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# Roadmaps for Energy (R4E): A Systemic Approach to the Renewable Energy Transition of Smart Communities

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## Abstract

The sustainable energy transition of communities is one of the main targets within the European energy policies. Consistent energy planning is needed but conditioned by difficulties of city administrations to meet the necessary skills and have the necessary knowledge in order to lead the corresponding transition processes.

The R4E project (www.roadmapsforenergy.eu) responds to the EE-07-2014 call entitled "Enhancing the capacity of public authorities to plan and implement sustainable energy policies and measures" within the Secure, Clean and Efficient Energy Work Programme of HORIZON 2020 of the European Commission

R4E develops roadmapping capacities of 8 European partner cities (Eindhoven, Forlì, Istanbul, Newcastle, Murcia, Palermo, Sant Cugat and Tallinn) together with their local stakeholders, and provides them with the necessary knowledge about innovative energy solutions in the fields of smart buildings, smart mobility and smart urban spaces.

A specific systemic approach to these future energy solutions has been developed, based on *Deskstudies*, Experts interviews and resulting *Generic Roadmaps.*

The *Deskstudies* consist in *Systemic Solution Maps, Technology Outlooks* and *Case Studies* building a systemic knowledge generation tool for participants in multi-stakeholder processes. First applications and the feedback of stakeholders of city partners will be presented at the conference, discussing the usefulness of the approach for the city partners.

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*Keywords:* Sustainable energy transition; Roadmapping; renewable energies; systemic solution maps; participatory processes

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## 1. Background

The R4E project (www.roadmapsforenergy.eu) responds to the EE-07-2014 call entitled "Enhancing the capacity of public authorities to plan and implement sustainable energy policies and measures" within the Secure, Clean and Efficient Energy Work Program of HORIZON 2020 of the European Commission. The main challenge of the partners within R4E is to develop visioning and roadmapping capacities within municipalities to initiate joint activities to spur development and implementation of innovative energy solutions in cities.

The implementation of strategies and plans on municipal level suffers from the effects of the recent global economic and financial crisis, the shifting of competences and responsibilities between government levels, difficulties within organizations to meet the necessary, and changing, skills and capacities; and a lack of knowledge on the state of the art concerning technological and organizational innovation. This leads to imperfect implementation processes and loss of faith in the usefulness of strategies and action plans.

In order to overcome these barriers, R4E established the following objectives:

• Creating high quality visions and roadmaps that drive collaboration between municipalities, entrepreneurs, knowledge institutes and citizens to achieve longer term ambitious goals through short term decisions and actions
• Implementing with all partners a similar participative process for vision and roadmap development that enables continuous cross-city learning exchange of experiences, challenges and best practices.
• Building an ecosystem of relevant local parties in each city, laying the foundation for extended collaboration between partners to drive innovation for sustainability purposes, through joint projects, e.g. joint pre-commercial procurement projects.

This ambitious approach requires new processes and tools in order to foster understanding, communication and informed, shared decision-making among stakeholders.

## 2. Introduction

Our western societies are recently experiencing a strong shift towards participation of citizens and all type of interest groups in participatory, multi stakeholder processes, with the aim to find consensus among individual interests regarding societal changes and challenges, especially in the field of transition towards sustainability.

In the technological field so-called user-centered research has been developed in order to capture user insights or user behavior regarding innovations with the aim of shortening product-to-market periods and gaining higher security regarding user adoption and market success of a product or service. New infrastructures and processes have been developed like e.g. Living Labs and Open Innovation strategies.

Similar processes are increasingly taking place in the area of governance and decision making within municipalities, where citizens, entrepreneurs, academics and local entities as "users", are expected to contribute to collective innovation and decision making processes.

Similar to the questionable role of users as actors in the field of innovation (lack of experts knowledge, lack of motivation for continuity, IP rights and exploitation of results) the capacity of individual stakeholders has to be questioned in overviewing the whole process e.g. of the current transformation processes of cities towards more sustainable energy models. These processes are highly complex and open ended, including technological developments and changes, legislation, governance, societal changes and social innovations, linked to individual as well as collective value discussions and behavior changes regarding our lifestyle.