Stakeholders involvement for energy conscious communities: The Energy Labs experience in 10 European communities

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A B S T R A C T

In the framework of the INTERREG IVC RENERGY project an innovative methodology was devised to exploit stakeholder involvement on energy and environmental decisions at community level and to increase community acceptance. It is based on the “Living Lab” paradigm applied to policy making as a powerful instrument to encourage and coordinate stakeholder engagement. The paper describes the preliminary stakeholder analysis performed and the application of “Energy Lab” concept to eleven different EU communities (Kaunas — LT, Torre Vedras — PT, Potenza — IT, Slagelse — DK, Durham and Sheffield — UK, Tulln — AT, Szentes — HU, Jaslo — PL and Avrig — RO) with the purpose of identifying gaps and needs at regional level, share the knowledge through the discussion of exemplar case studies, maximize the transfer of good practices for the regional implementation plans and derive effective policy recommendations. The results show that the Energy Labs can give a sound basis for a future dialogue and a long lasting co-operation among the different parties and can be therefore considered an investment in the future at community level. At interregional level the comparison of the experiences among different countries helps to highlight the different motivations and aspirations of the various communities as well as the main common barriers in the implementation of renewable energy and energy efficiency strategies.

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1. Introduction

Energy system sustainability is a demanding challenge that should be faced by EU and local governments with coordinated efforts so as to cope with multiple aspects concerning both energy and environmental themes (e.g. energy independence and security, climate change mitigation, environmental quality) [1]. In this framework, energy efficiency and renewable source deployment represent key priorities. Moreover, social awareness is fundamental to foster significant behavioural changes, and the diffusion of new and more efficient technologies, such as energy-conscious communities, can drive local energy systems towards a low-carbon configuration [2].

The general framework of the long-term EU policy vision is outlined in the European Union strategy for a sustainable development [3–5] and, more recently in the Europe 2020 strategy [6] focused on knowledge and innovation, competitive economy, social and territorial cohesion as keystones to promote a smart, sustainable and inclusive EU growth. In particular, a sustainable development and an inclusive growth are addressed by seven flagship initiatives presented by the Commission, among which the most interesting in the energy context is “A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy” [7]. The strategy “Europe 2020” outlines the EU’s actions and the three headline targets to be achieved by 2020 to address climate change and the energy requirements: to cut greenhouse gas emissions by 20%, to generate 20% energy from renewable sources and cut energy consumption by 20%. The long-term vision is to transform the EU into a competitive low-carbon economy and in this framework renewable energy and energy efficiency are essential because they allow reducing fossil fuel consumption and, consequently, CO2 emissions. The local scale is a strategic dimension to translate the
making and business development issues so as to work out sustainable and feasible strategies. Energy Labs could contribute effectively to the fulfilment of the main aims of a project or a planning process through the creation of a common understanding (Fig. 1).

The Energy Lab methodology is based on the Living Lab or Living Laboratory concept — that integrates concurrent research and innovation processes within a public-private-people partnership (the so-called Public-Private-People Partnership – 4P), making them operative in a territorial context (e.g. city, agglomeration, region) [13–15].

Living Labs involve user communities, not only as observed subjects but also as a source of innovation. This approach allows all the involved stakeholders to concurrently consider both the global performance of a product or service and its potential adoption by users [16]. Living labs constitute an experiential environment, which can be compared to the concept of experiential learning, where users are immersed in a creative social space to design and experience their own future [17]. Living labs are also used by policy makers and users/citizens for designing, exploring, experiencing and refining new policies and regulations in real-life scenarios to evaluate their potential impacts before their implementations.

The Living Lab concept was initially developed and applied by William J. Mitchell, Kent Larson, and Alex (Sandy) Pentland at the Massachusetts Institute of Technology [18] that understood its methodological value to try, validate, refine and implement prototypes and complex solutions in a real life context [19].

Living Labs are also useful for finding out the community needs in order to make the necessary improvements for the regional development and integration of actions of different stakeholders’ groups [20].

The utilization of Living Lab methodologies is become very popular and increasingly important, because of the following reasons: open innovation; innovative approach to involve the community [21], direct transfer of research results and scenarios into real life conditions with stakeholders (citizens and/or institutions) that have some experience or an interest in particular issues. This methodology is designed to favour the integration of stakeholders’ ideas, interests or objections and to ensure a better acceptance, dissemination and implementation of the results of a project. The main objective is the analysis of real people, institutional and spatial context, in order to find the best solutions for a successful implementation of new projects and initiatives. In fact, the solving of common problems by collectively-developed solutions which take the specific contextual nature into consideration could help to avoid unexpected obstacles in the implementation phase. In particular, the active involvement of the community is useful to support the ongoing activities, monitor the project development as well as contribute to the achievement of results [1]. In fact, the originality of the Living Labs is strongly based on the awareness of users and the real-life settings to identify a physical or virtual environment in which stakeholders are involved to create, prototype, validate, and test new technologies, services, products, and systems. Thus, the outcomes of living labs are expected to be representative and have a good potential for transferability [15].

In this context, Energy Labs could support innovation in a “softer” way depending on the objectives and the expected outcomes. To this issue the organization of an Energy Lab requires a clear identification of the overall objective and the type of event (meetings, conferences, thematic workshops, fairs, etc.) and the methodology for maximizing the community participation [22] and to ensure that stakeholders’ inputs are properly managed. A thorough analysis of the project/planning process is therefore necessary to identify the specific purposes of the Energy Labs in relation to the critical phases and the main issues to which the stakeholders are
expected to contribute, as well as to clarify the methods for involving stakeholders. A further step of utmost importance concerns the analysis of the outcomes of the Energy Labs that should highlight the stakeholders’ contribution and their recommendations. To this issue an exhaustive reporting documentation should follow including the list of participants, a short report on the event, presentations, photos and other related informative material.

The stakeholders’ involvement [23] is the core of Energy Lab working methodology. It is generally defined as a process by which an organization involves everybody who takes an interest (or “stake”) in a decisional process in order to foster the acceptance of policy and measures, to get contribution and support as well as manage possible conflicts and oppositions.

The analysis and selection of the possible stakeholders strongly depend on the specific purpose of the Energy Lab: in particular, their role in the planning process should be defined carefully in order to identify a supportive and motivated stakeholder set.

In fact, stakeholders involvement helps to enlighten community problems from several points of views, and in some cases it makes possible to define common goals or a common path towards sustainability. This helps to motivate stakeholders participation and to promote their active support. In particular, in some situations this process can contribute to the definition of effective solutions and/or to foster a broader acceptance of policy and measures. As a main consequence, stakeholders role is empowered and the network established among the stakeholders during the process could be favourable for all the involved people, fostering a structured cooperation in further initiatives.

The underlying principles for an effective stakeholders’ commitment are to valorise their knowledge of specific issues and take advantage of their capability of influencing the policy-making processes [24]. This is where lies the essential difference from communication processes that seek to issue a message or influence groups to agree on well-established decisions. In fact, stakeholders could be affected by project outcomes and policy decisions, and at the same time they can have an impact on the implementation of policy and measures. Therefore, they can support or hinder a project, be influential in the organization or within the community, in which the project operates, hold relevant information, official positions or be affected in any of these terms in the longer run. Furthermore, to maximize their contribution the stakeholders should be involved at the beginning of a project and in all the crucial decisional phases.

According to the Community-Based Strategic Planning [25,26] stakeholders should represent groups from all levels of community and government, including:

- Groups with access to power — political representatives of national and local authorities and financial institutions,
- Groups with technical knowledge — people with justice background, planning and community mobilization skills, access to information and training about planning, promising programs, etc.
- Citizens affected by the policy decisions and who live the problem from the ground level — local community members and community leaders.
- Local investors — other groups and individuals with access to material resources whose support is necessary to the success and implementation of the initiatives, such as the business community, civic groups and NGOs, state and federal or regional lawmakers.

In the stakeholders’ involvement process it is fundamental to characterize a clear frame for their successful commitment and agree on the participation rules (for instance which decisions can be influenced by stakeholders) to delineate and understand each party’s role. A precondition is to consider their possible interests, objections, and motivations as well as their possible role in the decision-making process.

A preliminary brainstorming should be performed to identify a list of possible stakeholders among the different interest groups according to their political, economic, social interests in the project, knowledge and skills background, advantages and disadvantages that the stakeholders may have when involved in the process (arising from the project itself or its outcomes), possible opponent parties.

Brainstorming can be done individually or in a group, but the best results are often achieved by combining these two methods. A meeting with different people involved in the project or in the planning process with different roles/contact areas should be organized in order to enlighten all the possible aspects that have an impact on the stakeholder identification [27].
There are several ways to identify the possible stakeholders, such as mind mapping [25], reverse mind mapping, brain-writing etc. Pre-defined ice-breaker questions and instruments can be prepared to encourage the participants’ vision. The ideas collected during the session can be recorded on flip charts, whiteboards, or computers in order to come to a draft stakeholders list. Criticism and evaluation of ideas during the brainstorming session should be avoided because this can stifle creativity and cripple the free running nature of a good brainstorming session.

After the brainstorming, a visual overview/matrix of the different stakeholders’ power and importance is useful in order to highlight their influence in the project (very important/little power; very important/big power; not important/little influence; not important/big power) (Fig. 2) and define the final stakeholder list.

In the framework of Energy Lab, the stakeholders’ analysis is finalized to get the best way of involving the different groups (e.g. direct interviews, restricted expert meetings, public events, etc.) and consequently their role in each Energy Lab. Table 1 collects the main issues to be considered in a deeper analysis. The in-depth analysis can ease the decision of how and when the stakeholders can be involved (e.g. in the elaboration of the phase, consultation about the draft products, decision making about different development paths/options etc.). Transparency is another important aspect that contributes to the success of the stakeholders’ involvement. In fact, trusting the stakeholders, being open about their motions and setting a clear frame for their involvement can ease the process.

3. The Energy Labs of the RENERGY project: objectives and main results of the first round

In the context of the RENERGY project, the Energy Labs were designed to represent key building blocks of the interregional cooperation which constitute a fundamental tool for the analysis and the diffusion of the project themes as well as the development of sustainable energy policies at a local level. Moreover, besides their usefulness in the local communities, the analysis of comparable experiences in different territorial contexts can provide an added value to the development of generally applicable strategies.

Three Energy Labs per partner were planned in the RENERGY project according to the main project milestones: Build up the knowledge; Share the knowledge and discuss the knowledge. In a more general view, they were designed to support the main planning phases: the identification of gaps and needs at a regional level, discussion of the case studies and the transferability of exemplar good practices for the definition of customized regional implementation plans in the partners’ territories, so as to maximize the transfer of knowledge through the definition of sound policy recommendations.

In brief, RENERGY Energy Labs focused on the following main points:

- To inform and mobilize the community on possible solutions in order to maximize Renewable Energy Sources (RES) and Energy Efficiency (EE);
- To encourage local businesses in order to promote and develop products, services and technologies for EE and RES;
- To identify tools for project partners in order to promote solutions on EE and RES;
- To identify local/regional good practices and discuss the transferability of good practices of the partners’ countries;
- To identify opportunities and barriers for their implementation.

According to these objectives, the stakeholders’ involvement can noticeably contribute to three crucial project phases (that are in general the fundamental phases of every planning process): initial diagnosis (self-assessment and selection of exemplary good practices); definition of implementation plans for the implementation of transferable good practices and definition of policy recommendations (Fig. 3.). Moreover, as one of the main objectives of the RENERGY project is the transfer of good practices between partners, stakeholders’ involvement contributed to foster a right implementation of good practices to the respective regional contexts.

The first round of Energy Labs was held in the September 2012–January 2013 period, present the project facts to the local community. The overall objective was to “define the problem” starting from the community’s and the stakeholders’ needs as well as to find out local/regional best practices to be shared within the RENERGY partnership. This common understanding was reflected in the general issues debated in each Energy Lab that was focused on specific territorial issues concerning renewables, energy efficiency, climate protection.

Table 2 reports the main common issues discussed.

According to communities’ needs and cultural background, different types of events were organised. The most popular were technical workshops including selected groups of stakeholders and thematic experts to discuss in depth opportunities and criticalities at a local level. Some partners organized public events addressed to a broader audience with a relatively open agenda. On the whole, 8 workshops, 3 larger events/conferences, 4 larger meetings and 2 smaller meetings with a number of selected stakeholders were organized. In particular, the Association of Municipalities Polish Network “Energie Cités” (PNEC), a support structure of the Convent of Mayors in Poland, organized a larger meeting on “Energy Strategies for Municipalities”, with the participation of local key actors, whereas the Building-For-the-Future and Durham City Council (both from UK) gave emphasis to the local community members already engaged in energy projects, highlighting in their Energy Labs the additional opportunities that the RENERGY project could be able to support.

Among the events that involved the community actively, the “Do-it-yourself” Symposium “organised in Szentez, Hungary” and the “Vand-og Energimesse” (Energy Fair) organised in Slagelse
Table 2
Summary of issues discussed in the RENERGY Energy Labs.

<table>
<thead>
<tr>
<th>Culture</th>
<th>Demand</th>
<th>Economy and Investments</th>
<th>Environment</th>
<th>Infrastructures</th>
<th>Legislation</th>
<th>Local Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptance</td>
<td>Energy background</td>
<td>Financing RES and EE interventions</td>
<td>Natural heritage</td>
<td>Electrical grid</td>
<td>Specific needs</td>
<td>Endogenous resources</td>
</tr>
<tr>
<td>Energy background</td>
<td>Local Market</td>
<td>Level of return of investments</td>
<td>Impacts</td>
<td>Future politics</td>
<td>Current politics</td>
<td>Manpower</td>
</tr>
<tr>
<td>Prices</td>
<td>Market barriers</td>
<td>English grid</td>
<td>Legal barriers</td>
<td>Technology</td>
<td>Competition</td>
<td></td>
</tr>
</tbody>
</table>

Denmark, focused on parents and kids with more than 1100 visitors of whom 70 kids and their parents, aroused a great interest and demonstrated to be very helpful to stimulate the communities' interest in renewable energy and efficiency. Table 3 reports the main features of the first round of Energy Labs by partners.

The events were attended by local and regional administration representatives, academic and other educational institution members, power supply companies, private companies, energy agencies, branch organizations, environmental associations and private citizens.

The number of participants (Fig. 4) was highly dependent on the type of event. The average audience of most of the workshops was around 20 participants. The higher participation rate was achieved, obviously, in public events (e.g. the Conference organised by Kaunas, Lithuania, the Public seminar and technical workshop of Potenza, Italy, the Energy Fair, of Slagelse, Denmark in which the kids – target audience – amounted to 70 children).

The second and the third round of Energy Labs will be held in the second part of the project. The second Energy Lab will focus on the exemplar best practices identified as relevant to boost energy efficiency and renewable energy policy in the local communities in the framework of the implementation plans (the final output of the RENERGY project), whereas the third Energy Labs is expected to qualify the implementation plans in the form of policy recommendations.

4. Conclusions and policy implications

The overall objective of Living Lab concept is the integration of the community as an active player into policy design and problem solving process, thus establishing a positive and long-lasting cooperation. The application of this concept should be, therefore, customised with respect to the issues and the problems to be solved. Nowadays the Living Lab concept has been comprehensively used in many fields among which it is worth noting the concept design [28]; the support to an intensive use of IT technologies in e-Government [29]; the support to innovation [30]; the integration of the customers into the creation of new products [31].

Its application to the energy sector due to the complexity of energy-related issues and the multiple stakeholders' points of view should be carefully addressed, in order to integrate different needs and attitudes and maximise the potential contribution of the different stakeholder categories. It should be also taken into account that most of them are also the beneficiaries of the energy strategies. In fact, depending on the issue that is to be worked with and the nature and stage of the project/problem to be solved, the involvement of stakeholders can be a tool for democratic bottom-up process or a tool for a consensus building process. It is crucial for a successful strategy to define and communicate clearly the aim and the framework of the process. In this way it is possible to create transparent and optimal conditions that maximise the stakeholders role and their expected contribution. The definition of the “rules of the game and the selection of the most representative categories” represent, therefore, a crucial point of the process. In fact, a broader participation of all the groups of interest that valorise their expertise, their deep knowledge of the territory, its criticalities and potentialities as well as the communities' expectations and motivations, can be helpful to exploit the community inputs to the policy making process. However, a customised strategy should be defined to avoid redundancies as well as manage the possible conflicts between different groups. To this issue, it should be taken into account that sometimes stakeholders can provide negative feedback that could be hard to be taken in. Despite that, their contribution is useful to learn more about problems, difficulties and barriers, and their opinion is always valuable to work out sound and customized measures that avoid future problems.

However, Energy Lab is the new and innovative measure for community involvement which has been implemented in every region analysed since the RENERGY project started. It is anticipated that Energy Labs will contribute to the community involvement not only as a separate event, but it will help to create the strategies for the community involvement actions and their implementation.

The analysis shows that some of the countries are very advanced in the communication with the community members through various established centres for information and consultation and other well-planned initiatives, ensuring the high rate of the involvement of the community in Energy sector. In particular, Austria, Denmark Germany and United Kingdom with a long tradition on energy and climate issues and active community associations, utilised the RENERGY Energy Labs to increase the effectiveness of already existing initiatives. The less experienced countries, strongly motivated by the increasing problems related to security of energy supply and environmental protection, found the Energy Lab experience very useful to motivate their communities and to provide a sound basis for a future dialogue and co-operation.

Important aspects need to be considered in every region before considering the implementation of particular community involvement action: integrity, visibility, transferability, accessibility/availability, transparency, correspondence to the needs and expectations of the community, the target group of the community.

The responsibility on the community involvement actions differs from region to region: municipality, energy providers, scientific organisations and NGOs are the typical stakeholders initiating and implementing the community involvement actions. The distribution of the community involvement responsibility is very laudable, nevertheless the coordination of the community involvement actions need to be performed because of the coordination of the different actions and intentions to avoid the duplication of previous campaigns. It is identified that the overload of the information without an evaluation of the current need of the residents could have a negative impact as the community could become indifferent to the information related to the particular theme: at this case — RES and EE. Furthermore the coordination of community involvement actions could ensure the effective usage of the monetary and human resources.

In this framework, the implementation of the Energy Labs in the different European regions of the RENERGY partners disclosed the main advantages and the methodology potential at a regional level in order to work out the local problems and achieve a broader consensus on sustainable energy strategies. As a general
Table 3
The aim and results of the 1st round of Energy Labs in different regions.

<table>
<thead>
<tr>
<th>Region</th>
<th>Event Description</th>
<th>Aim of Energy Lab</th>
<th>Participants</th>
<th>Main results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potenza IT</td>
<td>Public seminar and technical workshop</td>
<td>To identify needs and opportunities at local level concerning the energy sector.</td>
<td>Politicians, Selected stakeholders, Local experts, Selected politicians, Local experts</td>
<td>Increased awareness by citizens about energy themes; Identified problems and opportunities at local level.</td>
</tr>
<tr>
<td>Tullin-AT</td>
<td>Seminar and technical workshop</td>
<td>Identification of local and regional issues related to energy policy</td>
<td>Three stakeholders groups: Associations and citizen; Private companies Knowledge institutions</td>
<td>Information about the effectiveness of the (regional) renewable energy sources (RES) energy policy</td>
</tr>
<tr>
<td>PT</td>
<td>Technical Workshop</td>
<td>Stakeholders debate, Presentation of the RENERGY survey results, and Presentation of local energy matrix</td>
<td>Academics, Politicians, Power suppliers Consumers</td>
<td>Information about policy instruments for the establishment of RES and EE</td>
</tr>
<tr>
<td>DE</td>
<td>Public workshop</td>
<td>Information about the CO2 balance for the years 2009–2010, Discussion about the results and possibilities to further the progress of emitting less energy</td>
<td>Citizens</td>
<td>Informing about the CO2 balance and the generation of ideas on the future improvements in order to decrease the CO2 emissions</td>
</tr>
<tr>
<td>PL</td>
<td>Workshop</td>
<td>Energy strategies for municipalities – projects and initiatives which can help in local energy development</td>
<td>Local authorities, SMEs</td>
<td>Representatives of municipalities told about energy management actions and problems in their regions – from air pollution and low emission decreasing programmes, to public lightening.</td>
</tr>
<tr>
<td>LT</td>
<td>Conference</td>
<td>To initiate the community discussion about the sustainable energy development opportunities and prospects in the Kaunas city and region, To identify the main problems and challenges for the successful implementation of the sustainable energy sector in Kaunas city, promoting the usage of RES and energy efficiency.</td>
<td>Academics, Scientists, Power suppliers Consumers</td>
<td>The short questionnaires have been delivered for the participants. They have filled it in time of the conference. The aim of this short survey was identify the main expectancies of the participants for the Energy Lab, the main problems in Kaunas energy sector from their point of view and to identify the past events, regarding energy issues which have been useful for the attendees.</td>
</tr>
<tr>
<td>RO</td>
<td>Technical Workshops/Thematic Meetings</td>
<td>To organise the dialogue and Exchange of experiences on renewable energy production, To establish the necessity and opportunity to invest in renewable energy, To start being an example beneficiary of renewable energy projects</td>
<td>Selected stakeholders</td>
<td>All the mentioned issues has been analysed</td>
</tr>
<tr>
<td>DK</td>
<td>Energy Fair</td>
<td>Promotion of RENERGY with focus on kids and their families- 1. Energy Lab.</td>
<td>Citizens Kids and their families</td>
<td>Successful RES promotion and a kid (and parents)-focused approach (is supposed to be followed up with schools in enlarged case study)</td>
</tr>
<tr>
<td>HU</td>
<td>Interactive Workshop</td>
<td>Smart metering; Highly efficient automated stoker for wood firing; Application of LED lights in public and office lightings; Current subsidy opportunities available in the field of energy sector.</td>
<td>Consumers</td>
<td>Geothermal energy as one type of renewable energy sources can be used in cascade system in many ways, including the production of electricity, district heating, heating of greenhouses in horticulture, in thermal bath for balneology. This provides a huge opportunity for the city, whereas the legal environmental regulations can eliminate the exploitation of this type of RES, in case that the pushing back of water will be obligatory after 31 December 2014. This is still under debate. Nobody knows which party’s will or argument will be stronger.</td>
</tr>
<tr>
<td>Durham County – UK</td>
<td>–</td>
<td>To inform the community association about the RENERGY Project To revise the energy campaigns already undertaken by Oakeshaw Community To identify additional energy efficiency and renewable energy opportunities that the RENERGY project may be able to support.</td>
<td>–</td>
<td>The aims of the RENERGY project has been discussed within the community association</td>
</tr>
<tr>
<td>Sheffield–UK</td>
<td>Thematic Workshop</td>
<td>To identify additional energy efficiency and renewable energy opportunities that the RENERGY project may be able to support</td>
<td>Selected stakeholders</td>
<td>Results of the group discussions lead to 3 main areas to target in Sheffield: Knowledge; City Metrics; Clarity of Policy. It was decided to produce some well-designed literature aimed at disseminating the results of the SAA to all 3 thematic pillars, in order to: Educate region about EE and RES; Inform region about the state of the art; and to increase a community uptake in RES.</td>
</tr>
</tbody>
</table>
conclusion, the stakeholder involvement process can be considered as an investment in the future as this structured process can support the trust in the institutions and the creation open innovation networks facilitating the implementation of policy strategies and further cooperation in future projects.

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Fig. 4. Energy Lab participation rate in different regions.