WP4 SPATIAL PLANNING AND ANALYSIS

Description

WP4 aims to reinforce Renewable Energy Source (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 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. WP4 has a strong training dimension in a twofold way by: (a) raising the awareness of researchers from non-academic organizations with information on methodological approaches/tools on RES spatial planning resulted from academia and (b) enhancing the knowledge of researchers from academic institutions on the development of business-oriented RES spatial planning tools and relevant public participation/engagement techniques. The results of WP4 will be disseminated to the public via the development of an online Web-GIS platform, which corresponds to one of the main WP4 deliverables.

WP leaders

AUTh

Participants

AUTh, USE, UNITN, GSH, TERRITORIA, CONSORTIS GEOSPATIAL, SP INTERFACE

Objectives

1. Transfer of knowledge and enhancement of skills related to 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.

Framework

WP4 will focus on the enhancement of existing RES spatial planning approaches by delivering integrated and advanced methodologies/tools, which are applicable to different RE projects and relevant 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. Using a bottom-up approach, and in close collaboration with WP2, WP3 and WP5, a versatile online geographic information system (Web-GIS platform) for appropriately selected Case Studies will be developed capable of: (a) including thematic maps

of siting criteria representing technical, economic, legal, environmental, landscape-related and social factors, (b) identifying potential areas for RE projects' implementation considering a variety of exclusion criteria representing technical, economic, legal, environmental, landscape-related and social constraints and (c) enable the efficient public participation on the assessment of the potential areas.

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 RE projects and relevant REL.

Deliverable: D 4.1 Best Current Practices Month 12 (2020, July). Confidential *(All secondments of WP4 will start after Month 12. However, the deliverable will be prepared prior and will be submitted according to the corresponding deadline with the possibility to be updated (via Annexes) during the secondments).*

Research questions

RQ1. *What are the existing BCP on RE projects spatial planning/analysis and decision making methods/tools generally in Europe and more particularly in the Mediterranean countries?*

RQ2. *How public participation is incorporated in the planning process of RE projects?*

Methods

- *Literature review* (books and articles) on applied RES siting criteria: *Identification of existing relevant BCP and highlight of potential gaps*.

- *Literature review* (books and articles) on current RES spatial planning/analysis, decision making methods/tools: *Identification of existing relevant BCP and highlight of potential gaps*.

- *Literature review* (books and articles) on public participation involvement in the planning process of RE projects: *Identification of: (a) the spatial planning and decision making stages, where the public is mostly anticipated to be involved and (b) best practices of public involvement and information-sharing techniques to the public (e.g. web platforms, questionnaires, open public meetings, REL photorealistic representations). Highlight of potential gaps.*

Task 2. Advanced Methodologies in Sustainable Energy Planning (SEP)

This task focuses on the enhancement of existing energy planning methodologies in terms of: (a) siting criteria selection (based on the output of WP4 Task 1) and inclusion of policy aspects (based on WP2 output) and (b) public engagement reinforcement (based on the output of WP3 and WP5) towards the development of integrated and advanced methodologies in SEP. Spatial planning/decision making stages, where the public is anticipated to be most involved and public involvement best practices will be identified (taking also into account the output of WP4 Task 1). Moreover, an online geographic information system (Web-GIS platform), which sets the basis for the registration of geographical project data and the emergence of the information derived from all relevant data, will be designed and implemented. The ***developed Web-GIS platform*** will be ***capable of***: ***(a) including thematic maps of siting criteria*** representing ***technical***, ***economic***, ***legal***, ***environmental, landscape-related*** and ***social factors***, ***(b) identifying potential areas*** for ***RE project implementation*** considering a variety of ***exclusion criteria*** representing ***technical***, ***economic***, ***legal***, ***environmental, landscape-related*** and ***social constraints*** (overlay of thematic maps and application of buffers) and ***(c) enable*** the ***efficient public participation*** on the ***assessment of the potential areas.***

Through close collaboration of all involved in this Task partners and through the implementation of applied research:

(a) the ***general requirements*** (e.g. data types, incorporation of buffers to quantify the various constraints, components/modules) of the Web-GIS platform will be defined considering mainly the ***scale of spatial planning (national, regional, local)*** as well as the ***Case Studies*** (defined in WP4 Task 3), for which the Web-GIS platform will be applied (***bottom-up approach***).

(b) ***enhanced methodologies/modules*** will be developed focusing on the integration/combination of the crowdsourcing concept within spatial planning tools (i.e. GIS).

The lead partner for the development of the Web-GIS platform will be GSH, while all partners involved in this Task will contribute to the definition of the general requirements of the Web-GIS platform.

Deliverables:

D4.2. Methodologies in SEP Report Month 48 (2022, January) Confidential

D4.3. Web-GIS Platform Month 40 (2021, May) Public

Research questions

RQ3. *What are the requirements of an on-line geographic information system that can support efficiently SEP? Which planning factors affect mainly these requirements?*

RQ4. *Which are the most adequate methods that can be integrated in an on-line geographic information system for supporting the efficient public involvement in SEP?*

Methodology

- *Definition* of the *required <u>general</u> capabilities* of the *Web-GIS platform* based on the *Case Studies* (defined in WP4 Task 3), for which the Web-GIS platform will be applied (*bottom-up approach*).

  Secondments for implementing this sub-task: All secondments of Table 1 (see below).

- *Definition* of *data types/structure* required in the *Web-GIS platform* based on the *Case Studies* (defined in WP4 Task 3), for which the web-GIS will be applied (*bottom-up approach*).

  Secondments for implementing this sub-task: All secondments of Table 1 (see below).

- *Definition of the modules* of the *Web-GIS platform* that should be integrated in the platform for supporting public participation. *Standardization* of the rules for *crowdsourcing use* in the platform.

  Secondments for implementing this sub-task: All secondments of Table 1 (see below) and secondment of GSH to USE (6 M).

- *Definition* of the *architecture* of the *Web-GIS platform*.

  Secondments for implementing this sub-task: GSH to USE (6 M), with an initial version defined prior to the 1st secondment of WP4 (USE to GSH).

- *Development* of the *Web-GIS platform*. The web-GIS will be developed according to Service Oriented Architecture (SOA), which will provide possibility of publishing, finding and distribution for each data type. Moreover, Administrators from the participating organizations can capture, consolidate and cataloging of geospatial and other data to be accessible to other users and the public through a local network or the Internet. The web GIS capabilities will offer a friendly environment to extract the information needed easily and quickly and to intervene where necessary in order to identify and make the necessary corrections in the study areas. The system will offer WMS, and also WPS WFS & WFS-T.

  Secondments for implementing this sub-task: GSH to USE (6 M), with an initial version defined prior to the 1st secondment of WP4 (USE to GSH, July 2019).

Task 3. Web-GIS platform - Application of the methodologies/modules to specific Case Studies via the Web-GIS platform

This task focuses on the application of the Web-GIS platform on specific Case Studies. With the aim of demonstrating the versatility/efficiency of the developed Web-GIS platform irrespectively of geographical, spatial and/or social factors, Case Studies with different characteristics will be defined (e.g., different country, different critical planning parameters, such as the spatial planning scale (national, regional or local); different renewable energy source exploitation). The required spatial data will be collected, appropriately digitized, if necessary, and will be uploaded in the Web-GIS platform. Then, by applying specific constraints (according to relevant exclusion criteria) in the Web-GIS platform, exclusion zones will determined along with areas eligible for RE projects' realization. Finally, the Web-GIS along with the methodologies/modules on enhancing public participation will be applied to specific
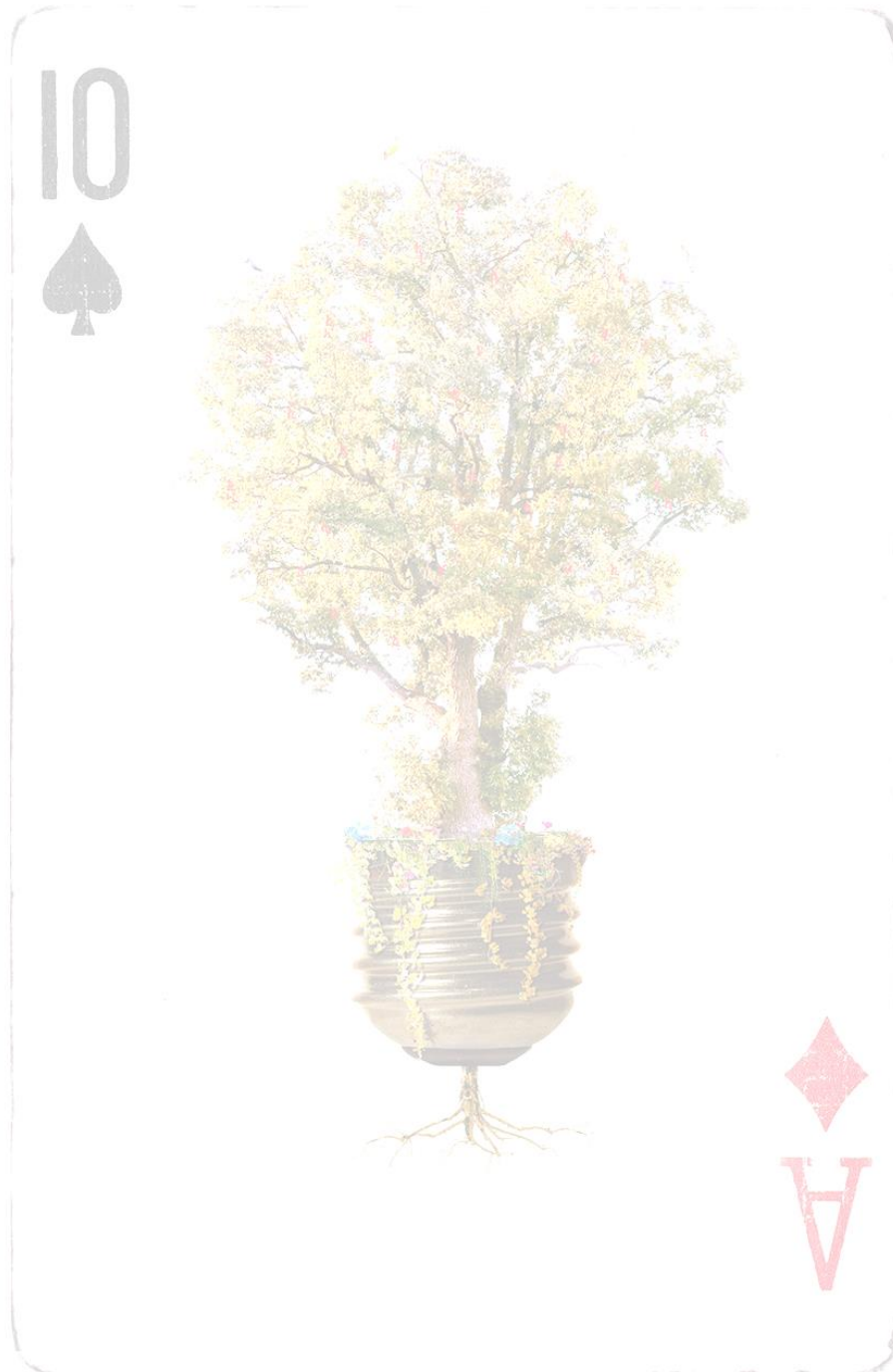
public target groups for the sustainable planning of various renewable energy technologies in WP4 participant countries.

Methodology

- *Definition* of the *Case Studies*: Based on the characteristics (country of hosting organization, duration of secondments) of WP4 secondments and aiming at demonstrating the versatility/efficiency of the developed Web-GIS platform irrespectively of geographical, spatial and/or social factors *the Case Studies included in Table 1 are proposed*. It is emphasized that main characteristics of the Case Studies may be modified based on data availability and will be finalized during the relevant secondments' implementation.

- *Definition* of *siting criteria* for *each Case Study*.

- *Definition*, *collection* and *digitization* of *data required* for the Web-GIS for *each Case Study*.

- *Creation* of *thematic maps in* the *Web-GIS platform* for *each Case Study*.

- *Spatial planning constraints quantification* and creation of buffers in the *Web-GIS platform* for *each Case Study*.

- *Identification* of *exclusion zones* along with *areas potential for RE projects' installation* for *each Case Study*.

- *Application of the crowdsourcing techniques* of the *Web-GIS platform* for *each Case Study*.

- *Highlights of main findings* and *potential commonalities* on *spatial planning* of *RES*.

Table 1. Proposed WP4 Case Studies

No	Country	Planning Scale	No of RES	Type of RES (indicative)	Secondments for implementation
CS1	Israel	National	1	Solar	1. AUTH to SP Interface (6 M) 2. AUTH to SP Interface (1 M)
CS2	Spain	Regional	At least 2	Solar, Onshore wind	1. AUTh to Territoria (2 M) 2. UNITN to Territoria (2 M) 3. CONSORTIS GEOSPATIAL to USE (1 M)
CS3	Greece	Regional	At least 2	Solar, Onshore/Offshore wind	1. USE to GSH (1 M) 2. USE to CONSORTIS GEOSPATIAL (1 M) 3. UNITN to GSH (2 M) 4. UNITN to CONSORTIS GEOSPATIAL (2 M) 5. USE to CONSORTIS GEOSPATIAL (1 M)

Deliverables:

D4.2. Methodologies in SEP Report Month 48 (2022, January) Confidential

D4.3. Web-GIS Platform Month 40 (2021, May) Public

Prepared by WP4 leader
May 23, 2019