principle Investigator at the hosting organization, to the local authorities and they were finally included in the spatial planning of the region.

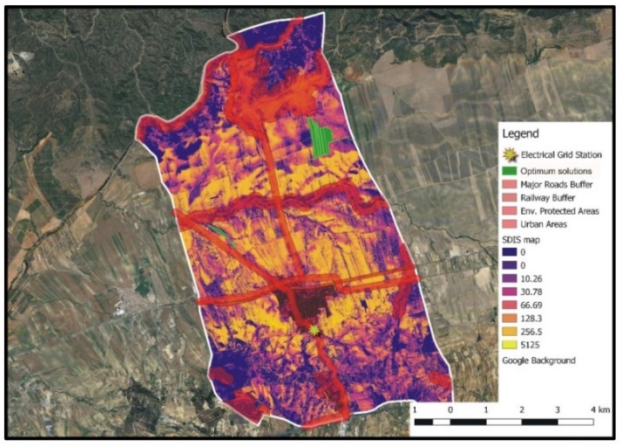


Figure 4.4 WP4 CS2b optimum solutions for DG_{max}=7.0 km and $Area_{min}$=0.5 km^2 (values of the SDIS map have to be multiplied by 10^9) (Nagkoulis et al., 2022)

Ms. Chioni focused on objective (ii) of the WP4 C2b Case Study. Specifically, a co-visioning workshop was drafted to support a participated innovation of the municipality's plan, and a questionnaire was designed to investigate citizens' perceptions of REL (with special attention to solar energy on rural land). The methodology for the participatory process was proposed for a working group composed of decision-makers. The co-visioning workshop was proposed to be organised in **three (3) rounds** of 30 minutes each in order to lead to a shared vision of La Palma Del Condado in 2032. Regarding the questionnaire (online and onsite dissemination is possible), it consisted of **four (4) main sections**. It is noted, however, that the municipality of La Palma Del Condado cancelled the meeting with the citizens, the mayor and the political opposition, and stopped the dissemination of the questionnaire before it was even started.

3.4. WP4 Case Study CS3a

WP4 CS3a Case Study was developed and implemented successfully by Prof. María Ángeles Barral (UHU, Spain), Ms. Chiara Chioni and Ms. Angelica Pianegonda (UNITN, Italy) during their secondment at GSH (Greece) in July 2019 and July 2023 (two 1M secondments by Prof. María Ángeles Barral) and September-October 2022 (1M secondment by Ms. Chioni and 1M secondment by Ms. Pianegonda).

CS3a aims at (i) assessing the visibility and the visual impacts of existing and planned onshore Wind Turbines (WTs) in the Island of Paros, and (ii) collecting the opinion of inhabitants/tourists/experts regarding their perception about them. Objective (i) was realized by Prof. Barral, while Ms. Chioni and Ms. Pianegonda implemented research activities related to objective (ii). More specifically, during the first secondment of Prof. Barral, the visibility (from each point of the surface of the island)

and the visual impacts (on beaches) of existing and planned WTs in Paros Island were assessed, using existing GIS tools. Accordingly, various data were collected, digitised/pre-processed appropriately and used to create relevant thematic maps in GIS (see Figure 4.5(a)). More details can be found at Kontopoulos et al. (2020). During her second secondment, Prof. Barral developed an easy-to-use GIS methodology to address the WTs' visual impact. This methodology considers not only the area from which a WT is visible, but which part of the WT is actually visible and at what distance. Indicative results are shown in Figure 4.5(b). Ms. Chioni and Ms. Pianegonda designed a questionnaire to investigate community perceptions of REL. The questionnaire structure was the result of both a top-down and a bottom-up approach. Specifically, the questions were drafted together with the colleagues from UNITN (Mrs. Codemo and Mrs. Barbini) during their concurrent secondments at CONSORTIS GEO (Greece), aiming to conduct a comparison between WP4 CS3a and CS3b Case Studies (top-down approach). The questions were further tailored after the discussion with "Friends of Paros & Antiparos" (FoP&A) NGO (bottom-up approach). The final questionnaire had four (4) main sections. The questionnaire's wrap up and interviewed people's comments are shown in Figure 4.5(c).

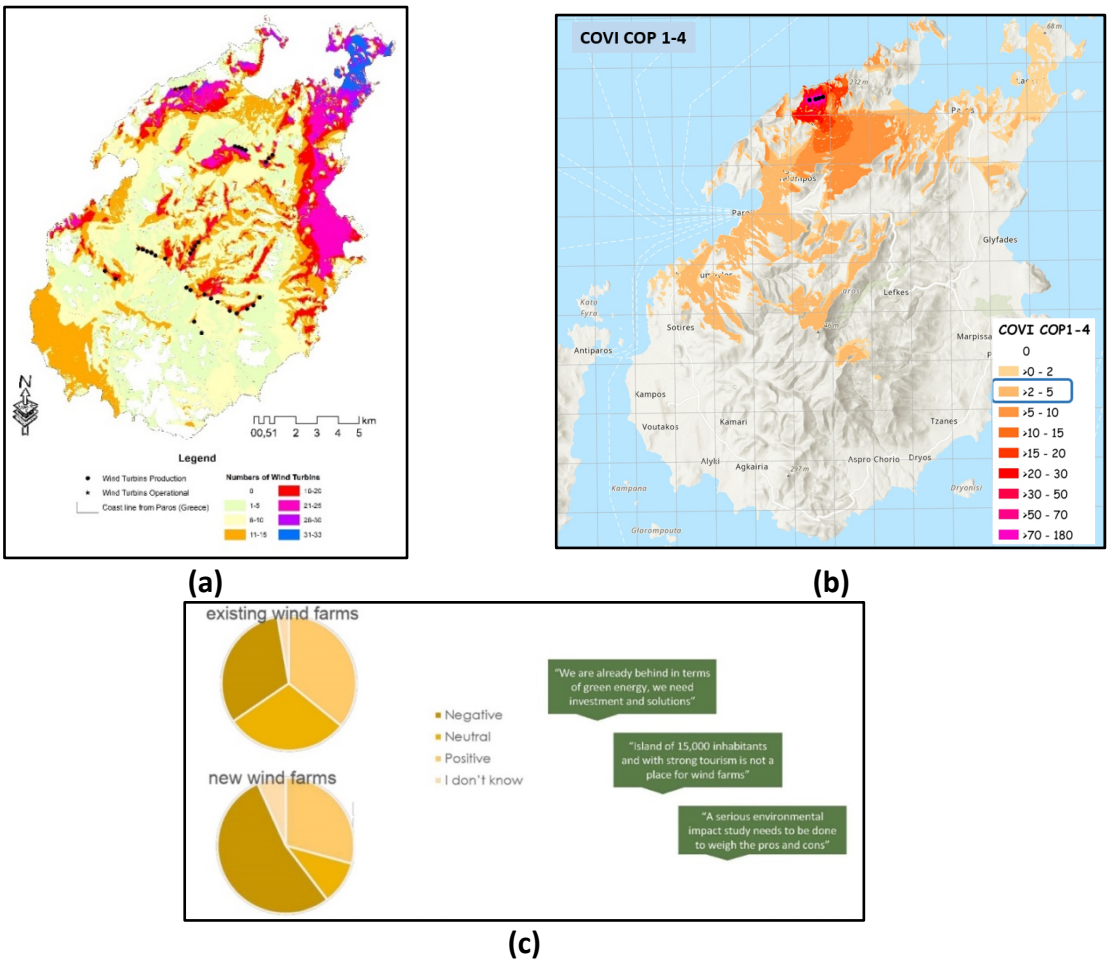


Figure 4.5 WP4 CS3a results: **(a)** Classification according to WTs number visible from each point of Paros; **(b)** Cumulative Objective Visual Impact (COVI) of currently operating WTs in Paros Island; **(c)** Questionnaire's wrap up and interviewed people's comments

3.5. WP4 Case Study CS3b

WP4 CS3b Case Study was developed and implemented successfully by Mr. Anastasios Bitziadis (CONSORTIS Geo, Greece) during his secondment at UNITN (Italy) in July 2022 (1M secondment), Prof. María Ángeles Barral (UHU, Spain) during her secondment at CONSORTIS Geo (Greece) in July 2022 (1M secondment), as well as by Mrs. Ambra Barbini and Mrs. Anna Codemo (UNITN, Italy) during their secondment at CONSORTIS Geo (Greece) in September-October 2022 (1M secondment) and September-November 2022 (2M secondment) respectively.

CS3b aims at assessing the location of new (licenced) SPPs in the Kilkis regional unit in Greece. The suitability of the potential projects is evaluated according to relevant sitting criteria, visual impact and social perception. Mr. Bitziadis focused on the selection of the SPPs to be examined and the creation of thematic maps of sitting criteria, the visual impact assessment was realized by Prof. Barral, while Mrs. Barbini and Mrs. Codemo implemented research activities related to social perception. Starting with Mr. Bitziadis' secondment, five (5) Areas of Interest (AoI) in the regional unit of Kilkis, where new (licensed) SPPs are planned to be installed, have been selected based on a group of appropriately selected sitting criteria by producing relevant thematic maps using QGIS (Figure 4.6). The results illustrate that the locations of the 5 AoI are expanded between the urban centres of Polykastro and Kilkis as well as a number of surrounding settlements. Accordingly, the characteristics of any potential project will affect a large part of the local community. Residents' systematic visual contact with the parks should be considered as a major factor that should shape the intention to accept or reject the project. Prof. Barral focused on the visual impact assessment of the examined SPPs in the 5 AoI, as well as on their possible impacts on urban centres and nearby communication routes by deploying various relevant ArcGIS Pro GIS tools (Figure 4.7). Finally, Mrs. Barbini and Mrs. Codemo implemented research activities related to the social perception of the five examined in this Case Study SPPs. Their investigation (Codemo et al., 2023) proposes spatially explicit public considerations as an additional layer that can be overlapped with other societal factors, aiming to connect appropriate locations with integration requirements. 86 residences were interviewed with a questionnaire reflecting on the perception of the impacts and benefits of the SPPs through site selection and design strategy criteria through an onsite and online campaign. The questionnaire was composed of an introductory part, including a presentation of the project, an information sheet and consent form, and four sections. The results have demonstrated that there is general support for SPPs. However, respondents highlight concerns of the environmental impacts (e.g. landscape impacts) of SPPs. Finding suitable sites in accordance with visual and contextual public perception can facilitate social acceptance.

(a) ***(b)***

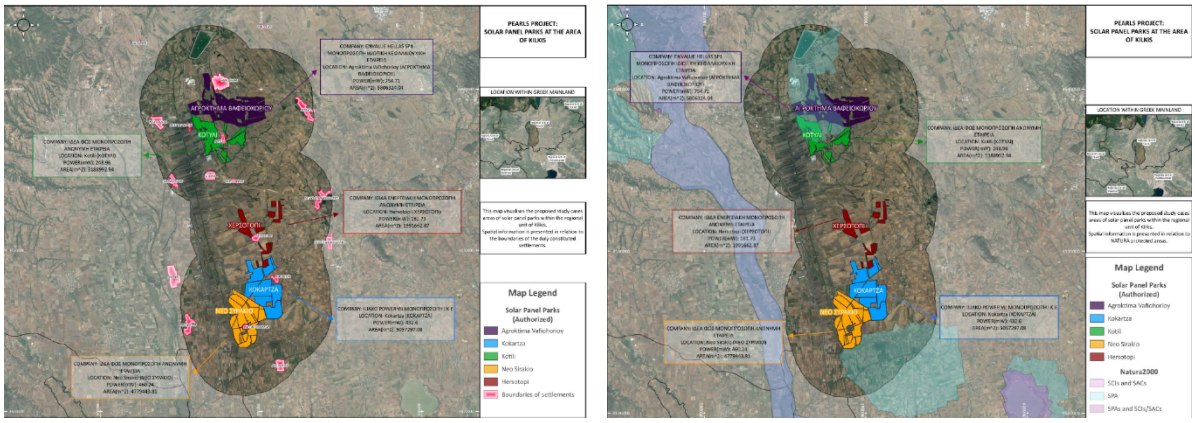
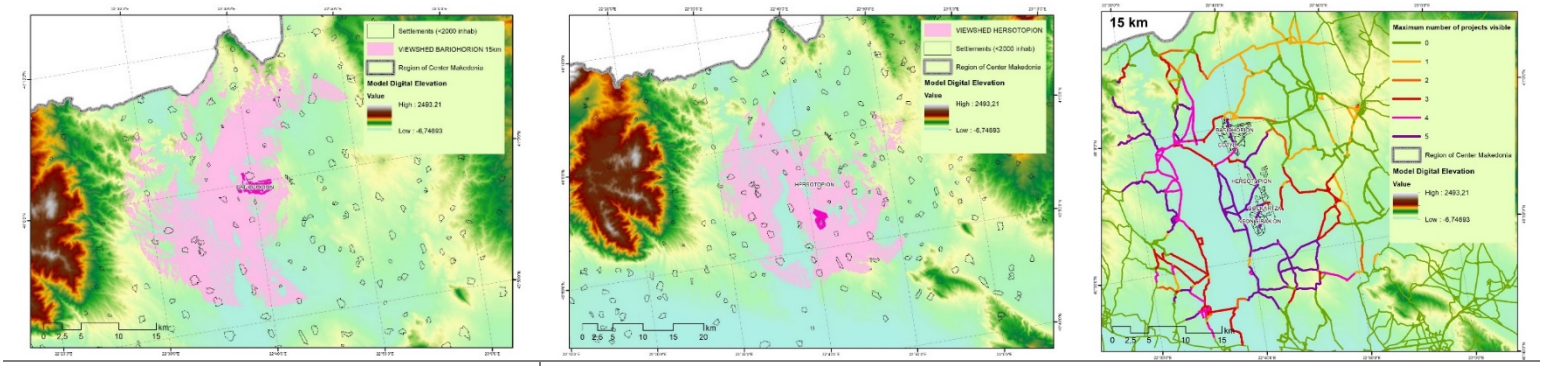


Figure 4.6 Thematic maps of the five AoI and the relevant SPPs in relation to: **(a)** the boundaries of settlements and **(b)** the NATURA protected areas (WP4 CS3b Case Study)



(a) **(b)** **(c)**

Figure 4.7 Viewshed for one AoI in the north **(a)** and in the south **(b**) of the study area; number of SPPs visible from main roads within a radius of 15 km **(c)** (WP4 CS3b Case Study)

3.6. WP4 Case Study CS4

CS4 WP4 Case Study was developed and implemented successfully by Dr. Sofia Spyridonidou from AUTh (Greece) during her 1M secondment at ENERCOUTIM (Portugal) in May-June 2022.

CS4 aims at the development of a Decision-Support Framework for the Site Selection (DSF-SS) of PV technologies in Portugal (Figure 4.8), in order to: (i) classify and prioritize the municipalities of the country according to their suitability (e.g., geographic, economic and social characteristics) to host PV projects and (ii) pinpoint and evaluate suitable, technically and economically viable, as well as environmentally and socially sustainable, sites for PV installations in the Portuguese municipality with the highest PV SI. The overall outputs of the proposed DSF-SS are a set of highly suitable municipalities in Portugal for hosting PV projects and a set of highly suitable sites for PV installations in the Portuguese municipality with the highest SI for PV deployment. More details about the developed methodology can be found at Spyridonidou et al. (2022).

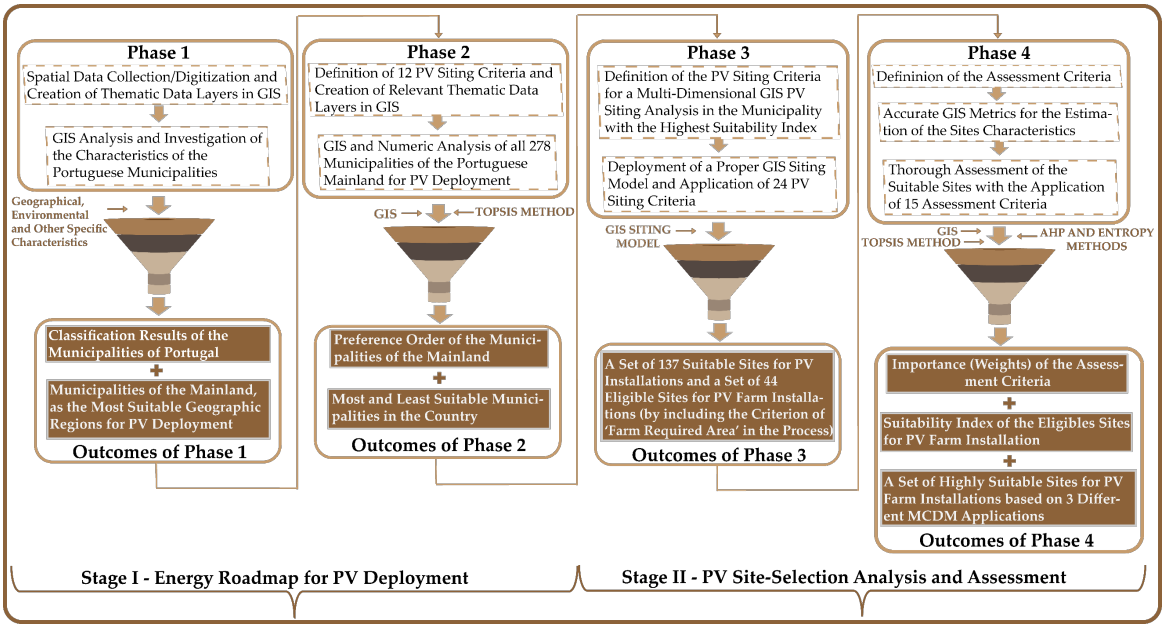
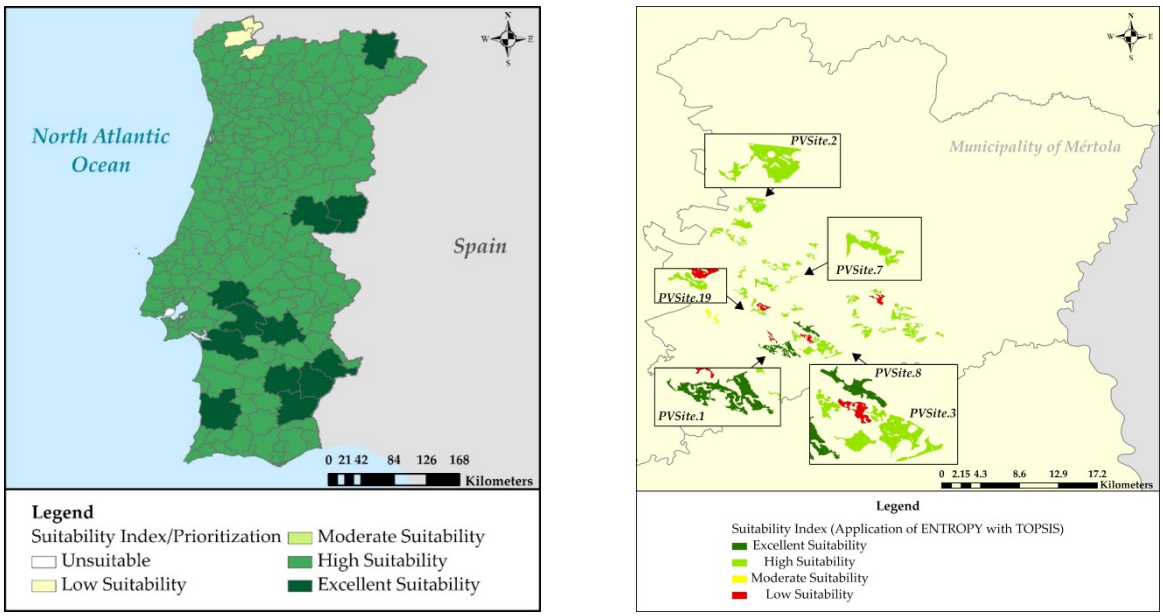


Figure 4.8 WP4 CS4 decision-support framework for sustainable PV site selection in Portugal (Spyridonidou et al., 2022)

The main outcome derived from the implementation of Stage I of the proposed DSF-SS is the preference order of all municipalities on national and regional scales. The results of the prioritization process of the Municipalities of the Mainland (MoM) are illustrated in Figure 4.9(a). According to the prioritization results, the municipality with the highest SI for PV deployment in the Portuguese mainland is the Municipality of Mértola (SI = 0.996). In the next stage (Stage II) of the proposed DSF-SS, a total of 44 sites with a total surface area of 20.5493 km^2 were ultimately identified as eligible for the potential sitting of PV farms in the Municipality of Mértola. The SI results reveal the precise suitability of the potential sites for PV farm installation, and their spatial allocation according to the resulting SI is presented on the final suitability map (Figure 4.9(b)). Extensive results related to WP4 CS4 Case Study can be found at Spyridonidou et al. (2022).



(a) **(b)**

Figure 4.9 WP4 CS4 main results: **(a)** Stage I – preference order of the MoM in Portugal and **(b)** Stage II – SI of the potential sites for PV farm installation in the Municipality of Mértola based on ENTROPY with TOPSIS application (Spyridonidou et al., 2022)

3.7. WP4 Case Study CS5

WP4 CS5 Case Study was developed and implemented successfully by Mrs. Ainhoa Maruri Arana from USE (Spain) during her 1M secondment at HABITECH (Italy) in June-July 2023.

CS5 aims at identifying the most adequate marine areas in Italy towards the deployment of Offshore Wind Farms (OWFs). Accordingly, a GIS-driven methodology was developed, where marine areas (eligible areas) not satisfying a set of exclusion criteria representing economic, technical, social and environmental restrictions/implications are determined. All exclusion criteria have been defined considering the available literature as well as online data availability and access. A GIS database was developed, using the QGIS GIS tool that includes individual thematic maps of the exclusion criteria (see Figure 4.10). By overlaying the thematic maps of exclusion criteria, areas unsuitable for the deployment of OWF in the Italian marine environment are determined, while the remaining ones, not satisfying any of the exclusion criteria, correspond to areas eligible for this purpose. In total, twenty-nine (29) eligible areas have been identified, after having additionally excluded those areas with an extent less than 2.5 km^2, as they do not fulfil economical purposes. The eligible marine areas are shown in Figure 4.11. It can be seen that most of the eligible areas are situated around the islands, except of some few areas that are located along the peninsula's coast. It is emphasized that the vast majority of the eligible areas is characterized by deep water conditions with water depths ranging from 200 m up to 500 m. However, some marine areas located southwest of Italy have water depths in the range of 50 m – 200 m. The results have demonstrated that Italy has a great potential for OWF deployment. By installing OWFs at some of the eligible marine areas proposed in this research study the target of 0.9 GW offshore wind energy production by 2030 established for Italy

can be achieved.

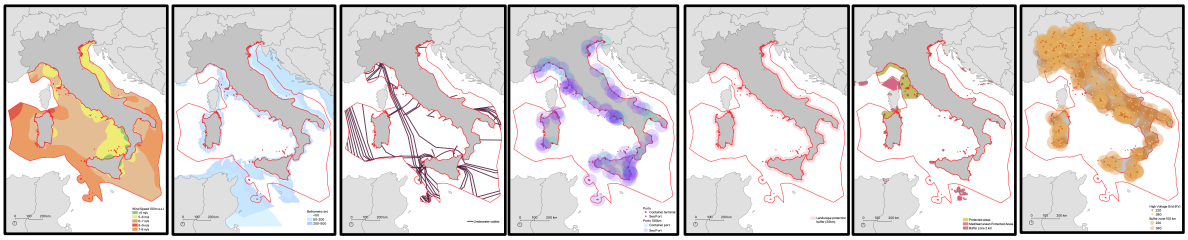


Figure 4.10 WP4 CS5 thematic maps of exclusion criteria

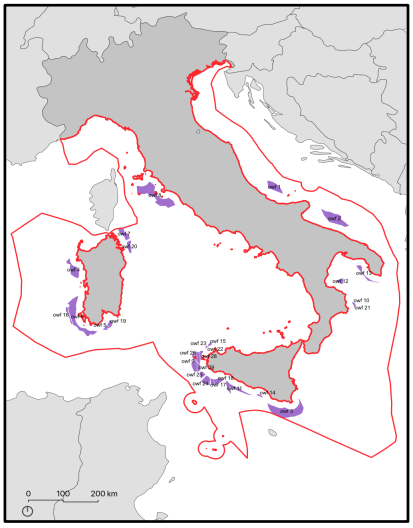


Figure 4.11 Eligible marine areas for OWFs deployment in Italy (WP4 CS5 Case Study)

4. The PEARL*S* Web-GIS Platform

The PEARLS Web-GIS platform developed within WP4 corresponds to a versatile online geographic information tool implemented by utilizing only free and open-source libraries/tools. The general architecture of the application is shown Figure 4.12. Snapshots of the platform are cited in Figure 4.13, while In Table 4.2, all PEARLS collected and harmonised datasets that can be retrieved for visualization through the platform are presented per country and Case Study. Details about the main functionalities, technological stacks and interdependencies (e.g., architecture, data types) of the PEARLS Web-GIS platform can be found in the "D4.3. Web-GIS Platform" deliverable, prepared and submitted by the beginning of July, 2023. It is noted that the PEARLS Web-GIS platform has been implemented by Mr. Christos Kontopoulos (GSH) during his 2M secondment at USE and Mr. Thomas Papakosmas (GSH) during his 5M secondment at USE and 2M secondment at UHU.

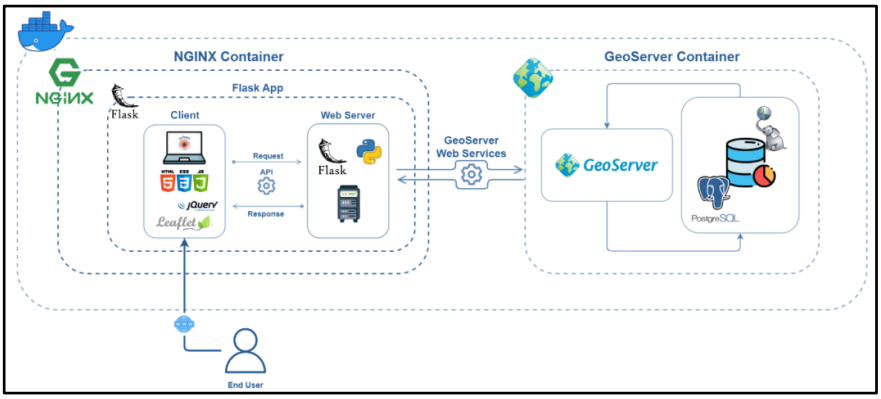
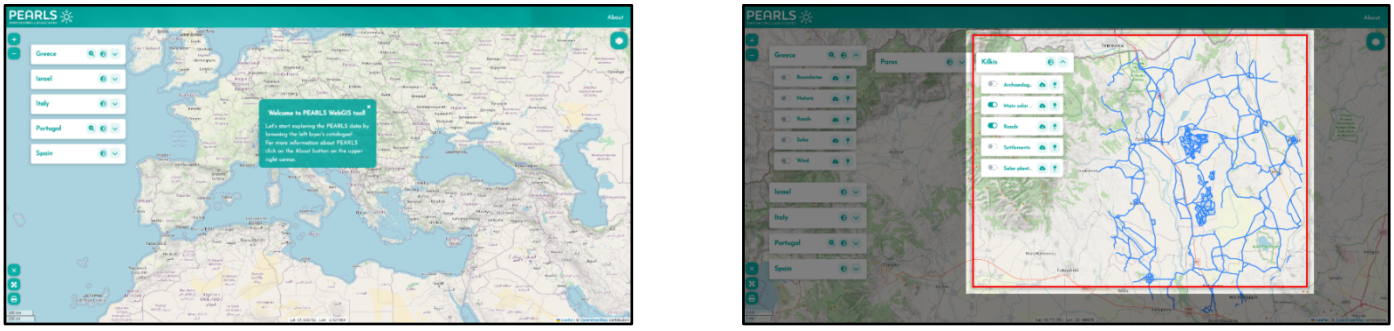


Figure 4.12 Schematic representation of the UML workflow depicting the architecture of the described geospatial data management solution



(a) **(b)**

Figure 4.13 PEARLS Web-GIS: **(a)** Landing page and main interface; **(b)** Layer selection for the Case Studies of each country

Table 4.2 Summary of harmonized data for publishing through PEARLS Web-GIS platform

Country	Case Study	Layers
Israel	**CS1** (country level)	Archaeological Historical Cultural Heritage Sites; Environmental Protected Areas; Forests Reserves; Global Horizontal Irradiance; High Voltage Electricity Grid; Important Bird Areas; Wind Velocity; Site Suitability Analysis results: PV Farms Suitability LE, LP and REP; Site Suitability Analysis results: Wind Farms Suitability LE, LP and REP
Spain	**CS2a** (Arcos de la Frontera)	Visibility from public spaces (500 m; 1200 m, 2500 m)
Spain	**CS2b** (La Palma del Condado)	Boundaries; Optimum PV parcels (7 km max grid distance , 2 km^2 total PVs area; SDIS map
Greece	**CS3a** (Paros island)	Beaches; Coastline; Roads; Settlements; Villages; Villages points; WTs Visibility (Operational); WTs Visibility (Production license)
Greece	**CS3b** (Kilkis regional unit)	Archaeological sites; Main solar plants; Roads; Settlements; Solar plants with Operational License (30 km around main plants)
Portugal	**CS4** (Municipality of Mértola)	Suitability Index PV Sites (AHP & TOPSIS; ENTROPY & TOPSIS; EW & TOPSIS)
	CS4 (country level)	Archaeological, Historical and Cultural Heritage Sites; Global Horizontal Irradiance; Important Bird Areas; Practical PV Energy Output; Prioritization Results for PV deployment in municipalities
Italy	**CS5** (country level)	*Under processing*
Common layers for all countries		Boundaries; NATURA areas; Solar farms; Wind farms

5. Conclusions – Planning for the Remaining Period

During the reference period (*October 18, 2019 – September 7, 2023*) extended research activities have been made towards the successful implementation of WP4 Tasks 2 and 3. In accordance with Annex I of the Grant Agreement, WP4 Tasks 2 and 3, including the development of the Web-GIS platform and of the WP4 Case Studies (definition of Case Studies, methodologies development, production of data and thematic maps), have been almost finalized, MS4 has been achieved and Deliverable D4.3 has been submitted. The remaining activities by the end of the project include: (a) inclusion/uploading of CS2a, CS2b and CS5 data and thematic maps in the Web-GIS platform, (b) refinement of data and thematic maps of WP4 Case Studies in the Web-GIS platform and (c) preparation and submission of Deliverable D4.2 according to the corresponding deadline.

6. WP4 References

Codemo A., Barbini A., Mantouza A., Bitziadis A. and Albatici R. (2023). “Integration of Public Perception in the Assessment of Licensed Solar Farms: A Case Study in Greece”, *Sustainability*, Vol. 15, 9899; https://doi.org/10.3390/su15139899.

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Nagkoulis N., Loukogeorgaki E. and Ghislanzoni M. (2022). "Genetic Algorithms-Based Optimum PV Site Selection Minimizing Visual Disturbance", *Sustainability*, Vol. 14, No. 19, 12602. https://doi.org/10.3390/su141912602.

Spyridonidou S., Loukogeorgaki E., Vagiona D.G. and Bertrand T. (2022). “Towards a Sustainable Spatial Planning Approach for PV Site Selection in Portugal”, *Energies*, Vol. 15, No. 22, 8515; https://doi.org/10.3390/en15228515.

Spyridonidou S., Sismani G., Loukogeorgaki E., Vagiona D.G., Ulanovsky H. and Madar D. (2021). "Sustainable Spatial Energy Planning of Large-Scale Wind and PV Farms in Israel: A Collaborative and Participatory Planning Approach", *Energies*, Vol. 14, No. 3, 551; https://doi.org/10.3390/en14030551.

WP5 Social Innovation and Public Engagement
2nd Progress Report (Period: October 18th, 2019- September 7th, 2023)

Lead beneficiary	4-ICSUL		Start month	December 2018	End month	June 2023
Participation per Partner						
1–USE	2–CLANER	3–Territoria	4-ICSUL	5 - Enercoutim	6-COOPERNICO	8-AUTH
9-GSH	12-UH	14-BGU	16-UPO	18-E4G		

Objectives

1. To identify and replicate social innovations in the field of renewable energies in the consortium countries.
2. To appraise innovative practices in public engagement in renewable energies.
3. To strengthen the cultural dimension of renewable energy development processes.
4. To promote training and dissemination of methodologies for public engagement.

Description of work and role of partners

WP5 Social Innovation and Public Engagement aims to reinforce the social dimension in renewable energy development. It aims to explore how resources from social research can be used to enhance the involvement of communities, to tap into local knowledge to create innovative solutions, to defuse potential causes for conflict around landscapes and cultural values.

Task 1: Case studies (CS) of social innovation and entrepreneurship in the energy sector. This task consists of the identification of relevant cases of social innovation regarding renewable energy (novel more sustainable solutions to problems such as community opposition, landscape impacts, underdeveloped RE generation potential) through document analysis and interviews with stakeholders. A common template will be designed for data collection in order to derive comparable information and best practices jointly with WP2 to WP4. Scientific paper on case studies of social innovation and entrepreneurship in the energy sector will be published. (D.5.1)

Task 2. Landscape and cultural analysis. (LCA). This task consists of developing studies on landscape and cultural factors in potential locations for renewable energy. Researchers will gather information on local cultural valuations of landscape and heritage in order to assess and anticipate potential conflicts and resistance to renewable energy facilities and help devise alternative locations or mitigation measures (through visual tools and other planning devices in cross cooperation with WP4). (D.5.1, D.5.2)

Task 3. Training (T) in social analysis and participatory methods according to WP1 communication and dissemination strategy. This comprises the organisation of a methodological course on social analysis and participatory methods aimed at researchers and technicians from business and civil society organisations. It includes a final integration seminar with all participants in the WP, which will take place at ICSUL. (D.5.1, D.5.2)

List of deliverables

D Nº	Title	Leader	Type	Dissemination	Due Date
D5.1	Cases Studies	4-ICSUL	Other	Public	June 2023
D5.2	Training	4-ICSUL	Other	Public	April 2023

Schedule of relevant Milestones

M Nº	Title	Leader	Due Date	Means of verification
MS5	Training activity Background	4-ICSUL	June 2023	Re-direction of secondments to fieldwork, case studies and stakeholder selection

1. Introduction

WP5 Social Innovation and public engagement aims to reinforce the social dimension in renewable energy development, by promoting knowledge exchanges between business and CSO involved in RE planning and implementation and academic institutions that carry out research on social issues concerning energy. It aims to explore how resources from social research can be used to enhance the involvement of communities, to tap into local knowledge to create innovative solutions, to defuse potential causes for conflict around landscapes and cultural values. It has a strong training dimension, providing researchers and technicians from business and civil society organisations with information on cutting edge methodological tools for social research and participatory engagement emanated from academia. Nevertheless, secondments of academic social researchers in business and CSO will also raise their awareness of the needs, interests and specialised knowledge of non-academic partners, extremely fruitful for future collaborations. Finally, this WP also has a strong dissemination component, patent both in scientific outputs (article, report) and actions aimed at communities (exhibition) and the general public, as well as seminar that will include all WP participants.

WP5 objectives are:

01. To identify and replicate social innovations in the field of renewable energies in the consortiumcountries.

02. To appraise innovative practices in public engagement in renewable energies.

03. To strengthen the cultural dimension of renewable energy development processes.

04. To promote training and dissemination of methodologies for public engagement.

WP5 partners include six academic organizations, namely ICS (WP leader), U. Sevilla, Universidad Pablo Olavide, Universidad de Huelva, AUTh, andBen Guron U., and seven non-academic organizations, namely Coopernico, Enercoutim, CLANER, TERRITORIA, Geosystem Hellas, Habitech and Ethics4Growth.

The present document presents the *2nd progress report of WP5* aiming at describing the WP5 activities implemented during *October 18, 2019 – September 2023* (reference period). During this period:
(1) research activities were carried out for all Tasks *(2)* a Training Course (methodologies for public engagement (Deliverable 5.2) *(3)* a Seminar on Social Innovation and Public Engagement was held (Deliverable 5.1) *(4)* Presentation of results at several scientific conferences; *(5)* Publication of two scientific articles in indexed peer-reviewed journals.

During the reference period, 14 secondments (19 months) have been accomplished.

Table1: WP5 Secondments

Sender	Host	Duration	Start month	Staff
ICS	Territoria	3 months	January 2020	Researcher
ICS	CLANER	1 month	January 2022	Researcher
AUTh	Enercoutim	1 month	May 2022	Early stage researcher
AUTh	Coopernico	2 months	May 2022	Early stage researcher
ICS	Territoria	1 month	September 202	Researcher
Coopernico	U Sevilla	1 month	September 202	Technical staff
Territoria	ICS	1 month	July 2022	Technical staff
Territoria	ICS	1 month	March 2023	Technical staff
ICS	CLANER	1 month	January 2023	Researcher
ICS	Habitech	1 month	May 2023	Early stage researcher
ICS	Geosystems Hellas	1 month	July 2023	Early stage researcher
Ethics4Growth	U Sevilla	2 months	May 2023	Technical staff
Territoria	ICS	1 month	July 2023	Technical staff
Universidad Pablo Olavide	ICS	2 months	June 2023	Researcher

In the following sections all the above items are described in detail, while, finally, an overview of the WP5 activities' planning until August 2020 is provided.

2. Definition of WP5 Methodological Framework

WP5 is divided in three tasks: case studies of social innovation and entrepreneurship in the energy sector; landscape and cultural analysis; and training in social analysis and participatory methods.

2.1 Task 5.1 Case studies (CS) of social innovation and entrepreneurship in the energy sector

This task consists of the identification of relevant cases of social innovation regarding renewable energy (novel more sustainable solutions to problems such as community opposition, landscape impacts, underdeveloped RE generation potential) through document analysis and interviews with stakeholders. A common template will be designed for data collection in order to derive comparable information and best practices jointly

with WP2 to WP4. A scientific paper on case studies of socialinnovation and entrepreneurship in the energy sector will be published.

Research questions

RQ1. What networks and practices are developing social innovation tools? What are their best practices?

RQ2. What social innovations exist to promote and support extended renewable energy landscapes?

Methodology

1. Literature review - Definition of "social innovation" in the context of RE (cooperatives, microgrids, community energy)

2. Policy review - Analysis of legislation and policy documents for assessing framework for social innovation in RE (cooperatives, microgrids, community energy)

3. Document and web analysis - Identification of social innovations in the partner countries (type, location, main actors), creation of an analytical grid, selection of case studies

4. Interviews with cooperative representatives - analysis of actors, networks, practices, connection to the policy and legal framework (barriers and incentives)

5. Interviews with promoters, authorities and residents of energy communities - analysis of actors, networks, practices, connection to the policy and legal framework (barriers and incentives), citizen participation
6. Identification of best practices

2.2 Task 5.2 Landscape and cultural analysis (LCA).

This task focuses on using the methodologies and outputs resulting from WP4 in order to assess the effects and impacts on the landscape that have that the facilities implemented by citizen energy communities identified in the WP5 case studies. The researchers will apply the methodologies devised by WP4 methodology in existing and, especially, prospective locations. The aim is to evaluate, and anticipate in the case of new projects, the existing and potential conflicts raised by REfacilities, and to propose either alternative locations or landscape impact mitigation measures.

Research questions

RQ4 What values shape the implementation of spatial planning tools for renewable energy development e.g., economic, social, cultural?

RQ5. What are the significant dilemmas voiced in public participation e.g., sustainabilityissues, conflicts, employment opportunities?

Methodology

1. Run a methodological test.

2. Select, at least, one case study out of the energy communities identified during the course of WP5, which can be analysed from the point of view of its effect on the landscape.

3. Using the Web-GIS platform and methodology based on WP4 output, to assess the landscape effects of RE facilities implemented by energy communities (existing RE projects and new RE projects).

4. Participation involving citizen energy communities (members of community and local administrations).

5. Proposal of alternative locations and/or measures for landscape mitigation.

6. Return of the study to the energy community and local administration.

A methodological test has been carried out on two case study: the municipality of La Palma del Condado (Huelva), and the municipality of San Juan de la Palma (Huelva). In both case is an agricultural area subject to strong pressures for RE development, and the study has covered the full extension of the municipality.

The methodology has been adapted to the local scale. Firstly, a dataset was compiled. The information was collected by Territoria during the secondments, and in collaboration with other people that I've made his secondment of WP4 in Territoria. It was then pre-processed appropriately and used in order to create the relevant thematic maps in GIS, as well as a landscape fragility map. Secondly, a landscape analysis has been carried out, resulting in a map of the fragility of the landscapes in the entire municipality. The resulting zoning was adapted to the land property structure, so as to facilitate the subsequent management by the local administration.

2.3 Task 5.3 Training (T) in social analysis and participatory methods

This comprises the organisation of a methodological course on social analysis and participatory methods aimed at researchers and technicians from business and civil society organisations. It includes a final integration seminar with all participants in the WP, which will take place at ICSUL. The deliverable is a methodological course on social analysis and participatory methods for the business and CSO sectors.

3. Research Activities

3.1 Research activities for Task 5.1

During the reference period, several research activities were undertaken, regarding social innovation and entrepreneurship in the energy sector.

First, we continued to feed the database of bibliographic references on social innovation in renewable energy (RE) was conducted. 65 books and scientific articles were collected and gathered in a folder in the Mendeley platform. We used the references collected to build the literature review for articles and conference presentations.

Second, we continued to gather contextual information on social innovation in RE, such as legislation, policies and programmes, was compiled, in particular in Portugal, Spain, Italy and Greece. This contextual information was collected through document analysis, participation in institutional events, field visits and interviews with key informants, such as the representative of the Agencia Andaluza de la Energía (Energy Agency of Andalucia) and the Mesa de Autoconsumo en Andalucía (Board of Self-consumption of Andalusia).

We conducted case studies of energy cooperatives and energy communities in Portugal, Spain, Italy and Greece (see Table2). The case studies relied on document analysis, observation at events and interviews with promoters, stakeholders and residents (following a common interview protocol, the interviews were recorded and transcribed). The case studies of cooperatives were published as two articles in peer-reviewed journals and the case studies of energy communities are summarized in a report that is being finalized.

Table2: WP5 Case Studies

	Energy cooperatives	Energy communities
Spain	Som Energia La Solar	Crevillent, Comunidad Valenciana Arroyomolinos de Leon, Andalucía Torreblanca, Sevilla
Portugal	Coopernico	Culatra Valverde São Luis Alta de Lisboa
Italy	Energia Positiva	FERLA La Buona FonteRiccomassimo
Greece	…	Hyperion

3.2 Research Activities for Task 5.2

A methodological test has been carried out on a territory that is similar to that of the upcoming energy community *Asociación MUTI-Espacio evolutivo* (the energy community has not yet been named) to be held in the municipality of Arroyomolinos de León, in the province of Huelva (Spain).

The test was carried out on the municipality of San Juan del Puerto (province of Huelva, Spain), an agricultural area subject to strong pressures for RE development. These come in the shape of permit applications for new renewable energy facilities that aim to take advantage of the municipality's great solar, wind and biomass potential. Solar and biomass are also the most likely energy sources to be tapped by the MUTI energy community.

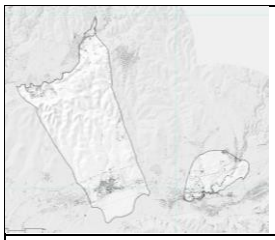
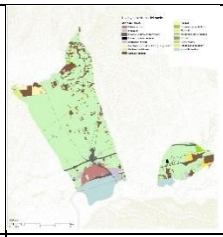
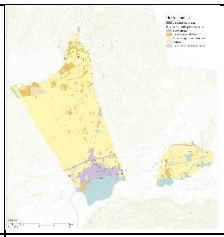
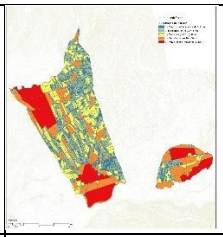
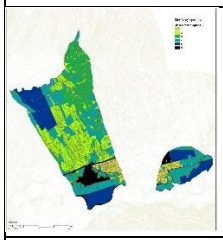
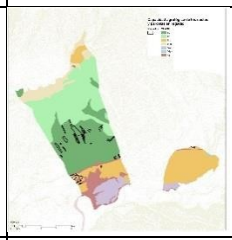
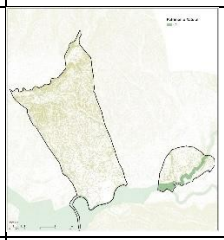
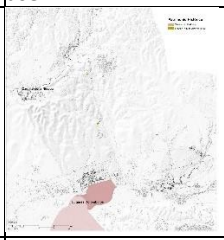
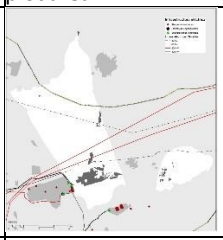
The study has covered the full extension of the municipality. In 2018, San Juan del Puerto had a population of 9,198 inhabitants. It extends over 45 sq. km, thus featuring a population density of 194 inhabitants/sq. km.

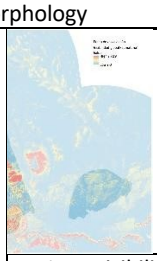
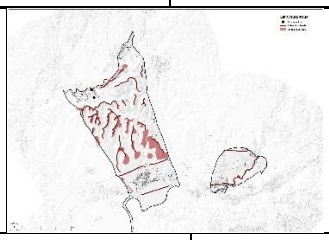
The methodology has been adapted to the local scale.

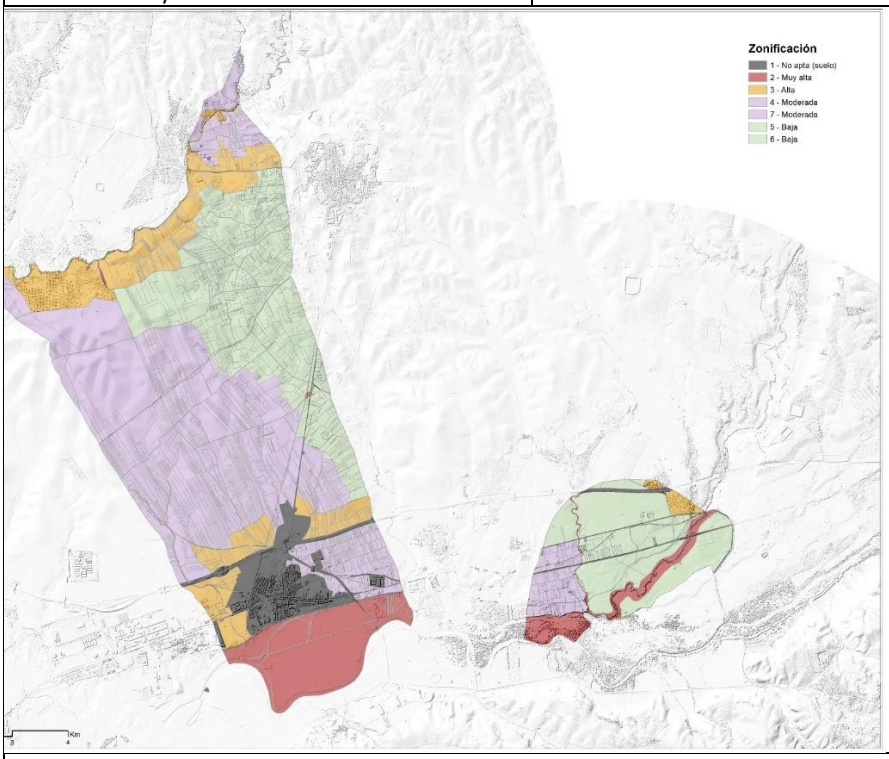
Firstly, a dataset was compiled. The following information was collected by TERRITORIA during the secondments. It was then pre-processed appropriately and used in order to create the relevant thematic maps in GIS, as well as a landscape fragility map:

- Digital Elevation Model. Source: MDT 2013. Environmental Information Network of Andalusia - REDIAM)
- Land use: land cover and degrees of human land use (interpretation and analysis of land use in terms of human activities on the territory). Source: SIOSE Cartographic Base Andalusia 2013. Land Occupation. REDIAM.
- Land property structure: plot surface ranges and morphology. Source: vector cartography of the official land registry, latest update (June 2019). Ministry of Finance. Government of Spain
- Agricultural land suitability. Source: Evaluation of agricultural resources. Map of agrological classes. County Condado Campiña (Huelva). Department of Graphic Engineering and Geomatics of the University of Cordoba, 2002.
- Natural heritage (sites of environmental interest). Source: Natura 2000 Network in Andalusia, updated information. REDIAM.
- Cultural heritage. Source: General Catalogue of the Historical Heritage of Andalusia.
- Energy installation (grid). Source: Reference Spatial Data (DERA), from the Andalusian Institute of Statistics and Cartography.
- Visual analysis: intervisibility and visual structure. Source: LIDAR Laser Imaging Detection and Ranging.

Secondly, a landscape analysis has been carried out, resulting in a map of the fragility of the landscapes in the entire municipality. The resulting zoning was adapted to the land property structure, so as to facilitate the subsequent management by the local administration.

				
Area of study	DEM	Land use: land cover	Land use: degree ofhuma use	Land property structure: plot area
				
Land property structure:plot morphology	Agricultural landsuitability	Natural heritage	Cultural heritage	Electrical grid

		
Intervisibility	Visual structure	



Landscape fragility map
t suitable; red: very high fragility; orange: high fragility; purple: medium fragility; green: low fragility.

The test was satisfactory. It clarified the necessary sources of information and analyses.Redundant analytical methods were ruled out.

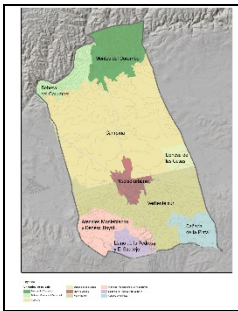
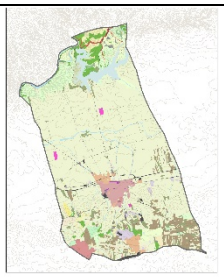
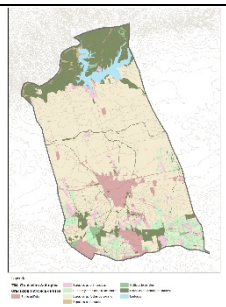
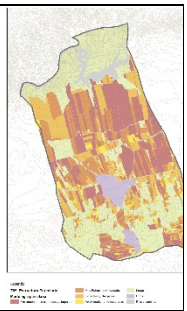
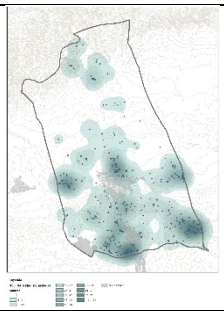
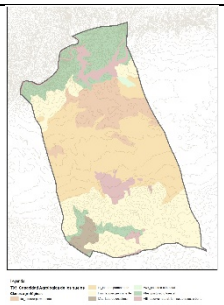
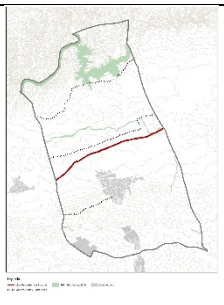
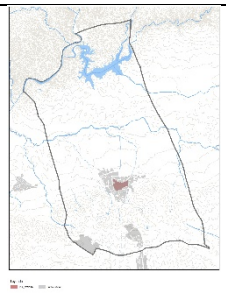
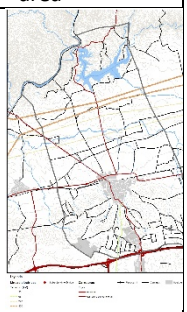
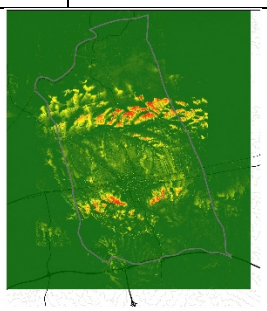
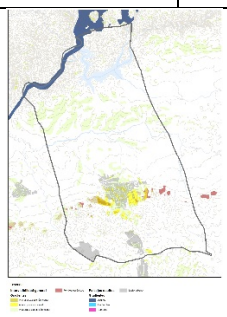
Case study n.2. The test was carried out in the municipality of La Palma del Condado (province of Huelva, Spain), as in the previous case, an agricultural area subject to strong pressures for RE development, due to the large solar and wind potential (no biomass) of the natural resources of the municipality.

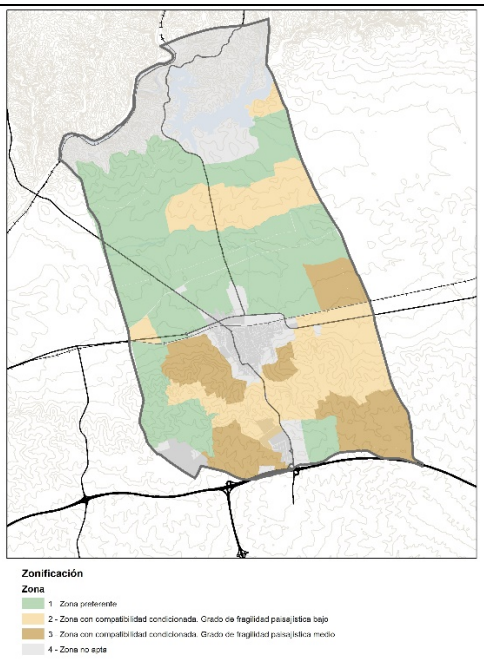
The study has covered the entire area of the municipality, which has an extension of 60,52 km2. The population of the municipality is 10.770 inhabitants (year 2022), so the population density is 178 inhabitants/km2.

First, a set of data was collected. The following information was collected by TERRITORIA during the secondments. It was then appropriately pre-processed and used to create the relevant thematic maps in GIS:

- Digital Elevation Model. Source: MDT 2013. Environmental Information Network of Andalusia - REDIAM)
- Land use: land cover and degrees of human land use (interpretation and analysis of land usein terms of human activities on the territory). Source: SIOSE Cartographic Base Andalusia 2016. Land Occupation. REDIAM.
- Land property structure: plot surface ranges and morphology. Source: vector cartography ofthe official land registry, latest update (June 2019). Ministry of Finance. Government of Spain
- Agricultural land suitability. Source: Evaluation of agricultural resources. Map of agrological classes. County Condado Campiña (Huelva). Department of Graphic Engineering and Geomatics of the University of Cordoba, 2002.
- Natural heritage (sites of environmental interest). Source: Natura 2000 Network in Andalusia, updated information. REDIAM.
- Cultural heritage. Source: General Catalogue of the Historical Heritage of Andalusia.
- Energy installation (grid). Source: Reference Spatial Data (DERA), from the AndalusianInstitute of Statistics and Cartography.
- Visual analysis: intervisibility and visual structure. Source: LIDAR Laser Imaging Detection and Ranging.

Secondly, a landscape analysis has been carried out, resulting in a map of the fragility of the landscapes in the entire municipality. The resulting zoning was adapted to the land property structure, so as to facilitate the subsequent management by the local administration.

				
Area of study	Slope	Land use: land cover	Land use: degree of human use	Land property structure: plot area
				
Building density in rural space	Agricultural land suitability	Natural heritage	Cultural heritage	Electrical grid
				
Intervisibility	Visual structure			

	Landscape fragility map Legend: Grey: Not suitable; red: very high fragility; orange: high fragility; purple: medium fragility; green: low fragility

Conclusion. The tests have been carried out successfully. In both cases, through the methodology, it has been possible to identify the best locations for the installation of renewable energies, on rural land, needed by an energy community. In this way, the heritage values of both urban land (urban landscape) and rural land (natural, cultural and landscape heritage) are preserved, within the 5 km distance set by national legislation in terms of distance between the point of production and the users (consumers) of the renewable electricity generated.

A different methodology has been also developed and implemented for Portugal (Figure 3), in order to: (i) classify and prioritize the municipalities of the country according to their suitability (e.g., geographic, social, environmental and economic characteristics) to host PV projects and (ii) pinpoint and evaluate suitable, technically and economically viable, as well as environmentally and socially sustainable, sites for PV installations in the Portuguese municipality with the highest PV Suitability Index (SI).

More specifically, the proposed Decision-Support Framework for the Site Selection (DSF-SS) of PV technologies consists of four successive phases allocated in two distinctive stages (Stage I: Energy Roadmap for PV Deployment and Stage II: PV Site-Selection Analysis and Assessment). The aim of Stage I is to identify the most and least suitable regions and municipalities of the country for sustainable PV deployment (Phases 1 and 2; Figure 3). In particular, in Phase 1, a geographic information database is developed, and numerous thematic data layers (i.e., in total 25) of important PV siting criteria (e.g., practical photovoltaic energy output (PVOUT)) are created. Then, a Geographic Information System (GIS) analysis of the municipalities of the investigated country (Portugal) is conducted by examining their geographic, environmental, technoeconomic, social and other specific characteristics. The main outcomes of the first phase are (i) the classification results

of the municipalities of Portugal (i.e., municipalities of the mainland (MoM) and municipalities of the island regions (MoIR)) and (ii) the identification of the MoM as the most suitable geographic regions to host PV projects in the country based on the examination of their characteristics in GIS. Next, in Phase 2, 12 Siting Criteria (SC) are defined for the prioritization of the MoM for PV deployment. Then, a detailed GIS and numeric analysis of all 278 MoM is conducted in accordance with the predefined SC. The main outcomes of Phase 2 are (i) the preference order of the MoM on national and regional scales and (ii) the most and least suitable municipalities of the country based on their determined SI to host PV projects.

The most suitable municipality of Portugal for PV deployment (i.e., Municipality of Mértola) obtained in Stage I is then considered as an input in Stage II to conduct an integrated PV site-selection analysis. Specifically, in Phase 3, additional PV SC are defined, and an appropriately designed siting model is created in GIS for the implementation of a multidimensional siting analysis in the aforementioned municipality. The outcomes of this phase are a set of 137 suitable sites for PV installation and a set of 44 eligible sites for PV farm installation, including in the latter case the SC of 'farm minimum required area' in the site-selection process. In the last phase of the proposed DSF-SS (Phase 4), 15 Assessment Criteria (AC) are defined to evaluate thoroughly the suitable sites. Accurate GIS metrics are employed to estimate the site characteristics for each AC. The suitable sites are then assessed by deploying three different Multi-Criteria Decision-Making (MCDM) approaches, namely AHP and TOPSIS, ENTROPY and TOPSIS, and the equal weights approach and TOPSIS. The outcomes of this phase are (i) the importance (weight) of each AC in the assessment process, (ii) the specific SI of each eligible site for PV farm installation and their preference order and (iii) a set of highly suitable sites for PV farm siting resulting from examination of the site-suitability results from the application of three hybrid MCDM approaches. More details about the developed methodology can be found at Spyridonidou et al. (2022).

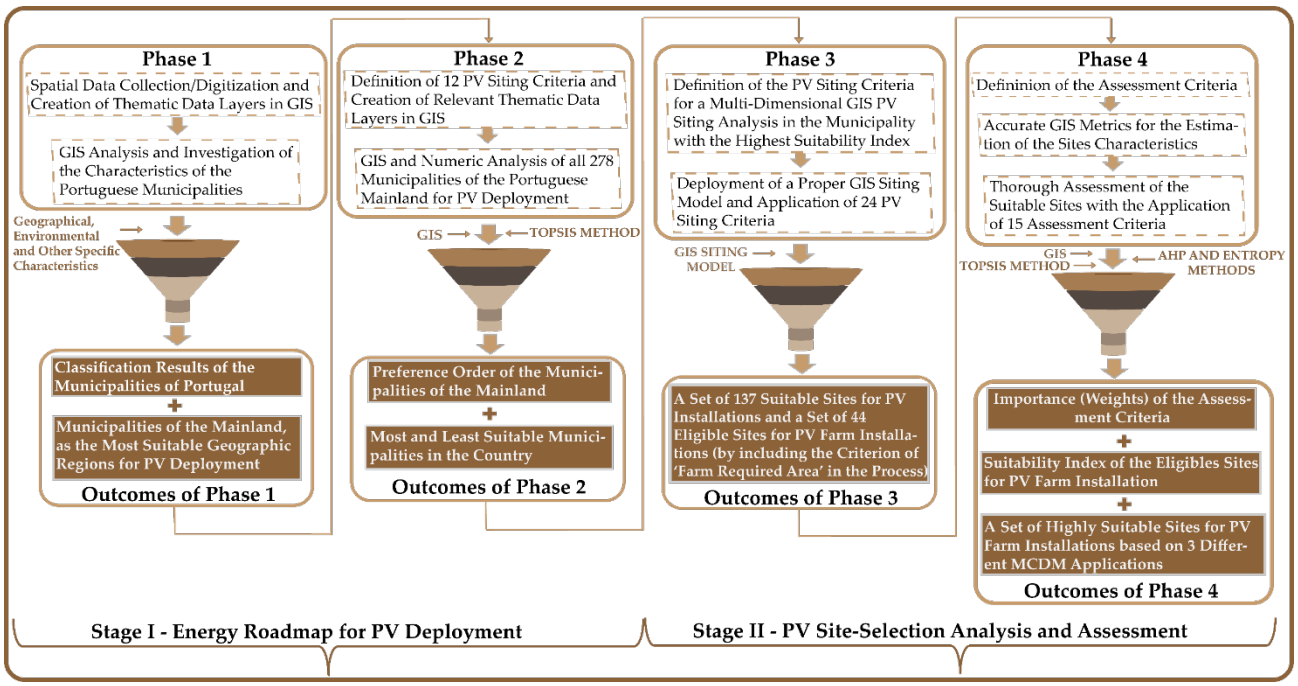


Figure 3 WP5 decision-support framework for sustainable PV site selection in Portugal (Spyridonidou et al., 2022).

The main outcome derived from the implementation of Stage I of the proposed DSF-SS is the preference order of all municipalities on national and regional scales. The results of the prioritization process of the Municipalities of the Mainland (MoM) are illustrated in Figure 4(a). According to the prioritization results, the municipality with the highest SI for PV deployment in the Portuguese mainland is the Municipality of Mértola (SI = 0.996). In the next stage (Stage II) of the proposed DSF-SS, a total of 44 sites with a total surface area of 20.5493 km^2 were ultimately identified as eligible for the potential siting of new PV farms in the Municipality of Mértola. The SI results reveal the precise suitability of the potential sites for new PV farm installations, and their spatial allocation according to the resulting SI is presented on the final suitability map (Figure 4(b)). Extensive results related to this WP5 case study can be found at Spyridonidou et al. (2022).

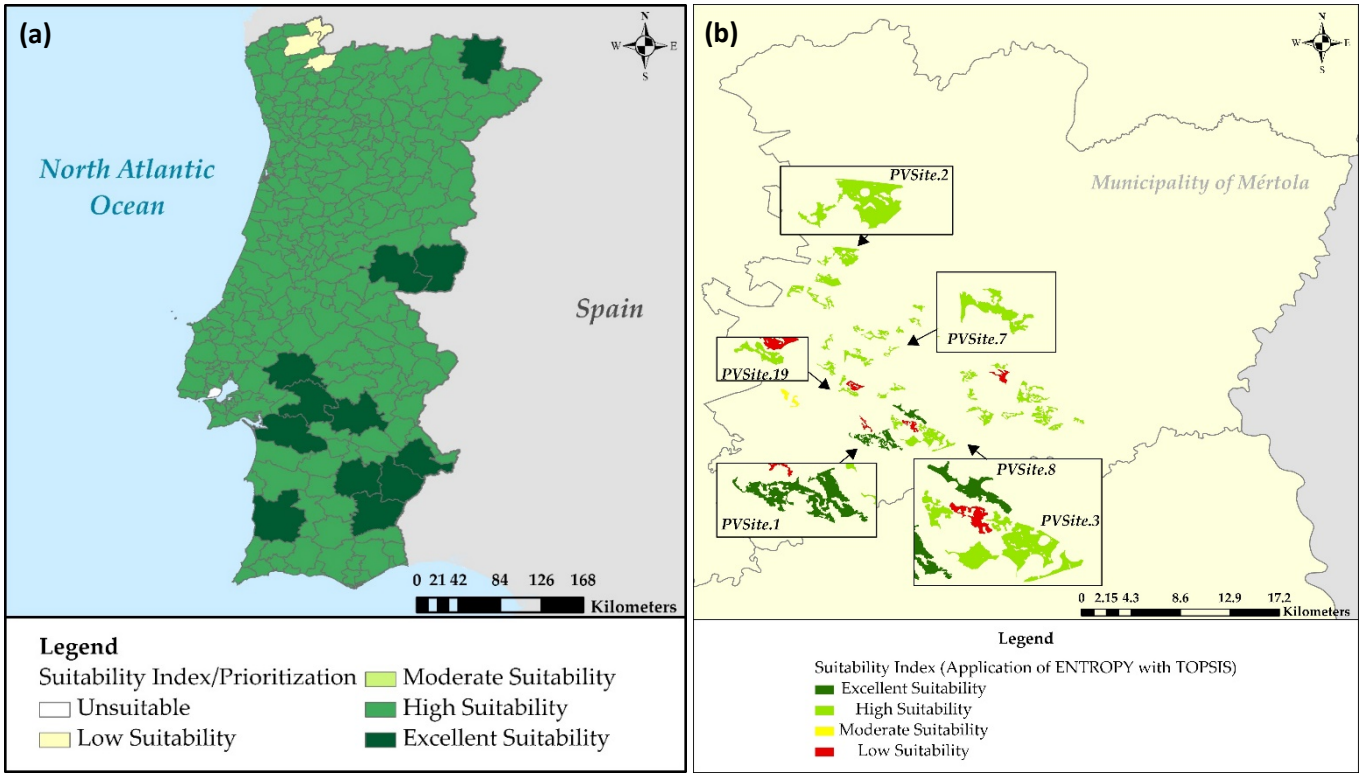


Figure 4 WP5 DSF-SS main results: **(a)** Stage I – preference order of the MoM in Portugal and **(b)** Stage II – SI of the potential sites for new PV farm installations in the Municipality of Mértola based on ENTROPY with TOPSIS application (Spyridonidou et al., 2022).

3.3 Research Activities for Task 5.3

The activities described above for Task 5.1 set the base for the Training Course and the Seminar organized in Task 5.3.

Training Course

The Methodological course on social analysis and participatory methods for the business and CSO sectors (Deliverable D 5.2) took place online on the 27th, 28th and 29th of March 2023. Researchers from ICS ULisboa and from the company Ethics for growth shared knowledge on citizen engagement, a tool-kit for policy co-design and implementation and Future studies applied to community engagement.

24 members from 11 organisations of the PEARLS team registered for the course and between 7 and 11 participants attended each session. The presentations and video recordings of the sessions were made available to registered participants. A report giving an account of the organisation of the course and the contents of each session, including the presentations, was produced and uploaded to the Portal. Once it is approved, it will be placed in the website of the project.

Seminar on Social Innovation and Public Engagement

The Seminar on Energy Communities (Deliverable D 5.1) took place in hybrid form (at ICS and online) on the 20th June 2023. Researchers from ICS ULisboa (PT), Coopernico (PT), Territoria (ES), Universidad Pablo de Olavide (ES), and Ethics for growth (IT) shared knowledge on energy communities, based on the secondments and the research work that has been conducted throughout the project.

The seminar was open to the public and was publicised in the usual channels of ICS and the Research Group SHIFT. 19 persons registered to participate online, 5 of them external to the project (4 from a Portuguese government agency of the energy sector). On the day of the seminar, five persons were present at ICS and 14 joined online. A report giving an account of the organisation of the seminar and the contents of the presentations was produced and uploaded to the Portal. Once it is approved, it will be placed in the website of the project.

4. Presentation of results at conferences

Work carried out for WP5 has resulted in five conference presentations during the reporting period.

- Iglesias, R., Delicado, A., Prados, M. J., Truninger, M., Ferreira, V, Macca, G., The social dimension of energy communities: New hope for local governance or just an enlargement of the energy market in rural areas of Southern Europe?, Territories, communities and sustainability: views from Southern Europe ESA RN Midterm Conference, Lisbon, 21-22 September 2023
- Delicado; Ana Monica Truninger; María-José Prados; Carolina del Valle; Ramon Garcia (2023), "O que é que há, pois, num nome?": o conceito de comunidade em comunidades de energia renovável no sul da Europa, XII Congresso Português de Sociologia, Coimbra, April 2023
- Delicado, A., Truninger, M. Ghislanzoni, M., Social innovation in renewable energy: communities, cooperatives and other grass-root initiatives, 4S Annual Meeting, Toronto (online), October 2021

  Delicado, A. Pallarès-Blanche, Prados, M. J., Garcia, R., Del Valle, C., Cooperativas de energia renovável em Portugal e Espanha: David contra Golias?, XI Congresso Português de Sociologia Identidades ao rubro: diferenças, pertenças e populismos num mundo efervescente, org. Associação Portuguesa de Sociologia (online) March 2021, Proceedings: http://aps.pt/wp-content/uploads/XI_Congresso/Ambiente_XI-APS-38256.pdf
- Delicado, A., Couto, J.S., Iglesias, R. From prosumers to communities: sharing renewable energy production. In International Seminar on Environment and Society. Org. Associação Portuguesa de Sociologia. ICS-Ulisboa. Lisboa, Portugal, March 2020

5. Publications

The research carried out for WP5 has already generated three scientific articles published in indexed journals:

- Prados, María-José, Ricardo Iglesias-Pascual, and Ángeles Barral. "Energy transition and community participation in Portugal, Greece and Israel: Regional differences from a multi-level perspective." Energy Research & Social Science 87 (2022): 102467.

- Delicado, Ana, Marta Pallarès-Blanch, Ramón García-Marín, Carolina del Valle, and María-José Prados. "David against Goliath? Challenges and opportunities for energy cooperatives in Southern Europe." Energy Research & Social Science 103 (2023): 103220.
- Spyridonidou, Sofia, Loukogeorgaki, Eva, Vagiona G., Dimitra and Bertrand, Teresa. "Towards a Sustainable Spatial Planning Approach for PV Site Selection in Portugal." Energies 15 (2022): 8515. doi: https://doi.org/10.3390/en15228515.

A book chapter, a conference paper in proceedings and a blog post were also published with WP5 results.

- Delicado, A. (2020). Comunidades de energia renovável. In Pensar o Eco-bairro, pp. 23-26. Lisboa: Associação Eco-bairros do futuro. ISBN 978-989-33-1028-1
- Delicado A., et al., "Cooperativas de energia renovável em Portugal e Espanha: David contra Golias?", XI Congresso da APS, Lisbon, 29-31 March 2021, XI-APS-38256, https://aps.pt/wp-content/uploads/XI_Congresso/Ambiente_XI-APS-38256.pdf

Delicado, A., Truninger, M. (2022), Energias renováveis, paisagens e inovação social: o projeto PEARLS, Blogue SHIFT, https://ambienteterritoriosociedade-ics.org/2022/06/29/energias-renovaveis-paisagens-e-inovacao-social-o-projeto-pearls/

WP6 PEARLS Project Management
2nd Progress Report (Period: October 18th, 2019– September 7th, 2023)

Lead beneficiary	1-USE		Start month	July 2018	End month	December 2023
Participation per Partner						
1–USE	2-CLANER	3–Territoria	4-ICSUL	5-ENERCOUTIM	6-COOPERNICO	7-UNITN
8–AUTH	9–GSH	10 –CONSORTIS	11-CONSORTIS Geo	12-UH	13 –SP Interface	14-BGU
15-UHU	16-UPO	17-HABITECH				

Objectives

1. To adopt financial and administrative procedures for monitoring, tracking and controlling deviations caused by progress, costs, and financial and scheduling changes.
2. To lead the consortium's internal network activities through the Steering Committee. Coordinated supervision and monitoring of PEARLS project scientific work packages to ensure their correct implementation, delivery of results and risk control.
3. To identify, manage and protect intellectual property generated in the project. To map out the commercial and research development of project results in the future establishing and exploitation plan.
4. To guarantee communication with the Advisory Board, keeping it updated on the project's work going forward, and contributing to the implementation of its recommendations.

Description of work and role of partners

Task 1. Establishment of Project intranet communication as Internal Communication (IC) to provide key information on the Project and contact information for all partners. This includes creating, distributing, and updating the project handbook, implementing and administering the online collaboration platform and online GIS facilities. (D.6.1, D.6.2)

Task 2. Supervision of periodic reports (PR) (scientific, financial and managerial reports), keeping records of supporting documentation and preparing internal work documents for tasks. Project results will be periodically reviewed, assessed and reported to implement the strategy for protection and/or publication together with the quality assurance procedure. Projects results will be assessed and reported to draft an exploitation plan & strategy with appropriate protection where applicable. (D.6.2, D.6.3, D.6.4, D.6.5)

Task 3. To oversee task distribution in compliance with secondment criteria and participation in other mobility actions regarding internationalisation, multisectoral involvement and Gender Balance (GB). (D.6.1, D.6.2, D.6.3, D.6.4, D.6.5)

List of deliverables

D Nº	Title	Leader	Type	Dissemination	Due Date
D6.1	Internal Communication	1 – USE	Websites, patents, filling, etc	Confidential	December 2018
D6.2	Data Management Plan	1 – USE	Report	Public	January 2019
D6.3	Progress report I	1 – USE	Report	Confidential	July 2019
D6.4	Progress report II	1 – USE	Report	Confidential	July 2021
D6.5	Mid-term meeting	1 – USE	Other	Confidential	December 2019

Schedule of relevant Milestones

M Nº	Title	Leader	Due Date	Means of verification
MS6	Financial Management	1 – USE	June 2022	Delivery of reports and secondments/networking activities monitored via Skype conferences

Prepared by PEARLS Steering Committee
September 7th, 2023

1. Introduction

This Progress Report is an update on activities carried out in WP6 between 18th October 2019 and 7th September 2023. Work Package 6 is responsible for PEARL*S* Project coordination activities and therefore involves all beneficiaries. Work Package management underpins project effectiveness, efficiency and justification. Its key points are initiation, planning, execution, quality assurance, and completion and delivery. The main goal is for the PEARL*S* project to be developed optimally through secondment organisation, management and execution. The main contribution will be to ensure the international, multisectoral exchange of staff members with equal opportunities for all consortium members. This means that efforts in innovation research and knowledge transfer will guarantee the project's success.

WP6 is structured on four levels. The first level is as an aid to coordination in the University of Seville itself. The second level is based on the Steering Committee. Thirdly, PEARL*S* beneficiaries and participants. Finally, the fourth level is the Advisory Board. The project's general structure was outlined at a preparatory Workshop held by the University of Seville in January 2017. This activity was attended by lead partners from all the EU countries involved and representatives from non-academic beneficiaries who are part of the Steering Committee and the Advisory Board. Since the workshop, all management activities have been approached in an open and cooperative atmosphere with the aim of accommodating the highest number of beneficiaries' opinions and points-of-view possible. All partners also have commitments in PEARL*S* project management directly or through their national representatives.

2. Definition and structure of WP6

The definition of WP6 is based on a set of objectives and activities. These objectives address goals designed to support financial and administrative procedures required for monitoring the Project. Periodic reports on these procedures have to be submitted and are project linchpins along with the results of the WPs. For this, WP6 sets a timetable of clearly indicated milestones and deliverables for all team members to see. This timetable determines the reporting sequence, dates and formats of the expected deliverables across all of the Work Packages. Through WP6 the Coordinator remains in regular contact with PEARL*S* beneficiaries by way of e-mails, national representatives, Skype meetings, regular reports and attendance at project meetings. The WP's work is organised through these contacts. The WP is responsible for all practical arrangements in relation to the exchange of secondments, e.g., organising accommodation, meetings and networking opportunities for visitors. The WP is also in charge of supervising the secondment calendar, the results that sustain the deliverables and financial aspects, as well as identifying, managing and protecting intellectual property generated by the Project results. WP6 leads on the production of deliverables by WPs, ensuring that their deliverables match expectations and objectives and that the end product functions effectively.

The multilevel structure is underpinned by the PEARL*S* Coordinator's support team. The coordinator is supported by the European Social Research Laboratory, EUSOCLAB. Together with the Administrative Manager and the Technical Staff from EUSOCLAB, they take responsibility for all travel arrangements, for processing day-to-day finances and organising networking activities, and are in charge of setting up and maintaining the web site. They work together with the Research International Office at the University of Seville. The University research-based administrator

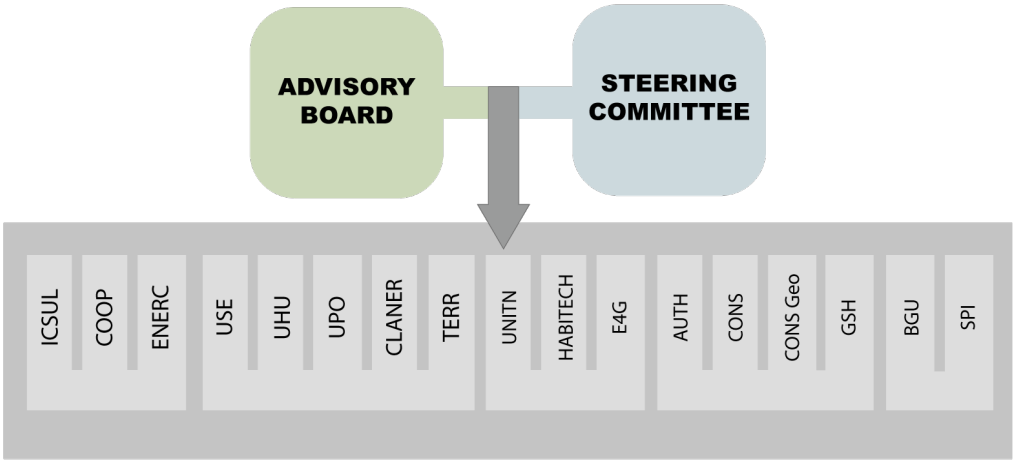
oversees compliance with the Grant Agreement and the rules governing the MSCA RISE call.
The administrator also oversees compliance with the arrangements adopted in the Consortium Agreement, especially concerning issues regarding the allocation of funds, the corresponding calendar and expenditure items. The Research International Office maintains fluid contact with the Coordinator and the National Contact Point. In turn, the Coordinator maintains fluid communication with the European Research Agency Project Officer in Brussels.

The Coordinator is also supported by the Steering Committee, SC, the second level in the project structure. This Committee is made up of a representative from both the academic and non-academic areas of each of the participating countries. Steering Committee members also act as leaders of the project's work packages. Dr Teschner and Professor Albatici co-coordinate with Dr Prados, Dr Techner on WP2 and Prof. Albatici on WPs 1 and 6. Researcher Antonia Molina leads WP3 and Dr Loukogeorgaki and Dr Delicado coordinate WPs 4 & 5, respectively. Their main task is to support the Coordinator in day-to-day decision-making and act as a link to their respective countries' beneficiaries. SC members hold periodic meetings at the beginning of each year for an interim update on achievements and any possible execution dysfunctionalities. They also maintain fluid contact through virtual meetings by Skype, email and phone. The team's commitment and good working relationship enable continuous information-sharing and also, above all, support and also ensure agreement on any decisions that are made.

It goes without saying that the SC cannot operate properly without a good understanding with the PEARL*S* team. The representatives of academic and non-academic beneficiary organisations and all the secondments are all strongly committed to PEARL*S*. They bear the bulk of the tasks and contribute to generating the deliverables. They are also invited to take part in any activities that might further disseminate and spread knowledge of the results. The beneficiaries exchange local and thematic knowledge and share research, dissemination and impact skills and competencies. The seven universities and research centres contribute by doing research, publication, policy analysis and knowledge exchange for each work package. The pool of ten non-academic organisations strengthens this collaboration through extensive experience in systems development, policy implementation, landscape management, civic participation and relationships with local groups/case studies affected by REL. Last but not least, the team is made up of secondments from academic and non-academic areas, with different profiles and with concern shown for gender balance and cultural integration. They all contribute and enrich the research outcomes and knowledge sharing, and are involved in training and innovation transfer. They are working together via secondments and WP involvement, as well as meetings, training events, seminars and workshops. At this moment in time, these people number 41 in all, and their profiles can be found on the PEARL*S* web site (http://pearlsproject.org/our-teams/).

The Advisory Board is the fourth level of the PEARL*S* structure. It comprises Dr Patrick Devine-Wright from Exeter University; the researcher Ms Alessandra Scognamiglio from the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA); and the researcher Mr Miguel Somé from the Prodiel multinational renewable energy company. The Project Coordinator's duties include fluid information sharing and compiling the Advisory Board's experience in order that research activities and knowledge transfer are duly undertaken during the project. The Advisory Board was involved in the organisation and execution of the kick-off meeting held in Seville in July 2018, the Mid-Term Meeting held in Malaga in October 2019 and the PEARL*S*

Project Plenary Forum in Syracuse in September 2023. The present document is the result of this last meeting held in Syracuse, thus putting in writing all the evolution and results of the project.



3. Project intranet communication platform

WP6 has generated the first deliverable: D.6.1 Internal Communication. This is the development of the PEARL*S* project web site as the first deliverable of WP1 D.1.1. The project web site is continuously evolving as the project itself matures. It carries out some necessary functions, such as acting as a dissemination tool, an internal networking platform and work and discussion space, and information resource. Another section of the web site and Intranet accommodates the online geographical information system (web-GIS) based on Service Oriented Architecture (SOA) (D.4.3: Web GIS Platform), designed and implemented in connection with WP1 and WP6 (D.4.2; D.4.3). The Web-GIS platform will demonstrate the versatility and efficiency of the methodologies and tools for reference case studies and renewable energy landscapes, irrespective of geographical, spatial and/or social factors.

D.6.1 refers to a web site Intranet section, whose main features are described below.

Document Title	Internal Communication
Deliverable Type	Web sites, patents filling, etc.
Contractual Date of Delivery	31st December 2018
Unit Responsible	USE
Contributors	USE; CLANER, Territoria; ICSUL; ENERCOUTIM; COOPERNICO; UNITN; AUTH; GSH; CONSORTIS; CONSORTIS Geo; SP Interface; BGU; UHU; UPO; HABITECH
Dissemination level	Confidential, for members of the Consortium (including Commission Services) only

The main goal of the Intranet is to support daily internal activities. The Pearlsproject.org's Intranet is based on the BuddyPress system. This is a powerful community plugin for WordPress that upgrades the pearlsproject.org web site to the status of an Intranet. It includes all the features required, such as user profiles, internal messaging, notifications and the ability to add content to the Online Atlas. As an internal communication tool for the project, it comes with several components that integrate directly with the site. BuddyPress is a GPL licenced open-source project based on PHP, Javascript and CSS3 that is frequently updated by thousands of contributors. It is a light weight solution using the Wordpress database and software to ensure seamless integration.

Its main features include the following sections:

Members Directory: provides a page with the total number of registered/logged users

Members Profiles: two functions are included: 'View" to show personal profile fields and 'Edit Panel' to check the field files before or after entering information into the profile fields.

Member Messages: allows users to privately communicate with each other and share information

Site Admin Only: 'Notices': shows a list of sitewide notices and date sent via a compose panel.

Member Settings: shows the general options for logged-in users to change their information fields, passwords and email addresses and to see notifications and change their avatars.

4. Data Management Plan

According to the Work Package 6 agenda, the PEARL*S* Project presents the first version of the Data Management Plan (DMP) as part of this deliverable. The DMP includes the following: data sources; data used in the Project related to specific work packages; main features of data used as metadata; interoperability and accessibility; and data legal protection procedures according to current legislation. Content is as follows: i) Data Summary; ii) Fair data; iii) Funding Allocation, and iv) Data Security. To conclude, any ethical aspects related to data security are also mentioned.

Document Title	Data Management Plan
Deliverable Type	ORDP: Open Research Data Pilot
Contractual Date of Delivery	31st January 2019
Unit Responsible	USE
Contributors	USE; CLANER, Territoria; ICSUL; ENERCOUTIM; COOPERNICO; UNITN; AUTH; GSH; CONSORTIS; CONSORTIS Geospatial; BGU; SP Interface
Dissemination level	Public

The aim of the Data Summary is to organise data management throughout the whole of the PEARL*S* Project. This deliverable includes a set of questions or key points that must be answered. Fair Data refers to the way that data is made findable, including provisions for metadata, openly accessible data, interoperable data and increasing data re-use (through clarifying licences). Project funds are allocated to research costs, training and networking, management and indirect costs. Data Security ensures that all data collected in the Project will be securely stored and shared in accordance with all security protocols. The Project will not collect personal data but it may collect the basic

biographical data of people involved in research. The project requires the use of interviews, surveys and focus groups, and fieldwork photographs and videos with non-invasive equipment. The Project undertakes to fully and responsibly inform participants of the purpose of the research and of the ways in which their data and information will be used. However, these data will be collected and stored as anonymous data. Data will be stored throughout the whole of the PEARL*S* project execution plan and will be destroyed six months after its conclusion. Paper data will be physically destroyed. Digital data will be overwritten in such a way as to ensure that they are fully wiped and rendered inaccessible.

According to ethics rules, PEARL*S* Project research does not involve any human unable to give informed consent. A Project information sheet and a consent form are provided to each of the participants in the various activities. Researchers and other participants are only able to work with average and aggregated data, which guarantees the reliability of research without any access to private data. The Project will ensure the right and proper use of the results of the research. All collected data will be subject to the usual rules regarding data protection in relation to data confidentiality, anonymity and privacy in accordance with current European and National regulations.

5. Periodic Progress Reports

A number of Progress Reports must be prepared throughout the project. Progress Report I correspond to the first year of the Project. It includes references to the way that the actions have been executed in general, any corrective measures applied, ethical aspects and some information related to changes to the Project during the first year.

Document Title	Progress report I.
Deliverable Type	Report
Contractual Date of Delivery	31st July 2019
Unit Responsible	USE
Contributors	USE; CLANER, Territoria; ICSUL; ENERCOUTIM; COOPERNICO; UNITN; AUTH; GSH; CONSORTIS; CONSORTIS Geospatial; BGU; SP Interface
Dissemination level	Confidential, for members of the Consortium (including Commission Services) only

It is important to highlight good progress as far as the activities and deliverables are concerned. There is no delay in the activities in relation to the communication of results (http://pearlsproject.org/news/) and the roll-out of dissemination activities (http://pearlsproject.org/bibliography-documents-and- weblinks/) as useful tools to ensure Project impact. Furthermore, the deliverables have already met the established conditions (http://pearlsproject.org/deliverables/).

Document Title	Progress report II
Deliverable Type	Report
Contractual Date of Delivery	31st January 2023
Unit Responsible	USE
Contributors	USE; CLANER; Territoria; ICSUL; ENERCOUTIM; COOPERNICO; UNITN; AUTH; GSH; CONSORTIS; CONSORTIS Geo; SP Interface; BGU; UHU; UPO; HABITECH
Dissemination level	Confidential, for members of the Consortium (including CommissionServices) only

The Progress Report II corresponds to the final part of the project. It includes references to the way that the actions have been executed in general, any corrective measures applied, ethical aspects and some information related to changes to the Project during the first year. From 18th October 2019 to the end of the project, PEARL*S* has 21 of 25 deliverables delivered to date: one corresponds to WP1, three to WP2, two to WP3, WP4 and WP5; five to WP6 and six to WP7. Thus, to date, four deliverables remain to be delivered: two from WP1, one from WP3 and one from WP4.

Regarding secondments, a total of 6 secondments were completed before October 18th 2019, since then and up until September 7th 2023, a total of 40 secondments have been completed by our members, 11 secondments done by ER, 17 by ESR and 12 by Technicall Staff. There are 7 secondments that are currently being carried out, 6 by ER and 1 by Technicall Staff, and 6 secondments that have not been commenced yet, 2 each.

With each of them, a similar planning has been followed as the one established and the initial plan has resulted in the duration established by the project. In this way, no secondment is left unfinished.

To conclude, during the first year of project implementation there have been some minor changes. Concerning the academic area, Haifa University is no longer participating in the PEARL*S* Project and its place has been taken by the Ben-Gurion University of the Negev. This is due to the transfer of Professor Naama Teschner to BGU. In addition, Trento University has changed its lead academic due to the forthcoming retirement of Professor Zanon. Professor Albatici is now in charge. Concerning the non-academic area, the names of the participating companies from Greece—AKKT Engineering and Consortis Geospatial—have changed. Current names are Consortis and Consortis Geospatial, respectively.

During the year 2022 the project also underwent some minor modifications that affected the composition of some of the beneficiaries. CLANER changed its lead, Carlos Rojo which ceased to belong to this company and Antonia Molina is now in charge. Also, there are two new non-academic Italian partners: HABITECH and Ethichs 4 Growth. The first one joined the team in September 2021 represented by Marcello Curci as Project Manager and the second one joined in February 2023 represented by Giuseppe Macca who is CEO of E4g.

6. Project Meetings

Organising meetings throughout the Project is also part of the WP6 remit. The Grant Agreement states that it is the Coordinator who organized the 'Mid-Term Review Meeting' between beneficiaries, partner organisations, capital or legal stakeholders and the Agency before the deadline for the submission of the report for Reporting Period 1 RP1 (due date November 7th). To duly comply with this commitment, the Coordinator may request all or concerned beneficiaries to take part along with external experts (i.e., the PEARL*S* Project Advisory Board).

Apart from the MTM done in December 2019, some meetings are also envisaged at the beginning andthe end of the project, as well as follow-up meetings for members of the Steering Committee only.The kick-off meeting was held in the University of Seville's "Pabellón de Brasil" on 4th July 2018. Theentire Consortium, made up of Academic partners, companies, associations and consultants from Portugal, Spain, Italy, Greece and Israel, participated in the event. In addition, this meeting was alsoattended by other people interested in the links between Social Sciences and Renewable Energy, including PhD students, visiting lecturers and research groups from the University of Seville. The European Commission's Joint Research Centre Science and Knowledge Service in Seville was invited to present the Smart Specialisation Platform on Energy. The Kick-off Meeting enabled information to be shared on Grant Agreement compliance, project implementation conditions and funding, and familiarisation with the SYGMA platform.

Four annual Steering Committee meetings were done (Lisbon Month 7, Seville Month 19, Thessaloniki Month 31 and Trento Month 55). The first Steering Committee annual meeting was held in Lisbon at the Instituto de Ciências Sociais de Lisboa ICS on 4th and 5th February 2019. The WP leaders were present at the meeting along with A. Arrabal, as leader of the PEARL*S* Management Coordinator Support Team, and N. Mendes from ICSUL, as head of administration. The meeting was held over two sessions. The first session was devoted to scientific matters and the second to Project organisation and management. The main results consisted of proposed work outlines coordinated between WP leaders to clarify the work that was to be carried out during secondments, how participants would be able to help strengthen results, and the Project's expected impact. Particular topics discussed included the secondment map for next year and the reinforcement of communication of the first results using web tools such as an online atlas. On 5th June 2019, a Project Steering Committee Meeting was held by Skype to assess the Project's progress. This interim meeting evaluated the progress of the various WPs and monitored secondments in order to keep the project on track in relation to deliverables. The Coordinator undertook to communicate all decisions to Israel as a Third Country and to keep in regular contact with the Advisory Board. WP leaders also coordinated internal peer reviews of any output in the WP group and then in the wider project team, respecting the agreed timelines for review and publication. The next SCM was held in Seville in January 2020, in the Faculty of Geography and History. Participants debated a previously agreed agenda proposed by the coordinator of the project. The topics addressed a double component, on the one side specifically scientist topics; on the other hand, everything related to PEARL*S* organisation and management. The Steering Committee is composed by the seven Work Packages leaders: A. Delicado from the ICSUL of Lisbon as leader of WP 5; M. J. Prados as coordinator of the Project and co-leader of WP's 1 & 2 from the University of Seville; R. Albaticci, also in WP 1 in representation of the University of Trento; C. Rojo as responsible of WP 3 representing CLANER; and E. Loukogeorgaki in WP 4 from the University of Thessaloniki. For her part, Dr. N. Teschner from

Ben-Gurion University co-leaders WP 2 and followed the session via skype. Work Packages leaders are at the same time national representatives of the Project, which ensures the proper representation of their teammates in the Steering Committee and the correct development of the activities and secondments foreseen for each package. The meeting also counted with the attendance of Ms. A. Arrabal, as administrative manager of the project, and other members of the Portuguese and Spanish team in an advisory capacity.

Due to COVID-19 restrictions the assistance to Thessaloniki's SCM was cancelled, instead, a virtual meeting was organized via Skype. The last SCM was held in Trento in January 2023, here all problems caused by COVID-19 were solved. New dates for the project were confirmed: instead of 48 months, now the project lasts 66 months (+18 months), setting the finalization in December 2023. Due to this extension, Reporting Periods are changed: RP1 remains the same (from month 1 to month 24) but RP2 that used to be from month 25 to month 48, now it is prolonged to month 66. Furthermore, Progress Report II (Deliverable 6.4) must be submitted in January 2023. Also, Periodic Report and Final Report are due December 2023. Lastly, a new partner is mentioned to be joining the Project, Ethics4Growth, a non-academic partner from Italy, participating in WP1 and WP5.

Finally, the PEARL*S* Project Plenary Forum PPPF conference was organised upon the conclusion of the project and during the period of the final Consortium meeting, some Advisory Board experts and the networking group, the opportunity to provide contributions of their experience in the project. The PPPF exploited Advisory Board and Consortium expert networks abroad to widely disseminate the project results in Mediterranean countries. This meeting has been held in Syracuse in September 2023.

WP7 Ethics requirements

2nd Progress Report (Period: October 18th, 2019– September 7th, 2023)

Lead beneficiary	1-USE		Start month	July 2018	End month	December 2023
Participation per Partner						
1–USE	2–CLANER	3–Territoria	4-ICSUL	5-ENERCOUTIM	6-COOPÉRNICO	7-UNITN
8–AUTH	9–GSH	10 –CONS	11-CONS Geo	12 BGU	13 –SP Interface	

List of deliverables					
D Nº	**Title**	**Leader**	**Type**	**Dissemination**	**Due Date**
D7.1	H-Requirement No. 3	1-USE	Ethics	Confidential	November 2018
D7.2	H-Requirement No. 4	1-USE	Ethics	Confidential	November 2018
D7.3	POPD-Requirement No. 5	1-USE	Ethics	Confidential	November 2018
D7.4	POPD-Requirement No. 6	1-USE	Ethics	Confidential	November 2018
D7.5	POPD-Requirement No. 10	1-USE	Ethics	Confidential	November 2018
D7.6	NEC-Requirement No. 14	1-USE	Other	Public	October 2018

Description of deliverables

The 'ethics requirements´ with which the project must comply are included in this work package as deliverables.
D7.1 : H – Requirement No. 3 [5]
2.3. Templates of the informed consent forms and information sheets must be submitted to the Agency.

D7.2 : H – Requirement No. 4 [5]
2.9. Copies of ethics approvals for research involving humans must be obtained, kept on file and submitted upon request to the Agency.

D7.3 : POPD – Requirement No. 5 [5]
4.1. Copies of opinion or confirmation by the competent Institutional Data Protection Officer and/or authorisation or notification by the National Data Protection Authority (whichever applies according to the Data Protection Directive (EC Directive 95/46, currently under review, and national law) must be obtained, kept on file and submitted upon request to the Agency.

D7.4 : POPD – Requirement No. 6 [5]
4.2. If the position of a Data Protection Officer is established, their opinion/confirmation should be obtained that all data collection and processing will be carried out according to EU and national legislation, kept on file and submitted upon request to the Agency.

D7.5 : POPD – Requirement No. 10 [5]
4.6. Templates of informed consent forms and information sheets must be submitted to the Agency.

D7.6 : NEC – Requirement No. 14 [4]
6.3.B. The applicant must obtain appropriate authorisations for any material that will be imported to/exported from the EU, keep them on file and submit them to REA upon request.

1. Introduction

This Progress Report is an update on activities carried out as part of WP7 between 18th October 2019 and 7th September 2023. Work Package 7 is responsible for the regulation, implementation and control of the PEARL*S* Project's ethical aspects. Although these aspects concern the Consortium as a wholeand the subjects and areas investigated, it is the Coordinator's responsibility to assure the obligation to comply with the ethical and research integrity principles laid down in Article 34 of the Grant Agreement. Article 34 addresses compliance with ethical principles (including the highest standardsof research integrity) and the applicable international, EU and national law as set out in the European Code of Conduct for Research Integrity of ALLEA (All European Academies) and ESF (European Science Foundation) in March 2011.

Activities raising ethical issues must comply with the 'ethics requirements' determined as deliverables in this WP7. This implies that, prior to the commencement of an activity raising an ethical issue, each beneficiary must comply with the full established procedure relating to any ethics committee opinion required under national law and any notification or authorisation for activities raising ethical issues required under national and/or European law required to implement any of the action tasks in question. As proof, the supporting documents must be kept on file in English and be submitted upon request by the Coordinator to the Agency to demonstrate that the action tasks in question are covered, including the conclusions of the committee or authority concerned.

2. Definition and structure of WP7

The PEARL*S* Project requires the participation of individuals and local communities (as *Humans*) to study public engagement in spatial planning processes and social innovation issues. For this reason, personal data protection is related to data collected for case study analysis, in fieldwork and interviews concerning spatial planning policy, social impact assessment and energy behaviour. The PEARL*S* project applies Horizon2020 ethical standards and Horizon2020 guidelines regardless of the country in which the research is to be carried out, as there will be some activities in which Third Countries are involved. These activities include (some) research activities carried out in a Third Country and participants or resources from a Third Country. No materials will be imported to/exported from the EU to a Third Country.

Document Title	H - Requirement No. 3H - Requirement No. 4 POPD - Requirement No. 5 POPD - Requirement No. 6 POPD - Requirement No. 10
Deliverable Type	Ethics
Contractual Date of Delivery	30th November 2018
Unit Responsible	USE
Contributors	USE
Keyword List	Informed consent forms; informative flyer; Ethics relating to Humans; Institutional Data Protection Officer
Dissemination level	Confidential, for members of the Consortium (including Commission Services) only

The Ethical requirements definition describes the principles and procedures that the PEARL*S* partnership is obliged to comply with during the execution of the project. This will ensure that the project will meet the relevant quality and ethical requirements set by the European Commission (EC). The document structure is based on the Ethical Protocol for the project, which consists of a list of eight documents required for correct compliance.

The definition of WP7 addresses deliverables relating to the Ethical requirements for the PEARL*S* Project. Those listed in the Grant Agreement are deliverables D7.1; D7.2; D7.3; D7.4; D7.5. These consist of six requirements, which are detailed in the accompanying table.

Description of Deliverables	
Title	**Description**
D7.1: H-Requirement No.3	2.3. Templates of the informed consent forms and information sheets must be submitted to the Agency.
D7.2: H - Requirement No. 4	2.9. Copies of ethics approvals for research with humans must be obtained kept on file and submitted upon request to the Agency.
D7.3: POPD - Requirement No. 5	4.1. Copies of opinion or confirmation by the competent Institutional Data Protection Officer and/or authorisation or notification by the National Data Protection Authority (whichever applies according to the Data Protection Directive (EC Directive 95/46, currently under review, and national law) must be obtained, kept on file and submitted upon request to the Agency.
D7.4: POPD - Requirement No. 6	4.2. If the position of a Data Protection Officer is established, their opinion/confirmation should be obtained that all data collection and processing will be carried out according to EU and national legislation, kept on file and submitted upon request to the Agency.
D7.5: POPD - Requirement No. 10	4.6. Templates of the informed consent forms and information sheets must be submitted to the Agency

Below there is a synthesis of the ethics protocol and the Data handling procedure at the University of Seville in its position as coordinator.

3. PEARL*S* project Ethics protocol

The nature of the research work proposed in the PEARL*S* project involves a number of ethical issues that can be addressed in a relatively straightforward way. The PEARL*S* project applies the EU Charter of Fundamental Rights and the European Convention on Human Rights and its Supplementary Protocols. PEARL*S* research activities should be compliant with the principles of lawfulness, fairness and transparency, purpose limitation, data minimisation, accuracy, storage limitation, integrity and

confidentiality (security) and accountability in Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 concerning the protection of natural persons with regard to the processing of personal data and the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

The most important **ethical issues** for the PEARL*S* project are:
1. Respecting current European and National regulations in terms of security, data collection, privacy and communication of results

2. Fully and responsibly informing any participant of the purpose of the research and of the ways in which their data and the information that they provide will be used for the purposes of the study itself

3. Favouring the right and proper use of the research results and of knowledge of the techniques and theories applied.

The PEARL*S* project will use different methodologies applied in the Social Sciences such as interviews, questionnaires, surveys, focus groups, and photographs and videos for their subsequent analysis. The project will require the use of tools such as interviews, surveys and focus groups, and fieldwork photographs and videos with non-invasive equipment. The main principles to guide the research activities are:

1. The use of personal data for the research purposes will be justified in the context of personal rights

2. Data security will be an ethical imperative, in particular, data confidentiality and the reliability of data gathering methods

3. Empirical studies linked to sensitive areas such as confidential security data, personal aspects and multiculturalism will be addressed with due care

The PEARL*S* project will not access private data, such as names or personal identification numbers. The research will NOT include any human unable to give informed consent. Researchers and other participants will only be able to work with average and aggregated data, which guarantees the reliability of research without access to private data. All data collected will be subject to the usual rules governing data protection with respect to data confidentiality, anonymity and privacy. The project will obtain the relevant authorisation to use any data that is not available to the public and/or will also use data-sets that are publicly available. In the first case, authorisation will be obtained and provided to the European Research Agency upon request.

4. Information Sheet, Consent Form and Non-Disclosure Agreement

Information sheets and consent forms have been created by the Coordinator and tailored to each activity or event (interview, focus group, etc.). These sheets and forms are being distributed with permission from each organisation involved. All participants are asked whether they have any queries about the information provided on the participant information sheet and are invited to talk with (by phone) or email the contact person if necessary.

The prepared Consent Form contains the following statements:

1. Participation in the PEARL*S* project is voluntary

2. It is the participant's right to withdraw from the interview at any time

3. The data will be collected in such a way that the person responsible will not impose any of their own bias on the data itself

Participants are also informed that a) any data, video or audio recording portraying or featuring him or her will be treated as confidential by the researchers, b) any recording and data will be securely stored and used only for the purpose of the present research and c) none of the participants' personal details will be published and/or made available to the public without their explicit consent. Before being asked to sign consent forms, apart from these consent forms and information sheets, all research participants will be given a leaflet in their local language with detailed information about the PEARLS project, as well as the name of a contact person to whom any questions can be addressed.

Regarding the Non-Disclosure Agreement, any data collection activity done with end-user organisations will require such an agreement to be signed. This Agreement ensures that whatever data is collected from end-user organisations— from interviews and observations to in-house pre-recorded data such as CCTV and customer questionnaires—are treated as strictly confidential and not to be released to third parties.

5. Data handling procedure

Questionnaires, interviews, surveys, audio/video recordings and fieldwork observations are subject to current European regulations on matters of data handling and privacy Regulation (EU) 2016/679 of the European Parliament and of the Council of 27th April 2016 concerning the protection of natural persons with regard to the processing of personal data and the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)). Legal and data protection requirements are met in full. All PEARL*S* researchers agree to work in accordance with equal opportunity policies and ensure that there is no discrimination on the basis of age, gender, disability or ethnicity. Furthermore, the data is appropriately used for the purposes of the PEARL*S* project and will not be retained for any longer than is necessary.

Research outcomes are always reported without contravening the right to privacy and data protection, in particular:

-Data anonymity is always guaranteed

-The data are stored at the facilities of the Project Coordinator - University of Seville, European Social Research Lab

-Data consists of digital or/and paper data. Digital data are stored on hard disks disconnected from the network and stored in secured drawers; and/or on secured servers, with defined protocols that limit access to authorised personnel. Paper data is stored in secured drawers with limited access to authorised personnel

-Data access is limited to authorised staff only within the spatial and temporal limits established by the data owners and never beyond 2022

-No data are modified or falsified

-Data will be destroyed six months after the termination of the project. Paper data will be physically destroyed. Digital data will be overwritten to ensure that they are fully wiped and rendered inaccessible

Any publication of interim or final results must comply with the following statements:

1. Everyone who has participated in data collection will be acknowledged in the publication's acknowledgements section, either individually or collectively. Co-authorship of publications will be determined and agreed on the basis of standard academic conventions

2. Sensitive information will only be presented to competent, responsible and scientifically-sound audiences

3. Political and socio-economic matters must be carefully considered when presenting the results as any opinion expressed could affect or wound feelings and public opinion

When authorisation is required from national data protection authorities as part of an empirical study, the partners in charge must submit the data collection plan to the competent National Authority for Data Protection for scrutiny and copies of requests and consequent authorisations will be attached to the relevant deliverables. This additional data check is expected to apply when collecting data about public crowds in States that require approval to be given by their national authority.

6. Ethics and Security checks of deliverables; publications and dissemination materials; Ethics and DPO approval procedures for data collection activities

The Consortium has devised and implemented a comprehensive ethics strategy that considers ethical issues from the very earliest phase of research planning. All research partners in the PEARL*S* project have agreed to comply with all ethical thinking and legislation in their respective countries and including the Charter of Fundamental Rights of the European Union. Moreover, the proposed Project adheres to the guidelines of the national funding agencies. Ethical issues are predominantly relevant for WPs 2 to 5 (case studies, interviews, fieldwork) and WP6 (dissemination). They include the following areas:

• Awareness of intellectual property and copyright issues (all phases of the project): all partners need to be aware of intellectual property and copyright issues

• Obtaining permission to conduct empirical research (case studies, fieldwork and interviews): all research partners will obtain permission to access sites, written/informed consent, to conduct debriefing, explain the right to refuse/omit answers or withdraw, and obtain consent for interview recording

• Promoting participation by providing comprehensive information (case studies, dissemination):

prospective participants (stakeholders, interviewees, workshop participants) will be given full information in advance about the purpose of the research

• Providing Privacy and Confidentiality (case studies, fieldwork and interviews): all research partners will ensure that interview schedules will avoid unnecessarily intrusive questions

Before consent is obtained from respondents and before research begins, all researchers agree to inform prospective participants of a) which individuals and organisations, if any, will be permitted access to personal data, and in what circumstances such access will be granted, b) the purpose for which the personal information provided is to be used.

All the DPO and Ethics procedures for the research tools detailed in this template have required initial approval by the Ethics Committee of the University of Seville -Project Coordinator.

DPO and Ethics procedures have been established as follows:

- Personal Data Questionnaire by the University of Seville
- Information about Personal Data Protection by the University of Seville
- Written Guarantee by PEARL*S* Project Coordinator
- Confirmation of Institutional DPO by the University of Seville to PEARL*S* (letter of approval)
- Declaration of Ethics approval for research with humans by the University of Seville

https://investigacion.us.es/area-investigacion/comite-etico

7. Health and safety checklist for researchers involved in research activities in Third Countries

PEARL*S* project applies Horizon2020 ethical standards and Horizon2020 guidelines regardless of the country in which the research is carried out: activities in which Third Countries are involved. These activities include (some) research activities carried out in a Third Country and participants or resources from a Third Country. No materials will be imported to/exported from the EU to a Third Country.

As the PEARL*S* project implies researcher staff mobility within and outside EU countries, risk assessment will be executed. Steering Committee members and local participants will jointly implement risk assessment when researchers are sent abroad. The latter are to be informed about appropriate safety measures that must be taken in the host country or region, such as doing fieldwork accompanied by local organisers, carrying phone numbers provided by host organisations, and checking for any warnings issued by their own/national foreign affairs authorities before travelling.

Conclusions

When we started the PEARL*S* project in 2018, the United Nations Sustainable Development Goals already held fossil fuels responsible for climate change, making renewable energies an essential asset for mitigating global warming. Assuming world heterogeneity in terms of supply needs, access to resources and technology, and the contrasting relationships of the population with renewable energies, PEARL*S* has focused its analysis based on two fundamental premises: i) the favourable attitude of Southern European countries and Israel towards renewable energies, and ii) that any approach should be made from the perspective of renewable energy landscapes and from a transdisciplinary perspective. In contrast to the widespread opinion that the change in the energy model is a technological and economic challenge, PEARL*S* aimed to demonstrate that change requires a strong social commitment.

Energy is essential as an engine of the economy, a weapon of war in international conflicts, a driver of civic movements and, as mentioned above, a key topic at international summits. Social concern for energy can be found in social media and the press headlines, which focus on 'Not in My Backyard', among other things. In the post-pandemic context and in a geopolitical crisis caused by the war between Russia and Ukraine, the population is particularly sensitive to catastrophe, even showing signs of alarm in the face of a global blackout. The European Union's energy dependence and its ability to generate currents of thought have led it to adopt ambitious energy policy goals. This puts the renewable energy landscapes that emerge from the territorial roll-out of clean energies even more at the heart of the debate. For the PEARL*S* Project, renewable energy landscapes represent an opportunity to give thought to the consequences for the landscape of the socio-technical transition due to the regional differences inherent in their implementation in Southern Europe and Israel.

The MSCA RISE call has provided the opportunity to analyse these landscapes from a dual cross-disciplinary and cross-sectoral perspective. Joint efforts of disciplines such as Sociology, Geography, Architecture, Civil Engineering, Economics and Public Planning constitute an enrichment as they allow the sharing of different visions on renewable energy landscapes, as well as different strategies on how to address changes in renewable energy landscapes from the perspective of companies and academia. The implementation of the project through secondments has also been a key part of information and knowledge exchange in addition to the personal experience it has afforded. The opportunity to analyse in person the impact of renewable energies in the case studies has enabled regional differences to be incorporated into the analysis. What is understood by regional differences is the set of social, economic, cultural and geographical characteristics that are normally considered in territorial analysis. Regional differences approach the analysis of case study issues based on the recognition that a territory's uniqueness and specific features are key factors for addressing and resolving problems. The PEARL*S* project takes interregional differences into account for two fundamental reasons. The first is that the project's territorial coverage compels the choice and analysis of case studies or other examples. The second is that the transition to a low carbon economy is putting great emphasis on citizens as the prime actors tasked with dealing with this challenge.

Prepared by PEARLS Steering Committee
September 7th, 2023

The climate and energy crises in the context of the Russia-Ukraine war have resulted in an about-turn in the actions carried out by the European Union. Initially, the uncertainty of achieving political objectives and commitments led to strong support for the implementation of large-scale renewable energy installations in terms of generation and surface area. Despite the growth of renewable energy production, this failed to become established as a real alternative to fossil fuels, with distortions generated in the energy market and significant territorial tensions. As a result, distributed energy from renewable sources has been allowed to surge into production, with the committed involvement of the population, and the participation of small supply companies and the repositioning of large energy companies trying to find their place in this concept. The regulatory, financial, and jurisdictional frameworks of the transition process have huge impacts on territories. Despite this, territory and land have been absent from the debate on energy, or rather, they have been appropriated by large generation and distribution infrastructure in rural and natural environments, affecting the landscape and replacing land use and agricultural activities. Renewable energy landscapes are spaces perceived by the significant presence of infrastructure for the production and distribution of energy from renewable resources, compromising rural territories and condemning them to a secondary role. Inasmuch as urban sustainability policies are being implemented based on consolidating the dependence and subordination of rural areas, and given that the EU's new roadmap is to promote the transition of the population from consumers to prosumers, the urgency of implementing social innovation measures that integrate the population and territory in this transition is both evident and necessary as these two models have an impact on landscapes, territories, villages and large cities. The energy transition is proceeding at a slow but inexorable pace.

After more than five years of intensive collaboration, I thank all PEARLS project members for having enriched the discussions with their secondment experiences, work, ideas, and expertise. I am indebted to everyone who actively contributed to the MSCA RISE action. My special thanks go to Ana Delicado, Bruno Zanón and Eva Lougeorgaki for boarding the ship before it left ort. Their advice and support were crucial for expanding the number of participants under the premise of a balance between academic and non-academic beneficiaries. I would also like to extend my acknowledgement to the other Steering Committee members, Carmen Romera, Rossano Albaticci and Naama Teschner, for their unwavering support throughout the project implementation. I am especially grateful to the companies that have taken part, represented by Ana Rita Antunes, Teresa Bertrand, Michela Guislanzoni, Marcello Curci, Giuseppe Maca, Betty Charampoulou, Georgios Tsakoumis, Ahi Mantouza and Hagitt Ulanovsky and Daniel Madar for fulfilling the project activities mainly designed by academics. Their contribution has been most valuable, and we feel sure that we will now continue working together. Thanks also to the Advisory Board and others who have contributed to the project by their involvement in dissemination and communication activities. And finally, thanks to Aleksandra Schoetz-Sobczak and Almudena Arrabal for their management and to all those who provided technical support to the PEARL*S* project.

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