

A Methodological Approach for Holistic Energy Planning through Living Lab Concept: the Case of Karditsa Prefecture

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Abstract The development of urban and rural landscapes constitutes a pioneering era with novel combinations between energy production and consumption and the upcoming changes in the urban and rural fabric including the associated socioeconomic uses. Moreover, the energy initiatives are more viable for development and upscaling and less vulnerable to failure and societal resistance if they are well-integrated in the local and regional contexts. However, institutional questions remain regarding the required level of integration, while simultaneously the sustainable energy planning involves actors with diverse and conflicting objectives that must come to a consensus. Inspired by these findings, a methodological approach has been developed for holistic energy planning on regional/local level within the framework of INTENSSS-PA project that is funded by HORIZON2020. The approach urges for a holistic energy plan beyond a blueprint for allocating renewable technologies with the involvement of the society including aspects such as the development of spatial concepts, new co-creating strategies, business cases, societal alliances and institutional changes and formats. To implement this approach, the Living Lab (LL) concept will be applied. The case of Karditsa, in Greece, will be presented, to provide evidence on the effectiveness of the proposed planning approach.

Keywords: Holistic Energy Planning, Living Labs, Participatory Decision Making, Spatial Planning, Regional Development

1. Introduction

Integrated sustainable energy planning implies the integration of the energy theme in spatial planning and physical and socioeconomic landscapes. Specifically, the integrated energy planning assumes that linking alternative land use functions and the interests associated with them in order to exploit the potential of the different renewable

energy sources has important benefits, because it will facilitate the pursuit of alternative societal interests and developments such as agriculture, nature maintenance, mobility or economic development. Participation is required to avoid NIMBY and NIMFY and to allow local self-organization for the development of YIMBY projects.

The integrated energy planning provides direction for identifying and understanding the area-based conditions that may enable or accommodate energy initiatives, which can be supported by the local society and can be connected to the local economy. Nevertheless, integrated energy planning is not merely a matter of spatial design, but also of institutional design as it involves several actors with diverse and sometime conflicting objectives that must come to a consensus. The conduction of an effective energy related planning presupposes deep changes in the structure and organization of the society (DeBoer & Zuidema 2014, Crawford & French 2008, Sørensen & Torfing 2007).

Obviously, local and regional governments are forced to find solutions in a dynamic and changing field where alternative societal partners interact with other stakeholders.

Figure 1 provides a schematically representation of the identified items regarding energy planning. The need for multilevel and participatory decision making process with interdisciplinary skills is demonstrated in order to lead to feasible, viable and bankable energy projects. Considering the wicked nature of this integration problem along with the continuously increasing planning requirements imposed by the European Union and the relatively stagnant economic environment, an attempt has been made to develop an approach not only to guide the Public Authorities, but to perform a form of experiential learning that will lead to an innovative and acceptable institutional decision making process involving societal and business partners and cross departmental agendas. The objective of this paper is twofold: firstly to present a holistic

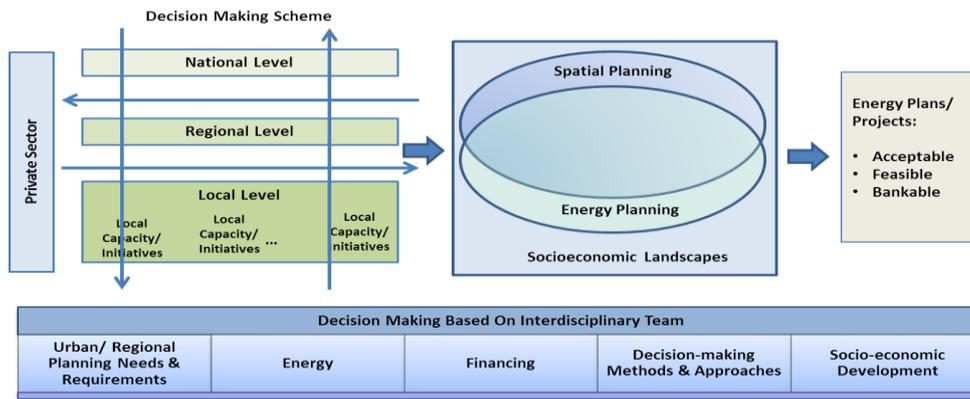


Figure 1. INTENSSS-PA Concept

methodological approach for integrated sustainable energy planning at regional/local level and secondly to present the application of this approach in Karditsa Prefecture in Thessaly, Greece.

2. INTENSSS-PA Project Framework

INTENSSS-PA project is funded under the 2015 call of HORIZON2020 Programme. The objective of INTENSSS-PA is to develop and implement a human and institutional capacity building process related to sustainable energy planning and energy projects implementation addressed to public authorities and societal stakeholders in order to support them to enter in a new era of integrated sustainable energy planning through a participatory, multi-level, interdisciplinary decision making process. An interdisciplinary team of 17 partners from public and private sectors and academia coming from 7 Member States constitute the consortium.

To achieve the above stated objective, INTENSSS-PA considers a four step approach: (i) to build a planning approach-structure including supportive materials and tools for the implementation of this approach, then (ii) to build human (i.e. technical) and institutional (i.e. mainly normative and cognitive) capacity, (iii) to build proof of concept through experimentation into the different planning contexts and energy related issues considered in the participating countries, and last (iv) to build institutions; actually to explore alternative frameworks, that will ensure the operation of the identified planning concept-structure beyond project duration.

To implement this approach, the Living Lab (LL) concept (Ballon & Schuurman 2015, Stahlbrost & Holst 2012) has been adopted. A LL represents “a user-centric” research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real life contexts. LLs are defined as both an environment and an approach, where innovation process is supported for all

involved stakeholders in real-world contexts, not constructed laboratory or project settings.

LL concept seems a very promising for INTENSSS-PA approach since it addresses the characteristics of the decision-making problem providing the capacity to develop an innovative integrated energy planning concept and to implement effective capacity building through experiential learning. Nevertheless, LL concept itself can contribute to the formulation of an institution in order to support the regional and national integrated sustainable energy planning.

The INTENSSS-PA LLs (i.e. Regional Living Labs–RLL) are defined as emerging citizens-public-private partnerships in which all the stakeholders work together to create, experiment and evaluate new innovative approaches and institutional innovation related to integrated sustainable energy planning.

The Holistic Energy Planning Environment that INTENSSS-PA aims to develop, evaluate and exploit is graphically presented in figure 2. The RLL collaborative environment involves the provision of structured expert support with the involvement of: (i) a technical facilitator within each RLL, (ii) an interdisciplinary group of experts in order to develop methodological tools and guidelines and (iii) a Database of Practice that includes training materials and case-studies so as to support and inspire the RLLs. This environment safeguards and pushes the operation of the newly established RLLs and facilitates their operation. The approach aims to develop the conditions of a transnational thematic network of RLLs as well as the conditions to assess the capacity of RLL concept to be incorporated in the institutional framework of energy planning of different Member States/Regions (INTENSSS-PA (A) 2017). RLLs are expected to add value to energy planning by developing planning processes and strategies in relation to a more open and collaborative approach to governance and making the involved actors more effective and the decisions more legitimate.

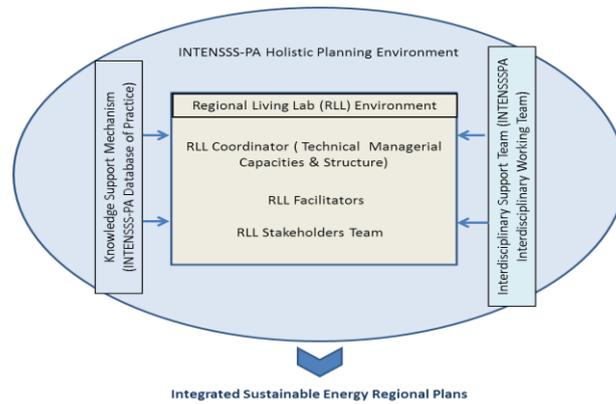


Figure 2. INTENSSS-PA Implementation Environment

3. Methodological Approach

The fulfillment of the established objectives can be achieved through the constitution of the INTENSSS-PA RLL network based on a unique governance framework and a common repository of methods, tools and experiences between all the involved stakeholders (ALCOTRA 2013). There is a predefined framework for the formation of the RLLs, while the structure and level of governance, the contingent interest and the converging requirements of the actors must be taken into consideration (INTENSSS-PA (A) 2017, ALCOTRA 2013, Stahlbrost & Holst 2012).

The overall methodological approach for RLLs on Holistic Energy Planning has been set up on four iterative steps that are presented in figure 3 (Stahlbrost & Holst 2012). The first procedural step provides a structured path for the creation of a RLL involving the analysis of the contextual factors of the spatial and energy planning process in each region, the identification of the related stakeholders and their role, the socio-economic settings, institutional structures and the spatial and energy capacity of each region. The second step is focused on the co-decision of the Planning Focus effort. In particular, within this step the focus, the vision and the magnitude of the plan including the involvement of the stakeholders is specified. The third step is the actual holistic energy co-planning including the

experiential learning within INTENSSS-PA project, while the fourth step is focused on the assessment of the designed holistic energy planning concept and its effectiveness and efficiency through the overall evaluation of the seven plans to be developed within INTENSSS-PA

Within each of these four steps, work will be organized and implemented with a focus on the five key principles of living lab approach, i.e.: value, influence, sustainability, openness and realism. To achieve these, Living Lab activities/processes should allow stakeholders to elaborate holistic energy planning in their context to determine if it brings value to them, and provide insights about how stakeholders perceive value. Moreover, the established decision-making process must go beyond participation, involvement or engagement of stakeholders providing the opportunity to influence the innovation. To this respect it is important to secure that domain experts' and stakeholders' needs and ideas are clearly traceable in the holistic energy planning environment and approach, and to assure that participation, influence and responsibility among stakeholders are balanced and harmonized.

Considering sustainability, the LL process goes beyond environment and resources and builds on creating relationships for the present and the future, which entails the development of networks and trust including the continuous learning and development over time. Openness

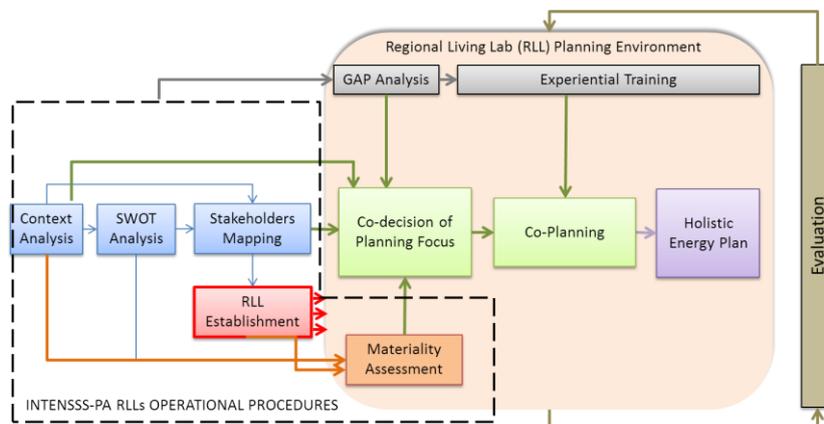


Figure 3. INTENSSS-PA Implementation Methodological Approach

within Living Lab process seems then to be a requirement for sustainable relationships and collaboration between people of different backgrounds, perspective, knowledge and experience that secure faster and feasible integrated sustainable energy planning.

Finally, realism is a cornerstone of Living Lab approach since innovation activities should be carried out in a realistic, natural, real life setting. Since all stakeholders have their individual local reality, everyone has a potential useful view of how the current situation can be improved.

Summarizing, the approach provides the capacity to experiment and develop new forms of systemic innovation, which are sustainable and well balanced regarding a representative participation from the side of society and public-private partnership. Furthermore, it creates strong networks of stakeholders that can increase and upscale the benefits of LLs about energy related innovation ensuring the necessary critical mass for its sustainability while considering jointly the impacts of globalized economy and local daily needs.

4. The Case of Karditsa RLL

Karditsa's RLL is being coordinated and hosted by the Development Agency of Karditsa (AN.KA SA) that has a very significant role in energy and spatial planning of the Prefecture. It was established by Local Authorities in 1989 and nowadays is expressing the "local partnership". AN.KA SA is focused on Social Interest and the environment protection.

The context analysis and SWOT analysis revealed that at this particular moment there are three prevailing positive circumstances that can support and be supported by INTENSSS-PA: (a) the existence of the Cooperative Bank and its healthy financial situation that reduces to an extent the funding uncertainty, (b) the fact that Energy Cooperative Body of Karditsa (ESEK) seems to perform well, so there is a success story in the Prefecture in relation to energy cooperative schemes and (c) the substantial biomass stock in the prefecture owned/produced by local actors (i.e. municipal waste, forest residues, agricultural and farming residues). A positive attitude is expected also by the society that has been substantially impacted by the economic crises, the increased energy cost and unemployment.

Major threats identified were focused on the legislative framework in relation to the permission process of energy production facilities and land-use constraints. It is also interesting to mention that one of the identified threats of integrated sustainable energy planning at the local level is the lack of knowhow and the capacity to meet consensus. The scarcity of the available and accessible capital was also considered to be a major issue.

Stakeholders' analysis revealed twenty five (25) different stakeholder groups involved in or affected by integrated sustainable energy planning in Karditsa.

Stakeholders were prioritized and grouped in terms of their importance to perform the planning and their

capacity/power to influence planning process and plan implementation in a later stage. In addition, an analysis of collaborations, synergies or conflicts among the stakeholders or other groups of the society has been conducted that provides a set of scenarios that create a relationship canvas between stakeholders (INTENSSS-PA (A) 2017).

Based on the above analysis the constellation of the RLL in the different stages of the project development has been identified. The main group of Karditsa's RLL participant is the following:

- Local Authorities: the Regional Authority of Karditsa, the six Municipalities of the Prefecture, the Association of Municipalities of Thessaly Region
- Forest Management Service
- Energy Cooperative Body of Karditsa ESEK
- Oikosfaira NGO
- Technical Chamber of Greece and Chamber of Commerce of Karditsa
- The Technological Institute of Thessaly through the Department for wood and furniture and the Department of Forestry
- Cluster of businesses – construction sector: ROMVOS
- Sawmills Industry PINDOS FORESTRY
- Cooperative Bank of Karditsa

It must be mentioned that further to these 17 actors there are more groups to be considered on different planning phases, e.g. farmers associations, forest owners and cooperatives etc., depending on the decision for the Planning Focus and the co-planning needs.

Prior to the formal invitation to participate in the RLL informal meetings were organized in order to inform each stakeholder on the project and concept and request their support and commitment. The formal kick-off meeting of the RLL took place in Karditsa in June 2016. During the kick off the context analysis, the SWOT analysis and the stakeholders mapping were presented, discussed and revised/enhanced in certain cases providing in this way a short of a validation process to this initial and very important analysis. During the kick-off a number of major energy related issues for the regional area were identified and discussed based on the implementation of materiality assessment process. More specifically, 25 issues related to regional conditions, people, funding capacity, awareness, land use, legislation and the structure of the renewables and energy market in Greece were identified. By implementing a materiality assessment, a prioritized list of the 10 most relevant issues affecting the regional energy planning were identified and further discussed in a second RLL meeting.

The most relevant issue to be considered with a much higher score from the rest issues was the "Residues and waste from farming, agriculture and forestry (biomass) management", followed by the "High costs for equipment conversion from conventional energy to renewable energy" and the "Lack of public awareness on actual RES and RET applications costs and benefits".

GAP analysis has been performed with the support of the project team providing very useful input that was discussed on several meetings of the RLL in order to co-decide on the Planning Focus of the RLL. These meetings were either sectoral (i.e. forest sector, agricultural sector, etc.) or of the main RLL assembly. The co-decision of the RLL was to focus its Planning Effort on the development of a “Strategic Plan on the energy exploitation of the biomass in the Regional Unit of Karditsa”. This strategic plan will attempt to provide the big-energy picture of Karditsa and to focus the planning effort on the most prevailing, mature and directly related to the socio-economic development of the regional area pathway, i.e. the pathway of biomass (INTENSSS-PA(B) 2017).

The expected added value will be significant: The development of an energy plan including tangible proposals and actions will provide strategic guidance for Karditsa, necessary to face the coming planning requirements stemmed by the national law and/or to take advantage of future funding opportunities for energy projects. Furthermore, the development and the pilot run of a strategic planning approach that could easily be replicated in other fields will enhance the capacity of the local stakeholders.

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