



EUROPEAN COMMISSION  
DIRECTORATE-GENERAL FOR RESEARCH & INNOVATION

Directorate I – Climate Action and Resource Efficiency  
**I.2 – Eco-innovation**

# **Final Report**

Expert workshop

## **‘A Systemic approach to Eco-innovation’**

Summary and Conclusions of the Workshop on 2-3 June 2014

Date of report: 16 July 2014

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# 1 Introduction

In June 2014, Directorate-General for Research Innovation organised an expert workshop 'A Systemic approach to Eco-innovation' held in Brussels.

The workshop is part of DG RTD's actions to access opportunities for developing a European policy framework on systemic eco-innovation. It aimed at drawing a common basis for understanding and connecting actors in the field of systemic eco-innovation.

Systemic eco-innovation is an emerging field currently attracting wide interest and triggering many initiatives in Europe and worldwide, by a range of different stakeholders including governments, businesses, researchers and citizens.

At such an early stage of development, no 'unique' definition for this field exists as of yet. The experiences with eco-innovation over the last years still need to be analysed and integrated. In most cases, the impact of 'single' eco-innovations (e.g. development of green products or processes) is incremental, local, small-scale and overall insufficient to achieve total decoupling of growth from resource use and environmental impact. Furthermore, lock-in effects of traditional production and consumption patterns represent an additional barrier.

To achieve a shift towards sustainable consumption and production patterns, a more systemic approach is needed. Different stakeholders (public/private sector and citizens) need to be engaged – either on the level of value chains or on regional level (urban, metropolitan, innovation clusters, delta areas etc.), cross-regional, and even international level.

Europe is facing the challenge to increase demand for, raise awareness about, and enable all players to collectively take part in systemic eco-innovation. The objective is to promote a circular economy and strengthen the EU's global leadership on resource efficiency, not only of products and services but also of whole value chains.

In this context, the workshop aimed at providing a snapshot of the systemic eco-innovation state-of-play in Europe. 17 experts from public and private organisations had been invited due to their expertise and the relevance of their professional activities in relation to the workshop's theme. Colleagues from Directorate-General for the Environment and the Joint Research Centre also attended the workshop. The outcomes will serve as a contribution to future policy initiatives supporting systemic eco-innovation.

This paper reports on the discussions of the workshop. It is neither aimed at giving comprehensive definitions nor explicit results on the discussed issues. It will serve as the basis for the work of the expert group on systemic eco-innovation currently set up by DG RTD to support with advice and expertise on defining an EU framework for systemic eco-innovation. The report has been compiled by Verena Fennemann and Vincenzo Gente, DG RTD, with contribution from the participants of the expert workshop.

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## 2 A common understanding on systemic eco-innovation

The workshop was mainly organised in interactive sessions. After the opening on the first afternoon, a mapping exercise was held with the purpose of finding a common understanding of systemic eco-innovation between the participants. On the second day the group of experts was split into four breakout groups (each of them moderated by a colleague from DG RTD and supported by one voluntary rapporteur from the audience) and to discuss thematic questions.

The mapping exercise was aimed at developing a common understanding of the key elements describing 'systemic eco-innovation'. Starting from the 'traditional' types of eco-innovation – from product, process, marketing, and organisational innovation to incremental, radical and disruptive impacts of change – it is still difficult to outline the 'systemic' nature of the activities which go beyond the silos of isolated changes made to products, processes, organisational structures, business and cooperation models.

As the participants came with different experiences from their working fields this exercise was therefore intended to lay the basis for the further discussions on the topic.

The experts were asked:

1. 'What is systemic eco-innovation for you/how would you apply it?'
2. 'What are the challenges to make eco-innovation systemic?'

Using participatory and interactive techniques, participants identified the concept of systemic eco-innovation as follows:

- Starting from today's economic and ecologic challenges like environmental pressure, resource scarcity etc. the concept of systemic eco-innovation means a sustainable development perspective to develop and implement systemic solutions to economic, environmental and social problems which have their origin in the systems dynamics of current production and consumption processes ('systemic solutions for systemic problems').
- The aim is a paradigm shift including strategic/long-term/radical changes in the existing 'regime' (disruptive to vested interests).
- To make this change happen a functional, ecosystems approach is needed where no waste is produced and everything is transformed.
- The transition process will lead to include technological, organisational, and social changes in a systemic way engaging and empowering society and entrepreneurs.

Answering the question on how to apply systemic eco-innovation the audience agreed that:

- There is a toolbox with instruments to drive the change on the level of a product or a single company (e.g. Eco-design, Design for recycling, LCA, Transition Management, etc.) but they are often limited to micro-level changes. Even instruments that go beyond the boundary of a single company (e.g. Extended Producer Responsibility EPR, Material Stewardship) will not alone drive innovation.
- We need a change of actors initially and to involve more stakeholders than before
- We need a coordinated process where politicians / policy makers take the lead to drive the change at functional/systemic level (i.e. not make a better product, but provide a significantly better function to society) by (a) promoting a consistent vision and (b) providing the conditions. Long-term strategic thinkers and more creative stakeholders not representing vested interests will help to generate more thinking-outside-the-box and more radical solutions.

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- Policy needs to find measures to up-scale (existing) niches which are already promoting systemic eco-innovation.
  - Societal initiatives are an important (self-organised) driver.
  - Although the assessment of the past experiences is difficult, we need to learn from (successes and failures in) cities and (large scale) demonstrators.

It is crucial now to understand what systemic eco-innovation is in order to identify (a) when it is already being used and (b) further opportunities. Adding clarity to this somewhat elusive concept could help firms to become conscious of this type of approach to innovation, and to implement it more effectively.

Following this exercise, participants were asked to think of the main challenges to make eco-innovation systemic. The responses were divided into three clusters:

1. Economic challenges (micro- and macroeconomic)
2. Political/legislative challenges
3. Cultural challenges

Table 1 lists the challenges under the three clusters. Challenges that fit into more than one cluster are indicated.

<b>Cluster 1 Economic challenges</b>	<b>Cluster 2 Political challenges</b>	<b>Cluster 3 Cultural challenges</b>
Economic fundamentals (need to be changed)	Consistent policy/vision for societal actors to provide direction	Change in thinking/behaviour (from old mind set to innovation)
Financing the trajectory from basic invention to marketable product (bridging the valley of death)	Connecting local initiatives to systemic changes (channel existing energy)	Connecting local initiatives to systemic changes (channel existing energy)
Better economics (how does it pay to be green and aim for a big market)	Cross scale integration and harmonisation should be done from niche markets on local level up to EU/international level.	Knowledge, Communication and language
	Time perspective of innovation and its impact	MYOPIA (not seeing the whole picture)
	Power in wrong hands (political challenge)	Inadequate system knowledge
	Adapt the research tools (Trends in Sustainability Technological Innovation System (TIS), Design for Sustainability DFS, Transition Management <sup>TM</sup> , Material Flows Analysis (MFA)) to real activities and use them	Short-Termism
		Support actions to create system response level
		Engagement, communication, language
		Companies are rather focussed on solutions to a business problem than on looking for eco-innovation
- to accept the fall of some parts - to identify the potential victims	- to accept the fall of some parts - to identify the potential victims	
Corruption	Corruption	
Addressing vested interests	Addressing vested interests	
The price should reflect/include all environmental impacts	The price should reflect/include all environmental impacts	
	Dynamics and indicators of 'old regime'	Dynamics and indicators of 'old regime'
(Overcome) Societal silos and 'silo-based' policies	(Overcome) Societal silos and 'silo-based' policies	(Overcome) Societal silos and 'silo-based' policies
Path dependencies (systemic lock-ins)	Path dependencies (systemic lock-ins)	Path dependencies (systemic lock-ins)
Lock-ins: - Infrastructure - Cannibalism - Network effect - Skills	Lock-ins: - Infrastructure - Cannibalism - Network effect - Skills	Lock-ins: - Infrastructure - Cannibalism - Network effect - Skills

Table 1: The main challenges to make eco-innovation systemic

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After the workshop the following additional comments on the concept of systemic eco-innovation and its implementation were provided.

The concept of systemic eco-innovation could be characterised by the following:

Systemic changes may be driven by the conscious decision to improve sustainability (by using a systemic approach) or by a mayor event (such as a natural disaster) that triggers a reactive systemic change. In case one wants to manage the change starting from an existing system the following points may apply.

- Objectives/targeted results:  
A certain solution/outcome/impact is targeted to improve sustainability of a product or process (as opposed to eco-innovation in which environmental benefits could be simply a side-effect without intent) Overall, systemic change always requires a vision.
- Understanding of the system:  
Identifying the root causes of systemic problems and the underlining needs of actors (e.g. buying a car or mobility service) as well as triggers to change the system.
- Knowledge on long-term/overarching objectives:  
What is the overarching direction for change? As one-dimensional and reactive solutions to problems could lead to problem shifting and long term lock-ins, and be counterproductive in light of overarching goals (e.g. first generation biofuels). A positive example is the idea of alternative solutions which go ahead with knowledge of the system and the overarching goal. For example, Detroit has a huge problem with wastewater when it rains heavily as the wastewater system is flooded. As building a new and bigger wastewater system is extremely expensive, the city's strategy is to create more green spaces, ponds, forests etc. to soak up rain. Therefore different stakeholders have to be involved (citizens, firms, public authorities etc.). This is a kind of 'thinking outside of the box' which could be promoted by system eco-innovation.
- Strategic and targeted changes toward decoupling/improving the environment:  
The question is how the innovation process takes place and whether systemic eco-innovation has to include multiple stakeholders, co-ordinated efforts and multiple actions or if a single company could engage in systemic eco-innovation by e.g. developing a new product (good or service) which changes the market (e.g. car2go car sharing). Do effects even have to be immediately visible on a macro level (economies) or could systemic eco-innovation also simply lead to systemic solutions at the micro level?

Stakeholders may respond to these challenges by the following approaches:

- a) Internal:  
How can we use systemic eco-innovation to improve our offering (e.g. engage with value chain, improve existing/be open to new business models, change of mind set, working culture, communications etc.)?
- b) Meso-level systemic change (integrated collaboration):  
For example co-ordinating with hand-workers, architects, engineers, etc. to improve the function of a building (which is the system in this case) or for example at a city level working together towards objectives like 'greening the city'.
- c) Address societal challenges (vision):  
How does our offering contribute to societal transition (this link between micro level change and macro level effects is probably the most difficult to understand, monitor, conceptualize etc.)?

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### 3 Breakout sessions

The discussions on the second day were intended to gather information/views on success stories, barriers and opportunities, demonstrating and assessing solutions, and key players. Therefore, the group of experts was split into four break-out groups where they discussed the different questions in turns.

<b>Group I</b>	<b>Group II</b>	<b>Group III</b>	<b>Group IV</b>
<b>Success Stories</b>	<b>Barriers and Opportunities</b>	<b>Demonstrating and Assessing</b>	<b>Key players</b>
What examples for systemic eco-innovation do you already know?  How successful would you consider them to be?	What new trends / movements and networks would characterise systemic eco-innovation?  Are specific areas / branches / trends more likely to be innovative as others?	What are the key parameters to assess systemic eco-innovations?  How to demonstrate innovative systemic solutions?	Who is going to drive systemic eco-innovation in the future?  How can civil society get more involved?

Table 2: The Breakout groups

The results are summarised in the following sections. The information given are not exhaustive due to the limited time of discussion. But they give a good overview about the issues and mirror the collective knowledge of the experts.

#### Group I – Success Stories

The aim of this exercise was to identify and discuss success stories and best practices, as we will have to learn from existing examples.

The discussion made clear that it is difficult to distinguish between well-defined initiatives to support systemic eco-innovative solutions (e.g. National Industrial Symbiosis Programme, UK) and general trends towards more environment friendly behaviour and sustainable development that promote systemic approaches (e.g. renewable energy, food supply chain).

The cases discussed were structured into comprehensive examples and enablers, examples for 'moving from product to service delivery', and trends (rather than explicit examples).

The list of examples can be found in Annex III – Results Break-out group I: Success Stories.



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## Group II – Barriers and Opportunities

Group II identified barriers and opportunities and characterised them according to different perspectives – stakeholders (e.g. companies, citizens, financial sector, governments), level of the system (niche, regime, landscape level), or type of barriers/opportunities (financial, investment, knowledge, technology, policy, etc.). The experts came up with almost one hundred contributions.

After the workshop all input was again screened and classified in the following overall clusters.

- Tools/Methods
- Information/education
- Infrastructure
- Procurement
- Politics/Regulation
- Finance
- Markets/Prices/Economics
- New technologies/Digitalisation/Business models
- Environment/Ecological factors
- Stakeholders
- Behaviour

The list of drivers and opportunities and the classification categories used by the groups can be found in Annex IV – Results Break-out group II: Barriers and Opportunities.

## Group III – Demonstrating and Assessing

Group III started the discussion on demonstrating and assessment measures for systemic eco-innovation by asking some important questions: What are we demonstrating? What do we want to achieve? Who will be the audience for demonstrators?

The experts agreed that the approaches depend on the level of demonstration ('mezzo vision', macro level) and the type of assessment we want to achieve. Demonstration needs a clear schedule and should take place on the basis of a 'transition arena' (in terms of long-term, large scale, flexible/open to changes etc.) rather than as R&I projects/PPP like under H2020.

### How to demonstrate systemic eco-innovative solutions?

During the discussion it has been highlighted the possibility of demonstrating systemic eco-innovative solutions starting from some examples that are already taking place in Europe and that an enabling policy framework is set up.

As examples, the experts mentioned, inter alia:

1. A project in France that included the participation of industries, municipalities and regulators, and foresaw the realization and management of water tanks for industrial use shared among companies of different productive sectors;
2. The case of collection of used cooking oils in Belgium that started because of regulatory obligations and with State support, and that afterwards became self-sustainable thanks to the revenue of the commercialization of recycled materials (Belgian EPR scheme on used oil 'Valorfrit').

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The key elements of how to demonstrate systemic eco-innovation where described as follows:

- Vision and scope: functional changes (What shall be achieved?)
- Support model: demonstrator spaces and roadmaps (How to do it?)
- Level of demonstration: regime (meso-level)
- Duration of demonstration: short-, medium-, long-term
- Actor-based approach: perspectives of the stakeholders
- Assessment and metrics: pathways and new indicators

The relevant conditions, identified during the discussions, for the setting up of an enabling policy framework, are:

- Promote demonstrator space/‘transition arenas’, inclusive and problem driven for short-terms goals;
- Create a platform/PPP for governance and long term vision to scaling up ‘transition arenas’;
- Provide the right duration of demonstration actions – functional changes need long-term;
- Give access to public funding for R&I programmes, and particularly Public Procurement for Innovation (PPI) and Green Public Procurement (GPP);
- Support regions/municipalities as key players, and stimulate cross fertilisations among regions;
- Include always social dimension (e.g. users’ behaviour and practices).

#### What are the key parameters to assess systemic eco-innovation solutions?

For the assessment of systemic eco-innovative solutions, different scopes of measurement will be necessary – based on timing and the system level.

For ‘disruptive changes’ of a regime a long-term perspective is needed (long-term follow-up measurement). In the same way, the scale for assessing cannot be limited to a single enterprise but it has to be wider, looking at city or region level at least. The monitoring of the impacts of the systemic eco-innovative solutions has to be based on different levels, considering the regime and landscapes for main functions (including emerging and declining regimes), and starting from the evaluation of the baseline for the change to happen.

One of the possibilities is to start from available best practice for ex-ante impact assessment of possible systemic solutions.

The main tools/methods for assessing systemic eco-innovative solutions have been identified in:

- Systemic Impact Assessments, including social assessment,
- LCA (extended to social, business, system lock-ins),
- Focus on behavioural patterns and practices (individual and organizational),
- Spill-over analysis (value chain, analysing substitution),
- Price analysis,
- Control groups (long-term observation),
- Job (quality and creation).

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## Group IV – Key Players

The objective of Group IV was to identify key players driving systemic eco-innovation and finding answers to the question how civil society could be more involved in the paradigm shift.

The main challenge for the group was to distinguish between innovation, eco-innovation, and systemic eco-innovation. For the latter, the 'traditional' stakeholders (regulators/governments, companies, entrepreneurs, facilitators, research and academia, media, NGOs etc.) will have to transform themselves along the transition process. Furthermore, new stakeholders have to be engaged as to make eco-innovation more systemic (across traditional borders of manufacturing, consume, supply chains etc.). The experts agreed that in the future financial stakeholders, civil society and facilitators supporting companies will get more importance to make the shift to systemic eco-innovation happen.

Annex V – Results Break-out group IV: Key Players shows the results from the discussion of Group IV.

The following key messages could be drawn from the discussions:

- The stakeholders are entering transition and innovation processes at different stages playing different roles (e.g. Politicians setting ambitions → creative arts generating alternatives → researchers turning these into practicable alternatives → niche operators for testing and launching → larger companies changing their business strategies).
- Along the transition process the stakeholders will also change their roles and activities as a part of the systemic change (different stakeholders must be tempted to take leadership in different stages of systemic change).
- Stakeholders have to be supported and guided I) to take a leadership role in large organisations and II) within society as a whole to break out traditional paradigms of thinking in silos.
- It is necessary to harmonise the actions of stakeholders which are already working on same/similar issues but without sharing their knowledge/information; But competition between alternatives is also essential to challenging the dominant regime and ultimate change at the landscape level (i.e. systemic change)

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## Additional questions

In the course of the discussions the following additional questions came up. As they could not be addressed during the workshop the experts were asked to provide their comments afterwards (the answers are merged together under thematic clusters where possible).

### **What are the benefits that systemic eco-innovation could bring to industry and clean-tech solutions?**

Costs benefits:

- Systemic eco-innovation mostly requires developing and implementing integrated solutions in co-operations and networks of companies, with governments, NGOs, consumers, and citizens (triple helix++), entering new alliances and developing new business models with stakeholders and customers. This requires a new management approach through concepts as business ecosystems, business models, and supply chain management. They trigger companies to engage with a larger system when making decisions on (new) markets and products. Thus, these concepts potentially produce both economic and ecological benefits.
- By closing material loops (zero waste, circular economy) and decarbonising the activities (zero emissions) industry would reduce costs and supply chain risks, energy consumption and costs associated to polluting outputs.
- This would not only contribute to reindustrialising Europe but also to bring back industries into the cities, where the labour force and most inputs are, shortening the supply chain. Silent, clean, self-reliant industry capable of feeding on locally available energy and material inputs would ease the acceptance in cities and facilitate the third industrial revolution to flourish in Europe.
- Industrialisation of eco-innovation knowledge and sharing it via schemes such as ISO 50000 or EMAS.

Enhancing competitiveness and acceptance, and reducing risks:

- Systemic eco-innovation increasingly becomes a necessity for industry to develop and market eco-innovative solutions. Pressures on ecosystems (climate change, disasters, energy supply risks, resource scarcity) impinge directly on businesses and lead to (more) radical and fundamental changes in production and consumption patterns. Thus, companies dealing with these challenges pro-actively will face competitive advantages.
- Systemic eco-innovation would allow industry to be cleaner, more competitive and better accepted by society. Reduced costs of resources (material, energy, labour) and waste management, and improved processes through knowledge/technology transfer will help enhance competitiveness. Quality certification of products and services would underline this development.
- An enhanced resilience against environmentally-rooted stress, commodity price volatility and supply chain risks could be reached.
- Systemic eco-innovative solutions demonstrate leadership and ability to innovate, they help to develop new markets for new solutions or sustaining evolving markets against competitors – especially for demand led innovation that responds to business needs.

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- Acknowledging that other countries/markets are driven by other priorities (security, air pollution rather than climate action, etc.) - systemic eco-innovation brings also lots of co-benefits for them.

#### Management benefits:

- The benefit could be an alternative approach to innovation activities thanks to understanding (and providing) underlying needs to create new products/solutions. This could mean expanding the clean-tech industry beyond technological solutions to clean services or maybe a combined approach (e.g. wastewater services to reduce need for treating wastewater by combined solutions – e.g. information to help customers reduce waste water and technologies like low-water toilets or an information campaign encouraging hotel customers to re-use their towels)
- Improved efficacy and efficiency, transparency and order throughout an organisation would go along with optimised communication between employees and also between headquarters and affiliates.
- (Public) institutions will benefit from the opportunity to disseminate/share knowledge internally in the organisation and also among SMEs up to task level.
- Supporting interdisciplinary teams, methodological approaches, communication, discussion and deliberation in particular concerning conflicting issues, (e.g. water) e.g. via specific multi-criteria ICT tools and methodologies (e.g. GOUVERNe project).

#### **What is the role of Research & Innovation and how (by which actions/instruments) can they promote systemic eco innovation?**

##### Influence politics:

- Research & Innovation can help politicians at the EU level to provide a clear direction to the innovation attempts of companies. A clear vision on circular economy, resource efficiency, and CO<sub>2</sub> reduction helps to reduce uncertainty, and improves the trust of the business community and citizens in EU politicians and regulators. Research & Innovation has a unique role in stimulating coherence of such vision within the EU. It can foster this within the European Services but should also be enacted outward to connect to the many stakeholders involved.
- Research & Innovation have the objective to set an agenda that reflects the bigger picture (e.g. critical materials for European markets and economy and priority sectors for green growth), to support research/development in these fields, and afterwards even the deployment of new technologies and business models.
- R&I can help creating the market for innovation through the (European Commission's) own procurement policies.

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### Regional cooperation:

- Part of developing a vision is to select and support 'beacons': companies, communities and (urban or rural) regions that are truly implementing the vision. Support could be provided by giving the regions a platform and visibility as to attract followers and build additional linkages. This is an enhanced form of what is traditionally thought of as 'pilot projects'.
- Systemic eco-innovation often materializes at regional level; there, the systems approach can be addressed in a meaningful way (e.g. initiatives in the areas of urban ecology, industrial symbiosis, innovation clusters, local production and consumption systems). Research & Innovation has the unique position to act as a connector between such regional initiatives: by doing research on how these 'regional islands' can be connected into a European 'archipelago' that provides a resilient solution to sustainability challenges.

### Research co-operation:

- First, Research & Innovation can promote systemic eco innovation by promoting a systems thinking approach to funding projects and by fostering systems thinking in research projects.
- Research & Innovation is crucial, however the innovation parts should become more extended, and more transformative research should be conducted than in earlier years. There's a need to establish an international network on those issues (e.g. 'green economy CSA network' under Horizon 2020); however foresight analysis for such markets are a key and it's not quite sure which of the new projects will handle it and how a collaboration across projects and internationally will be organized.
- The focus of Research & Innovation maybe put rather to explore basic societal needs and functions of products and processes than only on technological solutions. Faster and deeper innovation should be triggered by integration of social, environmental and economic objectives.
- Coordinators of newly established European funded projects could be encouraged to collaborate more, including international experts from outside the EU, and organize high-impact publications, potentially with industry partners. Long-term funding and collaborations with international experts from key markets (China, Brazil, etc.) will be beneficial, should always have a visible 'research identity' (too many talking clubs around...) such as foresight analysis, integrated risk assessments, resource nexus, sustainable mobility, cities, food, etc. Financial guidelines should reflect such shift, i.e. ability to invite and partner with international experts, to attend international meetings.
- Research & Innovation by successful pilot scale demonstrations will help to convince companies to change their processes and production patterns.
- The European research program Horizon 2020 may help to bridge the gap between conventional and regime changes.

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Social innovation:

- Research & innovation are important components to promote systemic eco innovation but not the most important ones. Current knowledge and practices help to close materials loops, reach energy self-reliance, green the industry, and advance towards a sustainable Europe. What separates Europe from sustainability is not the lack of knowledge or technologies but the vested economic interests, lack of political will, and, in general, the inertia of the old political and economic habits. Thus, the key to trigger systemic eco innovation is not the technological Research & innovation but much more social innovation which will help to remove the barriers and unlock the potential for change.
- Three potential actions for social Research & Innovation to promote systemic eco innovation are:
  - Social impact – notably job creation but also local resilience and self-reliance – should be considered more important.
  - Generate evidence and facilitate understanding of the importance of shifting taxation from labour to resources – we need to compile evidence and launch pilot projects to showcase the benefits of a changed price allocation on the current system and making room for systemic eco innovation to flourish.
  - Reveal and showcase best practices of local industrial and social ecosystems. Although examples of industries moving towards circular economy and greener production already exist they are isolated and need to be placed into local contexts. Hence, it is important to zoom out to include in the picture the resilience and sustainability at community/regional level (e.g. facilitate the creation/trigger the transition of towns that generate most of their own food and energy turning all solid and liquid waste into inputs for local processes – zero waste and zero emissions –, with diversified innovative closed-loop local economy that allows for full and green employment, housing and mobility and which is vibrant and capable of adapting to changes).

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## 4 Conclusions

The participants welcomed DG RTDs initiative on systemic eco-innovation. They agreed that the workshop and the exchange of experiences were fruitful and that there is a need to promote an agenda for eco-innovation supporting sustainability through a systemic approach.

From the overall discussion the following key messages could be drawn:

- We need to involve all stakeholders, build awareness amongst them and find ways for collaboration/cooperation (but also using competition as a way of energizing the change process). Key selected 'change agents' may be an option to leverage collaboration initiatives.
- Large scale demonstration projects are one of the best options to showcase good examples for future actions (but not in the current projects or even PPP models. A specific support model and guiding principles should be provided).
- Policy makers must take their responsibility to lead the change (e.g. by less centralised policy approaches, policies built upon existing self-organized initiatives).
- We need to create a common understanding making people understand easily what is going on.
- Legislation, compliance and governance are important in two ways: (I) to set the boundary conditions that are necessary to facilitate systemic eco-innovations, and (II) to define the expected results of such innovations as to create a level playing field. They may be used as 'connectors' between regional initiatives and thus help to capture the benefits of diversity amongst the European Member States. They can also facilitate the development of a vision e.g. to connect regional initiatives to 'networks of eco-innovations'. But in fact, for a resource efficient economy this is not enough. We need a reference framework including a whole set of respective policy measures.

Regarding the added value of systemic eco-innovation for the EU the audience came up with the following issues:

- Systemic eco-innovation will support a high quality of life, well-being, and competitive national industries, co-lead the 3rd Industrial revolution.
- Holistic approach helping the development of a coherent EU policy (energy, environment, chemicals etc.), write a narrative for the reindustrialisation of the EU.
- Wake up call for EU, learning about effects and influences, going away from silos (research, business etc.) making EU collaborative, fast and innovative
- EU 2020 is so far too focussed on sectorial innovation. Challenges are too large for companies or countries to tackle them alone. A clear task/mission for the EU is to promote systemic eco-innovation (an ambitious vision will create dynamic leadership).
- Systemic eco-innovation helps Europe to regain and keep its position in the global economy. China will catch up fast but Europe has the chance to do thing different.

The participants agreed to explore further ways to boost systemic eco-innovation and bridge the gap between research and markets.



## 5 Annexes

### Annex I – List of participants

First Name	Name	Organisation	Type of Organisation	Expertise
Caterina	BERBENNI-REHM	PROMIS	Consulting firm	Knowledge and technology transfer from research to SMEs, e-Learning and e-Business, collaborative working environments, multilingualism, international marketing, inter-cultural and cross-cultural issues, advisory member of AI& Society (Artificial Intelligence and Society) of Springer Verlag
Raimund	BLEISCHWITZ	UCL ISR - University College London – Institute for Sustainable Resources	University	Green economy, eco-innovation (Eco-Innovation Observatory, RECREATE), research on environmental and resource economics, resource efficiency, incentive systems and policies, raw material conflicts, industry and sustainability
Francoise	BONNET	ACR+ (Association of Cities and Regions for Recycling and Sustainable Resource Management)	Non-profit sector	Environmental law and consulting, waste management planning and policy
Frank	BOONS	Erasmus University Rotterdam	University	Governance of material and energy flows, systematic process approach to governance, how social processes are shaped influenced by natural ecosystems and the physical resource flows in global economy
Annick	CARPENTIER	Eurometaux	Private Sector	Strategic development, sustainable development, corporate social responsibility, development of environmental strategies
Laurent	GEORGEAULT	Institut pour l'Economie Circulaire	Non-profit sector	Circular economy
Ichin	CHENG	Sustainable Innovation Lab	Consulting firm	Environment management systems, water, energy, resource and climate change policy, Sustainable Business through value chain, green communication, Green tech, innovation, climate change action plan and policy
Robbert	DROOP	Ministry for Infrastructure and Environment	Government	Environmental research and innovation, policies on resource efficiency and circular economy
Berit	GULLBRANSSON	SP Technical Research Institute of Sweden	Research Organisation	How public procurement can drive eco-innovation, wastewater management systems, environment management, ecolabelling, LCA, environmental audits, due diligence
Peter	LAYBOURN	International Synergies	Consulting firm	Benefits of industrial ecology and symbiosis
Michal	MIEDZINSKI	Technopolis Group	Non-research Commercial sector including SMEs	Eco-innovation and resource use issues, notably in the area of science, technology and innovation (STI)
Meghan	O'BRIEN	Wuppertal Institute for Climate, Environment and Energy	Research Organisation	Resource Efficiency, Bio-based economy, eco-innovation

First Name	Name	Organisation	Type of Organisation	Expertise
Christopher	PALMBERG	TEKES	Research Organisation	Innovation research for policy and strategy, Technology and Innovation Policy (TIP) and Nanotechnology (WPN), system innovations, impact assessment, benchmarking of RDI programs and instruments, emerging technologies
Joan-Marc	SIMON	Zero Waste Europe	Non-profit sector	Waste and resources policy at European and national level, waste management and prevention plants, local infrastructures and citizen-based solutions, local and international governance, economics and citizen participation
Patrick	TEN BRINK	IIEEP - Institute for European Environmental Policy	Non-profit sector	Environmentally sustainable Europe via policy analysis, Valuing nature, environmental economics and benefits assessments, market based instruments and subsidy reform, voluntary agreements, beyond GDP indicators, climate change and transport
Nicola	TOLLIN	Centre for Sustainable Environments - Bradford Centre for Sustainable Environments University of Bradford	University	Sustainable development, processes design and sustainable transition planning for cities/regions, integrated evaluation of sustainability, future scenarios (visioning, forecasting and backcasting), system thinking, decision making processes, strategic planning, and stakeholder analysis
Arnold	TUKKER	Universiteit Leiden - Institute for Environmental Science (CML)	University	Industrial ecology, sustainable innovation and sustainable design
Grégory	GIAVARINA	Institut pour l'Economie Circulaire	Non-profit sector	Sustainable development, waste, water, natural environment, environmental regulations
Arnaud	PETEIN	DG RTD/D.2, Advanced manufacturing systems and Biotechnologies	EC	
Rasmus	BOLDSEN	DG ENV/A.1, Eco-innovation and circular economy	EC	
Lana	ZUTELIJA	DG ENV/A.1, Eco-innovation and circular economy	EC	
Laurent	BONTOUX	JRC.A.1.001, Science Advice to Policy	EC	
Panagiotis	BALABANIS	DG RTD/I.2, Eco-innovation	EC	
Verena	FENNEMANN	DG RTD/I.2, Eco-innovation	EC	
Vincenzo	GENTE	DG RTD/I.2, Eco-innovation	EC	
Valérie	GOLDEN	DG RTD/I.2, Eco-innovation	EC	
Wojciech	KLIMEK	DG RTD/I.2, Eco-innovation	EC	
Carmen	MENA ABELA	Executive Agency for Small and Medium-sized Enterprises (EASME)	EC	
Tomas	TURECKI	DG RTD/I.2, Eco-innovation	EC	
Giulio	PATTANARO	DG RTD/I.2, Eco-innovation	EC	
Luisa	PRISTA	DG RTD/I.2, Eco-innovation	EC	
Kurt	VANDENBERGHE	DG RTD/Dir. I	EC	

## Annex II – Mapping exercise 'A common understanding on systemic eco-innovation'



Figure 1: The concept of systemic eco-innovation



Figure 2: How to apply systemic eco-innovation

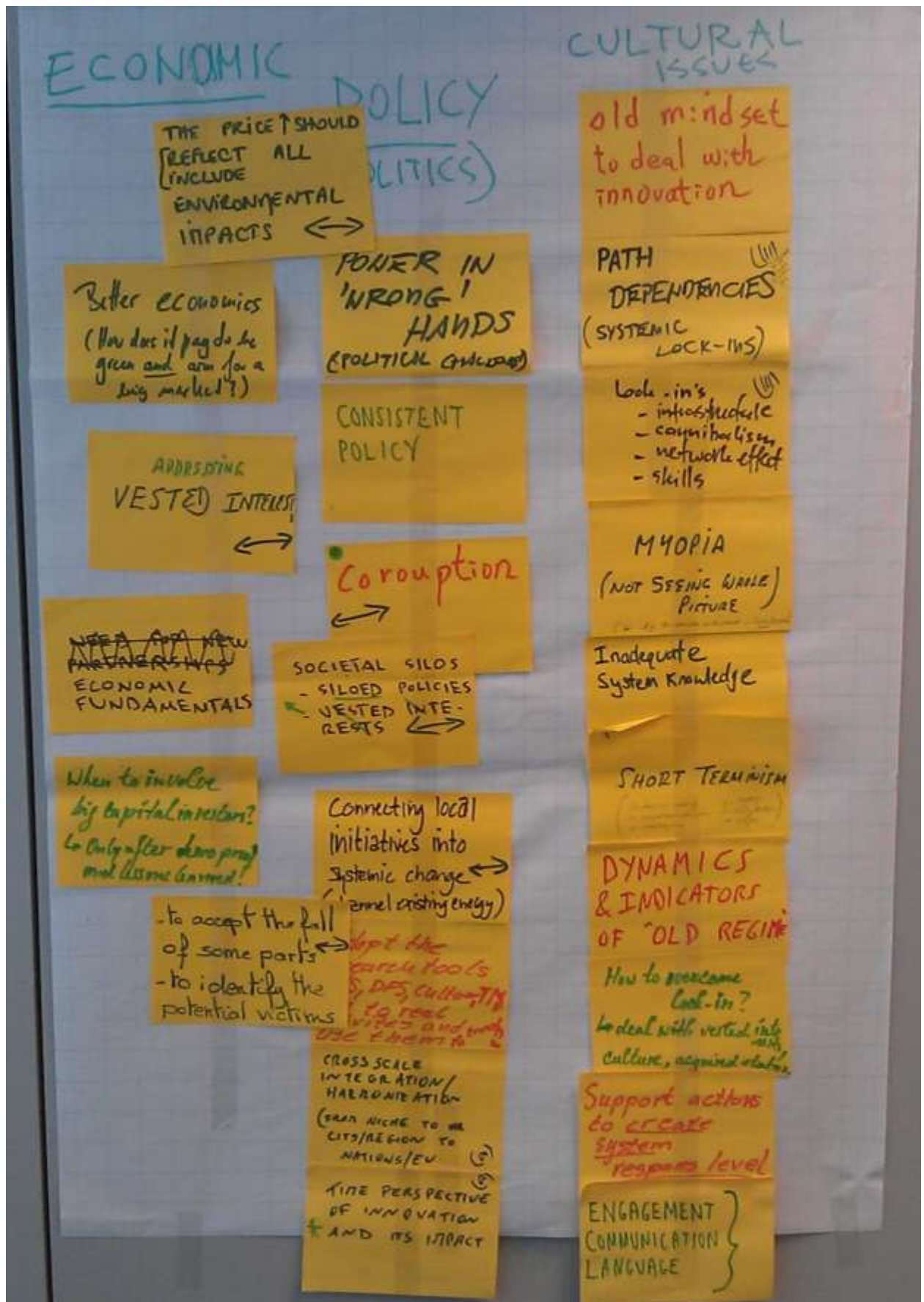


Figure 3: The main challenges to make eco-innovation systemic

### Annex III – Results Break-out group I: Success Stories

Examples of systemic eco-innovation solutions (projects, activities, initiatives etc. enabling and/or supporting circular economy, industrial symbiosis, systemic approach to eco-innovation)

Name	Stakeholders	Systemic approach	Maturity; Local vs. global	Comments
<b>Comprehensive examples</b>				
National Industrial Symbiosis Programme NISP, UK	<ul style="list-style-type: none"> <li>- Mass participation</li> <li>- businesses</li> </ul>	<ul style="list-style-type: none"> <li>- Creating space for eco-innovation, kind of a learning house, match making, knowledge transfer.</li> <li>- Engagement model assists with replicating best practice and provides an entry point for other tools such as LCA, Design for Environment etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Nationally coordinated; regionally implemented.</li> <li>- European examples include province of Limburg, Denmark, Finland, Poland, Italy, Belgium, Turkey, etc.; outside Europe examples include Brazil, Mexico, South Africa, China, Canada etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Evidence based (carbon reduction value creation)</li> <li>- Business opportunity; Cross sectorial</li> <li>- Opportunity, Diversity, Expertise</li> <li>- Effects on Business Models</li> <li>- EUR-ISA-Association (European Industrial Symbiosis Association)</li> <li>- Driving force to eco-innovation: serendipity → chance business: profit, risk, cost reduction)</li> </ul>
Zero Waste Cities	<ul style="list-style-type: none"> <li>- Policy makers</li> <li>- Companies</li> <li>- Citizen driven</li> </ul>	<ul style="list-style-type: none"> <li>- Impact in a wider scale</li> <li>- Transition action</li> </ul>	<ul style="list-style-type: none"> <li>- Started with the locality of Conterina (20.000 inhabitants and expanded in the region. (600.000 people in 50 municipalities)</li> </ul>	<ul style="list-style-type: none"> <li>- Alternative management of residual waste</li> <li>- How to collect and treat the waste in the community</li> <li>- 40% Reduced waste, recycling doubled</li> <li>- Zero waste hotels</li> </ul>
Metsä Group	<ul style="list-style-type: none"> <li>- Private investors</li> <li>- Aim at PPP in future</li> </ul>	<ul style="list-style-type: none"> <li>- Bio Economy</li> <li>- Eco systems around factories at EU level</li> </ul>		<ul style="list-style-type: none"> <li>- Transform paper mills into bio-refineries</li> <li>- 1.4 Bill Euro investment</li> <li>- Existing plant to be mirrored</li> </ul>
Eco Island	<ul style="list-style-type: none"> <li>- Local communities &amp; public administrations</li> </ul>	<ul style="list-style-type: none"> <li>- UK – DK</li> <li>- to be mirrored in other islands</li> </ul>	<ul style="list-style-type: none"> <li>- Pilot (12-13 islands)</li> </ul>	<ul style="list-style-type: none"> <li>- Optimize islands ecosystem</li> <li>- Circular Economy + sustainable societies</li> <li>- Share information; scale up in island with consumption patterns</li> <li>- Organisational capacity: who is going to realise the Business Plan</li> </ul>

Name	Stakeholders	Systemic approach	Maturity; Local vs. global	Comments
<b>Enablers</b>				
PROMIS	<ul style="list-style-type: none"> <li>- PPP (EC + private Investors)</li> <li>- Stakeholders' eco-system of (i) Knowledge consumers (SMEs, associations, chambers) and (ii) Knowledge producers (e.g. universities, institutions, ministries, organisations).</li> </ul>	<ul style="list-style-type: none"> <li>- eBusiness Tool enabling Systemic eco- innovation</li> <li>- Integrated Compliance &amp; Governance for SMEs</li> <li>- Industrialisation of knowledge</li> </ul>	<ul style="list-style-type: none"> <li>- In the European market (1.400 users)</li> <li>- Aiming at going global (Cloud/Software-as-a-Service, eBusiness)</li> </ul>	<p>PROMIS is a Software-as-a-Service and intranet platform of multilingual interactive services. It guides organizations, institutions and stakeholders through the maze of standards, norms and other regulations. It structures processes and knowledge for customers, helps improving relations with authorities and financial institutions, certification, audits, operations and generating cost reductions.</p> <ul style="list-style-type: none"> <li>- Human-centred technology and methodologies</li> <li>- Clear definition between free of charge and paid-for content</li> <li>- Respect of individual tacit knowledge and recognition of IPRs</li> <li>- Clear and well defined rules, duties and rights (Win-win)</li> <li>- Communication Collaborative Community based approach</li> <li>- Communicate in different languages but always speaking yours</li> <li>- Innovative Business Models</li> </ul>
<b>Examples: Moving from product delivery to service delivery</b>				
Mud Jeans	<ul style="list-style-type: none"> <li>- Private invest</li> </ul>	<ul style="list-style-type: none"> <li>- New business model (from product to service)</li> <li>- Environment (recycling)</li> <li>- Change of consumer behaviour</li> </ul>	<ul style="list-style-type: none"> <li>- Local NL</li> <li>- eBusiness Business Model</li> </ul>	<ul style="list-style-type: none"> <li>- Leasing garments/jeans, Changing ownership</li> <li>- Recycling the cotton fabric</li> <li>- New technology to recombine smaller fibres into jeans manufacturing</li> <li>- Driven by consumer needs</li> <li>- H&amp;M (Clothes retake)</li> <li>- Impacts elsewhere e.g. Salvation Army</li> </ul>
River Simple (SME)	<ul style="list-style-type: none"> <li>- Private action/ investment</li> </ul>	<ul style="list-style-type: none"> <li>- Towards a sharing economy</li> </ul>	<ul style="list-style-type: none"> <li>- Local UK</li> </ul>	<ul style="list-style-type: none"> <li>- Do not sell cars to people but mobility</li> </ul>
Philips				<ul style="list-style-type: none"> <li>- Philip provides lighting service, rather than bulbs</li> <li>- Innovation procurement</li> </ul>
<b>Trends, rather than examples</b>				
Renewable Energy	<ul style="list-style-type: none"> <li>- Supported policy</li> <li>- Buy-in of many stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>- Nuclear energy took shares</li> <li>- Economic challenge</li> <li>- Decentralised energy supply</li> <li>- Local decision on energy mix</li> </ul>		<ul style="list-style-type: none"> <li>- Expected roadmap</li> <li>- Solar, Hydro Green, Heating</li> <li>- Intelligent demand</li> </ul>
Food Supply Chain	<ul style="list-style-type: none"> <li>- Local communities</li> <li>- Actors in food supply chains</li> </ul>	<ul style="list-style-type: none"> <li>- Changing the supply chain in order to make it more sustainable and produces with less losses</li> </ul>	<ul style="list-style-type: none"> <li>- Local for Local</li> </ul>	<ul style="list-style-type: none"> <li>- Stable supply of (eco-friendly) food</li> <li>- Local growing needs vs. global production</li> <li>- Social component (poor people being supported by local food producers)</li> </ul>
Bio Gas Valley	<ul style="list-style-type: none"> <li>- Local experiment</li> <li>- Public funding</li> </ul>	<ul style="list-style-type: none"> <li>- Methanation of domestic waste</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-competitive</li> <li>- Demonstrator</li> </ul>	<ul style="list-style-type: none"> <li>- Bio Gas Methanation</li> <li>- Move towards other sources of energy</li> <li>- Sectorial-Agricultural</li> </ul>

Name	Stakeholders	Systemic approach	Maturity; Local vs. global	Comments
Sybimar	- Local - Finland		- Demonstrator	- Waste from fish processing to bio-energy (closed loop)
Essex Marshes	- Local authority	- System changes (System changing analysis) - Making use of nature	- Mature	- Local flood control around coastal areas - Adaptation to global changes
Bio Mimicry		- Methodology		- Learning from nature - Architectural design
CEPI: 2 Team Project	- Business (paper industry)	- Sectoral impact	- Study finished - Strategic roadmap	- Paper sector – to achieve more efficiency - 8 technologies combined - Value chain in production - Allowing to move away from a centralised system to a more decentralised and diversified system
Used oil	- Municipalities	- Production of energy	- European impact - Business and legislative framework	- Waste sector - Recycling of waste oil (fried oil) at local, regional, national level supported by EC legislation
Waste management in NL	- Wide stakeholder involvement	- Hierarchies lead transition - National policy in NL	- Citizen driven	- Innovation capacity - All the waste is sustainably harvested
Silent transition		- Certification of the supply chain		- Supply chain quality and environmental standards - de-facto certification (e.g. fair trade coffee, fish)
Energy production	- Policy makers - authorities		- Localised - Stable policy environments	- Driving forces for systemic eco-innovation - Local government want to have more say in energy/water - Trust in local infrastructures authorities
Green Chemistry				- Chemical working with Pulp&Paper industry
Cradle-to-Cradle - Venlo				
Sustainable Appraisal Council				



## Annex IV – Results Break-out group II: Barriers and Opportunities

Examples of barriers and opportunities systemic eco-innovation and their classification categories

Class. category (barriers)	Barriers	Class. category (opportunities)	Opportunities
<b>Tools/Methods</b>			
- EU level	- Lack of evidence - Reporting metrics	- EU-level	- Identify opportunities using TIS tool ('trends in sustainability') 'light' for understanding what is happening → existing system knowledge - Certification - Connecting positive examples and understanding context
<b>Information/education</b>			
- Local level (cities) - Citizens - Regime - Media	- Lack of awareness and information - Lacking skills, Know-how - Ownership of media (media are owned by a relative low number of people who influence the reporting) - Advertising (attracting people to buy more than needed)	- Citizens - Financial Sector - Regime - Media - NGOs	- Information/education - Awareness/knowledge - Rising awareness in emerging economies (we can't outsource more) - Reporting/certification (about good examples) - Social media
<b>Infrastructure</b>			
- Governments - Regional level	- Existing infrastructure - Infrastructure diversity	- Governments - Regional level	- Investing in public infrastructure/goods
<b>Procurement</b>			
- Local level (cities) - Governments	- Municipalities afraid of legal repressions resulting from innovative PP models - Inefficient procurement/investment	- Local level (cities) - Governments	- (Municipal) Public procurement of innovation (PPI) - Green Public Procurement/whole life costing - Public Procurement
<b>Politics/Regulation</b>			
- EU level - Governments - Landscapes - Regime - Local level (cities)	- Lack of integration of objectives - Lack of coordination on EU-level - Poor regulation (Definitions (e.g. waste), lack of co-ordination, outdated subsidies, lack of long-term consistency (price)) - Lack of political will/election cycle - Poor implementation of what is already in place - Power of (existing) policy - Agenda on growth and jobs does not support systemic eco-innovation; political parties don't see it as an opportunity - Environmental regulation focuses on 'bad' behaviour not promoting good the one - Lack of schemes to support up-scaling → mass market finance versus demonstrations - Risk of failing states - Corruption	- Governments - Regime	- Environmental Tax reform / Environmental Harmful subsidies - New policy instruments (e.g. GPP) - New regulation (positive targets) - Green growth strategy/objectives to integrated actions - Mentality change in policy from fixing bad to promoting good (incentives) - Setting clear targets towards a good development

Class. category (barriers)	Barriers	Class. category (opportunities)	Opportunities
<b>Finance</b>			
- Financial Sector	- Risk aversion/risk knowledge → insurance indicators	- Financial Sector	- Crowd funding - Green banks - Carbon Disclosure Projects (CDP)
<b>Markets/Prices/Economics</b>			
- EU level - Companies - Landscape - Local level (cities) - Citizens - NGOs	- Vested interests block scaling-up of niche-markets - Sunk Investment - Market incentives supporting 'wrong' actions (subsidies) - Low hanging fruits - Drivers are purely financial - Commodity prices too low / Labour too expensive in relation to resources - Actual product standards and standard contractual arrangements - Economic fundamentals (low energy and materials prices) - Mainstream economists (lack of alternative models, operational messages to make transition within 20 years happen?) - Affordability (of new/more expensive products) - Lack of resources		- 'rising'-prices-trend
<b>New technologies/Digitalisation/Business models</b>			
- Local level (cities)	- 'niche'-business models don't transfer to big players - Mainstream research not connected to economy; Transition research underestimates the financial aspects	- Communities - Landscape - Regime - Local level (cities)	- Emerging technologies + manufacturing processes (e.g. 3D printers) - Bottom-up 'movements' (repair cafes, 'I-fix', fab-labs, etc.) - Digital start-ups (linking nature to citizens ('awareness APPs'), organise/collect data etc.) - Better data availability and tools (e.g. to be used for crowdsourcing) - New business models (e.g. Product Service System PSS)
<b>Environment/Ecological factors</b>			
	- Ecological problems (e.g. climate change) are too far away/not tangible for people		- Disasters/natural catastrophes → will open windows for opportunities - Raw materials scarcity
<b>Stakeholders</b>			
- Cross-cutting issues	- Missing players - Lack of leadership - Lack of trust between actors (e.g. citizens and government) - Users (lack of effective, proactive approaches to reach new actors)	- Regime - Regional level - Local level (cities) - Companies	- Empowering new actors, agencies and networks - Rising role of (smart) cities, taking their role as innovation agents - Big Player (Unilever, IKEA,...) → strategic, future analysis, marketing, supply chain control, quality value
<b>Behaviour</b>			
- Local level (cities) - Communities - Citizens - Interest Groups - Companies	- Short-term self interest - Individualistic culture (self-interest stops collaboration e.g. forestry) - Company culture	- Local level (cities) - Companies	- New company culture (good examples) - Co-operative models

## Annex V – Results Break-out group IV: Key Players

Examples and further discussion on key players for systemic eco-innovation

Who are the actual key players	
Regulators	<ul style="list-style-type: none"> <li>• Political actors</li> <li>• Administration at different level → should have an outspoken strategy to support the environment for systemic eco-innovation</li> </ul>
Government (European level, National level, regional/local level)	<ul style="list-style-type: none"> <li>• Give framework conditions</li> <li>• Supporting the creation of infrastructures</li> <li>• Clarify the 'rule of the game', set guiding principles</li> </ul>
Companies	<ul style="list-style-type: none"> <li>• The ones implementing systemic eco-innovation (all sizes)</li> <li>• They work on their own risk, resource efficiency and profit</li> <li>• SME: often face difficulties to innovate due to lacking capacity (financial, time, knowledge)</li> <li>• Companies can work ahead of regulation, but is not said that they will help regulation to be in place</li> </ul>
Entrepreneurs	<ul style="list-style-type: none"> <li>• People spotting the opportunity for new business</li> <li>• In all kind of sectors (production, service, finance)</li> <li>• Also employees driving innovation within their organization</li> <li>• Innovators running start-ups</li> <li>• Venture capital investors</li> </ul>
Facilitators	<ul style="list-style-type: none"> <li>• Key players helping SMEs and other companies facilitating and enabling the shift to systemic eco-innovation</li> <li>• Independent people, normally from industries, who can push the agenda (not the implementation) or consultants</li> <li>• Working as enablers/connectors by identifying opportunities for systemic eco-innovation or organising workshops to inform companies</li> <li>• At the moment public sector is financially supporting these kind of facilitators</li> <li>• Providing the much needed linkages (especially to SMEs) to eco-innovation solutions</li> </ul>
RTD community (not only Academia)	<ul style="list-style-type: none"> <li>• Two functions: research and facilitation/consultancy</li> <li>• Different levels of research: ground research (normally funded by state/EU, long-term perspective); applied/collaborative research (bringing companies together and overcome technological gaps)</li> <li>• Consultancy requests for specific problems (paid by the companies, short term results expected)</li> <li>• Knowledge-transfer-partnership between academia and companies, mutual beneficial to bring forward results already made or demonstrate first developments</li> <li>• Knowledge broker</li> <li>• Impartial assessment</li> <li>• Foresight capacity</li> </ul>
Civil society (formal and informal organizations)	<ul style="list-style-type: none"> <li>• Civil society as a triggering actor, reacting to a specific problem/challenge (e.g. waste management at local level). They will go to media, local politicians and trigger reaction.</li> <li>• Extremely differentiated</li> <li>• The leaders/trend setters are necessary</li> <li>• Consumer becoming producers</li> </ul>
Media and social media	<ul style="list-style-type: none"> <li>• Open innovation</li> <li>• Crowd sourcing</li> <li>• Reporting (e.g. Italian Television)</li> </ul>
NGO	<ul style="list-style-type: none"> <li>• Structured and unstructured</li> </ul>
Regional economic development agencies	

<b>Which are the 'new' stakeholders?</b>	
Financial foundations	<ul style="list-style-type: none"> <li>• Pension funds or bank foundations working for the benefits of both sides (investors and entrepreneurs)</li> <li>• Thematic orientated Foundations (e.g. Ellen McArthur Foundation promoting circular economy)</li> <li>• Multi-stakeholders groups</li> <li>• Networks (Networks at European scale, exchanging knowledge, removing regulatory barriers)</li> </ul>
Civil society	<ul style="list-style-type: none"> <li>• Through media, grouping, campaigning</li> </ul>
Facilitators	
<b>Specific instruments/functions (Performed by stakeholders and for stakeholders)</b>	
Finance	<ul style="list-style-type: none"> <li>• How to finance stakeholders and the systemic change (at different stages)?</li> <li>• To change an existing non-eco business to be eco-friendly or because they're environmentally or economically unsustainable</li> <li>• To foster the creation of new businesses</li> <li>• To foster the creation of new forms of organisation (also non-profit)</li> <li>• Need public investment (thus, a variety of public actors) for more risk and long term innovation</li> </ul>
Knowledge and key practices	<ul style="list-style-type: none"> <li>• Platforms and networks for knowledge sharing</li> <li>• Centre for knowledge storage and categorizations</li> </ul>
ICT	<ul style="list-style-type: none"> <li>• For information exchange</li> <li>• Data collection and analysing</li> <li>• Benchmarking</li> <li>• Knowledge structuring and filtering</li> <li>• Knowledge sharing → Communities of Knowledge</li> <li>• Online work, collaboration and communication (team building)</li> </ul>
Regulation	
<b>How to categorize new stakeholders</b>	
Name	
Sector	
Logic	
Interest	
Stage of innovation they enter	
Capacity (financial, knowledge)	
Different time perspective	
Different perspective in scale	
Strategic visions	