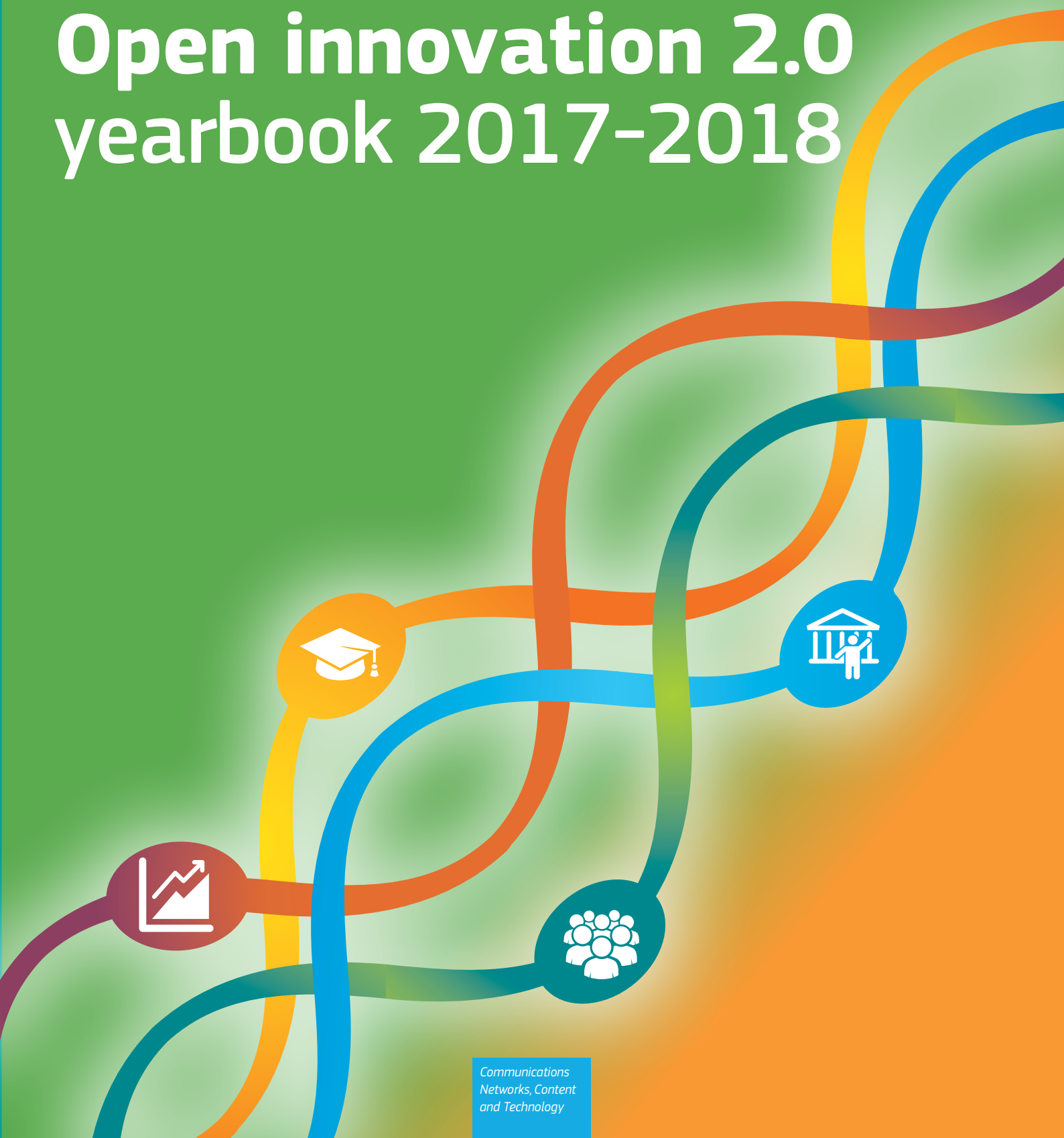




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Communications
Networks, Content
and Technology

PART III

Regions and cities

Article 11

Co-creating smart city visions and roadmaps: bridging cultures in policymaking. Cities as game-changers for innovation

Introduction

In previous editions of this yearbook we have described the process of open innovation in the domain of smart cities and smart urban lighting, based on the experiences in the city of Eindhoven. The process started off with a vision and a roadmap for urban lighting that was co-created with stakeholders of the quadruple helix in 2012. In subsequent years, various projects and public procurement procedures were organised to start the realisation of the shared ambition, among others the seventh framework programme for research and technological development pre-commercial procurement project Enigma.

One of the main prerequisites of open innovation is cooperation within the quadruple helix. To come to a real participatory process turns out to be challenging, especially when the participants are this different. In this edition we therefore emphasise our experiences in co-creation by describing a practical example of a project.

During earlier projects it became clear that driving innovation in smart city solutions towards better quality of life for people in the cities requires a new approach to innovation and the scalability of solutions. Special attention needs to be paid to the continuous development of an open, multi-purpose democratised platform (a mash-up of data, services and products) to enable a diversity of propositions. Projects are the context-specific connection that enables partners to develop appropriate local solutions to answer questions that have a global impact. However, we have the ambition not only to see solutions as local pilot projects, but also to seek ways to scale up those solutions. This is important for companies to develop sustainable business, but also for faster development of the platform and thus to realise more effect for citizens. Solutions that work for one city cannot simply be transferred to other contexts; they may need to be tuned to the specific new local needs. But a smart platform will enable added-value services in different contexts, using similar hardware (modules) but with different services, settings and usage scenarios. This also makes it possible to make adjustments over time and to further develop the platform. This in turn will enable further development of new propositions.

To realise the development of open platforms requires collaboration with other cities with similar needs. This was the reason the city of Eindhoven applied for a Horizon 2020 project to enhance the capacity of public authorities to plan and implement sustainable energy policies and measures through energy roadmapping for smart cities. In the roadmaps for energy (R4E) project eight partner cities together develop visions and roadmaps in co-creation with local stakeholders to formulate requirements for solutions from specific needs in the cities. This will enable the search for scalable solutions — solutions that share a common platform but are tailor-made to the context of implementation and allow add-on of locally developed applications and services.

The R4E project therefore creates open innovation ecosystems on two levels: the European level with eight cities; and the city level with all local stakeholders. This poses challenges relating to bridging cultural differences in the approach on two levels: on the European level between the different ways of working; and within the cities between the public, private and people partners in the local ecosystem. In this article we describe the experiences in R4E. The second section describes the project and process in more detail. In the third section the experiences with creating the two different ecosystems are described. Finally, in the fourth section the key success factors relating to bridging cultures in policymaking are provided.

The role of municipalities in the smart city challenge

Cities need to react to new, disruptive transformations caused by the digitisation of society and associated solutions to ensure that technology is applied to truly contribute to a better quality of life for their inhabitants. On the one hand this means giving participating citizens the space and opportunities to become enthusiastic and involved. On the other hand it means ensuring that smart city systems enable co-creation of human-centred personalised services that meet people's needs and contribute to economic resilience.

In smart cities citizens live together well, public interests are safeguarded and new technology creates business opportunities for companies and contributes to an attractive economic climate, while protecting people from undesirable commercial interests. The role of municipalities cannot be overestimated, i.e. to achieve liveable and resilient cities by reducing energy consumption and increase the production and use of renewable energy. Cities across Europe have shown their commitment to playing this key role by endorsing, in large numbers, the targets as set out in the Covenant of Mayors.

They have also engaged in the development of the strategic energy action plans required by the covenant. Energy planning is high on local agendas across the EU, and the interest in the smart cities concept has further raised the attention of local authorities and is directing their policy attention to the integration of local energy, mobility, digital and innovation policies with a view to becoming truly smart cities. However, the actual implementation of strategies and plans continues to be a difficult exercise, for many reasons. Challenges include: financial 'surprises', such as the recent economic and

financial crisis; changes in competencies because of the shifting of responsibilities between government levels; difficulties within organisations with meeting the necessary, and changing, skills and capacities; and a lack of knowledge on the current state of affairs concerning technological and organisational innovation.

A full reliance on industry to develop solutions may result in commercial solutions that are not necessarily in line with longer-term societal ambitions or do not sufficiently safeguard public interests. Municipalities will need to drive innovations in the desired direction: improving the quality of life for their citizens.

Co-creating smart city visions and roadmaps

A new co-creation policymaking process

In the R4E project energy roadmaps are developed. The R4E partner cities implement a similar participative process for vision and roadmap development that enables continuous cross-city learning and exchange of experiences, challenges and best practices. In each city a local ecosystem is built of relevant parties and connected to the ecosystems of the other cities and internationally recognised thought leaders. These connected ecosystems are the foundation for extended collaboration between the partners to drive innovation for sustainability purposes through joint projects, such as joint transnational procurement of digital platforms for smart city solutions.

Since energy and smart cities are too broad to cover in one roadmap, R4E focuses on three themes within the domain of sustainable energy that are closely linked to the municipalities' main responsibilities: smart buildings, smart mobility and smart urban spaces (see also Figure 1).

Figure 1: Focus areas in the domain of energy for smart cities

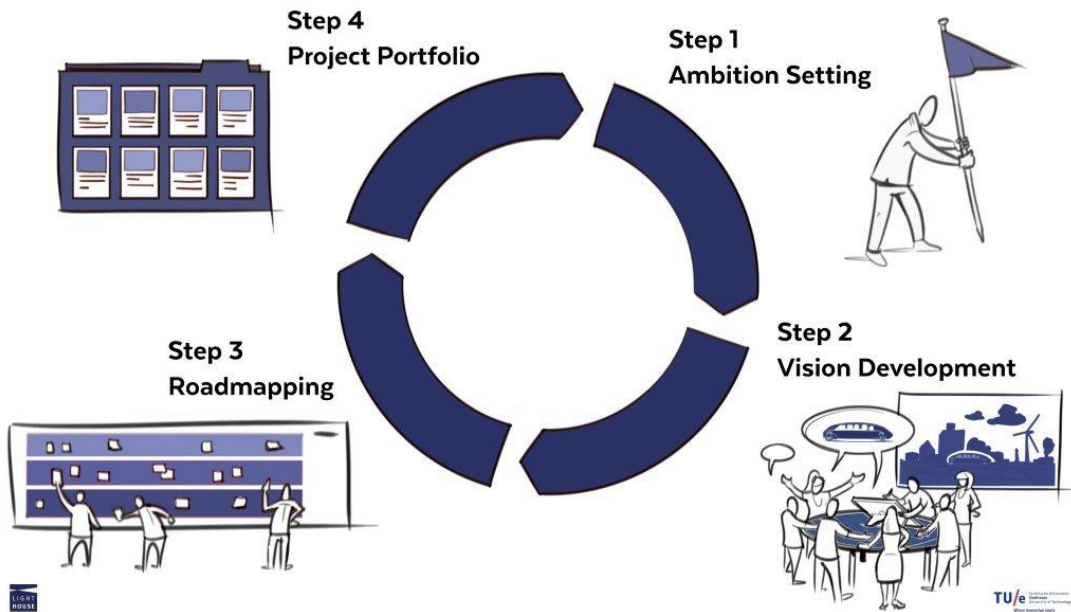


A four-step approach

In the R4E project a structured, four-step approach is applied: 1. ambition setting; 2. vision development; 3. roadmapping; 4. project portfolio (see also Figure 2).

In each step the relevant (local) stakeholders are invited to co-create in workshops or interviews. The workshops are held in the participants' own language and are tailored to meet cultural needs.

Figure 2: Four-step approach to co-create visions and roadmaps



Step 1 — ambition setting

The first step sets out the ambitions for the project. For this purpose, several sessions are organised with policymakers, strategic managers from different sectors within the municipality and external stakeholders. The workshops are structured with posters, on which the results of a brainstorming session are clustered and prioritised. Then, in a plenary session,

three strategic ambitions for the city for the year 2050 are formulated, using the input on the posters. Figure 3 shows photos of the ambition setting workshops and the result: prioritised strategic ambitions.

In parallel, an assessment of the ecosystem takes place: who are the stakeholders and which ideas and initiatives can be included in the next steps.

Figure 3: Ambition setting

Ambition = what aspiration does the city have for the future?

Series of interviews/workshops to define the scope, aspirations and specific ambitions for each city



Workshops structured with posters to facilitate interaction and in-depth discussion between all stakeholders:

- policy makers
- internal experts
- external stakeholders



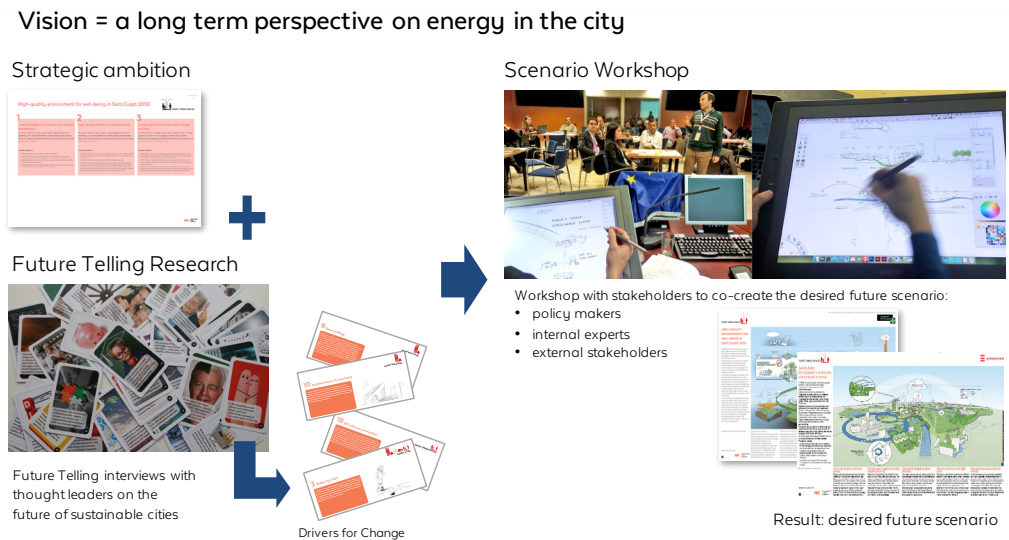
Result: prioritised strategic ambitions

Step 2 — vision development

The second step is to develop a desired future scenario. For the scenario development the ‘future telling’ methodology is used. Interviews with a diverse group of experts from different disciplines and with a broad perspective on the future of cities result in rich ‘stories’ that are analysed to identify key drivers for change. Combining the drivers for change with

the cities’ ambitions enables the stakeholders to develop the desired future scenario for their city. In an interactive workshop with all relevant stakeholders the desired future scenario is described in its key elements and visualised. The result is a visualisation in which the participants recognise their input as they have been engaged in the process. Figure 4 shows how the desired future scenario is developed.

Figure 4: Vision development



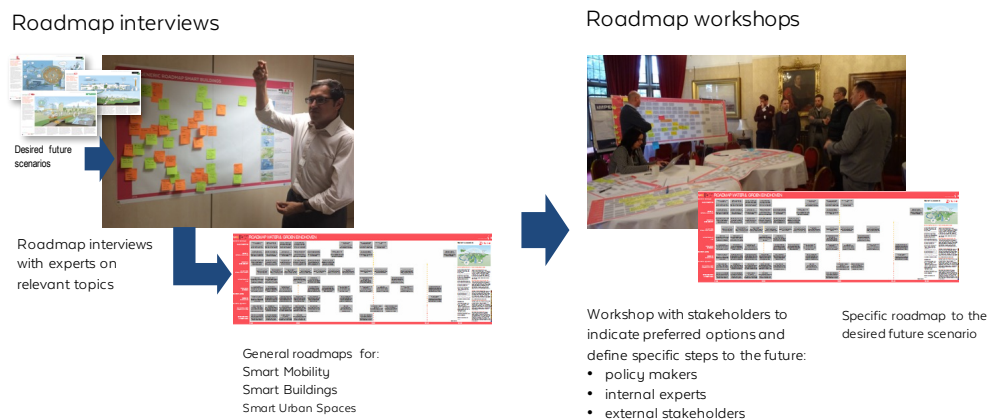
Step 3 — roadmapping

During this step the desired future scenarios are used to identify existing and future technologies and developments that will enable realisation. The information for the roadmaps is collected through interviews with thought leaders in different thematic areas. The result is a general roadmap in which opportunities and developments are plotted

on a timeline to provide insight into the required steps and milestones towards the desired scenarios. In roadmap workshops with all stakeholders in the city the specific milestones and project ideas involving local companies and knowledge partners are defined to realise the city’s specific desired future scenario. Figure 5 shows the process of roadmapping.

Figure 5: Roadmapping

Roadmap = a map with the possible routes to the desired future scenario



Step 4 — project portfolio

During the final phase a project portfolio is generated with new projects and initiatives to reach the ambitions, visions and roadmaps of the cities. This portfolio provides an overview of city-specific and joint projects, and includes a plan for further joint activities with other partner cities.

In between — joint workshops

After each step a joint workshop is organised with all partner cities to share results and to investigate commonalities and differences between the cities and their needs. Using the same process in all cities allows the creation of a common language to talk about abstract concepts such as visions, ambitions and roadmaps. In this way the cities are better able to indicate common and specific needs and choices in their cities.

Creating open innovation ecosystems

As stated, the R4E project creates open innovation ecosystems on two levels: the European level with eight cities; and the city level with all local stakeholders.

Developing a European-level ecosystem

The partnership was built by the team of the municipality of Eindhoven, based in the Eindhoven Brainport EU office in Brussels. This team has strong relations with other European cities and regions, collaborates a lot with them in Brussels and is active in different European networks.

The call for proposals under the Horizon 2020 programme focusing on ‘Enhancing the capacity of public authorities to plan and implement sustainable energy policies and measures’ was identified as a good opportunity for the city of Eindhoven to improve the impact of energy (action) plans, such as the Covenant of Mayors, and to spread throughout Europe the knowledge and experiences obtained by Eindhoven in developing roadmaps. At the same time, increasing the number of cities that are familiar with roadmapping is a relevant step towards pan-European open platforms and innovation ecosystems for smart city services.

A partner search was begun through the Eurocities network, explaining briefly the call, the focus and objectives of the project idea and the kind of partners being sought. Eindhoven is member of Eurocities, a network of 130 major European cities and 40 partner cities across 35 countries. The partner search resulted in the expression of interest of around 15 cities from nine different countries. Eindhoven also received expressions of interest from a couple of cities with which Eindhoven has close relations.

In order to develop a strong consortium the following requirements were taken into account with regard to the partner cities:

- a maximum of eight cities to be partners;
- a good geographical spread;
- the drive of the cities to participate in this project;
- the commitment and input of partners during project development;
- European added value;
- previous roles and experience in European projects and networks;
- the endorsement of the Covenant of Mayors.

Before the project proposal was submitted two partner meetings were organised: one at an early stage to discuss more specifically the focus of the project; and a second one a few weeks before submission to jointly go through the proposal, to add missing information and to make the final modifications.

These preparatory meetings are very important in the development phase of a project in order to see whether or not the different partners click, to ensure that everybody understands the project idea and agrees with it and to discuss the details. After the first partner meeting the partnership was further defined. Some partners indicated that they were not able to continue, and others expressed their commitment to continue the work. Also the project was given more focus, and the three focus areas of R4E — smart buildings, smart mobility and smart urban spaces — were chosen.

With those focus areas it also became clear what kinds of expertise and what kinds of knowledge partner were needed to complete the consortium.

TU/e LightHouse was involved from the beginning, and had an important role in the development of the proposal because of its experience in the development process of specific local roadmaps. Other knowledge partners were sought by asking around in networks, resulting in the involvement of TU/e Smart Mobility and the Universitat Politècnica de Catalunya. A final city was included in the partnership through the latter’s connections.

The R4E consortium consists of 10 partners from six countries: Estonia, Italy, the Netherlands, Spain, Turkey and the United Kingdom. This extensive geographical coverage is an important asset of the R4E consortium, since it shows that the process of visioning and roadmapping is applicable in different countries, all with different climates, cultures and habits, including one non-EU country (Turkey).

Figure 6: R4E partners



The core of the R4E consortium consists of eight committed cities with an ambition to overcome the current difficulties in implementing energy ambitions and willing to learn to develop vision-creation and roadmapping capacities within their organisation so as to improve the actual implementation of energy strategies and plans.

The cities play the role of actively participating clients. As owners of problems the cities co-create specific ambitions, strategies and plans on future energy development in a participatory approach with knowledge institutes, industry and stakeholders. The eight cities are spread over the whole of Europe, with a balance between north and south, between hot and cold climates and between large and small. Furthermore, the cities vary in their implementation capacity. Some have more own financial resources than others; some have more regulatory powers than others. All cities participate in joint workshops with other cities to optimise cross-city learning experiences.

The value of each other's capacities, tasks and experiences among the consortium members, together with good geographical coverage, is essential to emphasise the added value of each of the partners and to demonstrate the potential of replication of the activities and outcomes of the project.

Developing city-level ecosystems

Smart city sustainable energy policies require an integrated approach across sectors, for example linking social, mobility, real estate and digital policies. Moreover, successful implementation inevitably implies cooperation between the city and local and regional stakeholders to gather innovative ideas and concepts, to create ownership and thereby to achieve effective and efficient implementation. Therefore, in the R4E project an inclusive process is applied, engaging key stakeholders from business and knowledge sectors and from local and regional stakeholder groups at different stages.

The first round of workshops was on ambition setting. The main purpose of this step was to familiarise people with the project and the way of working and to make a start on developing the ecosystem. Therefore, the intention was to engage policymakers, strategic managers from different sectors within the municipality and civil servants in the area of the energy roadmap. Also, external stakeholders in the focus area were invited to a workshop to add their ideas and thoughts to the process.

Both the way of working (brainstorming session) and the way of thinking (setting ambitions for 2050) proved to be very new to everybody involved. Adaptions of the process had to be made due to

cultural differences and city practicalities in the cities, as detailed below.

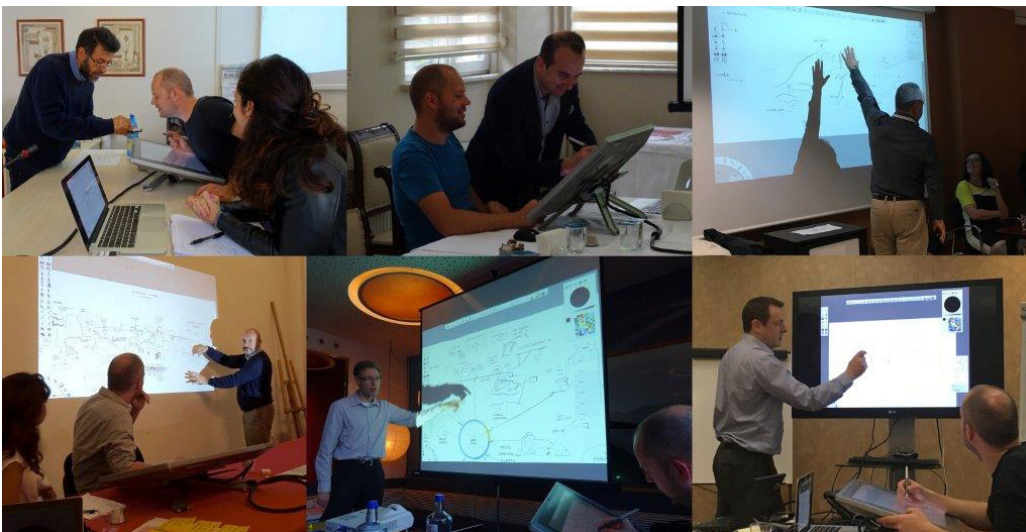
- Flexibility was built in to be able to speak to the policymakers. This proved to be the same in every city; it is difficult to make set appointments with mayors and aldermen. This resulted in separate interviews, during lunch breaks or at the end of the day. There proved to be a wide spread in the level of engagement at this early stage — some politicians expressed strong ambitions, others wanted to be more informed about the project.
- The timing of the workshops, especially when external stakeholders from companies or organisations were invited, was adapted to the (cultural) circumstances to ensure participation. For example, in Spain the afternoon workshops were scheduled towards the evening.
- Workshops, with brainstorming and teamwork, are a challenge in cultures that are not used to this way of working. For example, in the workshops in Istanbul we adapted the way of working because the participants spanned a range of hierarchical relationships, and we held parallel interviews with the main participants.
- Actively working with external parties was quite new for some cities (and their stakeholders). In this first round it turned out to be difficult to have a good balance between internal and external stakeholders.
- The tone of communications between municipalities and their stakeholders was new in some cases. The conventional way of talking to citizens was in public participation procedures and feedback rounds, where citizens criticise new plans and policies. For the citizens it was new to be asked to express their wishes and

dreams in advance; for the civil servants it was new to listen to these wishes without becoming defensive.

The second round of workshops was on vision development. The aim in this set of workshops was to agree on one visual — a future scenario for the city — based upon the input of all (internal and external) stakeholders. Again, this was done on the basis of a co-creative approach with local businesses, organisations and citizens to define the 'need'. The main experiences in this step were as follows.

- Many of the stakeholders of the first round of workshops participated again in this series, resulting in better understanding and more familiarity on the part of the participants with the process and the co-creative approach. The earlier experience also resulted in more confidence from the stakeholders (as well as the cities) in a good result.
- Again, the way of working — creating a future scenario and working in small teams — differed in the different cultures; there were striking differences in the way teams approached a task.
- In Turkey all teams instantly approached the task in a systematic manner: analysing the problem, generating ideas and presenting a full solution in the end. This resulted in a rich future scenario, understood in its challenges and solutions by all stakeholders present.
- In the Netherlands the culture of the Dutch consensus model resulted in a scenario where all options were included and no clear decisions were made, so as to keep options open.
- In Estonia the participants tended to apply a constructive dialogue, consequently adding

Figure 7: Jointly creating a visualisation of the desired future scenario (Forli, Istanbul, Murcia, Palermo, Sant Cugat and Newcastle)



ideas in a 'yes, and' manner. This eventually resulted in one of the most futuristic scenarios of all.

- Actively creating a visual together turned out to be very inspirational, across cultures. A visual is a good way to express ideas and to bring them together. In the workshops stakeholders actively participated with the visualiser and people laughed a lot during the workshops.

The third round of workshops was on the city-specific roadmaps, aiming for the definition of the first project initiatives towards the desired future scenario. Here, external stakeholders in particular were invited to add their ideas and thoughts to the process and bring in their expertise to start new projects. In this step the challenges are the following.

- After the difficulty of getting people to think into the future in the first two workshops, this time it turned out to be difficult to get them into the present again, specially to get them beyond defining aims and abstract goals and start defining activities and projects to realise the visions.
- Defining a new role for public-private cooperation: what to expect from future cooperation? One challenge is bridging cultural differences within the cities between the public, private and people partners in the local ecosystem. Typically, business people prove to be impatient when it comes to implementation. When they recognise the value of a project they would like to go straight into realisation, whereas people from the public administration are concerned about the processes and legislation requiring change before implementation is feasible.

A multi-level learning ecosystem

In the joint meetings between the different steps in the project the cities shared their city-specific results (ambitions, visions, roadmaps) and their experiences in the approach (way of working). This resulted in rich discussions and learnings. These included topics such as the following.

How to involve politicians in the project

All city representatives struggled with this issue. Councillors need to be involved, since they are in charge of the energy transition and made commitments. However, in their busy schedules with daily emerging issues, it is difficult to connect them to a project dealing with a more distant and less urgent future, such as R4E. Jointly it was decided to arrange an official moment in all cities at which politicians would sign an official statement, to also provide them with an opportunity to endorse the

vision for their city and overall project goals. Pictures of all these sessions were shared through the project website to create a community of supporting politicians.

How to involve external stakeholders in the project

The success rate of involving external stakeholders in the workshops differed greatly. In some cities over 35 participants joined the workshops, involving all relevant partners — companies, knowledge institutes, public partners and civic organisations. Other cities had difficulties in providing momentum for all parties concerned. In this aspect the cities helped each other. The Spanish partner, with a very high success rate, explained not only why and who he invited, but also shared experiences in how the invitation was written, how to implement a personal approach and relationship with the participants and how to keep them engaged during periods of project silence.

How to involve citizens in the project

Although less relevant for the stage the project was in, the cities also shared their experiences in citizens' participation. Tools and websites were exchanged and evaluated, with participants learning from each other's experiences.

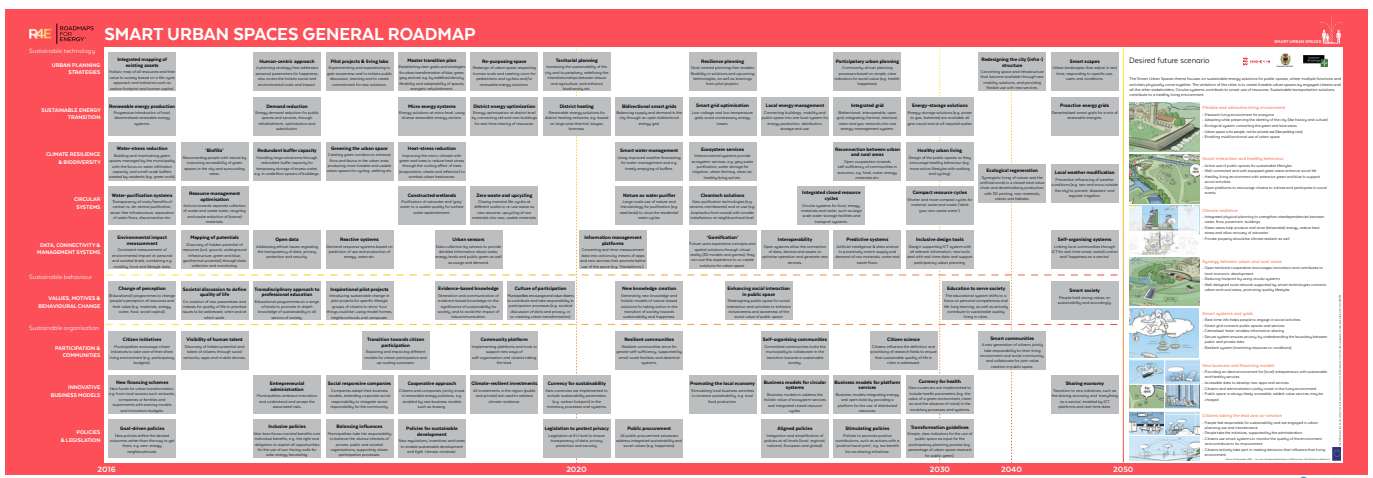
How to create joint learnings

Also, the content of the city results was shared between the cities, searching for common interests. After the creation of the vision the cities shared and analysed their needs in the three focus areas, resulting in the identification of common needs. These common needs describe a deeper, general understanding of the societal needs in the cities, as for instance in Figure 8 for smart urban spaces.

These common needs were the basis of the roadmap interviews, during which 25 experts were interviewed, looking for technological developments and solutions that contribute to the realisation of the societal needs.

The last step in the project is the project portfolio. This portfolio provides an overview of both individual and joint projects, including financial possibilities for joint initiatives. Although this phase is just beginning to take shape, confidence is high that this will lead to insights into joint initiatives and to a demand for platform solutions. This will enable the search for scalable solutions — solutions that share a common platform but are tailor-made to the context of implementation. When this happens the common knowledge of these cities will actually become a driver to become game changers for smart city innovation.

Figure 8: Common needs and general roadmap for smart urban spaces



Conclusion: bridging cultures as the key to success

In the R4E project we applied a vision and road-mapping approach to create energy roadmaps. This approach strongly depends on the open innovation 2.0 characteristics. The difference between ‘regular’ energy strategies and action plans and energy roadmaps is threefold.

Firstly, the much earlier and more developed engagement of local stakeholders. These include not only those who benefit from the strategy, such as citizens, but also relevant research and industry partners that offer a much clearer picture of the future potential of the city when it comes to measures and technologies selected, and of impossibilities when it comes to the situation of the city today.

An active focus on collective learning, both within each city and between the cities, creates a will and a platform to learn. Inclusive local workshops within the cities engage key stakeholders within the region and create a joint path towards the future of the city. Knowledge sharing between the cities creates a network of municipalities that understand the future possibilities and can position themselves in the movement.

Secondly, the method of backward planning, in which a joint desired future scenario for the city is a starting point for the creation of a well-developed path to get there. Local companies, entrepreneurs, knowledge institutes and citizens’ organisations are invited to co-create, and therefore become jointly responsible for decisions taken along the way. This creates insights into relevant activities and projects that will be relevant not

only in the short term but also in the long term, contributing to the energy transition at large.

Thirdly, a visual way of working is adopted in policymaking, enabling stakeholders to be included from different disciplines and knowledge levels to imagine the future possibilities and create a joint vision/visual to base decisions on, enabling ‘icons’ that they later can easily relate to. This provides a clear, jointly created and visual starting point for the creation of a well-developed path to get there. People can relate to it and define their own stake and role in its further development and implementation.

Municipalities can be the major game changers in smart city innovations if they are willing to take the lead in initiating new, co-creating policymaking processes. In the R4E project we experienced the same as in the Enigma project: cities have common societal needs on specific topics at a deeper level. Only in the application do they become more specific. This indicates that solutions such as open platforms are a sensible and sustainable way to meet these needs. It is then also of interest for companies that are seeking scalable solutions.

Cities are the key to safeguarding longer-term societal ambitions and public interests, and therefore to identifying societal needs. They cannot rely on industry alone to develop solutions, as this may result in commercial solutions that are not necessarily in line with societal needs within the city. Therefore, municipalities will need to drive innovations in the desired direction through the co-creation of roadmaps with the quadruple helix structure. This will ensure a shared vision and roadmap, enabling short-term decisions and actions with a

long-term perspective. The continuity of the roadmaps is ensured through the active involvement of different relevant stakeholders, thereby enabling sustainable businesses, financial models and plans to spur innovations to realise the shared vision.

In this the cities can support each other in strong consortia: in European cooperation the added value of working with each other, across cultural boundaries, enables understanding of the societal challenges that smart city development will bring in the future. Together it is easier to explore, to investigate and to better understand the forces behind the phenomenon, and to see how it can be addressed.

The city of Eindhoven is committed to bringing innovation in such open innovation smart city platforms to the next level. One of the initiatives currently being set up is a pan-European dynamic procurement system for an open 'plug-and-play' smart lighting platform, which will enable cities in to procure proven but tailored smart lighting solutions and will allow the continuous development and adoption of new applications and services.

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