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Circular Economy Opportunities for Research and Innovation

PART I and PART II

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Research and
Innovation

PART I

- ✓ **CIRCULAR ECONOMY PACKAGE**
- ✓ **R&D PAVING THE WAY ... up to 2014**

PART II

- ✓ **R&D PAVING THE WAY ... from 2014-2015**
- ✓ **NEXT OPPORTUNITIES in HORIZON 2020**

PART III

- ✓ **TOPICS DESCRIPTION**

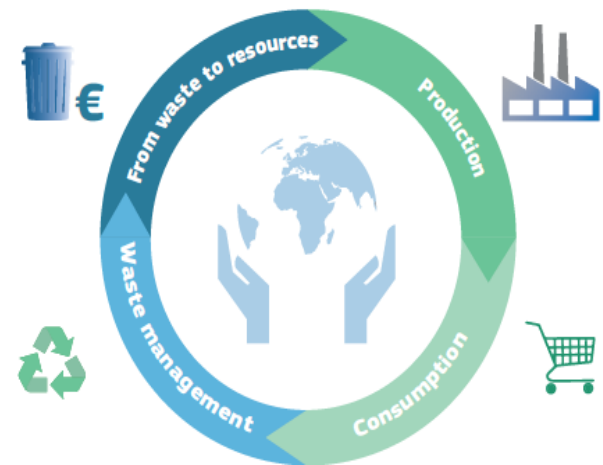


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OVERVIEW

PART I

✓ CIRCULAR ECONOMY PACKAGE





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Circular Economy Package

'effectively ambitious'
adopted 2 December 2015

- **In July 2014**, the EC adopted a **Circular Economy Package**
- Communication "Towards a circular economy: a zero waste programme for Europe" + legislative proposal introducing new waste recycling targets

but...

- package was **focused on waste**, without exploiting **synergies with other policies** and without addressing the **whole value chain**
- **specific reality of each country** not addressed

this is why...

- **In February 2015**, EC **withdrew** the proposal
- **In December 2015**, the **EC adopted a new and more ambitious Circular Economy Package**

Circular Economy Package December 2015

- **ACTION PLAN** focusing on concrete measures
- **REVISED LEGISLATIVE PROPOSAL on WASTE**
- beyond waste -> whole 'Circle'
- interdependencies across value chain
- Focus on barriers to circular economy that can be addressed at EU level

Circular Economy KEY ACTIONS

- ✓ **Funding** of over **€650 million** under Horizon 2020 and **€5.5 billion** under the structural funds
- ✓ **Actions to reduce food waste** including a common measurement methodology, improved date marking, and tools to meet the global Sustainable Development Goal to **halve food waste by 2030**
- ✓ Development of **quality standards for secondary raw materials** to increase the confidence of operators in the single market
- ✓ Measures in the **Ecodesign working plan for 2015-2017** to promote reparability, durability and recyclability of products, in addition to energy efficiency
- ✓ A **revised Regulation on fertilisers**, to facilitate the recognition of organic and waste-based fertilisers in the single market and support the role of bio-nutrients
- ✓ A **strategy on plastics in the circular economy**, addressing issues of recyclability, biodegradability, the presence of hazardous substances in plastics, and the Sustainable Development Goals **target for significantly reducing marine litter**
- ✓ A series of **actions on water reuse** including a legislative proposal on minimum requirements for the reuse of wastewater



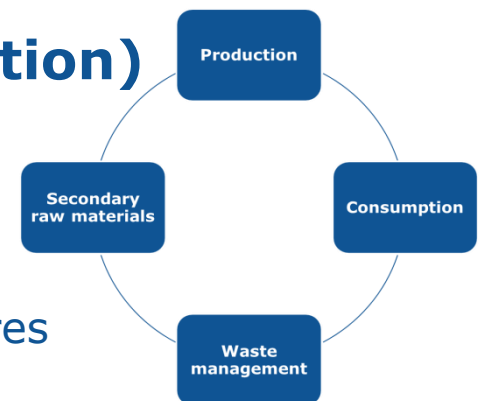
KEY ELEMENTS of the CE package

- **A revised legislative package on WASTE**

- long-term targets to increase recycling: 65% for Municipal Waste and 75% for Packaging Waste by 2030
- targets to reduce landfilling : max 10% of Municipal Waste by 2030
- a legislative framework that is more in line with Circular Economy principles

- **An ACTION PLAN on the CE (Communication)**

- mandate for this Commission's term of office
- concrete actions covering the whole cycle
- Specific sectorial action as well as horizontal measures



1. Production

Objectives

- Give incentives to the **design of products** that are easier to repair, recycle and disassemble to recuperate valuable materials.
- Promote innovative and resource efficient **production processes**.

Key actions

- Promote reparability, durability, and recyclability in future Ecodesign requirements (first steps: requirements on electronic displays e.g. TV screens)
- Promotion of best practices for waste management and resource efficiency in industrial sectors.
- Facilitate industrial symbiosis (waste or by-products of one industry becomes inputs for another).

2. Consumption

Objectives

- Encourage reuse and repair of products to avoid waste.
- **Empower consumers** with reliable information on the environmental impact of the products they buy.

Key actions

- New rules which will encourage reuse activities (waste proposal).
- Link with Ecodesign (reparability)
- Better enforcement of the guarantees on tangible products and action on false green claims
- Emphasise circular economy aspects in **Green Public Procurements**.
- Independent testing programme to identify issues related to possible planned obsolescence.

3. Waste management

Objectives

- Improve waste management systems across the EU, addressing the existing implementation gap
- Provide a long-term vision and drive investments towards recycling

Key actions

- Revised **legislative package** on waste
- Work with Member States to improve waste management on the ground, including to avoid overcapacities in residual waste treatment (e.g. incineration)
- Ensure that **Cohesion Policy** contributes to EU waste legislation, guided by the EU waste hierarchy.

4. Single Market for secondary raw materials

Objectives

- Increase the **use of secondary raw materials** and the trust of operators in their quality.
- Increase the use of **recycled nutrients** and the reuse of treated wastewater.
- Reduce the presence of chemical of concern in product cycle and improve their **tracking** along the cycle

Key actions

- Develop **quality standards** for secondary raw materials.
- **Revised EU regulation on fertilisers**, to facilitate the take up of organic and waste-based fertilisers in the single market.
- Legislative proposal on minimum requirements for reused water
- Analysis and options on the interface between chemicals, product, and waste legislation

5. Priority areas

Objectives

- Address specific sectors whose challenges run throughout the value chain. (Also identified as priority areas during the public consultation)

Key actions

- Strategy on **plastics** addressing recyclability, biodegradability, presence of hazardous substances and marine litter.
- EU methodology and indicators to measure **food waste** and create a platform to achieve SDG goals food waste; specific action on food donation / reuse of food as feed.
- Actions encouraging recovery **critical raw materials**
- Actions on recovery of resources and adequate waste management in the **construction and demolition** sector
- Promotion of efficient use of **bio-based** resources

6. Horizontal measures and monitoring

Objectives

- Create the **right environment for innovation** and **investments** in the circular economy.
- Measure progress

Key actions

- **€650 million Horizon 2020** initiative on 'Industry 2020 in the circular economy'.
- Pilot approach for "**innovation deals**" to identify and address potential regulatory obstacles for innovators.
- Targeted outreach for **various sources of EU funding**, in particular Cohesion Policy Funds.
- Development of a monitoring framework for the circular economy

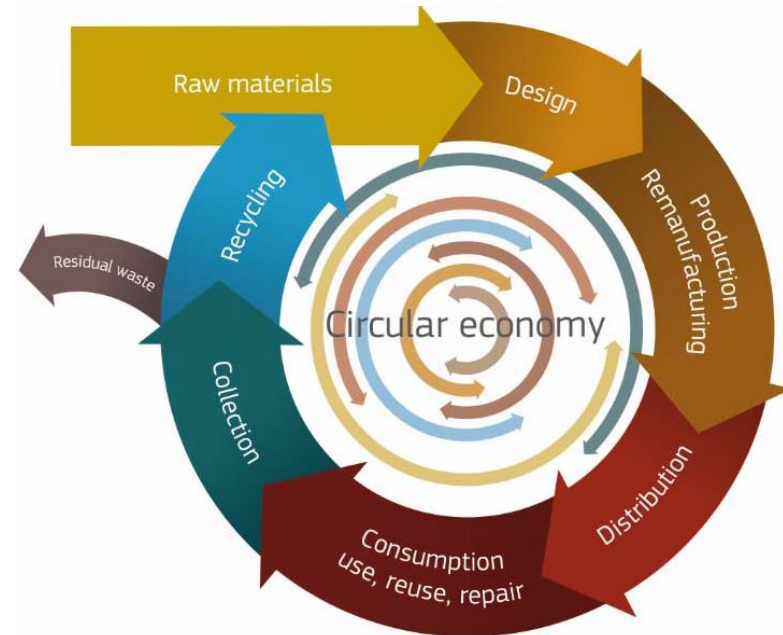


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What about Research and Innovation?

Circular Economy is about Change,
and about **Innovation**

requires **RTD&I investments,**
multi-stakeholder involvement
and an **enabling framework**





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towards a **GLOBAL IMPACT** in Circular Economy



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Research and Innovation Role in CE

Leading in the Enabling factors, including innovation and investments

- ✓ **DEMONSTRATING** the opportunities for moving towards a circular economy investing in **large scale innovation projects** with a strong industrial participation in the **Focus Area "Industry 2020 in the Circular Economy"**
- ✓ **BIOECONOMY STRATEGY:** promoting the sustainable use of biological resources and waste streams, applying the cascading principle to the use of biomass
- ✓ **REGULATORY INNOVATION:** addressing regulatory barriers to innovation that hinder the development or uptake of circular economy activities or business models, through the implementation of **Innovation Deals**
- ✓ supporting **FINANCING TOOLS** and **ADVISORY SERVICES** through **InnovFin**, in cooperation with EIB and Horizon 2020
- ✓ **Addressing ALL TYPE of INNOVATION:** technological, social, organisational innovation
- ✓ **Capitalise on SDGs** for promoting international R&I cooperation



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PART I

- ✓ CIRCULAR ECONOMY PACKAGE
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...the 7th RTD Framework Programme

RESFOOD

Resource Efficient and Safe Food Production and Processing

VALUE CHAIN

- Enhanced resources productivity
- Reduction of water emissions and biomass waste
- Re-use/recycling of water, nutrients, energy
- Recovery of bio-based compounds from biomass waste
- Food safety and cost considerations
- Partners from: NL, ES, IL, BE, TR, DE
- EU investment: € 4.35 Million

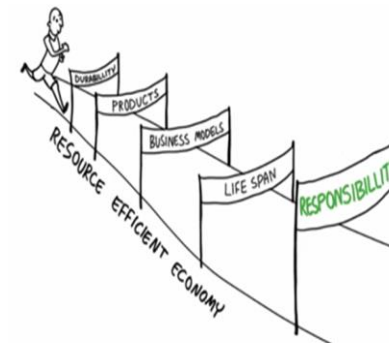


SPREE

Servicizing Policy for Resource Efficient Economy

SHARING ECONOMY

- Product-service & servicizing
- Design policy instruments integrate supply and demand side policies influencing both production and consumption patterns
- 3 systems: water, mobility and agro-food
- Partners: LT, UK, SE, ES, NL, IL
- EU investment: € 2.4 Million



WaterPipp

Public Innovation Procurement Policies

INNOVATIVE PROCUREMENT



- Local governments
- Public operators
- Regions
- Industry
- Exploring new public innovation procurement methodologies in water sector
- Testing with at least 5 pilot cases



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a.r.t.i.
Agenzia regionale
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e l'innovazione



The European House
Ambrosetti



City of Rotterdam

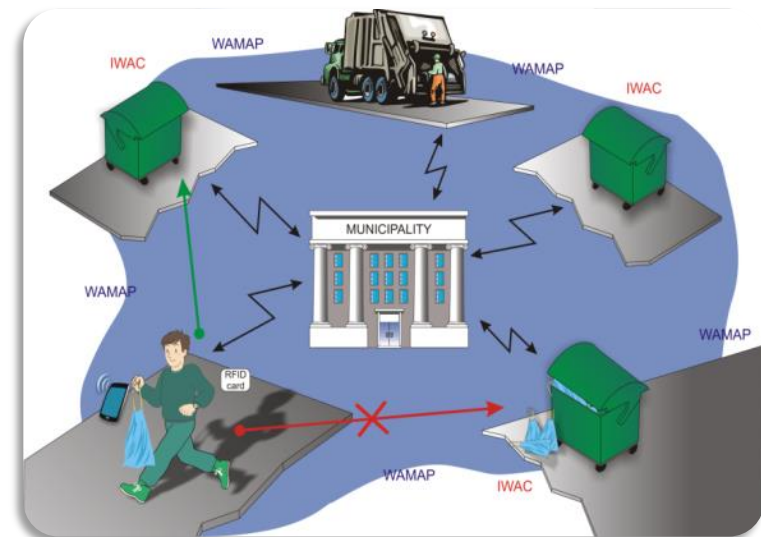


BURBA

Bottom-up selection, collection and management of urban waste

SYSTEMIC APPROACH TO WASTE MANAGEMENT NEW TYPES OF PARTNERSHIP

- Intelligent waste containers combined with IT technologies
- Cell-phone-based information system for citizens
- Demonstration in three Municipalities: Introduction of smart systems to support rewarding policy of fair taxation
- Partners: IT, ES, PT, PL, CN
- EU investment: € 2.15 Million



<http://88.32.124.85/BURBA/jburba/index.php>

ShredderSort

Selective recovery of non-ferrous metal automotive shredder by combined electromagnetic tensor spectroscopy and laser-induced plasma spectroscopy

MATERIAL RECOVERY: LIFE-CYCLE APPROACHES, SUPPORT TO POLICIES

- New sensing approach for non-ferrous heavy fraction (Electromagnetic Tensor Spectroscopy)
- New sorting approach for high value alloys in light shredder fraction (Laser Induced Break-down Spectroscopy (LIBS))
- High throughput separation process for cast and wrought type alloys and sorting technology for high value alloys
- Partners: ES, IT, AT, UK, PT
- EU investment: €3.37 M



ECOWATER

Meso-level eco-efficiency indicators to assess technologies and their uptake in water use sectors

ECO-EFFICIENCY METRICS CROSS-SECTORAL

- Methodological framework and indicators for impact assessment on eco-efficiency of water systems
- Platform for eco-efficiency analysis
- 8 case studies (agricultural, urban, and industrial water systems)
- Partners: GR, IT, NL, CH, PT, BG, UK, DK, SE
- EU investment: € 2.49 Million



ValuefromUrine

Bio-electrochemically-assisted recovery of valuable resources from urine

MATERIAL RECOVERY- CLOSED LOOP CROSS-SECTORAL

- System for recovery of nutrients from urine (>95% of phosphorous and nitrogen)
- Production of valuable secondary raw materials
- Improved domestic waste water treatment
- Prototype to process 100 L of urine per day
- Partners: NL, LU, PT, UK, ES
- EU investment: € 2.91 Million



ZeroWIN

Towards Zero Waste in Industrial Networks

INDUSTRIAL SYMBIOSIS

- Innovative approaches and strategies for resource-use optimisation and waste prevention in industries, based on industrial symbiosis
- 9 industrial case studies
- ReUse Network and Resource Exchange Platform
- D4R (Design for Recycling, ReUse, Repair, Refurbishment) Laptop and PV-System
- Partners: AT, ES, DE, FR, PT, ES, RO, UK, HU, IE, PL
- EU investment: € 6.15 Million



<http://www.zerowin.eu/>

ZEPHYR

Zero-Impact Innovative Technology In Forest Plant Production

ENERGY-WATER-FOOD NEXUS CLEAN TECHNOLOGIES

- System for large scale production of pre-cultivated forest regeneration materials
- New LED-Lamps and wireless sensors to reduce energy consumption and monitor cultivation process
- Recycling of water and fertilizers, avoiding pesticides
- First unit inaugurated in 03/2015
- Partners: IT, GR, FI, FR, DE, SE, BE, ES, PT, UK
- EU investment: € 3.43 Million





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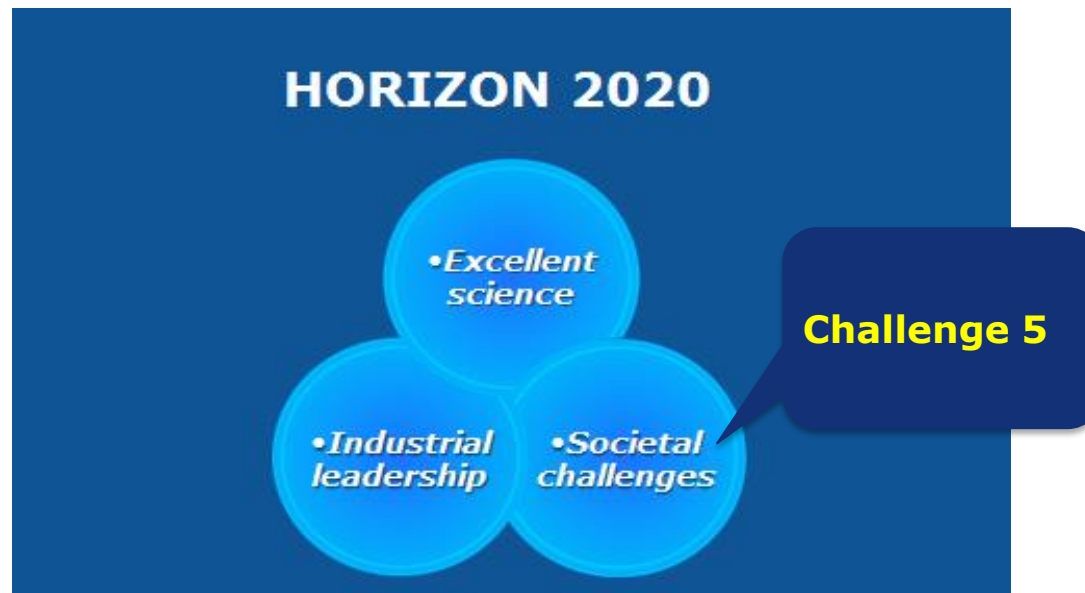
OVERVIEW

PART II

✓ R&D PAVING THE WAY ... from 2014-2015

... HORIZON 2020

R&D PAVING THE WAY ...2014-2015



**H2020 the world's largest cross border research and innovation programme,
with 80 billion € for the 2014-2020 period !**



HORIZON 2020 2014-2015

Societal Challenge 5 "Climate action, Environment, Resource Efficiency and Raw Materials"



HORIZON 2020 SPECIFIC PROGRAMME

STRUCTURE of Societal Challenge 5 (SC5)

1. Fighting and adapting to climate change
2. Sustainably managing natural resources and ecosystems
3. Sustainable supply of non-energy and non-agricultural raw materials
- 4. Transition towards a green economy through eco-innovation**
5. Global environmental observation and information systems
6. Cultural heritage

- Foster all forms of innovation
- Strengthening eco-innovation technologies, processes, services and products
- Impacts on society, economy, environment
- Across- sectors

Eco-Innovation in SC5 WP 2014-2015

Implementation

1. Focus Area **WASTE** 131 M€
2. Focus Area **WATER** 163 M€
- 3. SMEs** 36 M€

Outcomes

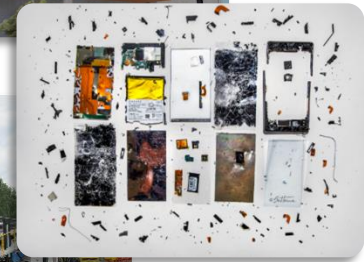
- Innovation actions on industrial symbiosis, across several industrial sectors & in support of EIP priorities
- Research actions (water & climate)
- Coordination actions & public procurement
- ERA-NET Cofund
- Wide range of stakeholders

Transition towards a more system approach to innovation ... Circular models

Eco-innovation in SC5 WP 2014-2015

Focus Area **Waste**

- **Number of projects*:** 13
- **EC contribution*:** 67 M€
 - Material flow management and zero waste approaches in building sector
 - CE concepts for Photovoltaics and textile sectors
 - Material recovery from WEEE and construction/demolition waste
 - Industrial Symbiosis for steel by-products
 - Waste management in metropolitan areas
 - Mapping up waste EU innovation network
 - Public procurement of innovation for resource efficiency and waste treatment



* Incl. calls WASTE-1 to WASTE-5; calls WASTE-6 and WASTE-7 not yet closed

Eco-innovation in SC5 WP 2014-2015

Focus Area **Water**

- **Number of projects*:** 23
- **EC contribution*:** 79 M€
 - Water Irrigation
 - Water management (including ICT models and tools)
 - Energy from wastewater treatment plants
 - Water reuse and -treatment
 - Reducing local flood risk in urban areas and forecast meteorological and hydrological extremes & impacts
 - Subsurface water solutions and hydrogeology research
 - cooperation partnership water Europe-China



* Calls WATER-3b, -4b, -5b not yet closed



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OVERVIEW

PART II

- ✓ R&D PAVING THE WAY ... from 2014-2015
- ✓ NEXT OPPORTUNITIES in HORIZON 2020

...WP 2016-2017

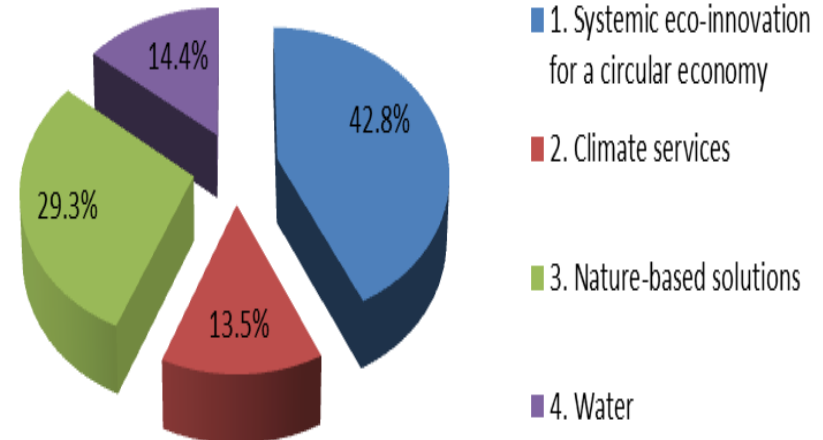
Preparation of WP 2016-2017

- ✓ **Stakeholder consultation** for Societal Challenge 5
 - >systemic and interdisciplinary solutions
- ✓ **Advisory Group**
 - >all forms of innovation, systemic eco-innovation across sectors, services, closed loop
- ✓ **Group of experts** on 'Systemic Approach to Eco-Innovation'
 - >systemic innovation, markets of the future, new business models, open space for innovation, need for demonstrators
- ✓ **Call for Ideas**
 - >large scale demonstrators

Call for Ideas large-scale pilot/demonstration projects

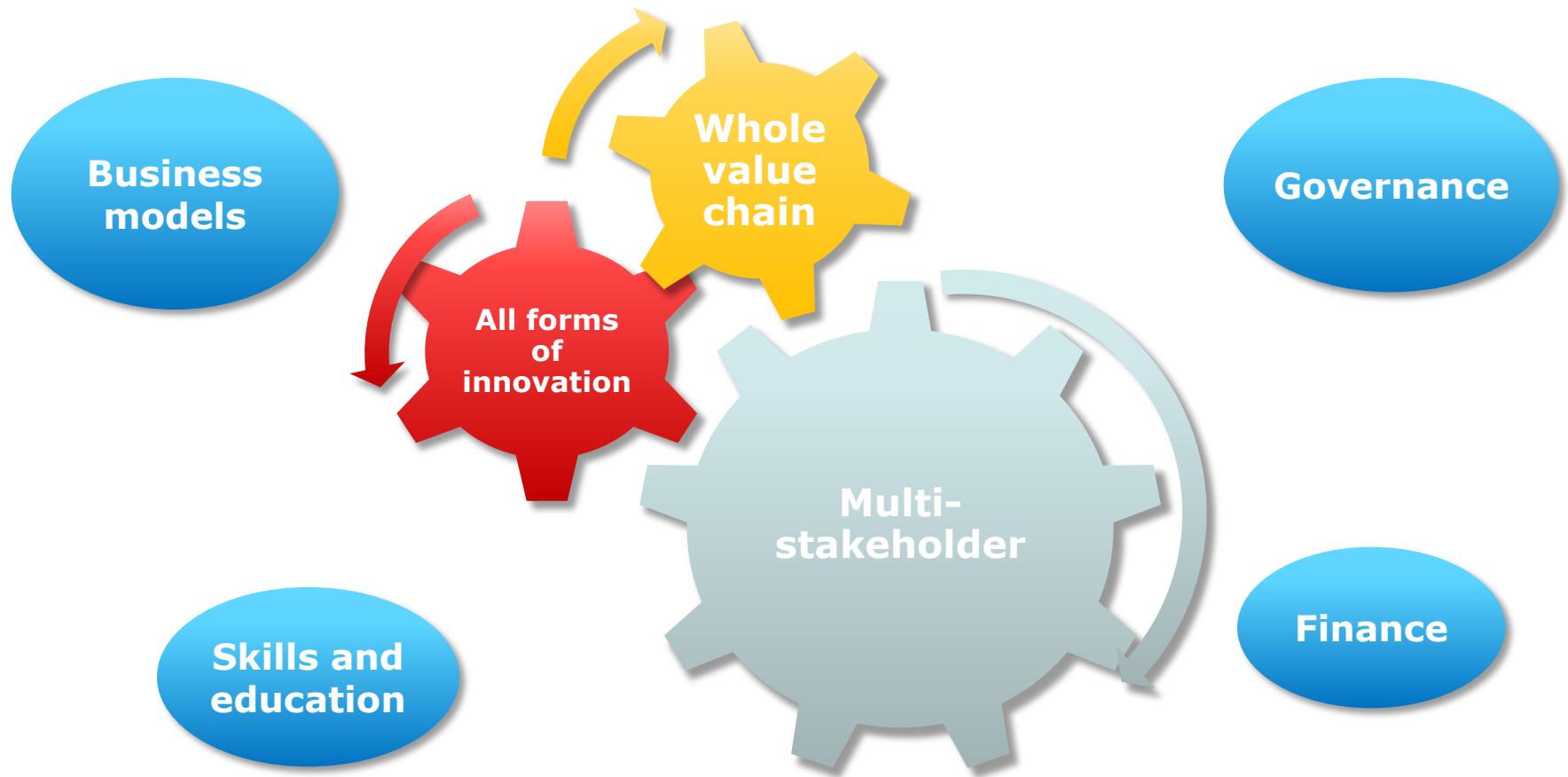
451 ideas received

- more than 42% addressed the area 'Systemic eco-innovation for a circular economy'
- Large enterprises and SMES more than 22% of submissions



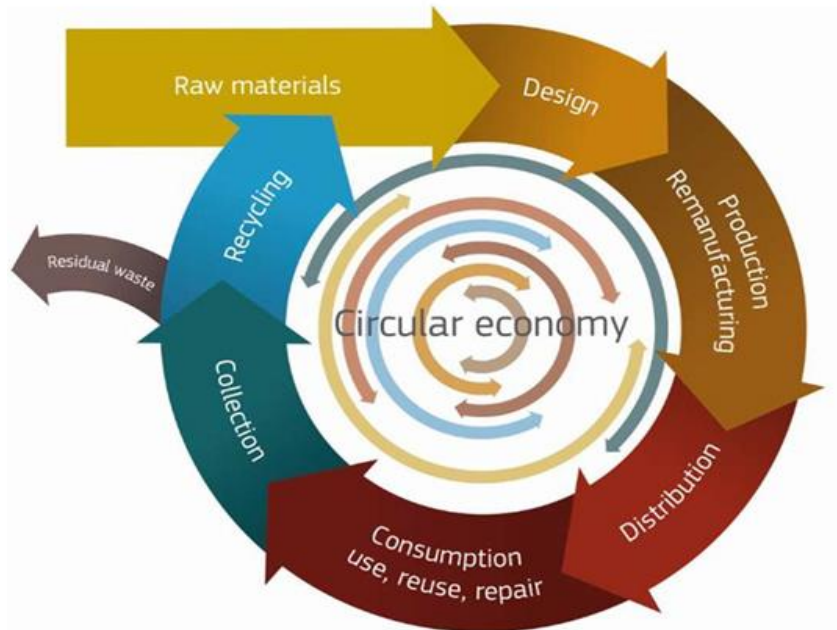
https://circabc.europa.eu/sd/a/07b4b20e-c995-478f-ac00-1dfc1ca8019b/Report_outcome_call

WHAT IS SYSTEMIC ECO-INNOVATION ?



Circular Economy requires Systemic Eco-innovation

Circular Economy RTDI Focus



- ❖ **demonstrating** the economic and environmental feasibility of the circular economy
- ❖ **supporting systemic innovation** to obtain a systems-wide **transformation**
- ❖ **reorganising production and consumption** to maintain or enhance the value of products, components, materials and resources throughout the **value chain**
- ❖ **decoupling** creation of wealth and jobs from resource consumption

What are the Opportunities for 2016 ?



...a new Focus Area:

Industry 2020 in the Circular Economy

Cross-cutting call

Where you can find it?

- ✓ Horizon 2020 - Cross-cutting activities (Focus Areas)
 - General introduction
 - Circular Economy section

What is inside?

- ✓ Description of **Systemic Eco-innovation**
- ✓ Topics for SC5 in 2016 – total budget 84.5 M€
- ✓ Topic descriptions
- ✓ Topics open: 10 Nov. 2015
- ✓ First deadline: 8 March 2016

FA Circular Economy - in SC5 for 2016 (84.5 M€)

- ✓ **Topics funded by Societal Challenge 5:**
 - **CIRC-01** Design for circular value and supply chains: large-scale demonstration projects (IA, 7-10M€/project total 60M€)
 - **CIRC-02** Demonstrating the potential of efficient nutrient recovery from water (IA, 6-8M€/project total 20M€)
 - **CIRC-03** Smart Specialisation for systemic eco-innovation/circular economy (CSA)
 - **CIRC-04** New models and economic incentives for circular economy business (RIA)
- ✓ **Topics open: 10 November 2015**
- ✓ **First deadline: 8 March 2016**



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SUMMARY

PART III

✓ TOPICS DETAILS



Thank you

- **Infoday**
<http://ec.europa.eu/research/index.cfm?pg=events&eventcode=480C5A1C-AE0C-20BC-227EDA8F8355FD0A>
- **Workprogramme Cross Cutting Calls**
https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/17.%20CROSS%20CUTTING%202016-2017_pre-publication.pdf
- **Circular Economy Package**
http://ec.europa.eu/environment/circular-economy/index_en.htm
- **DG Research & Innovation – Environment**
http://ec.europa.eu/research/environment/index_en.cfm