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## Policy Briefs at the National Level : Deliverable 7.2 of the CASI project

Repo, Juha Petteri

Public Participation in Developing a Common Framework for Assessment and Management of Sustainable Innovation, CASI

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**CASI: Public Participation in Developing a Common Framework  
for Assessment and Management of Sustainable Innovation**

**THEME SIS.2013.1.2-1**

Mobilisation and Mutual Learning (MML) Action Plans: Mainstreaming Science in Society Actions in Research

# CASI

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## **POLICY BRIEFS AT THE NATIONAL LEVEL**

Deliverable 7.2, Task 7.2

Organisation responsible for the deliverable

University of Helsinki

*Petteri Repo & Kaisa Matschoss*

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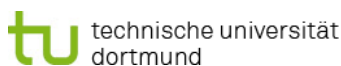
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## The CASI project

The CASI project (“**Public participation in Developing a Common Framework for Assessment and Management of Sustainable Innovation**”) aims to respond to one of the Grand Challenges set out in the Horizon 2020 programme of the European Union, namely “Climate action, environment resource efficiency and raw materials”. It represents an EU-wide cross-sectoral partnership on innovation-related challenges and considers not only the impacts of social and technological innovation, but also the types of actors involved and their inherent interests. It thus effectively integrates the perspectives of civil society, SMEs, industry, policy stakeholders, and leading academics.

CASI is based on the understanding of innovation as a key driver of societal progress in the age of technology and of imminent uncertainties about the future. Sustainable innovation, on the other hand, further enhances this understanding by introducing sustainability as a focal core of the innovation process and as an objective of innovation diffusion through social and market opportunities. At the same time, this is not an attempt to introduce yet another distinctive type of innovation. Rather, **CASI fosters a debate on conceptual dimensions, policy boundaries, and good practices combining innovative pursuits with sustainability objectives.**

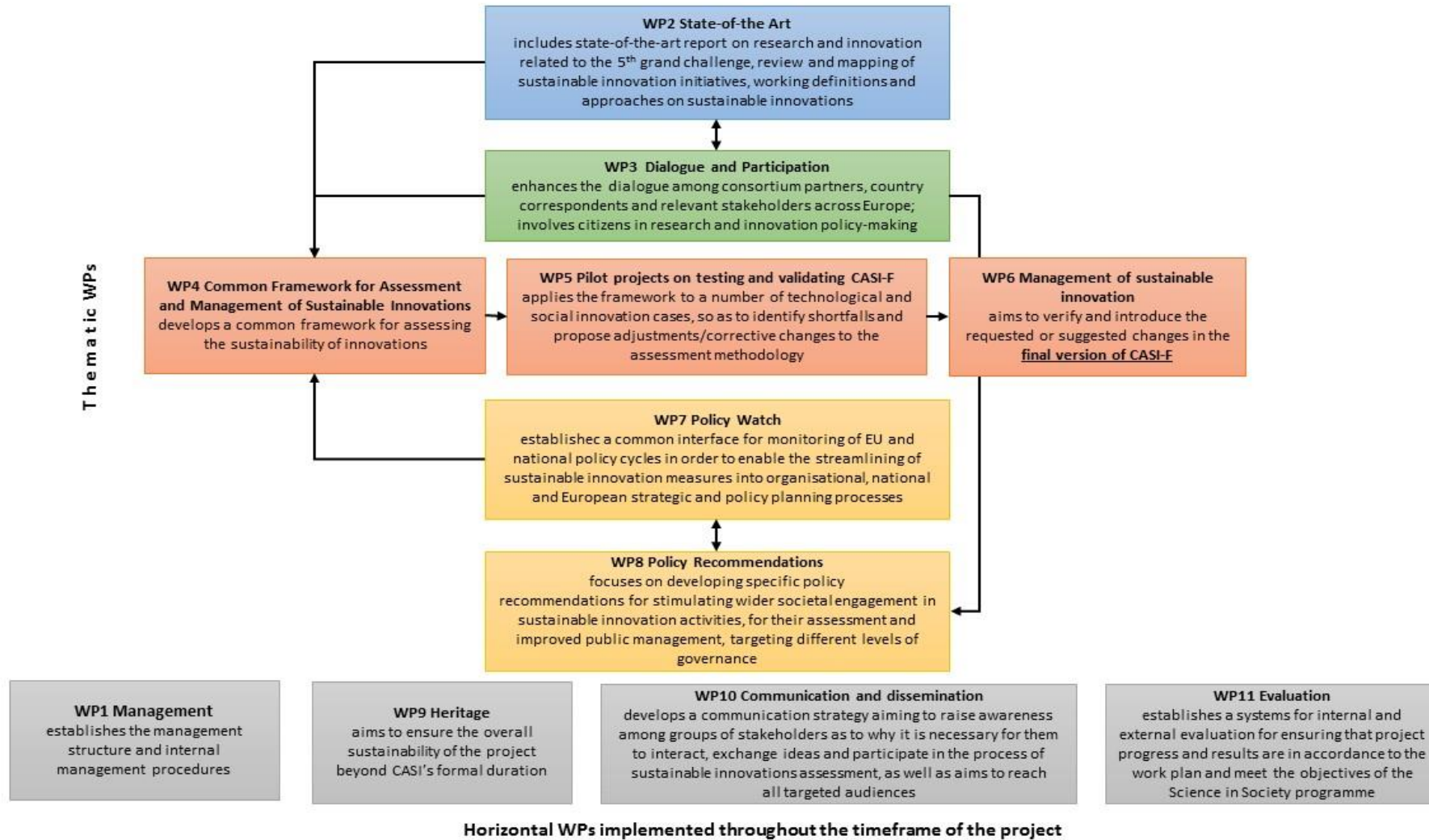
The collaboration of partners investigates the scope of sustainable innovation as a societal phenomenon and enables the elaboration of an **assessment and management framework of sustainable innovation practices**, based on a sound conceptual framework and a shared understanding of sustainability in innovation processes among stakeholders. CASI further **explores the impacts of innovative practices, as well as of specific technological and social innovations**, vis-à-vis the persisting challenges of climate change and resource depletion, and the societal effects thereof. Thus, it **makes a thorough inquiry into the balance between the social, economic and environmental impacts of innovations**, and **helps determine the scope and priorities for national and EU policy making.**

CASI is supported by the Science in Society Programme of FP7, Theme SiS.2013.1.2-1 “Mobilisation and Mutual Learning (MML) Action Plans: mainstreaming Science in Society actions in research”. It is coordinated by the Applied Research and Communications Fund (ARC Fund), a Bulgarian non-governmental policy and innovation research institute. The project’s consortium includes **19 partner organisations from 12 EU countries** and relies on an extended network of national experts in the remaining 16 countries not represented in the consortium to ensure coverage and inquiry in every EU member state.

CASI includes a rich and intensive set of activities carried out across the EU. The methodology of the project is structured into the following work packages:



## CASI – Organigramme of WPs



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# 1. Introduction

The specific objective of the CASI policy watch (Work package 7) is to establish a common interface for easy monitoring of and interchange with current EU and national policy cycles in order to enable the streamlining of sustainable innovation measures into organisational, national and European strategic and policy planning processes. In doing so, the CASI policy watch reviews EU's strategic priorities and relevant policies, identifies relevant EU and national policy debates, spurs new policy debates, builds awareness and connects the contributions of the CASI project with policy developments.

The key Policy Watch activity of monitoring policy developments across a number of countries has its academic tradition in comparative politics. Comparative politics provides Policy Watch with the comparative methodology (vs. experimental and statistical methodology) that includes the idea of reviewing a rather limited number of comparable cases (see Lijphart 1971; Wiarda & Skelley 2007) i.e. similar policies. Identifying and comparing key policies in the Member States of the European Union, in turn, provides insights in how far and in which ways Europe is policy-wise progressing to meet Societal Challenge 5 on climate action, environment, raw materials and resource efficiency.

Policy briefs form a key contribution in CASI Policy Watch (T7.1 and T7.2). During the project, CASI policy briefs progressed from identifying policy developments for CASI to providing CASI contributions to policy debates. Policy developments and initiatives relating to societal challenge 5 were first examined throughout Europe and findings connected to project activities in other CASI work packages. Examples of the latter included sustainable innovation initiatives (WP2), citizen-expert involvement (WP3) and the CASI-F framework (WPs 4-6). To achieve policy impact, the contributions from the policy briefs were used in project stakeholder events (T3.2, T8.1 and T10.7). WP7 and its policy briefs also supported WP8 (Policy recommendations) by providing policy contributions, WP9 (Heritage) as part of promoting CASI results and WP10 (Communication and dissemination) in project dissemination activities.

The policy briefs accomplished CASI impact and reached an estimated 28.000 downloads (5.000 at EU level and 23.000 at national level) by June 7<sup>th</sup> 2017<sup>1</sup>, which can be regarded a very high number considering the profound and contextual character of the briefs. WP7 has very much contributed to the two specific flags highlighted in the external CASI project review: 1) High visibility/media attractive project, and 2) Project with an impact on EU policies.

This CASI deliverable 7.2 first presents the issues examined and the process used in the national level policy briefs (for insights from the CASI EU level policy briefs, please review CASI deliverable D7.1). Key insights from the policy briefs are presented next, followed by a reflection of the further analytical contributions of the outcomes. Finally, a concluding discussion includes an assessment of the usability of the policy brief process in future endeavours.

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<sup>1</sup> These figures include the number of downloads of the first 13 EU-level policy briefs (5.147) and the first 6 sets of national level policy briefs (22.694). They exclude the number of downloads of the last EU-level policy brief and the last set of national level policy briefs from 12 countries as well as new downloads to earlier briefs.

## 2. Issues and process

Policy briefs played an integral role in the CASI policy watch and involved project partners in the 12 member states they represented as well as all CASI country correspondents in 16 additional member states. Policy briefs were published on an on-going base throughout the CASI project with European level policy briefs every 3 months, and national level policy briefs every 6 months. Altogether, 14 policy briefs addressed policy developments at the EU-level (D7.1) and the remaining 115 reviewed and compared national level policy developments in 7 issues as well as connected CASI contributions to them and to European level developments (the D7.2 at hand).



**Figure 1:** CASI partners and country correspondents delivering policy briefs

The two stage policy brief process developed in the CASI project involved approaching the policy issue first at a European level (T7.1), after which selected issues were further examined at the national level. Each national level policy brief included European level insights and national level analysis. This process increased the timeliness and relevance of the policy watch, integrated efforts and controlled production risks, albeit also required strict procedures and accurate timings due to the high level of interaction between project partners. For this purpose, an editorial board was set up to overview the accomplishment of the policy brief process.

There were two topics of national level policy briefs for every full project year. The following issues were addressed at the national level during the project:

1. *Smart Cities as Sustainable Innovation Actors* (European level in March 2014, national level in June 2014)
2. *The Eco-Innovation Action Plan in an Environmental Policy Context* (European level in June 2014, national level in December 2014)
3. *Europe 2020: Towards Growth and Resource Efficiency* (European level in December 2014, national level in June 2015)
4. *Crowdfunding in Sustainable Innovation* (European level in June 2015, national level in December 2015)
5. *Top-10 research priorities for sustainable futures* (European level in December 2015, national level in June 2016)
6. *Sustainable Innovation across Key Sectors and Societal Challenge 5* (European level in June 2016, national level in December 2016)
7. *Strengthening sustainable innovation policy with CASI tools* (national level June 2017)

The issues highlighted sustainable innovation and public participation while also taking institutional and environmental concerns into account. In addition to addressing the specified challenges, the briefs also complemented on themes relating to parallel and previous policies such as the Environmental Technologies Action Plan, the resource-efficient Europe initiative, and the Sustainable Development Strategy. The policy briefs focused closely to Societal Challenge 5 as defined in the Horizon 2020 framework programme for research and innovation: climate action, environment, resource efficiency and raw materials. In the first issue of national level policy briefs, particular focus was on climate action, resource efficiency and raw materials. Environmental challenges were introduced already in the second issue, and the fourth issue addressed the four challenges in a cross-cutting way. As the CASI project proceeded, all four challenges received increasing attention stemming from project activities such as sustainable innovation mapping, citizen and expert dialogues and CASI-F framework for management and assessment of sustainable innovation. The final issue of national level policy briefs connected tools developed in the CASI project for sustainable innovation to policy needs identified in stakeholder workshops in the member states of the 12 project partners.

**Table 1: Issues of the policy briefs related to SC5**

	<b>Societal challenge 5, focus</b>	<b>Public participation</b>	<b>Sustainable innovation</b>	<b>Number of countries</b>	<b>Publication date</b>
<i>Smart Cities as Sustainable Innovation Actors</i>	Climate action, resource efficiency, raw materials	Exists, insufficient	Driving force	12	June 2014
<i>The Eco-Innovation Action Plan in an Environmental Policy Context</i>	Climate action, environment, resource efficiency, raw materials	Essential for uptake	Bridges gap between innovation and market	20	December 2014
<i>Europe 2020: Towards Growth and Resource Efficiency</i>	Resource efficiency, climate action	Social impacts accounted, requires attention	Growth	23	June 2015
<i>Crowdfunding in Sustainable Innovation</i>	Climate action, environment, resource efficiency, raw materials	Base for crowdfunding	Emerging alternative	24	December 2015
<i>Top-10 research priorities for sustainable futures</i>	Resource efficiency, climate action, environment, raw materials	CASI provided participation	CASI provided priorities	12	June 2016
<i>Sustainable Innovation across Key Sectors and Societal Challenge 5</i>	Resource efficiency, climate action, environment, raw materials	Varying levels participation in case data	CASI provided data on the state of the art	12	December 2016
<i>Strengthening sustainable innovation policy with CASI tools</i>	Resource efficiency, climate action, environment, raw materials	CASI provided participation	CASI developed tools for the support of SI	12	June 2017

Policy developments were reviewed from the perspectives of public participation and sustainable innovation, which in turn were divided to environmental, economic and social types of sustainable innovation. All policy briefs were based on original work and the reviews and comparisons they provided were of timely interest.

### 3. Key insights from national level policy briefs

The following sections describe key insights from the 7 issues of CASI national level policy briefs. The description builds on the executive summaries and recommendations of the issues. The authors gratefully acknowledge the contribution of Anita Tregner-Mlinaric (META Group) in the framing of the issues. All these 7 issues of national level policy briefs can be found on the CASI web site ([www.casi2020.eu](http://www.casi2020.eu)).

#### 3.1. Issue 1: Smart Cities as Sustainable Innovation Actors

Cities have been recognized to be important economic actors. They can contribute to initiatives and long-term projects that build new innovation ecosystems, which in turn can open new opportunities and perspectives. The smart city concept is particularly promising in this respect. It promises competitiveness and economic growth through highly educated talent, high-tech industries and pervasive electronic connections. Creating conditions for continuous learning and innovation is a prerequisite for achieving smart cities. In order for European countries to be able to achieve Europe 2020 targets of employment, innovation, climate change, energy and poverty, progress in smart cities would be very desirable.

Smart city projects support growth and city development by applying information and communication technologies as well as involving public and private stakeholders. Due to the growing importance of smart cities, perspectives were on sustainable innovation and public participation. These are key objectives of the CASI project, which aims at developing a common framework for assessment and management of sustainable innovation and considers public participation in doing so.

Smart cities contribute to innovation that address the Horizon 2020 grand challenge “Climate action, resource efficiency and raw materials”. They connect to European and national policy debates and outputs within the framework of sustainable innovation and have impacts also at national and regional levels.

A review of the identified smart-city policies in the studied 12 European countries revealed three dimensions of sustainability emerge in smart city policy actions: ecological, economical and/or technological and social sustainability (Kaarakainen et al. 2014). Selected policy actions were mostly related to 1) ICT and ICT related issues; 2) energy issues; 3) intelligent transport and 4) society and social structures and services. For instance, “Smart City Wien” focuses on ecological dimension (reduction of GHG emissions), “City Deals” in the UK focuses on economic/technological dimension (through boosting local economies) and the “Poznan Citizen’s Budget” addresses the social sustainability dimension.

Smart city policy actions take place at local, regional and national levels. Most actions can be seen to target incremental change in mainstream policies, while some promote more radical or far reaching targets (such as Leuven (Belgium) “Klimaatneutral” aiming for climate neutrality and “MOBI.E” supporting the introduction of electric vehicles in Portugal).

In relation to aspects such as ecological sustainability and public participation that are a main focus of the CASI project, it is observed that in most countries the smart city policy actions focus more on economic/technological or social dimensions than ecological sustainability, and in only few countries the main focus of selected smart city policies’ is on ecological sustainability.

Regarding public participation, it can be considered one-way communication in the form of information disseminated from policy makers to the public, while more active public engagement would require two-way or multi-way interactions. In most of the selected policies, public participation is primarily directed one way

and can be considered to target incremental, conservative or mainstream engagement. In a minority of cases, public participation is conducted as an active dialogue between the policy action and the public.

There are, however, also innovative and ecologically sustainable smart city policies in the monitored European countries. Active smart policies should consider ecology as the core of sustainability and include two-way citizen participation. Furthermore, communication with all stakeholders is crucial for a successful implementation of an ecologically sustainable policy action.

The assessment of smart city policies was conducted from and for the following countries: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Italy, Poland, Portugal, Slovenia and United Kingdom.

### 3.2. Issue 2: The Eco-Innovation Action Plan in an Environmental Policy Context

The Eco-innovation Action Plan (EcoAP) is a key environmental policy of the European Commission (EC 2014a). It applies to industry and technology, thus proactively highlighting activities rather than ecological ends considering e.g. air, land use and water. Thus, the EcoAP differs from other environmental policies as it addresses innovation directly, boosting innovation and bridging the gap between innovation and the market. The Europe 2020 strategy, in turn, aims at achieving a resource-efficient and low-carbon economy setting the focus at smart, sustainable and inclusive growth (EC 2014b). The EcoAP, in support of the 2020 Flagship initiatives, such as “Resource-efficient Europe”, “Industrial policy for a globalised era”, “Agenda for new skills and jobs” and “Innovation Union”, aim at expanding the focus of innovation policies towards green technologies and eco-innovation and overcoming the gap between innovation and the market for the purpose of accelerating its uptake.

The EC and the Member States coordinate national and EU policies on eco-innovation for which a range of useful tools are available, e.g. Eco-innovation National Roadmaps and eco-innovation Scoreboard that gathers data on eco-innovation performance across the EU and beyond, thus helping to monitor and evaluate progress made by 2020. In addition, the European Innovation Partnerships aims to bring together public and private actors in key sectors where eco-innovation could contribute to greater resource efficiency. Such partnerships are being set up for raw materials, sustainable agriculture, and water.

A review of the identified eco-innovation policies in the monitored 20 European countries reveals similarities in geographical and strategic scopes (Matschoss et al. 2014). Eco-innovation policies typically address issues at national level rather than at regional or local levels. This is quite understandable, as national systems have been recognized to be important for the development of innovations (Lundvall 1992). Furthermore, national innovation systems represent an adequate way to support desired development of technological and economic activity without distorting markets. Sustainable innovation (SI) priorities related to climate action, environment, resource efficiency and raw materials are not specifically targeted within the national policy initiatives. Instead, policies address sustainable innovation across these priorities and provide instruments to fulfil their targets.

Funding instruments appear a common policy instrument in the studied European countries. Sustainable innovation is then realised through these instruments. If European countries were to address specific and detailed SI priorities, integrating more explicit SI targets in the funding instruments would be useful. Current funding instruments highlight the role of companies and the creation of innovations where eco-innovation is then seen to promote growth and competitiveness. However, funding instruments seem to put less emphasis on the use or adoption of eco-innovation. For large-scale adoption of eco-innovation, demand-side



instruments (such as public procurement of innovation (PPI)) could complement supply-side instruments (such as innovation support). Currently, eco-innovation policies rely on market actors and activities to realise the diffusion of eco-innovations (cf. Rogers 1995).

The policy initiatives recognized as relevant and representative in the CASI project's policy briefs provides a diverse picture of eco-innovation related policies in different countries. National policies often cover a wide spectrum of sustainability and environmental issues. In some countries, there is a clear tendency to focus on initiatives targeting resource efficiency and raw materials especially in the form of reuse and recycling. Furthermore, green technologies (such as energy efficiency technologies or increased use of ICT) are often in focus of policy support. Although not usually directly addressed under the eco-innovation policies, climate action is often taken into account in national policy initiatives through support on energy efficiency initiatives and cleaner production technologies that aim at greenhouse gas emission reduction.

The fact that the eco-innovation policies in the studied European countries do not generally fall directly under the Grand Challenges confirms the notion that the eco-innovation forms a special category under the policies related to environment. The focus in eco-innovation policy is to build economic growth, enhance national and global competitiveness, and increase employment while emphasising the ecological sustainability aspects, whereas environmental policies, typically, focus more on reducing the adverse effects of these activities within specific fields, showcasing that CASI concerns with sustainable innovation policy developments are highly relevant.

Eco-innovation policy initiatives throughout Europe showcase a low level of public participation. The methods of embracing the public into eco-innovation policies are conventional and not particularly novel or innovative, which means that public participation remains at similar levels as in other types of innovation policies. In addition, these initiatives aim to engage mainly business actors and stakeholders rather than general public and lay people, meaning that the policy initiatives reviewed here usually consider the general public rather as a target group instead of seeing it as an actor. Similarly, the common approach appears to be involving the public through representation (such as representatives of interest parties like housing associations etc.) rather than directly, each calling for distinct measures when developing sustainable innovations.

The assessment of Eco-Innovation Action Plan in an environmental policy context was conducted from and for the following countries: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Italy, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovenia, Spain, Sweden and United Kingdom.

### 3.3. Issue 3: Europe 2020: Towards Growth and Resource Efficiency

The Europe 2020 strategy addresses smart, sustainable and inclusive growth. It accounts for the 28 European Union Member States and is important for candidate and potential candidate countries as well, contributing to a European perspective on growth. However, the European Union and its Member States are struggling economically. Europe has great economic potential, but faces growing competition as the global economy is recovering. Internally, Europe faces challenges concerning unemployment, population age structure, education and poverty. Apart from these important societal challenges, investments in R&D and innovation are also being challenged and being viewed as expenses rather than economy boosters and job preservers.

Moreover, pressures on using of natural resources are increasing. These resources include raw materials such as fuels, minerals and metals but also food, soil, water, air, biomass and ecosystems. If current trends continue, the global population is expected to have grown by 30% to around 9 billion by 2050, and people in developing and emerging economies will legitimately aspire to the welfare and consumption levels of developed countries. Using natural resources efficiently is, therefore, a key to sustainable growth.

The European Commission introduced the Europe 2020 strategy as response to the above challenges. The 23 national level policy briefs address the main objectives of the 2020 strategy by putting an emphasis on the flagship initiative on Resource efficient Europe by looking at national policy developments especially related to CO<sub>2</sub>, energy security and resource efficiency. The slow growth of the European economy sets the background for sustainable innovation and public participation in it in Europe. Sustainability, however, transcends economic cycles, which becomes evident in how differently challenges relating to CO<sub>2</sub> emission reductions, energy security and resource intensity have been responded to in the studied 20 European countries.

The national level policy briefs related to CO<sub>2</sub> emission reduction policies show that three levels of CO<sub>2</sub> policies emerge in the examples: strategic, programmatic and operational. In many countries, reductions in CO<sub>2</sub> emissions are still being discussed in terms of national strategies, i.e. approaches to address reductions in emissions. In several countries, these discussions have led to programmatic policies such as financial institutions, funding arrangements and incentives designed to reduce emissions. There are, furthermore, operational activities especially in the field of transport, which fulfil the strategies and programmes. While all three levels of CO<sub>2</sub>-policies in the studied countries reflect varying degrees of maturity, it appears that public participation appears of low priority in them.

Energy security is more systemically embedded in terms of sustainability and public participation. Energy security policies distinguished in the studied countries were very often interlinked to other energy policy targets such as energy efficiency, resource intensity and clean energy production. In many cases, energy security per se was most readily recognizable in operational activities such as terminals and energy reserves providing diversification of fuel sources. Public participation in energy security operations often takes place through representative democratic procedure and is combined with public acceptance or lack thereof.

Resource intensity currently draws business attention in the studied policies of the selected countries. Market based policy tools such as joint purchases and offerings are prevalent in the cases. Waste management is seen as a provider of resources in the spirit of circular economy. Energy and building efficiency are also considered of interest. In these contexts, public participation takes form through activities of consumers and citizens.

Accordingly, studied policies relating to flagship initiative on resource efficient Europe provide a multifaceted view on current responses to how challenges are met in European countries. Policies in studied countries on CO<sub>2</sub> emission reductions, energy security and resource intensity form three distinct approaches. CO<sub>2</sub> emission reductions are addressed on strategic, programmatic and operational levels, depending on maturity of policy context. Energy security, in turn, is interlinked to a variety of parallel policy targets. Market related policy instruments appear more frequent concerning resource intensity, in contrast. Public participation also comes forth in different ways in the three policy domains.

The assessment of Europe 2020: towards growth and resource efficiency was conducted from and for the following countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland,

Germany, Greece, Hungary, Ireland, Italy, Latvia, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

### 3.4. Issue 4: Crowdfunding in Sustainable Innovation

The take up of innovative services and products has contributed to creative thinking also in new sources of financing. Innovation processes are characterised by constant development, and it is beneficial if models of financing can be aligned to that. Crowdfunding, i.e. collecting finance from publics, has emerged as a new alternative also in the field of sustainable innovation. Crowdfunding is particularly interesting for Small and Medium size companies (SME's) looking for financing when their product or service is not considered quite ready for traditional investments. Crowdfunding may respond to SME's needs in the absence of bank finance, venture capital or initial public offerings (IPO). Crowdfunding could contribute to bridging the finance gap for small firms and innovative projects, provide better access to finance for small businesses and promote entrepreneurship towards growth and job creation.

Crowdfunding is a large and rapidly growing business, with a volume of 16.2b\$ in 2014 which is estimated to double to 34.4b\$ in 2015 (Massolution 2015). Investments in Europe are estimated at 945 m€ across hundreds of platforms. Prevalent practices in crowdfunding and popular crowdfunding sites with programmes for sustainable innovation (cf. Crowdfunding.com 2015) provide alternatives to Commission funding schemes such as COSME (planned budget of 2.3b€ for 2014-2020) and Horizon 2020's SME instrument (about 3 b€ for 2014-2020).

This set of policy briefs looks at how crowdfunding relates to sustainable innovation. It introduces crowdfunding as an activity, discusses it in relation to sustainable innovation and looks at the development of crowdfunding in 25 European countries. This policy brief looks at crowdfunding from several levels: strategic, programmatic and operational case level.

Crowdfunding is prevalent in Europe at strategic, programmatic and operational policy levels. Strategic policy lags behind business operations. Crowdfunding in Europe is discussed based on relevant and representative policies and cases collected by CASI partners and country correspondents.

Crowdfunding has attracted strategic policy attention in a number of European countries. Attention has been paid to which acts cover the topic of crowdfunding, but crowdfunding, nevertheless, does not have a key position on all national policy agendas. Finland adopted the first crowdfunding act in Europe in 2016. Other strategic activities relating to crowdfunding include promoting acts on alternative financing (Austria), decree with associated labelling (France), classifying crowdfunding as collaborative funding (Portugal), and public consultation on forthcoming regulation (UK).

There are crowdfunding platforms widely across Europe. This indicates that there is growth potential for crowdfunding on European, national and local markets. The platforms described in the policy briefs have established connections to sustainable innovation. The reviewed cases include platforms specialised in sustainability (such as Green rocket in Austria, Green Hero in Bulgaria, Wised and MiiMOSA in France, ECOCROWD in Germany, Abundance Generation in UK), while most platforms are of general nature that are being used also for sustainable innovation projects.

Collected sustainable innovation cases showcase that crowdfunding has potential across a wide range of sustainable innovation. Examples of projects using crowdfunding range from renewable energy solutions

such as solar energy and wind power technology to industrial services in terms of waste and mobility, consumer products as packaging and designer clothing, as well as sustainable aquaculture, botanical garden and window gardening.

The assessment of crowdfunding in sustainable innovation was conducted from and for the following countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and United Kingdom.

### 3.5. Issue 5: Top-10 Research Priorities for Sustainable Futures

The sustainability of futures is closely connected to the change of lifestyles and everyday patterns of individuals and their approaches towards food and consumption, mobility and transport, housing, education, health and recreation with strong connections to communities and interpersonal relationships. Lifestyles also relate to cultural heritage as well as natural and economic environment. Hence, sustainability is also determined by the surrounding environment, not only personal needs.

At the same time, the pursuit of economic growth may take place at the cost of use of natural resources, which results in detrimental environmental impacts. Thereby, the state of the environment, the quality of life and well-being correspond to economic growth, profits and consumption, and call for sustainable business models and the green economy. A shift to sustainable business models can be achieved by optimising the efficiency and improvement of practices relating to health and well-being, by minimising negative social and environmental impacts, and by developing new markets for sustainable products and services in response to emerging global megatrends. New technologies and innovations also enable solving societal challenges.

This issue of national level policy briefs presents and reviews Top-10 lists of sustainable research priorities for Europe created in the CASI project. In order to address needs that have impacts on the sustainability of the future, the CASI project conducted a comprehensive citizen and expert engagement exercise, which involved 184 citizens in 12 European Member States. First, citizens drafted visions of sustainable and desirable futures, which experts then formulated into research priorities. Finally, citizens assessed and validated these priorities. The overall procedure as well as the Top-10 scoring procedure are described in greater detail in three CASI reports which are available at [www.casi2020.eu](http://www.casi2020.eu) (Matschoss et al. 2015 on Top-10 research priorities, Repo et al. 2015 on expert formulation of research priorities, and Kaarakainen et al. 2015 on citizen visions). This policy brief issue reviews those Top-10 lists against policy developments in Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Italy, Poland, Portugal, Slovenia and United Kingdom.

### 3.6. Issue 6: Sustainable Innovation across Key Sectors and Societal Challenge 5

Opportunities for industrial sectors to renew themselves are largely provided by sustainable innovations. The starting point of the sixth issue of national level policy briefs is in the recognition that European Union (EU) targets growth based on smart, sustainable and inclusive economies, which can be promoted through profound changes in the European economic sectors.

The CASI project's key contribution to Societal Challenge 5 on climate action, environment, resource efficiency and raw materials has been to develop a methodological framework for the assessment and management of sustainable innovation (SI). As one of the components of the framework, CASI presents a wide selection of European SI initiatives in an online repository named CASIPEDIA, which covers sustainable innovation initiatives from each of the EU-28 countries and altogether presents in detail over 200 SI cases ([www.casi2020.eu/casipedia](http://www.casi2020.eu/casipedia)).

This issue of national level policy briefs looks at the sectoral relevance of the SI initiatives collected in the CASIPEDIA against the Societal Challenge of climate action, environment, resource efficiency and raw materials. A statistical analysis was used to identify differences in how SI initiatives in key European sectors relate to the topics of Societal Challenge 5. The policy brief discusses how key policy developments are related to SI and connects the sectoral analysis on SC5 with policy developments at the national level.

The national level policy briefs thereby contribute to a joint European analysis of sustainable innovation initiatives, showcase the sectoral relevance of the SI initiatives in each country, and connect the sectoral analysis on SC5 with national policy developments to provide input to strategic and programmatic policy agenda settings. Doing so, the national level policy briefs provide insights on how SI could address national Societal Challenge 5 topics based on a European analysis of SI initiatives across key sectors. The briefs discuss policy developments at the national level and provide recommendations for the future development of SI initiatives and their support in Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Italy, Poland, Portugal, Slovenia and United Kingdom.

### 3.7. Issue 7: Strengthening Sustainable Innovation Policy with CASI Tools

Sustainable innovation forms a basis for the new solutions of and opportunities for the future, although it has not yet achieved an established programmatic policy position. The CASI project has developed a set of tools to strengthen the development and implementation of sustainable innovation policy. This issue of national level policy briefs reviews and showcases how these SI tools can be used when strengthening sustainable innovation policy.

Four CASI tools for sustainable innovation policy were addressed in the national level policy briefs:

1. The CASIPEDIA bank provides a state of the art of 500 mapped sustainable innovation initiatives
2. Citizen engagement methodology developed for sustainable innovation
3. Citizen agendas for sustainable innovation, which challenges expert agendas
4. The CASI-F common framework for assessment and management of sustainable innovation.

These policy briefs showcase how the policy tools developed in the CASI project can be applied when developing sustainable innovation policy. They connect CASI tools to national level policy needs identified in 12 CASI partner countries and thereby showcase how CASI tools can strengthen policy on sustainable innovation. The policy needs were identified in parallel CASI project activities, which engaged policy makers

and stakeholders in national-level events to foster dialogue on a wider societal engagement in sustainable innovation. Specific policy needs in sustainable innovation were identified and formulated in these events, and the policy briefs assess how the tools correspond to the needs to usability (strategic, very useful, applicable). The national level policy briefs are from CASI partner countries: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Italy, Poland, Portugal, Slovenia and United Kingdom.

## **4. Reflections on the further analytical contributions of policy briefs**

In addition to providing topical key insights, the national level CASI policy briefs also constitute interesting research material in their own right. This section reflects on the contributions of two analytical explorations which both provide new insights and showcase the use of a larger set of policy briefs in development work and in future endeavors.

Section 4.1 assesses what kinds of insights policy recommendations in national level policy briefs deliver when applied to an analytical framework. In particular, it reflects on the results from piloting policy brief recommendations to the CASI-F framework on assessment and management of sustainable innovation, which was developed in the CASI project. The second section, in turn, summarizes results from a topic modelling analysis of the recommendations of national level policy brief issues 1-6, and reflects on learnings for future endeavors in policy making and monitoring. The first analysis was published in full length in the second CASI annual policy report (Repo et al. 2016) whereas the second analysis in the third report (Matschoss & Repo 2017).

### **4.1. Assessing national sustainable innovation policies with the CASI framework**

The CASI project has developed an extensive procedure – a Policy Watch – to follow up on policy developments across a large number of European countries. Alongside, the CASI project has developed a framework for assessment and management of sustainable innovation – the CASI-F. This chapter reviews if and how the CASI framework (CASI-F) could assist in policy watch activities by piloting the application of the CASI framework in an analysis of policy developments using data from a set of policy briefs that reviewed the European Union's Europe 2020 strategy from the perspective of resource efficiency. Piloting the CASI-F provides an opportunity to consider utilization of its concept for diverse kinds of evidence based policy analysis.

The piloting data consists of policy recommendations for 23 European countries relating to the EUROPE 2020 strategy, which was the topic of the fourth CASI national level policy briefs. These recommendations are re-analysed with the CASI-F approach. The recommendations have been analytically developed by CASI partners and country correspondents for their respective countries and are based on comparative analyses of national, transnational, and European policy developments. The recommendations address policy makers at the national level, and a comparison of the recommendations provides a look at how the EUROPE 2020 strategy could progress in the near future.

The Policy Watch provides a solid set of actionable data (i.e. policy recommendations), which can be structured in accordance to CASI-F. The examined policy recommendations are not descriptions of policy developments, but instead represent CASI project partner and country correspondent assessments of how to foster, improve or challenge existing policies. Accordingly, they represent responses to key observations

in the policy field rather than attempt to present a thorough description of all activities in that field. The recommendations are prescriptive or normative by character rather than descriptive or interpretive.

The national level Policy Watch process considered the European Union's Europe 2020 strategy from the perspective of resource efficiency in 23 Member States. Varying developments in CO<sub>2</sub> policies were explained at strategic, programme and operational levels. For the analysis presented here, the full policy recommendations were first placed in the CASI framework tables by authors at the University of Helsinki, after which the other authors reviewed the placings of the recommendations concerning their validity and, when necessary, suggested changes. Altogether, 96 policy recommendations in 23 national policy briefs were analysed, with an average of 4 recommendations per brief. The briefs include 34 strategic, 50 programme, and 12 operational recommendations. A majority of the recommendations has, accordingly, focused on the programme level (52% of all recommendations).

Furthermore, the majority of the recommendations for policy makers in the national *policy briefs at the strategic level* focused on the governmental sector (56%), some at the business (15%) and civil society (21%) sectors, and only a few on research and education (9%). Also *at the programme level*, most recommendations focused on the governmental sector (44%). Nevertheless, there were quite a few recommendations also for the business sector (32%). *At the operational level*, most of recommendations focused on the business sector (50%). Equal shares (25%) of recommendations focused on governmental and civil society sectors.

The recommendations at the *strategic level* targeting the governmental sector focus on creation of strategies on long-term policy developments that target especially energy supply and low-carbon strategies, but also on governance approaches to an efficient use of resources. The recommendations call for the implementation, integration and co-ordination of national strategies related to climate change, resource efficiency and energy supply. The need for policies for a sustainable transport sector is also emphasised in several recommendations with calls for less traffic and long-term strategies for fossil free transportation relating especially to CO<sub>2</sub> reduction target of the Europe 2020 strategy. When the topic of resource efficiency emerges separately from other Europe 2020 topics (such as CO<sub>2</sub> reduction or energy security), the focus is on legislation and better resource efficiency.

In recommendations for the business sector, energy issues emerge as a key topic. Especially a need for a long-term commitment for the support of renewable energy as well as sufficient electricity and energy supply is highlighted, which also target CO<sub>2</sub> emission reduction objective of the Europe 2020 strategy. All recommendations focusing at the civil society concern the engagement of a wide range of stakeholders and the public in the strategy developments and their implementation, but without specifying topics or industrial sectors. In research and education, strategic recommendations deal with long-term vision development and policy-relevant research.

Also at the *programme level*, the topics are diverse but perhaps unsurprisingly repeat the topics emerging at the strategic level as these are in the core of Europe 2020 strategy and showcase similarities across countries. For the governmental sector, energy is the most significantly targeted topic relating to the CO<sub>2</sub> emission reduction, followed distantly by waste and innovation that concern more the resource intensity aspect of the strategy. The recommendations call for an efficient implementation of existing strategies, which forms the major difference between these recommendations and those at the strategic level. At the programme level, the recommendations focus on following the implementation of strategies, while at the strategic level, the focus was on their design. In addition, also stronger connection between strategic orientation and implementation of strategies is called for. Related to renewable energy sources (RES), the recommendations

include suggestions to promote investor confidence by stabilising the regulatory framework of private investments in RES, including also fiscal support and market-based incentive programmes. In innovation focused recommendations, a more innovative approach for resource use was emphasised. Concerning waste, on the other hand, more holistic waste management policies, incentives and public-scale programmes as well as informational initiatives, were highlighted. Recycling and reuse were seen as good objectives. Other topics at the governmental level include water and traffic.

For the business sector, most recommendations relate to implementing different kinds of support schemes and instruments that target investments in clean energy production and energy efficiency relating to the CO<sub>2</sub> emission reduction target of the EUROPE 2020 strategy. Supporting the development of public-private partnership and providing financial incentives and subsidies to increase public and businesses participation in sustainability efforts also emerge in the recommendations. The recommendations basically encourage investments in secure, low-carbon electricity and improve the security of energy supply. In recommendations that relate to the civil society, there is a call for an increased engagement of citizens and local businesses as co-developers of the thematic programmes and strategies, in general, and in material and waste management through the application of participatory methods in particular. The recommendations reflect the need for more public participation and suggestions for the provision of opportunities and tools for public participation. In research and education, the recommendations suggest a strengthening of the development of human resources, skills and R&D and innovation capacities and educating the work force suitably to facilitate a transition towards an inclusive low-carbon economy. Support for activities that increase general awareness of the topic is suggested as well as further investments in research, development and education.

For the business sector at the *operational level*, the recommendations are typically concrete and context related. The recommendations call for tools to support the public and companies in their choices. There is also a call for funding measures and instruments to support the development of technical improvements in material management, and development of business models for the integration of efficiency targets. In addition, support for projects with public-private partnerships is recommended. The few recommendations for the governmental sector include the promotion of market related policy tools to provide clean-tech innovations and participation, the development of new financing models that realise a socially balanced and intergenerational approach to avoid energy poverty, and the introduction of national monitoring system of climate actions and waste management. For the civil society at the operational level, the few recommendations include more political support for the creation of energy efficiency networks and the creation of better measures to have the general public involved in an efficient use of natural resources. In addition, citizens' fears of decreasing air quality, transport intensity, and quality of life in general should be addressed early in planning processes via public participation.

Interestingly, the CASI framework (CASI-F) helps to identify a recurring pattern across policy levels and stakeholder types in the policy recommendations. The role of governmental stakeholders is highlighted in strategic concerns while business stakeholders are seen as important players in the implementation of sustainable innovation policies. Civil society stakeholders, in turn, are called for when there are needs to involve the general public. Research and education are on their part seen to improve knowledge base of sustainable innovation both in terms of creating new knowledge as in sharing it. This recurring pattern can be considered conservative, albeit government centred, in that it repeats established stakeholder typologies and stereotypes. Accordingly, it can be argued that the studied CASI policy recommendations support incremental and constructive rather than radical or disruptive sustainable innovations in the realm of the Europe 2020 strategy and resource efficiency.



The examined policy recommendations, especially those at programme and operational levels, include actions that have been identified imperative to be carried out by a particular stakeholder or group of stakeholders. Those actions also represent expectations towards stakeholders in sustainable innovation management. Indeed, local, national and regional authorities, non-governmental organizations, citizens groups, private businesses, industry organizations, interest groups or even independent individuals can all take up important roles in sustainable innovation management (Kemp et al. 1998).

Piloting the CASI framework (CASI-F) with policy recommendations provided in CASI policy briefs, offers an opportunity to look for novel insights as well as to reflect on the established Policy Watch process. In particular, CASI-F provides added value to established CASI Policy Watch activities by drawing attention to stakeholders and by providing opportunities for procedural reflection. In particular, mapping policies, assessing their outcomes, and providing advice forms a coherent process which can well be applied in policy watch activities. Thematically, applying CASI-F on policy recommendations does not provide novel insights. This can be considered a reasonable outcome, as policy recommendations are expected to relate to the themes that they emerge from. Perhaps surprisingly though, the three core topics of the Europe 2020 - strategy in the national level policy briefs (CO2 emission reductions, energy security and resource intensity), have a downplayed role in the policy recommendations. This might showcase that European and national policy targets need to be translated to fit other political contexts and stakeholder settings (see Clarke et al. 2015).

Applying CASI-F in policy watch activities has two major benefits. Firstly, it provides a useful tool for analysing and reflecting the outcomes of a policy watch. Secondly, and as a logical outcome of the first benefit, CASI-F provides an opportunity for identifying gaps, which merit additional reflection and analysis. This is due to the balanced design of CASI-F, which make any imbalances between stakeholders and policy levels easily recognizable. The piloting of CASI-F showed also that using the framework could prompt a more balanced yet a conservative, set of recommendations on different stakeholder types. It can be seen that the application of CASI-F would guide additional attention to the different levels of policies and kinds of stakeholders. The added value of CASI-F in policy analysis would be in a more systematic reflection of outcomes and in an identification of emerging issues.

The piloting has shown that CASI-F can be applied to the assessment and management of policy initiatives. In particular, CASI-F is useful for detecting imbalances between the stakeholders targeted in policy recommendations or between levels of policy. CASI-F can thus be used to review policy fields that are already balanced, or when aiming to identify gaps in policy implementation across policy levels or stakeholder types.

In conclusion, the CASI-F framework provides a useful tool for observing policy recommendations according to policy level (strategic, programme and operational) and to stakeholder group, which has been piloted above. The European analysis stemming from the policy briefs and their relationship to the Europe 2020 strategy provided a content comparison of policy initiatives to which the recommendations piloted here all relate. The piloting in this section also shows that the CASI framework does not provide tools for conducting content related conclusions across countries as its aim is not to aggregate across topics nor to provide opportunities for country comparisons. Nevertheless, the lacking feature of contentwise comparison should not be seen as a deficiency of the framework. Rather, it should be seen as a further opportunity to use the CASI-F framework as one tool among a set of complementary policy analysis tools.

## 4.2. Sustainable innovation policy: focus on issues alongside challenges

Societal challenge 5 (SC5) of the European Union's research and innovation programme Horizon 2020 focuses on climate action, environment, resource efficiency and raw materials (EC 2017). These four sustainability sub-challenges both define SC5 and reflect how they are to be addressed in the growth strategy of the EC, Europe 2020. Yet, this definition is incomplete in the sense that the differences and overlaps between these four sub-challenges themes are not defined very clearly. The description of the SC5 does not make it clear whether the sub-challenges should be seen as independent domains (i.e. issues) or if focus should be in cross-linkages, which should be accounted for. As the sub-challenges are used to coordinate and allocate European research and innovation funding, this question is accordingly of key importance for future research and innovation policy. Policies can be of general scope or specific and targeted, and this section reviews the scope of policies relating to sustainable innovation and SC5.

Policy watch activities in the CASI project allow to tackle the question of independence and cross-linkages of the sub-challenges. When monitoring debates in policies relating to SC5 and sustainable innovation in 12 project partner and 16 country correspondent countries, the project provides a unique opportunity to review this question from a policy perspective as a key contribution of the policy watch has been to produce and disseminate 103 national level policy briefs on selected topics during the first three years of the project. The briefs all address SC5 from the point of view of innovation that is sustainable, and each of them relates to three or four of its sub-challenges meaning that they are cross-cutting and suggesting that the recommendations of the different issues of the policy briefs could also include cross-cutting topics that relate to climate action, resource efficiency, raw materials or the environment. Each policy brief contains either a takeaway or dedicated section for recommendations for policy makers, which serves as the analysed data in this section. These recommendations are the results of policy analysis and provide policy makers with practically oriented and nationally contextual forward-looking policy options (see Bromell 2017, Weimer & Vining 2016).

Methodologically, the distribution of topics across recommendations and the issues they relate to is reviewed through topic modelling. In the upcoming section, we introduce the analysed policy data and the applied method of topic modelling. Altogether, six issues of policy briefs were included in the analysis: smart cities, eco-innovation action plan, Europe 2020 strategy, crowdfunding, research priorities for sustainable innovation, and sectoral consideration of sustainable innovation policies related to SC5. Project partners from Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Italy, Poland, Portugal, Slovenia and United Kingdom have generated a brief to each issue and the 16 country correspondents from the other EU-28 countries have each provided 2 briefs (1 correspondent provided 1 during the examined time period). The studied data ranges from June 2014 to December 2016. The corpus is thus comprised of policy recommendations that were derived from 103 national level policy briefs.

The policy recommendations represent the assessments of these partners on how to foster, improve or challenge existing policies and, thus, represent responses to key observations related to European developments in the policy fields examined in the issues of the CASI policy briefs. The national level policy briefs have focused on the national reflections of the policy, providing a comparison to overall European developments by project partners and country correspondents.

The policy recommendations are analysed through topic modelling using MALLET as a tool for the analysis, because it is popular in statistical natural language processing and analysis (see Graham, Weingart & Milligan 2012). Topic modelling is a suitable tool for analysing unstructured textual data such as the policy

recommendations, which relate to numerous policy details and national contexts. Through topic modelling, we can cluster similarities across the corpus of policy recommendations. Topic modelling is based on the idea that texts can be understood through their underlying concepts, i.e. topics (Rehurek and Sojka, 2010). The technique used in the topic modelling is latent Dirichlet allocation, which is a generative probabilistic model (Blei, Ng & Jordan 2003). The clustering procedure looks on patterns of words and thereby extracts topics from texts. A topic is in this sense a probability distribution of words which frequently appear together – i.e. clusters of words (see Steyvers & Griffiths, 2007). In our analysis, all policy recommendations (i.e. corpus) define the topics, and each policy brief issue contains a mixture of topics.

We identified that seven topics described the corpus well: public SI policy, smart cities, eco-innovation, citizens and research priorities, industry, renewable energy & resource efficiency, and crowdfunding (Table 2). The topics were named on the basis of respective world clusters (7 most probable words are presented in the table), and are remarkably similar to the policy brief issues. The weights of the topics are presented in the last row of the table, showing relative prevalence in the recommendation corpus.

**Table 2 Identified topics and their relative weights**

<b>Public SI policy</b>	<b>Smart cities</b>	<b>Eco-innovation</b>	<b>Citizens &amp; research priorities</b>	<b>Industry</b>	<b>Renewable energy &amp; resource efficiency</b>	<b>Crowdfunding</b>
public	cities	ecoinnovation	citizens	manufacturing	energy	crowdfunding
sustainable	smart	funding	research	raw	efficiency	projects
policy	citizens	priorities	priorities	growth	resource	platforms
innovation	concept	technology	sustainability	product	renewable	financing
energy	making	order	society	total	policy	alternative
development	ecological	designing	food	design	transport	money
support	active	ecoinnovations	agriculture	resource	targets	potential
1,834	0,320	0,268	0,185	0,125	0,112	0,090

The first topic in the table is about public policy relating to innovations promoting sustainability. It is a common topic that clearly emerges from the policy recommendations and has great weight. The second topic deals with cities, smartness and active citizens, and the third with eco-innovations. They were, thus, named accordingly. The fourth topic that emerges from the policy recommendations relate to citizens and research in sustainability and society. The topic was named “citizens and research priorities”. The fifth topic is more focused on manufacturing, growth, products and resources, so it was named “industry”. The sixth topic deals with energy, efficiency, resources and renewables and therefore it was named “renewable energy and resource efficiency”. In fact, it is a topic closest related to the societal challenge 5. The seventh topic includes terms such as crowdfunding, financing, platforms and money, and it was named accordingly “crowdfunding”.

Table 3 presents the distribution of topics identified in the data in relation to the issue of the policy briefs. It shows that each policy brief issue is related to the general topic of public SI policy, but otherwise contributes mainly to one additional specific topic. For instance, the issue of smart cities is topically prevalent (0,544) in “public SI policy” and in “smart cities” (0,453). It has hardly any weight in the other topics. A similar topical distribution between public SI policy and another main topic applies for the policy brief issue of eco-innovation (“eco-innovation”) and the policy brief issue on key sectors (“industry”).

**Table 3 Distribution of topics across issues**

Issues \ Topic	Public SI policy	Smart cities	Eco-innovation	Citizens & research priorities	Industry	Renewable energy & resource efficiency	Crowdfunding
Smart cities	<b>0,544</b>	<b>0,453</b>	0,001	0,001	0,001	0,000	0,000
Eco-innovation Action Plan	<b>0,578</b>	0,002	<b>0,414</b>	0,001	0,000	0,000	0,004
Europe 2020	<b>0,456</b>	0,013	0,032	0,024	0,014	<b>0,461</b>	0,000
Crowdfunding	<b>0,279</b>	0,061	0,032	0,003	0,000	0,000	<b>0,626</b>
Top-10 research priorities	<b>0,420</b>	0,005	0,008	<b>0,566</b>	0,000	0,000	0,000
Key sectors	<b>0,585</b>	0,000	0,040	0,000	<b>0,287</b>	0,086	0,000

As for the other issues, the specific topic is more prominent than the general topic. This is the case for policy brief issue Europe 2020 and the topic “renewable energy and resource efficiency”, issue of Top-10 research priorities and the topic “citizens and research priorities” and especially for issue of Crowdfunding and the topic of “crowdfunding”. In conclusion, the analysis shows that the policy recommendations evident in the six studied policy brief issues all relate to the topic of public sustainable innovation policy and another specific topic, but that there is no significant distribution of topics across issues. This indicates that no cross-cutting topics emerge in policy recommendations, suggesting that a large number of issues should be covered in policy analysis in societal challenge 5 on climate action, environment, raw materials and resource efficiency.

An analysis of the 103 recommendations of the policy briefs showed that while the addressed policy brief issues are cross-cutting in terms of societal challenge 5, the distribution of topics in the recommendations is not. This implies that policy recommendations and the SC5-policies they target do not emerge as general by-products of SI policy activities but need to be specifically targeted. The results of the analysis enforced by this finding point to the conclusion that each area of SI policy should be approached as a separate issue that requires specific policy attention and not as an area where a general policy setting would bring the best results. Of course, specific policies also connect to a general public SI policy, as the analysis confirms.

For the research and innovation funding, this would mean the application of rather a large variety of approaches in addition to integrative approaches in funding. Furthermore, while developing policies for sustainable innovation, it would be worthwhile to consider a diversity of issues alongside pre-defined challenges.

## 5. Conclusions

The CASI policy brief process built connections between policies at European, national and local levels within the Societal Challenge 5 focusing on climate change, environment, resource efficiency and raw materials. Special focus was given to sustainable innovation and public participation. The briefs provided policy advice at European and national levels as well as formed an integral part of CASI contributions.

During the first years of the CASI project, key issues such as policies on smart cities, eco-innovation and environmental policy, growth with a focus on resource efficiency, and crowdfunding in sustainable

innovation were addressed in a joint effort to analyse on-going policy development. These issues guided to their part the policy connections and relevance of the CASI project.

In latter project stages, CASI contributions such as Top-10 research priorities, sectoral analysis of sustainable innovation and tools for strengthening sustainable innovation policy formed key contributions of the policy briefs. This, in turn, reinforced the connection between CASI contributions to ongoing policy debates on and needs in the realm of the assessment and management of sustainable innovation.

Alongside, a process to monitor how policies develop in European, national and local levels was developed. Much attention was given to the procedural interaction of bringing together the expertise of 19 CASI partners representing 12 countries and country correspondents representing 16 countries. Practicalities in these processes were continuously developed to ensure improved policy relevance and quality.

The European level policy analysis formed the starting point for addressing national and local levels in the CASI policy brief process. In this procedure, EU-level policies were first monitored and connections to national and local level policies thereafter constructed. While this procedure connected the levels well, it arguably represented a top-down approach and could potentially have limited the emergence of cross-cutting policy agendas at national and local levels. To alleviate this concern, contributors of national level policy briefs were instructed to select relevant policy developments based on their best expertise.

While the CASI project has been able to live up to expectations on the quality, quantity and relevance of the policy briefs, a number of future challenges were also identified. The policy brief process has shown that not all topics are as fruitful to be analysed on European, national and local levels. Some policy topics may be more prevalent in some countries or groups of countries than others. At the same time, the policy range may extend to truly global issues or should at least take policies at a global level into account. This poses challenges for creating a European platform for policy monitoring as well as for carrying out analysis for policy briefs.

The policy briefs provided by CASI project show that it is possible to create a policy watch procedure for monitoring complex policy initiatives across a large scope and provide useful advice to policy planning processes. The policy brief process also proved to be a unifying effort for CASI project partners and country correspondents. Policy Watch continues in the LinkedIn group of the CASI project. Membership in the group includes representatives from the extensive CASI network of stakeholders and collaborators as well as future newcomers.

## 6. References

- Blei, D.M., Ng, A.Y., Jordan, M.I. (2003). Latent Dirichlet Allocation. *Journal of Machine Learning Research*, 3(Jan), 993-1022.
- Bromell, D. (2017). *The Art and Craft of Policy Advising. A Practical Guide*. Cham: Springer.
- Casipedia (2015). Data bank with over 500 sustainable innovation initiatives mapped by the CASI project. Available at [www.casi2020.eu/casipedia](http://www.casi2020.eu/casipedia).
- Clarke, J., Bainton, D., Lendvai, N., Stubbs, P. (2015). *Making Policy Move: Towards a Politics of Translation and Assemblage*. Policy Press.
- EC (European Commission) (2017). Societal Challenges. Accessed 1.2.2017 at <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges>.
- EC (European Commission) (2014a). Environment. Eco-Innovation Action Plan. Available at: [http://ec.europa.eu/environment/ecoap/frontpage\\_en](http://ec.europa.eu/environment/ecoap/frontpage_en)
- EC (European Commission) (2014b). Europe2020. [http://ec.europa.eu/europe2020/index\\_en.htm](http://ec.europa.eu/europe2020/index_en.htm).
- Graham, S., Weingart, S., Milligan, I. (2012). Getting Started with Topic Modeling and MALLET. Accessed 1.2.2017 at <http://programminghistorian.org/lessons/topic-modeling-and-mallet>.
- Karakainen, M., Repo, P., Matschoss, K., Bedsted, B., Damianova, Z., Popper, R., Rask, M. (2015). 50 Citizen Visions on Sustainable Futures. Available at [www.casi2020.eu](http://www.casi2020.eu).
- Karakainen, M., Matschoss, K., Repo, P., Tregner-Mlinaric, A. (2014). CASI Policy brief: Smart cities as sustainable innovation actors, Insights from and for Finland. [www.casi2020.eu](http://www.casi2020.eu).
- Kemp, R., Schot, J., Hoogma, R., (1998). Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management. *Technology analysis & strategic management*, 10(2), 175-198.
- Lijphart, A., (1971). Comparative politics and the comparative method. *American political science review*, 65(03), 682-693.
- Lundvall, B-Å. (ed.) (1992). *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, London: Pinter Publishers.
- Massolution (2015). The Crowdfunding Industry Report. Available at [www.massolution.com](http://www.massolution.com).
- Matschoss, K., Repo, P. (2017, forthcoming). Sustainable innovation policy: focus on issues alongside challenges. In: Tregner-Mlinaric, A. (Ed.) CASI Annual policy report 3. Available at: [www.casi2020.eu](http://www.casi2020.eu).
- Matschoss, K., Repo, P., Karakainen, M., Kloppenborg, E., Ibsen-Jensen, J., Kyhn, B. (2015). Citizen assessment of priorities for European research. Available at [www.casi2020.eu](http://www.casi2020.eu).
- Matschoss, K.; Karakainen, M.; Repo, P.; Tregner-Mlinaric, A. (2014). CASI Policy brief: Eco-innovation action plan in an environmental policy context, Insights from and for Finland. [www.casi2020.eu](http://www.casi2020.eu).
- Rehurek, R., Sojka, P. (2010). Software framework for topic modelling with large corpora. In *Proceedings of the LREC 2010 Workshop on New Challenges for NLP Frameworks*.
- Repo, P., Karakainen, M., Matschoss, K. (2015). European Research Priorities Based on Citizen Visions. Available at [www.casi2020.eu](http://www.casi2020.eu).
- Repo, P., Matschoss, K., Tregner-Mlinaric, A., Van Eynde, S., Ramioul, M., Damianova, Z., Kozarev, V. (2016). Assessing national sustainable innovation policies with the CASI framework. In: Popper, R., Velasco, G. &

Popper, M. (Eds.) CASI Annual policy report: Sustainable Innovation Policy Advice. Available at: [www.casi2020.eu](http://www.casi2020.eu).

Rogers, E. M. (1995). *Diffusion of Innovations*. 4th ed. New York: Free Press.

Steyvers, M., Griffiths, T. (2007). Probabilistic topic models. In *Handbook of latent semantic analysis*, 427(7), 424-440.

Weimer, D. L., Vining, A. R. (2016). *Policy Analysis: Concepts and Practice*. London: Routledge.

Wiarda, H.J. (2006). *Comparative politics: Approaches and issues*. Rowman & Littlefield Publishers.

*All national level policy briefs can be found in Appendices 1-7 to this deliverable D7.2.*

## Appendices

### **Issue 1: Smart Cities as Sustainable Innovation Actors – Insights from and for the following countries:**

Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Italy, Poland, Portugal, Slovenia and United Kingdom.

*12 policy briefs published at the national level in March 2014 (88 pages, 2.0 MB)*

### **Issue 2: The Eco-Innovation Action Plan in an Environmental Policy Context – Insights from and for the following countries:**

Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Italy, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovenia, Spain, Sweden and United Kingdom.

*20 policy briefs published at the national level in December 2014 (199 pages, 7.6 MB)*

### **Issue 3: Europe 2020: Towards Growth and Resource Efficiency – Insights from and for the following countries:**

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Italy, Latvia, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

*22 policy briefs published at the national level in June 2015, 1 in December 2015 (245 pages, 16.0 MB)*

### **Issue 4: Crowdfunding in Sustainable Innovation – Insights from and for the following countries:**

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia and United Kingdom.

*24 policy briefs published at the national level in December 2015 (225 pages, 16.1 MB)*

### **Issue 5: Top-10 research priorities for sustainable futures**

Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Italy, Poland, Portugal, Slovenia and United Kingdom

*12 policy briefs published at the national level in June 2016 (101 pages, 8.4 MB)*

### **Issue 6: Sustainable Innovation across Key Sectors and Societal Challenge 5**

Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Italy, Poland, Portugal, Slovenia and United Kingdom

*12 policy briefs published at the national level in December 2016 (104 pages, 8.7 MB)*

### **Issue 7: Strengthening sustainable innovation policy with CASI tools**

Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Italy, Poland, Portugal, Slovenia and United Kingdom

*12 policy briefs published at the national level in June 2017 (115 pages, 7.8 MB)*



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