Circular Economy Digital Training Toolbox to Foster Innovative Green Entrepreneurs

INTELLECTUAL OUTPUT #1: Circular Economy Training Needs Analysis Report

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Part 1: Desk Research

Background, Regulation and Awareness about Circular Economy in Partner Countries

Malta

Malta’s Green Economy Strategy and Action Plan adopted in December 2015 aims to enhance the areas of eco-innovation and the circular economy. The areas being tackled include six basic areas [1], [2], [7] as follows.

Malta’s green economy (mainly jobs in the water supply industry, solid waste management sector and renewable energy-related sectors) is estimated to grow by 19% over the next three years. To further stimulate green economy in the coming years, the strategy proposes developing stronger links between industry and academia and incorporating sustainable development in all vocational training.

Waste management including updating of waste infrastructure and the setting up of waste separation and recycling systems and education programmes. A new Waste Management Plan 2014-2020 was also issued in January 2014, which sets the following national targets, in line with EU legislation:

- Target for the recycling of 50% of paper, plastics, metal and glass waste from households by 2020;
- A limit of 35% of biodegradable municipal waste allowed to landfill by 2020;
- A 70% recovery target for Construction and Demolition Waste by 2020;
- An obligation to collect 65% of the average weight of electrical and electronic equipment placed on the national market by 2021;
- Target for recycling 75% of packaging waste by 2030;
- Target for recycling 65% of municipal waste by 2035
- A binding landfill target to reduce the landfilling of municipal solid waste (MSW) to a maximum of 10% of the total MSW generated by 2035
- A ban on the landfilling of separately collected waste and the promotion of economic instruments to discourage landfilling

Greening the energy sector – An electricity interconnection with Italy was activated in 2015 and other projects are underway to update the energy infrastructure and energy generation. Although progress has been made in improving energy efficiency, additional efforts are needed to reach the country’s 2020 target.

Renewable energy – Malta’s share of renewable energy sources in total consumption has increased, reaching 4.7% in 2014. The use of cooperation mechanisms with other member states (such as importing ‘green electricity through the interconnector) could be considered to help the country achieve its targets. A new photovoltaic panels scheme was introduced in 2015, whereby residents installing such systems in their home are eligible for a grant covering up to 50% of the capital cost
capped to 2300 Euros, or 757 Euros per KWp, and a feed in tariff of 16c for 6 years and marginal cost for the remaining lifetime of the system

The transport system is still largely dependent on imported fossil fuels; the share of renewable energy in transport was 4.7% in 2014. To be able to reach the 2020 target of 10%, a National Electro-mobility Action Plan was adopted in 2013. The government is also providing individuals who purchase electric vehicles with a grant of up to 4000 Euros.

Water stress is a long-standing issue in Malta, with an annual natural renewable freshwater availability well below the UN threshold of absolute water scarcity. Malta is therefore heavily dependent on the desalination of water for its drinking water supply, which consumes 3% of the total electricity generated. An updated Water Catchment Management Plan for the period 2015-2021 was adopted in 2015, which sets out a programme of measures to optimise the management and use of water resources in Malta and Gozo. Innovative approaches to improve water availability are being explored and tested through projects such as MARSOL – Demonstrating Managed Aquifer Recharge as a Solution to Water Scarcity and Drought, an FP7 project investigating managed aquifer technologies, and Alter Aqua, a public-private initiative aimed at mobilising Non-Conventional Water Resources (rainwater harvesting, storm water management and greywater reuse systems).

Proposed actions related to water management include:

- Introduction of voluntary water audits in companies
- A grant scheme to support investments targeting water efficiency
- The Second Water Catchment Management Plan adopted in 2015, which foresees a number of innovative measures aimed at promoting efficient use of water resources, increasing water availability and developing new technologies for water treatment and management

In the past two years, awareness on the subject of circular economy has increased significantly. This is evident from the various articles in newspapers, press releases and consultation sessions being organised locally (References [3],[4],[5],[6]). Additionally, a new energy efficiency measure was launched in 2015 which involves door-to-door energy audits for households, whereby public officials conduct free on-site energy audits by appointment and provide energy-saving advice to residents [7].

Romania

Background

In Romania communication on circular economy is poor all communications being mainly targeted to sustainable development a concept well-known. Achieving sustainable development in the near future include the introduction in the school curricula of disciplines which are based on interdisciplinary and environmental issues. However, there are many obstacles in achieving this. Schools and Universities in Romania deal with promotion of sustainable development concepts in their teaching processes, allowing the introduction of compulsory courses, multidisciplinary courses and cross-disciplinary ones. Still curricular reform should be a priority for schools and higher education institutions.
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The most important document for structural changes in Romania is Partnership Agreement Romania -2014RO16M8PA001.1.1:

The extension and modernization of the water and wastewater infrastructure continue to be one of the most important priorities in improving Romanian living standards, especially in rural areas. Waste management is still far short of European standards with low levels of re-use, recycling and energy recovery. Romania has as transition period until 2017 to phase out non-compliant landfills. Romania is well endowed with natural assets, which, if sustainably managed, can offer important development potential, but environmental quality and biodiversity remain under pressure from both natural process and economic activity. There is a need to enhance environmental protection and to shift to more sustainable practices in areas where agriculture production is intensifying and in construction sector, in extractive industries and in business generally.1

Awareness

The general public in Romania is aware of the circular economy concept, because at the advanced search made on Google, the results regarding the circular economy concept was of 8.850 pages with this content.

The frequency of this topics in the media is of 263 pages that contain in the News topic of Google, the words: “circular economy concept”.

Checking the search engine the pages mirror European legislation and actions and very few Romanian ones.

There are only poor actions for circular economy at national level. The most important was “CIRCULAR”, the largest conference on the topic of the circular economy, which took place 1st September 2015, in Bucharest as a Green Report conference, organized by the Green Revolution Association. The conclusion was “Circular economy is a relatively unknown concept in Romania, but currently intensively discussed within the European Parliament. This concept describes an economy that is based on the reduction of energy and raw materials consumption, in which the waste is reused”2.

But still there are measures taken at the level of environmental protection. They can be found :

- Environment Fund Administration which managed schemes for water infrastructure, renewable energy investments
- National Agency for environmental protection
- National Rural Development Programme - The “greening” payment will provide an additional support per hectare provided that the CAP “greening” criteria are met. The agri-environment payment (EAFRD) supports farmers which voluntarily commit to meeting additional conditions (exceeding the basic requirements) of environmental protection
- ESI funding: Measures for environment protection, resources efficiency and climate change will be provided through ERDF and CF, including measures promoting the good environmental practice in business The EAFRD will complement activities in this area by measures to protect and maintain

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1 Partnership Agreement – the infrastructure challenge
2 ECONET

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biodiversity on agricultural and forest land, and by integrating climate change mitigation and adaptation actions to reduce the GHG emissions in agriculture and forestry.

Concerning the new European legislative package it is not transposed into Romanian legislation. Basic regulatory framework is limited to a Law - 211/2011 transposing the Waste Framework Directive. In it, the concept of circular economy is not set, but the steps appear to be prosecuted and appropriate measures. Practical measures are not implemented yet.

“. Elena Tudose, program director at the Institute for Public Policy (IPP), recently concluded:

"Unfortunately, in Romania, the waste is still viewed as a burden, rather than being viewed as an opportunity. Municipal waste recycling threshold set by the European Commission to 65% by 2030. Also, we are talking about a 75% target for recycling of packaging waste, as well as a reduction in landfill 10 %, all by 2030. "[13]

The ENVIRON association build awareness on the own web site http://environ.ro/index.php/ro/economie-circulara but only at the level of general information concerning EU policy.


Education

In Romania initiatives and/or documentation from the Ministry of Education on the topic, e.g. programmes “Train the trainer”, curricula on circular economy, etc. were not found. Fundamental principles and basic legislation in the area of education on circular economy were not found in Romania.

According to the National Strategy for sustainable development 2013-2020-2030:

- the Education for sustainable development will be integrated laterally in all syllabuses, either as sets of subjects or as modules, from nature sciences to civic responsibility to sustainable production and consumption patterns relative to available resources. This seems to be the start for circular economy principles but there are many steps to be done.

Spain

Background

Environmental education seeks individual and social changes that lead to improvement of the environment and sustainable development. It was in the mid-1970s that the deterioration of the environment began to be understood as a social problem and environmental education emerged as a response. In Spain this was closely linked at first to conservatism and pedagogical renewal, in parallel with the changeover to democracy.

Later, in the 1980s, coinciding with the division of Spain into 17 Autonomous Regions, the implementation of environmental education programmes became general. Three important events mark this decade: the First and Second Conferences on Environmental Education (Sitges, 1983
and Valsaín, 1987), and the conception and approval of the General Organic Law of the Educational System (LOGSE), in 1990, incorporating environmental education as a transversal theme into the educational system.

The new vision of the role of environmental education emphasized the need for education that involves society as a whole and moves towards sustainability. It reinforced the idea that education and environmental management are complementary.

**Awareness**

An intensive agenda of conferences and debate on the future of waste management in Spain has been organised across the State by local administrations, public bodies, business people’s associations, stakeholders and educators, to showcase the circular economy and emphasise the need for zero waste. This is evident when typing any combination of words relating to the circular economy into a search engine. In the last two years the national as well as local and online press have also been very actively engaged in promoting the circular economy. (R1)

The Circular Economy Foundation (Fundación para la Economía Circular - FEC) is the most active entity in promoting the circular economy. FEC is a private, supranational foundation comprising a board of members that brings together former senior regional administrations. The Foundation works with world experts, governments, private entities and social agents in areas related to circular economy, sustainability, resource use and environment. It is currently the undisputed leader in the knowledge of these sectors in Spain and Portugal.

FEC also works closely with economic, social and citizen entities such as CEOE, CEPYME, Chambers of Commerce, professional associations, syndicates such as UGT and CC.OO, Consumer or Neighbourhood Associations, and Ecologist Groups among others, the Industrial Engineers of Madrid, Barcelona and Seville professional schools, addressing their concerns and opinions. (R2)

**Regulation in Education**

It is important to note that the Spanish state is a decentralized administrative political structure with 17 autonomous regions whose parliaments have broad powers, established by the Constitution of 1978. The State is responsible for drawing up basic legislation and attention to international obligations in environmental matters. Autonomous regions can adapt and develop basic regulations, as well as establish additional measures of protection. In addition, they have competences in education and management in environmental protection.

In Spain the most relevant milestone was the drafting of the White Paper (R3) on Environmental Education in 1999, which would be maintained and renewed with other international reference points such as the European Union's Sustainable Development Strategy 2001 or the VII Action by the European Community on the Environment until 2020 "Living well, within the limits of our planet".

The White Paper aimed to give new impetus to environmental education, paying more attention to social aspects, deepening a change of values, integrating it into all sectors of citizenship and encouraging the full participation of all citizens in environmental policy. The objective was to guarantee the presence of environmental education in the Educational System. In schools, colleges and institutes, environmental education was introduced as a transversal theme.
In professional training the incorporation of environmental issues occurs, in general, in all training cycles, particularly in the specific studies that have a direct link with environmental improvement (industrial production, natural resources, agricultural sector, etc.).

In the White Paper more weight was given to environmental education in university studies in all career paths. Attention was paid to the environmental training of university faculty members. Research, cooperation and coordination were promoted between the university departments, the different universities, the university and the rest of the educational institutions, and the university and the administration and companies.

The White Paper addressed environmental education in the business world. It promoted environmental education through business organizations by encouraging programmes and courses of continuous training in environmental matters, as well as participation in internal processes, involving all the employees in the environmental balance of the company.

The unions were entrusted with encouraging the involvement of workers in the environmental management of companies by keeping them informed, motivating them and providing them with environmental knowledge and values.

In conclusion the White Paper offers a mosaic of ideas, suggestions and proposals for environmental education at all levels. (R4)

In the last few decades environmental education, which may vary from one autonomous community to another, has been implemented in training centres and schools. In the Principality of Asturias, for example, the focus is on education for the active participation of the entire population in the prevention and resolution of environmental problems. The regional government and other institutions such as local public administrations, public and private companies and non-profit organizations have actively taken part in this initiative.

In 2000 the programme called Environment in the School was introduced. In 2007, the Departments of Environment and Rural Development and of Education and Science cooperated in implementing the Programme for Sustainability and Environmental Issues (PRESTA).

The Network of Schools for Recycling (Red de Escuelas por el Reciclaje - RER) is another important awareness-raising initiative launched in 2005/2006 and organized by COGERSA (Compañía para la Gestión de los Residuos Sólidos en Asturias - Solid Waste Management Company of Asturias) in cooperation with the Ministry of Education, Culture and Sport. It offers environmental awareness and training on the correct management of waste, emphasising the three Rs: Reduction, Reuse and Recycling. Some 55,000 students from all levels of non-university education participate annually in the RER. (R5)

**Greece**

The general public is very well aware of recycling various forms of material (18% of material is recycled in Greece) and specific disposal boxes can be located in all municipalities (paper, glass, food residue, technical equipment/parts, lamps, batteries etc.). There are many different schemes and informational sessions ongoing and programmed by municipalities and prefectures to primarily inform local and regional actors on the principles and concepts of circular economy (examples:
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Municipality of Nisiros³, University of Patras⁴, etc). The general public is subsequently informed by the respective local and regional actors. The main topics of presentations are the following:

- Recycling and re-use
- New ways of using material
- Behaviour and global role
- Influence in the economy
- Role of local and regional authorities
- Business models of circular economy
- Support structures and information
- Definitions and concepts, good examples and case studies from across Europe
- Implementation areas in Greece and example sectors (i.e. raw material, technology and parts, bio distilleries, fishing, recycling, etc).
- Added value on various production sectors

The general public can find information and data on circular economy from the following points:

- Newspapers promoting respective conferences, government funding schemes, in local and regional authorities where posters and leaflets are available, universities which promote degrees (including topics on circular economy)
- Through own initiatives i.e. searching the Internet, discussing with relevant people,
- Through various case studies / good practices that are presented in TV and radio spots and news channels. There are quite frequent presentations of good practices on various topics on several national TV networks on weekly basis.

The government has in cooperation with the Hellenic Recycling Agency (HRA), started an information training campaign in primary and secondary schools in Greece approved by the Ministry of Education. The program is aimed at students in the last grades of elementary school to the final classes of secondary schools in Attica and Thessaloniki. The program aims to raise awareness on environmental benefits, recycling methods and the results of the recycling of electrical and electronic appliances, as well as motivating themselves, their parents and teachers to participate actively in recycling electric appliances. The specific training programme includes audiovisual material, Q&A sessions and presentations⁵.

✓ How frequent is the media displays on the topic?

The mass media presents information when a. informed by the organizer of a large event or where central government is involved. If a Greek case study serves as good practice, this makes the news. The TV channel SKAI has a TV programme called “Eco News” where various topics are presented

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³ http://re-greecesymposium.wix.com/nisyros
⁵ http://www.eoan.gr/el/content/468/ekpaideutiko-programma-tou-sed-anaklisi-suskeuon-a-e
such as circular economy case studies, green entrepreneurship, Greek good practices etc. The national news channel has a large audience.

The media – usually local and regional newspapers, also mention and report on the various conferences taking place. They have to be informed by the organizer or through a press conference.

✔ Is there any national framework, strategy, or action plan on the topic?

Initial Directive 94/62/EC on packaging and packaging waste was issued on the 20/12/1994. The Actual implementation date in Greece was 07/11/2008.

The Greek legislation on the Circular Economy is:

- 4 Greek laws passed (with updates)
- 6 Ministerial decisions
- 2 Presidential decrees

The aim is to reach the EC goals and boost European and Greek competitiveness. This will help fostering sustainable economic growth, generate new jobs for Greece and the EU while taking advantage of the funding available: €5.5 billion from structural funds and €650 million from Horizon 2020.

The new update on the law N.2939/2001 was presented on the 13th October 2016 by deputy minister Mr. Tsironis related to Packaging and alternative management of packaging and other products. A new organisation was set up called the Hellenic Recycling Agency (HRA) and will be the competent authority of the Ministry of Environment & Energy for the design and implementation of recycling policy in Greece. It is responsible for approving national alternative management systems for each product and for controlling the progress of recycling within the Hellenic territory. However, according to the above resource, the implementation period in Greece is 7 months to 2 years.

- Initiatives and/or documentation from the Ministry of Education on the topic, e.g. programmes “Train the trainer”, curriculas on circular economy, etc.

Following extensive research, no identification of formal VET or HEI training programmes in educational levels 4–7 was located. There are many seminars ongoing related to circular economy, a plethora of workshops and conferences, as well as topics included in post graduate and graduate degrees in university studies. However, specific VET training programmes or dedicated degrees for circular economy do not exist separately. There is a lack in this field.

- Municipality of Halandri, Athens: four new training pilot projects have started related to recycling and concepts of circular economy on a practical basis, addressing the general public on the following topics:
  1. Managing food residue
  2. Home compost training targeting people with gardens,
  3. Recycle paper on a neighborhood level,

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6 EY Study on the Circular Economy in Greece, May 2016, Vasilis Kaminaris, Diana de Graaf, Eirinikos Platis, Kiara Konti, SEV (Hellenic Federation of Enterprises) and EY.

7 www.eoan.gr
4. Train students in selecting/filtering garbage at the source.

**Bulgaria**

Conducting a search in Google with key words “circular economy” (in Bulgarian language) generates 25 000 results which are mainly news about new European and national initiatives and projects in the field of circular economy as well as links to companies providing different services connected with circular economy, e.g. waste management, renewable energy sources, etc.

When the search is done with the key words “education on circular economy” (in Bulgarian language) 17 000 results are generated. These results include conferences on circular economy, legislation documents, and training courses in this field.

During the last few years general (non-specialised) online media publish regularly (approximately on a monthly basis) news about different issues regarding circular economy (Table 1).

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In 2013, Bulgaria was ranked last under the Eco-Innovation Scoreboard. This indicates that low performance of the country in terms of circular economy and eco-innovation activities. Despite this, Bulgaria has made efforts to improve in these domains through the implementation of several Operational Programmes since 2013. In 2014 and 2015, eco-innovation policy measures and funding schemes included:

- The Innovative Strategy for Smart Specialization of the Republic of Bulgaria 2014 – 2020

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On 23 February 2016 a conference were held on "Circular economy and the ability for Bulgarian business ". In the event participated The minister of Environment and Water Ivelina Vassileva, The Minister of the Economy Bozhidar Lučarsky and The European deputy Eva Paunova (MEP), who was the organiser of the event. Many representatives of the business took part and were active during the discussion. Minister Vassileva presented long-term framework of actions initiated by her office. The framework is related to resource efficiency, sustainability of production and consumption in the country. The Minister guaranteed for active government policy to build circular economy in Bulgaria to cover all parts of government and to attract all stockholders.

The government encourages the use of renewable energy in the transport sector through several different initiatives:

- National Action Plan for the Promotion of Production and Adoption of Environmentally Friendly Vehicles Including Electric Mobility in Bulgaria for 2012 – 2014, and

There is no special legislation in the area of education on circular economy. There are some subjects which are connected to the topic of circular economy such as: The human being and the nature, The human being and the society, Chemistry and environment protection.

UK / Scotland

Introduction

The Circular Economy (CE) is the latest in a number of concepts, such as zero waste, which has been used to describe a more resource efficient approach to the use of raw materials in our economy. Various EU programmes which includes the Thematic Strategy on the Sustainable Use of Natural Resources[1], Sustainable Consumption and Production[2], Integrated Product Policy[3], and the resource-efficient Europe flagship initiative Roadmap to a Resource Efficient Europe[4]. Largely through the Leadership of the Ellen MacArthur Foundation, the EU has now progressing much of these initiatives in policy proposals framed as CE and is expected to introduce changes to existing EU legislation, including more ambitious recycling targets. The European Commission has also produced
Closing the Loop – An EU action plan for the Circular Economy, which sets out some innovative proposals around products, manufacturing.

Scotland and circular economy

Much of the UK’s environment and waste policy which applies in Scotland, is devolved to the Scottish Government and its parliament. As a result, Scotland has been developing progressive waste and resource policies for the past 15 years. A major development was the Zero Waste Plan (ZWP)[5], Scotland’s response to Article 28 of the Waste Framework Directive (2008/98/EC) on national waste strategies. The plan’s mission is to achieve a zero waste Scotland, where we make the most efficient use of resources by minimising Scotland’s demand on primary resources, and maximising the reuse, recycling and recovery of resources, instead of treating them as waste. This clearly has resonance with the principles of CE. This ZWP led to the Scottish Government introducing innovative legislation that required municipalities to provide food waste collection services to households, for restaurants to segregate their food waste, and for all businesses to have a segregate system for recyclate materials.

In 2016 the Scottish Government went further and produced its Circular Economy Strategy – Making Things Last[6]. In addition to policies that related to the waste management sector, such extending producer responsibility to tyres, furniture and mattresses, the Strategy looks to establish CE innovation funds, a remanufacturing centre supporting industry and academics.

The Scottish Government also runs a Resource Efficient Scotland programme[7], which has a wider interest in resource use, including energy efficiency. The programme offers online webinars and a free online training course (Green Champions Training) which is written for SMEs in modules which include question and answer interactions. The course has no formal qualification status.

Education on Circular Economy in Partner Countries

Malta

To promote green jobs, the Green Economy Strategy and Action Plan proposed the following [7]:

1. Development of a National Education for Sustainable Development Strategy by the end of 2016. This involves including sustainability among the priority areas for future Malta Government Scholarship schemes and encouraging students to follow a career in the green field. Also, this strategy aims to ensure that education for sustainable development provision reaches every sector of the local population (formal, non-formal and informally).

2. Mainstreaming sustainability in different training programmes by 2017. This ensures that both in training courses that offer specialised training related to the green economy, as well as in other training courses which focus on the development of transversal skills, participants appreciate and understand the role of the green economy in today’s economical and employment architecture. Additionally, by end of 2017, the Education measure for households aims to develop an outreach program for households and businesses whereby a sustainability mentor would be allocated to provide recommendations on how households could become more sustainable.
This would ensure that the economic benefits of going green can be reaped by everyone including the socially disadvantaged and micro-enterprise that may not have the resources to invest in greening programmes.

As Malta takes on the Presidency of the Council of the European Union in January 2017, the aim is to further advance the Circular Economy agenda, by making substantial progress in the negotiations relating to the legislative proposals to amend six Waste Directives. The Maltese Presidency will also attempt to promote discussions on marine litter and the plastics strategy expected by the end of 2017 [9].

3. Creation of specialised training programmes through the University of Malta and/or MCAST focused on the skills required by the green economy, with particular reference to the sustainable development and development of green buildings, by 2018. The strategy also reaffirms the Government’s commitment to enhance the competitiveness of SMEs via the green economy. This includes raising awareness among SMEs of the opportunities generated by the green economy, promoting energy audits leading to increased resource efficiency and supporting SMEs through the introduction of tax credits, grants, training and similar schemes.

Through the Training Aid Framework, financial assistance is given to companies that invest in the training of their workforce. This scheme is available for companies in the private sector and the subsidy varies according to the type of training and the size of the enterprise. Training can be in-house or out-sourced and can be given in Malta or abroad through distance learning [7].

Recently, sustainable development has been included as part of school curricula and teachers and managing staff have been trained with respect to this topic so as to assist in the implementation of the overall sustainable development approach of school and establishments. The University of Malta and MCAST (Malta College of Arts, Science and Technology) offer programmes related to sustainable development/green economy. The following are the courses offered by the University of Malta [8]:

**EQF Level 6:**
- B.Sc. (Hons.) in Earth Systems

**EQF Level 7:**
- Masters in Education for Sustainable Development
- Master of Science in Sustainable Environmental Resources Management
- Master in Environmental Management and Planning
- Master of Science in Sustainable Infrastructure
- Masters in Sustainable Energy

MCAST on the other hand offers courses in:
- **EQF Level 4:**
  - Environmental sustainability
  - Solar Thermal installations

- **EQF Level 5:**
  - Environment conservation
  - Environment and water technology

- **EQF Level 6:**
Circular Economy Digital Training Toolbox to Foster Innovative Green Entrepreneurs

- Environmental Engineering
- Power Generation and Renewables

Details of the curriculum for the MCAST Advanced Diploma in Environmental Sustainability [10] are provided in Appendix 1. More details on the different courses relating to the Circular Economy may be found on the University of Malta [12] and MCAST [11] websites.

Romania

Results about education and information sources on circular economy in Romania are summarised in Table 2.

Table 2. State-of-the-art of education on circular economy in Romania

<table>
<thead>
<tr>
<th>Type of source</th>
<th>Short description</th>
<th>Reference #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online articles</td>
<td>BUSSINESS MODELS OF CIRCULAR ECONOMY - written by Scientific Researcher PhD – Gabriela – Cornelia PICIU, Financial and Monetary Research Center “Victor Slăvescu”, Romanian Academy, Romania; This article considers the role of circular business models in efficient and sustainable growth. Circular economy is a fundamental change in the way products are designed, manufactured, sold and consumed. The company who assimilates circular economy principles must adopt new business models, especially this means the transition from selling products to selling services. In these business models, companies retain property rights on products.</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Circular economy. Blue economy</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Romania is prepared for circular economy?</td>
<td>17, 18</td>
</tr>
<tr>
<td></td>
<td>“…. In a way, the answer may be simple - no, it is not. The reasons are simple, but not the implications for Romania. If you look at some basic macro-economic indicators in terms of resource efficiency, we can easily conclude that the situation is not only happy, but also the prospects are worrying if we fail to channel the attention of employers and the government to re-thinking and stimulate economic trajectory with a fast circular economy.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ideas about circular economy - Sibiu Days</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Action plan for circular economy - Engineers National Association</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Creative recycling in the context of circular economy – POSDRU PROJECT - SUCCESS</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Description of the project Interreg - RETRACE – A Systemic Approach for REgions TRansitioning towards a Circular Economy, that has as objective the improvement of policies in resource efficiency</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Working workshop for National Strategy Renovation – “… Green buildings have a key role in the transition towards a circular economy based on growing &quot;green. The topics of this meeting will focus on: financial initiatives – Green Grants, Green Mortgage as the importance of circular economy / &quot;Green&quot; - especially in the construction industry;...”</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>NGOs can fund projects and public education aimed at key steps in the transition to the green economy, according to the Guidelines for the</td>
<td>28</td>
</tr>
</tbody>
</table>
program aimed at education and public awareness on environmental protection, it said in a press release from the Ministry of Environment, water and Forests (MMAPI) issued August 2016.

National Institute for Research and Development in Chemical and Petrochemical industry - ICECHIM started the project implementation processes sequential closing of flows outboard bioeconomy and (bio) innovative products resulting from them - sequence in the Competitiveness Operational Programme, Priority Axis 1 - Research, Technological Development and innovation (RDI) in support of economic competitiveness and business development, Action 1.2.3: Partnerships for knowledge transfer. This project is co-financed from structural funds and provides new opportunities for developing circular bioeconomy.

"Philips - This is the future of business, A circular economy aims to detach economic growth from natural resource use and ecosystem using those resources more efficiently. It is a driver of innovation in reuse of materials, components and products and creation of new business models. In a circular economy, more efficient use of materials creates greater value through both cost savings and the development of new or existing markets."

Sustainability born ideas - SUSTAINIA100 is a top 100 eco-innovations for this year, after they were documented over 1,500 projects and businesses in six continents.

Unic investment in Romania - New Biogas station in Maramures

The CHEP pallet reuse by rental comply circular economy

Switching to circular economy - a necessity for Romania

Some examples of ideas about Circular Economy

How to become a Green SME in a Circular Economy

Circular Newtork Europe (CEN) released website and database of best practices on circular economy

Opportunity zones, incl. possible national schemes supporting circular economy

1. Environment Fund Administration is the main institution that provides financial support for projects and programs for environmental protection, constituted in accordance with European principles "polluter pays" and "producer responsibility". It operates as a specialized body of central public administration, with legal personality to the Ministry of Environment, Water and Forests [30].

2. Innovation checks grants – it is a non-reimbursable financial allowances granted to SMEs to finance projects with a high degree of innovation, the funds are allocated from the state budget for the National Plan for Research, Development and Innovation 2015-2020 - PNCDI III [31].

The above institutions/programmes are opportunity zones that can be used by companies to improve their economy based on reduction of raw materials and reuse of waste, they have not as direct target the circular economy.

3. "Let's Do It, Romania! and The National Environmental Guard announces the competition "Let's Be Eco", a project dedicated to educational establishments in rural areas. Its purpose is to support rural communities by reusing resources. The competition runs from 5 January to 30 April 2017 [27].
According to Romanian legislation there are three educational profiles for VET post-secondary education:

- Post secondary schools
- Foremen schools

**Technical profile**, including fields: electronics, automation, electrical, energy, computer science, mechanical, electromechanical, media production, printing techniques, transport, manufacture of wooden constructions, installations and public works, building materials, textile and leather industry, chemistry industrial, transportation, metallurgy, mining, oil and gas

**Profile services**, including areas: tourism and food, economic, trade, aesthetic and human body hygiene, health and tutorials, etc.

**Profile natural resources and the environment**, including areas: food, agriculture, forestry, environmental protection.

In terms of skill levels adopted in Romania according to the European Council Decision 85-368-EEC, pre-vocational and technical education provides the first 3 skill levels as follows:

- level I of qualification through Arts and crafts (the appropriate EQF level 2)
- level II qualification through completion year (Level 3 EQF)
- level III qualification in upper secondary education - the technological path (Level 4 EQF) and post-secondary education (EQF level 5)

**EXAMPLES**

**Level 4 Ecological and environmental quality technician** - Life sciences and ecology technicians prepare facilities and equipment for experiments, tests and analyses; harvested and prepared samples subjected to experimentation: cells, tissues, plant parts and organs; participate or conduct experiments, tests or analyses; performs the instrumentation readings of air, water and performs charts transcription of results; centralizes data and estimate quantities and costs of materials and labour necessary to accomplish the projects; organizes maintenance and repair of machines and tools necessary research; uses theoretical and practical knowledge acquired to identify and solve problem


**Level 5 – Higher technician in environmental protection**

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**Level 6** - The Faculty of Biotechnical Systems Engineering / PUB Bucharest; Bachelor of Science in one of the following domains: Two specialisation: Mechanical engineering; Environmental Engineering

Concerning the environmental engineering curriculum:

- Mathematics, chemistry, IT and industrial design Micro and macro economy, physics, materials science non-organic and organic/composite materials; didactics

Major Fields of study:

- Machines and Equipment for Agriculture and Food industry
- Biotechnical and Ecological Systems Engineering
- Sustainable Rural Development Engineering
- Food engineering

**Level 7** – there are 8 Master Programmes in the Environmental Engineering according to National Legislation.

Spain

Although still fairly unknown, since 2014 the concept of the circular economy is being introduced into environmental education at all levels. One example is an initiative by the Ministry of Territorial Policy, Sustainability and Security of the Government of the Canary Islands, which is currently working on the development of a programme on the circular economy and environmental education aimed at non-university students. This initiative will be launched in 2017 jointly with the Ministry of Education.

Many of the 63 Universities in Spain include Sustainable Development and the Green Economy as part of their curricula. The courses offered vary from one university to another. The courses most related to the circular economy are (R6):

**EQF Level 7:**

- Postgraduate course in Renewable Energies and Energy Sustainability
- Masters in Environmental Project Management and Corporate Social Responsibility
- Master in Science, technology and water management

**EQF Level 6:**

- Degree in Environmental Sciences,
  Graduates become experts in the analysis, conservation and management of the environment and natural resources; of environmental quality management in companies, public administrations and civil society organizations; the understanding of the social processes involved in environmental quality and its relation to health; and environmental communication and education.
- Double degree in Environmental Sciences and the Sea
- Double degree in Environmental Sciences and Chemistry
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EQF Level 5:

- Higher Technician in Environmental Education and Control
  The objective of this course is the control of the environment and its resources and the development of environmental education programmes (information, communication, training, interpretation and environmental participation)

**Curriculum Areas**

During the 2000 hour programme of studies, students attend class-based lectures on the following modules:

- Structure and dynamics of the environment.
- The natural environment.
- Human activities and environmental issues.
- Environmental management.
- Cartographic methods and products.
- Environmental education techniques.
- Environmental education programmes.
- Activities for public use.
- Development of the environment.
- Social skills.
- Training and career counselling.
- Business and Entrepreneurship.

The programme is complemented with a period of practical experience in the sector and a project on environmental education and control. (R7)

**Legislation and Schemes supporting a Circular Economy (R8)**

Waste Management Framework State Plan (PEMAR) 2016-2022

On November 6, 2015 the State Framework Plan for Waste Management (Plan Estatal Marco de Gestión de Residuos - PEMAR) 2016-2022 was approved. The Plan lays down the waste policy in Spain in the coming years, so as to ensure that Spain meets the recycling targets set by the European Union within the set deadlines. This plan contains the strategic lines and measures that need to be implemented in Spain to achieve the goal of turning the economy into a circular economy and boosting preparation of society for reuse and recycling.

This new Plan is in compliance with:

- The obligations of the European Union to have of waste management plans, upon completion of the National Integrated Waste Plan in 2015.
- One of the ex-ante conditions of the waste sector for access to funds in this sector in the next period.

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- The adaptation required by the Law on waste and contaminated soils
- PEMAR promotes the application of the circular economy in Spain through the improvement of waste management and the application of the hierarchy principle in waste management.

The plan contains:

- The overall strategy for waste policy,
- The orientations and the structure to which the regional plans must conform
- Minimum targets to be met for prevention, preparation for reuse, recycling, recovery and disposal.

In order to ensure compliance with national objectives, the Autonomous Regions must meet at least those objectives with the waste generated in their territory, although the specific rules of each waste stream may establish other specific criteria. Waste that is transferred from one Autonomous Region to another for its treatment will be computed in the Autonomous Region where the waste was generated.

However, the Plan, which focuses solely on waste management, does not set out how this goal is to be achieved. It requires the Autonomous Regions to implement the necessary measures and also the relevant decisions. Some Autonomous Regions have already legislated to promote the circular economy.

Areas of Opportunity

There are many areas in which to invest in the circular economy such as the supply of innovative services, new ventures with innovative business models facilitated by new information technologies. There are opportunities for value creation in biological products, through cascade and biochemical extraction of components, identifying the properties of those resources which were previously considered waste and which can now be used as an input in new production processes. Some companies are already generating interesting business opportunities in this area.

There is a strong business potential in the niche market of reuse and redistribution of products, for the same use in their original form, as shown by the success of platforms for buying and selling, led by consumers. Consumers are now more willing to buy second hand goods.

In a saturated market where the sale of new goods is low, there are business opportunities in repair and maintenance which can stimulate local economies.

At business level, identifying opportunities created by the Circular Economy requires analysis of the flow of material and energy. Redesigning the production process in a way that enables the circulation of products and components through the system for as long as possible will generate greater business opportunities by increasing the productivity of resources as well as the value of knowledge and technology that is absorbed by the product during the process of production.

Greece

The documentation framework in Europe is the following which serve as guidelines to the Greek government.
Circular Economy Digital Training Toolbox to Foster Innovative Green Entrepreneurs

- European Commission’s roadmap: “Circular Economy strategy”
- European Commission’s official webpage “Moving towards a circular economy”
- European Commission Communication titled “Closing the loop - An EU action plan for the Circular Economy”

The Greek law dealing with the respective area is N.2939/2001. The responsible organisation is the Hellenic Recycling Agency (HRA) under the auspices of the Ministry of Environment & Energy.

Curriculum areas

- Example of one Curriculum located with topics, assessment and possible certification process (if any)
- Levels of education where CE training is usual

The following objectives can be deducted from the research conducted:

From a bottom-up view:

✓ New model of doing business
  - Circular supplies - Move to renewable, bio-based and biodegradable resources
  - Resource recovery - Recover every possible remaining value from waste and by-products
  - Product Life extension - Maintain a product in a working condition for a longer period
  - Sharing platforms - Share products with multiple users
  - Product as a service - Provide the use of a product instead of the product itself

✓ New business opportunities in Greece – identification and investment

✓ Creation of new jobs – according to the Ministry for the Environment, Physical Planning and Public Works, turning towards circular economy will yield 150 million yearly and will create 10 000 new work places.

✓ Cooperation structures between related parties

✓ Motivation and change of behaviour towards circular economy

From a top-down view:

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9 EY Study on the Circular Economy in Greece, May 2016, Vasilis Kaminaris, Diana de Graaf, Eirinikos Platis, Kiara Konti, SEV (Hellenic Federation of Enterprises) and EY

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✓ Boost competitiveness and reach EC goals
✓ use the opportunity to help the long-awaited investment cycle recommence for business in Greece, as and when the needed fiscal and structural reforms take place
✓ provide information and benchmarking to Greek businesses to explore transformational initiatives, as opposed to simply replicating past experience, by using the incentives and directions inherent in these programs
✓ transform the issue of waste management, recycling of wastes, storing and reusing of wastes, from a field of confrontation to an area where cooperation and win-win solutions can be established.

Critical points in education on circular economy

One important aspect, relevant to this category, is the need and understanding that circular economy implementation relates to a product’s design phase and not its end phase.

Opportunity zones, incl. possible national schemes supporting circular economy

There are many opportunity zones in Greece to invest and implement circular economy in areas such as:

- Energy
- Feedstock
- Waste

However, according to Kaminaris et al., the below obstacles are evident rendering investment difficult:

- Delays in implementation and failures in actual implementation of the European legal framework on the Circular Economy and the existence of concurrent and contradictory legislations and regulations,
- Non-transparent and deficient licensing regimes for Circular Economy activities
- Lack of law enforcement and absence of sufficient audit mechanisms and subsequent delays in the imposition of administrative fines

The government needs, on a central level, to cater for the above and establish audit mechanisms as well as align public procurement criteria to promote the concept of circular economy in Greece. Finally, a systemic approach is needed.

Bulgaria

Curriculum areas

- Example of one Curriculum located with topics, assessment and possible certification process (if any)

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11 EY Study on the Circular Economy in Greece, May 2016, Vasilis Kaminaris, Diana de Graaf, Eirinikos Platis, Kiara Konti, SEV (Hellenic Federation of Enterprises) and EY.

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• Levels of education where CE training is usual

Subject: Chemistry and environment protection

Topic 15: Environment protection problems

Topic 16: Analysis of environmental status

In December 2016 EcoSystem Europe (http://ecosystemeurope.org/en/news/circular-economy-in-the-classroom/) made an educational tour around Vidin, Ruse, Varna and Sofia. The target of the team was to introduce the circular economy to students aged 15 to 19. More than 350 students and their teachers participated.

During the classes the magical world of prof. Gunter Pauli and his Fables was presented. There were discussions how to eliminate waste from human systems. First in the classroom and later on at home. The waste was chosen as a prime topic for two reasons. On one hand, it clearly illustrates the impact of the linear economy on our world and Planet. On the other hand, it clearly contrasts between human and natural systems. The tour was an introduction to the unique educational project Green Entrepreneurs Europe.

1. **Project name**: „ConsUmuvaj – Educational tours for responsible consumption”

2. **Project duration**: 18 months (15.01.2015 – 15.07.2016)

3. **Beneficiary**: Ecocentric Foundation


5. **Geographical scope**: Western Bulgaria.

6. **Target groups**: students (8-12 school year), volunteers (age 18-35) from Bulgaria and Germany, trainers, high schools, meda, local communities.

7. **Main activities**:
   - Development of a concept for educational activities for responsible consumption in Bulgaria and preparation of practical consumer alternatives.
   - Training of multipliers in Bulgaria to work with school classes, exchange with volunteers from Germany.
   - Implementation of educational activities in six cities in Western Bulgaria.

8. **Expected results**:
   - Developing educational program and materials for responsible consumption in Bulgaria.
   - A network of volunteers multipliers in Western Bulgaria.
   - Guide to multipliers with substantive and methodological guidelines for conducting city tours.
Circular Economy Digital Training Toolbox to Foster Innovative Green Entrepreneurs

- Web-based educational materials, educational interactive online tool for mobile devices for use by children and youth trainers, multipliers and other interested parties.

9. **Financed by:** DBU (Deutsche Bundesstiftung Umwelt), [https://www.dbu.de](https://www.dbu.de)

MBA (Innovation, entrepreneurship and circular economy) – distance learning programme provided by the University of Bradford

**Critical points in education on circular economy**

Economic, financial, administrative and socio-cultural barriers were identified by Eco-Innovation Observatory that slow the advancement of eco-innovation in the country. Important barriers included limited investment and funding opportunities, high energy prices and inefficient energy infrastructure. Despite the growing demand for environmentally-friendly products and services, stakeholders remain reluctant to invest in these areas due to consequences of the economic crisis. To meet the objectives of promoting energy efficiency, renewable energy sources, waste management and green transport, local stakeholders are taking advantage of funding options set up by the European funded Operational Programmes.

**Opportunity zones, incl. possible national schemes supporting circular economy**

Several significant drivers could be identified; the most significant were: a rise in awareness from both business, citizens and government on the benefits of green products and technologies, high skilled human resource and knowledge capital and Bulgaria’s leading regional position in the information and communications technology (ICT) sector.

**UK / Scotland**

**Vocational education in Scotland**

First it necessary to map Scotland’s Scottish Credit and Qualifications Framework (SCQF) to the European Qualifications Framework (EQF), as shown below:

<table>
<thead>
<tr>
<th>Typical Qualification</th>
<th>Level</th>
<th>EQF</th>
<th>SCQF</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Certificates/ Higher</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Higher National Certificates (HNC)/Advanced Higher/SVQ 3</td>
<td>5</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Higher National Diplomas (HND)/ SVQ 4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelors (ordinary) degree</td>
<td>6</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Bachelors (honours) degree</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters degrees</td>
<td>7</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

Scotland has a well-established framework for academic and vocational education. This includes:

- **National Certificates** – which are principally targets students still in full-time education
Circular Economy Digital Training Toolbox to Foster Innovative Green Entrepreneurs

- **Higher National Qualifications** – HNC/HND, designed to meet the needs of employers, with a more vocational focus

- **Modern Apprenticeship** – where learners can receive paid employment and develop qualifications at levels 6/7 (SCQF) and study part-time.

At the core of these awards are the Scottish Vocational Qualifications (SVQ). There are several courses that relate to waste management operations to HNC levels but few courses in mainstream vocational training include circular economy thinking to careers not specific to the waste management sector. One interesting example though is the NVQ Diploma in Floorcovering Operations (Construction) where one unit considers sustainability and waste management of flooring.

There are several programmes offered at undergraduate and postgraduate levels at Scottish universities relating to sustainability, environmental management, or waste management, including Glasgow Caledonian University. However, these tend to attract international students, those interested in a full time career relating to environmental management.

**Next steps**

Initial discussions have been held with Zero Waste Scotland, an arms-length government organization responsible for the delivery of a more resource efficient Scotland and leading on the Circular Economy aspirations in Scotland. They have passed our details on to a college network responsible for incorporating energy and environmental thinking into some of the vocational courses on offer. However the Scottish Qualifications Agency is a key partner in considering how best to embed training in green entrepreneurship into vocational curricula.
Part 2: Survey

Survey form was developed by the University „Prof. Dr. Assen Zlatarov“ and was modified according to the comments and suggestions of the partners. It was decided during the project kick-off meeting that the survey should be accompanied by a consent form (Appendix 2). The final version of the survey form (Appendix 3) was translated into partners’ languages. It was transformed into six online survey forms in LimeSurvey software platform. The links (see below) were sent to the partners and distributed among target groups:


The results of the survey are presented following the structure of the survey form.

A. Attitudes toward Innovative Green Entrepreneurship

Table 3. Level of awareness of the terms ‘Circular Economy’ and ‘Green Entrepreneurship’, %

<table>
<thead>
<tr>
<th>Statement</th>
<th>MT</th>
<th>RO</th>
<th>BG</th>
<th>UK</th>
<th>EL</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was aware of ‘circular economy’ only</td>
<td>11.11</td>
<td>11.76</td>
<td>5.26</td>
<td>36.84</td>
<td>-</td>
<td>9.09</td>
</tr>
<tr>
<td>I was aware of ‘green entrepreneurship’ only</td>
<td>-</td>
<td>17.65</td>
<td>21.05</td>
<td>5.26</td>
<td>-</td>
<td>24.24</td>
</tr>
<tr>
<td>I was aware of both terms</td>
<td>22.22</td>
<td>35.29</td>
<td>31.58</td>
<td>42.11</td>
<td>81.82</td>
<td>12.12</td>
</tr>
<tr>
<td>I was not aware of any of them</td>
<td>66.67</td>
<td>35.29</td>
<td>26.32</td>
<td>10.53</td>
<td>-</td>
<td>54.55</td>
</tr>
</tbody>
</table>

The highest level of awareness is observed for UK respondents. The least aware about circular economy and green entrepreneurship are Maltese and Spanish respondents.

‘Innovative Green Entrepreneurship’ is associated mainly with the following terms and concepts:

- Sustainability (Sustainable thinking, Sustainable use of resources, Sustainable environment)
- Eco friendly processes; Eco business
- Environment friendly businesses
- Recycling
- Reuse of waste
- Ecology (Environmental protection, Ecological products)
- Renewable energy

Details about the answers of the respondents by countries are presented in Table 4.

Table 4. Associations about ‘Innovative Green Entrepreneurship’ by countries

<table>
<thead>
<tr>
<th>Malta</th>
<th>Bulgaria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coming up with original ways of doing business while minimising environmental harm</td>
<td>Eco oriented entrepreneurship</td>
</tr>
<tr>
<td>A company that while offering a service or producing some goods, they consider their</td>
<td>Activities aimed at preserving environment and natural resources</td>
</tr>
<tr>
<td></td>
<td>Development and implementation of alternative energy resources</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>UK</th>
<th>Greece</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental responsibilities while minimising their carbon footprint and operate in sustainable manner.</td>
<td>New and innovative methods to exploit natural resources and to protect the environment</td>
</tr>
<tr>
<td>Product development that gives priority to environmental issues</td>
<td>Eco friendly profitable entrepreneurship</td>
</tr>
<tr>
<td>Exploit environment to make profit by offering services or developing eco products</td>
<td>Reuse of waste</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UK</th>
<th>Greece</th>
</tr>
</thead>
<tbody>
<tr>
<td>An entrepreneur who bring innovative thinking to sustainability</td>
<td>Recycling and renewable sources of energy</td>
</tr>
<tr>
<td>Developing business from items considered to be waste</td>
<td>Minimalism</td>
</tr>
<tr>
<td>This term describes for me, what the nature of future business must be like in order to protect the environment and ensure sustainable use of natural resources, i.e. that business operations will need to do much more (be flexible - entrepreneurial) with a lot less in terms of resources (be innovative) in a way which benefits the environment (green).</td>
<td>Sustainable solutions with the aim to enhance environmental outcome and its protection. (renewable sources of energy, innovative use for waste management etc)</td>
</tr>
<tr>
<td>New environmentally friendly methods and technologies or new ways to effectively implement existing technologies</td>
<td>Recycling, green energy</td>
</tr>
<tr>
<td>Sustainable, low carbon methods</td>
<td>New entrepreneurial ideas based on the environmental aspect or seriously considering the environmental perspective</td>
</tr>
<tr>
<td>Hipsters</td>
<td>Sustainable environment</td>
</tr>
<tr>
<td>Some kind of &quot;new&quot; commercial/business deal environmentally correct or with the correct attitude towards the environment. Something that will make it &quot;different&quot; from what has been done that is degrading out environment.</td>
<td>Use of waste and manufacture symbiosis together with ICT</td>
</tr>
<tr>
<td>Sustainable ideas that protect and enhance our environment</td>
<td></td>
</tr>
<tr>
<td>Environmental Management Systems</td>
<td></td>
</tr>
<tr>
<td>Innovative green technologies related to waste management and recycling.</td>
<td></td>
</tr>
<tr>
<td>A new approach to environmental management</td>
<td></td>
</tr>
<tr>
<td>Saving the planet earth from potential problems like greenhouse gas emissions or plastics disposed at sea ending up in the food chain through consumption of fish</td>
<td></td>
</tr>
<tr>
<td>Doing or creating business that is environmentally friendly that it is useless jargon. then, elon musk.</td>
<td></td>
</tr>
<tr>
<td>Organisation/individual who are interested innovative green lifestyle, and who are concern</td>
<td></td>
</tr>
<tr>
<td>It sound to as a small company with a great and interesting aim, which needs our help in its expansion.</td>
<td></td>
</tr>
</tbody>
</table>

Spain

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Circular Economy Digital Training Toolbox to Foster Innovative Green Entrepreneurs

- Any sustainable action, even if it recovers traditional activities or uses, is innovative
- I do not like the term green nor entrepreneurship although they are very commercial and have become popular. In many cases I think they are just hot air.
- Creation of new companies that respect the environment
- Does not harm the environment; Care of the environment
- A new approach to make industry more sustainable
- An advertisement for Green Giant
- Activity aimed at preserving and conserving the environment
- Invest in less polluting industrial processes
- Sustainable development companies
- Environmental and sustainability awareness for businesses
- A company that is based on respect for the environment
- To improve the conservation of the planet
- Create companies that work ecologically in new technologies
- New strategies for reducing contamination
- Innovation concerning the environment and recycling
- Creation of initiatives that respect the environment
- Entrepreneurship that respects the environment
- A business that respects the environment in a sustainable way
- An initiative that does not harm the environment
- New ways to care for our planet
- Modern use of recycling with state of the art techniques.

The best examples of innovative green entrepreneurs provided by respondents are shown below:

Malta
- Water Services
- Solar panel companies, like Bajada - New energy
- Members of the green party
- Waste collection companies, suppliers of white goods, PV panels etc.

Bulgaria
- Waste Consult Ltd.
- Junior Achievement Foundation
- I cannot recall specific companies but some activities such as manufacturing of bio-dissovable packages and separate waste disposal
- Waste recycling

UK
- Richard Branson
- Tom Hunter
- Howies - make organic, recycled, low impact clothing that is competitively priced and good quality
- Econation Belgium
- Small businesses showing that anyone can do it
- bioregional.co.uk, now a global business.
- VIRIDOR and local environmental consultancies.
- Environmental management board
- Dale Vince.
- Science Faculty

Greece

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- Energy production from renewable sources, waste management
- Apivita and Korres (Greek companies producing cosmetics, creams etc)
- Cyclefi
- Company which places measure nets for wind power in Markopoulo Attica region

Romania
- Those who recycle
- Compost producers
- Manufacturers of cosmetics from natural sources
- Manufacturers of traditional agricultural products
- Paulownia business
- Entrepreneurs in The Danube Delta
- Green Report
- S.C. Hidroelectrica S.A
- Rompetrol
- In Bistrita-Nasaud County, Tasuleasa Social company dealing with innovative green entrepreneurship
- A business with planting and growth of Paulownia tree in Bistrita-Nasaud county
- Persons who have transformed solar energy or wind energy into another type of energy necessary to the people
- Those in the field of agriculture with all specialties included
- Ruben Budau
- Felicia Tulau
- Silviu Ganea

Spain
- Steel mills and thermal plants
- Small farmers
- Cogersa
- Entrecanales
- Those that own large companies and factories
- Small companies with an interest in ecology
- Amancio Ortega of the Inditex Group

The most important characteristics which should be possessed by an innovative green entrepreneur company differ slightly by countries. Environmental stability is ranked on the first place by respondents from Malta, UK, and Greece but on third place by Romanian respondents (Table 5 and Table 6). Clear organisation strategy, vision, mission, goals, culture is the most important characteristic according to Romanian and Bulgarian respondents.

Table 5. Importance of the characteristics of an innovative green entrepreneur by countries, ranks

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>MT</th>
<th>RO</th>
<th>BG</th>
<th>UK</th>
<th>EL</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful, motivated, contented employees</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<tr>
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<td>-</td>
<td>4</td>
<td>-</td>
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</tr>
<tr>
<td>Quality products</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
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<tr>
<td>Ecological and social awareness</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<td>1</td>
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</table>
Ecological and social awareness is second by its importance according to the respondents (except those from Malta and Spain). Quality products are considered important as well (ranked on third place).

Table 6. Importance of the characteristics of an innovative green entrepreneur by countries, %

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
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<td>-</td>
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<td>Quality products</td>
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<td>12.50</td>
<td>-</td>
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<td>23.53</td>
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<tr>
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<td>5.88</td>
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<td>5.26</td>
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<td>21.05</td>
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<td>-</td>
<td>10.53</td>
<td>10.53</td>
<td>5.26</td>
<td>15.79</td>
</tr>
</tbody>
</table>
Respondents provide other characteristics except those listed in the questionnaire which they consider important to be possessed by an innovative green entrepreneur. Some of them are given below:

- Must have value other than financial - benefit to the environment and society
- Innovation
- Adequate life and work balance. For example, 20 hour weeks. More time should be spent living than working for owners to live.
- Strong Leadership
- Successful, motivated and employees
- Good communication
- A proven track record of delivery from key individuals in the company.
- Confident, independent, accessible
- Take into account the demands and concerns of the society on which it is based
- Own capacity in research and innovation
- High visibility for entrepreneurs awareness
- Knowledge
- The involvement in public awareness activities
- Motivational strategies
- Earnestness
- Transdisciplinarity
- Strategy and innovation management

The main benefits of applying innovative green entrepreneurship are as follows: contribution to societal issues, customer satisfaction, product / brand support, and influence on organisation values, culture, mission, goals (Table 7).
Circular Economy Digital Training Toolbox to Foster Innovative Green Entrepreneurs

Table 7. Main benefits of applying innovative green entrepreneurship by countries, mode, %

<table>
<thead>
<tr>
<th></th>
<th>MT</th>
<th>RO</th>
<th>BG</th>
<th>UK</th>
<th>EL</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition by the public and stakeholders</td>
<td>4 (75.0)</td>
<td>3/4 (43.75)</td>
<td>4 (27.27)</td>
<td>5 (47.06)</td>
<td>4 (75.00)</td>
<td>3 (40.00)</td>
</tr>
<tr>
<td>Image and reputation enhancement</td>
<td>4 (87.5)</td>
<td>4 (35.29)</td>
<td>4 (31.82)</td>
<td>5 (50.00)</td>
<td>4 (71.43)</td>
<td>3 (40.00)</td>
</tr>
<tr>
<td>Contribution to societal issues</td>
<td>5 (50.0)</td>
<td>4 (35.29)</td>
<td>5 (66.67)</td>
<td>5 (66.67)</td>
<td>5 (50.00)</td>
<td>5 (46.67)</td>
</tr>
<tr>
<td>Staff motivation and loyalty</td>
<td>3 (50.0)</td>
<td>4 (43.75)</td>
<td>5 (28.57)</td>
<td>4 (47.06)</td>
<td>4 (85.71)</td>
<td>4 (43.33)</td>
</tr>
<tr>
<td>Financial efficiency</td>
<td>3/4 (37.5)</td>
<td>4 (40.00)</td>
<td>5 (40.91)</td>
<td>3 (37.50)</td>
<td>3/4 (37.5)</td>
<td>3 (35.48)</td>
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<tr>
<td>Influence on organisation values, culture, mission, goals</td>
<td>4 (62.5)</td>
<td>5 (50.00)</td>
<td>5 (33.33)</td>
<td>4 (47.06)</td>
<td>4 (42.86)</td>
<td>4 (46.67)</td>
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<tr>
<td>Product / brand support</td>
<td>4 (50.0)</td>
<td>5 (43.75)</td>
<td>5 (28.57)</td>
<td>4 (50.00)</td>
<td>4 (71.43)</td>
<td>4 (54.84)</td>
</tr>
<tr>
<td>Market position support</td>
<td>4/5 (37.5)</td>
<td>4 (33.33)</td>
<td>4/5 (28.57)</td>
<td>4 (46.67)</td>
<td>4 (57.14)</td>
<td>3 (50.00)</td>
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<tr>
<td>Customer satisfaction</td>
<td>4 (50.0)</td>
<td>5 (53.33)</td>
<td>5 (52.38)</td>
<td>4 (50.00)</td>
<td>4 (62.50)</td>
<td>4 (48.28)</td>
</tr>
<tr>
<td>Staff recruitment and retention</td>
<td>3 (37.5)</td>
<td>3 (33.33)</td>
<td>5 (33.33)</td>
<td>4 (37.50)</td>
<td>4 (57.14)</td>
<td>4 (28.57)</td>
</tr>
<tr>
<td>Trust-building among stakeholders</td>
<td>4 (50.0)</td>
<td>4 (46.67)</td>
<td>5 (33.33)</td>
<td>3 (50.00)</td>
<td>4 (62.50)</td>
<td>4 (48.39)</td>
</tr>
</tbody>
</table>

Note: 1 = not benefit at all; 3 = relative benefit; 5 = strong benefit,
Results are presented by Mode. Corresponding percentages are given in brackets

Respondents provide other benefits except those listed in the questionnaire which they consider important during the implementation of innovative green entrepreneurship. Some of them are given below:

- Effectiveness
- Environment protection
- Improves business efficiency
- Benefit to the environment
- Fulfillment while doing what’s just.
- Relating it to other, more established business practices, and emphasising the role it plays in enhancing these practices and behaviours - not detracting to them.
- External auditing by a credible independent statutory body
- Clean environment of wider community
- Help society on global warming’s effect reduction
- Staff training
- Environmental improvement
- Health
- Innovations in this area
- Ensuring the benefits of future generations
- The environment is preserved for the next generation
- Sustainable development
- Multiplication of positive examples
- Personal development
- Personal development
- Concern for the natural resources
- The processing and valorisation of local production and the promotion of traditional products
- Better access to financing
- Environment protection

B. Conditions for developing circular economy and current state of circular economy implementation in respondents’ country
According to the respondents Ministry of Economy and Ministry of Education are the most important actors of formal education in the field of circular economy followed by Teachers Training Institutions and Local education authorities (Table 8).

Table 8. The importance of actors of formal education in the field of circular economy by countries, Mode, %

<table>
<thead>
<tr>
<th>Actor</th>
<th>MT (55.56)</th>
<th>RO (76.47)</th>
<th>BG (35.29)</th>
<th>UK (47.37)</th>
<th>EL (27.27)</th>
<th>ES (60.61)</th>
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</thead>
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<tr>
<td>Ministry of Education</td>
<td>4 (55.56)</td>
<td>5 (76.47)</td>
<td>5 (35.29)</td>
<td>5 (47.37)</td>
<td>4/5 (27.27)</td>
<td>5 (60.61)</td>
</tr>
<tr>
<td>Ministry of Economy</td>
<td>5 (55.56)</td>
<td>5 (76.47)</td>
<td>5 (47.06)</td>
<td>4 (47.37)</td>
<td>5 (36.36)</td>
<td>5 (45.45)</td>
</tr>
<tr>
<td>Ministry of Environment</td>
<td>5 (88.89)</td>
<td>5 (94.12)</td>
<td>5 (70.59)</td>
<td>5 (57.89)</td>
<td>5 (72.73)</td>
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<td>Ministry of Health</td>
<td>4 (44.44)</td>
<td>5 (58.82)</td>
<td>5 (41.18)</td>
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<td>3 (45.45)</td>
<td>4 (39.39)</td>
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<tr>
<td>Teachers Training Institutions</td>
<td>4/5 (44.44)</td>
<td>4 (47.06)</td>
<td>5 (41.18)</td>
<td>5 (52.63)</td>
<td>5 (27.27)</td>
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<tr>
<td>Local education authorities</td>
<td>5 (44.44)</td>
<td>4 (41.18)</td>
<td>5 (35.29)</td>
<td>5 (57.89)</td>
<td>4/5 (27.27)</td>
<td>5 (36.36)</td>
</tr>
</tbody>
</table>

Note: 1 = unimportant to 5 = very important
Results are presented by Mode. Corresponding percentages are given in brackets

Media, local councils, business community, trade unions, political parties, business clubs and NGOs, Ministry of communication and agriculture, Trade Unions, Universities, neighbourhood associations, environmental groups and municipal institutions, local farmers with good practices are considered important actors for formal education as well.

Environment NGOs followed by social media and mass media are pointed out as the most important actors of informal and non-formal education in the field of circular economy (Table 9).

Table 9. The importance of actors of informal and non-formal education in the field of circular economy by countries, Mode, %

<table>
<thead>
<tr>
<th>Actor</th>
<th>MT (55.56)</th>
<th>RO (35.29)</th>
<th>BG (29.41)</th>
<th>UK (36.84)</th>
<th>EL (36.36)</th>
<th>ES (39.39)</th>
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</thead>
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<td>5 (36.84)</td>
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<td>Environment NGOs</td>
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<td>5 (63.16)</td>
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<td>Mass media</td>
<td>4/5 (33.33)</td>
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<td>Chambers and professional associations</td>
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<td>5 (52.94)</td>
<td>4 (29.41)</td>
<td>4 (52.63)</td>
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<td>Social media</td>
<td>5 (77.78)</td>
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<td>5 (35.29)</td>
<td>5 (47.37)</td>
<td>5 (36.36)</td>
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<td>4 (36.84)</td>
<td>4 (45.45)</td>
<td>4 (54.55)</td>
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</table>

Note: 1 = unimportant to 5 = very important
Results are presented by Mode. Corresponding percentages are given in brackets

Ethnical groups, roma people, retired people, teachers and trainers, families, NGO’s promoting innovation are considered important actors for informal and non-formal education as well.

According to the respondents the subjects within the Circular Economy which are taught in their countries at educational levels 4-7 are mainly optional (Table 10).

Table 10. Subjects within the Circular Economy which are taught in respondents’ countries (educational levels 4-7), %

<table>
<thead>
<tr>
<th>Subject</th>
<th>Compulsory</th>
<th>Optional</th>
<th>Cross curricular</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MT</td>
<td>RO</td>
<td>BG</td>
<td>MT</td>
</tr>
<tr>
<td>Entrepreneurship</td>
<td>11.11</td>
<td>23.53</td>
<td>17.65</td>
<td>55.56</td>
</tr>
<tr>
<td>Waste management</td>
<td>11.11</td>
<td>11.76</td>
<td>17.65</td>
<td>55.56</td>
</tr>
</tbody>
</table>
Circular Economy Digital Training Toolbox to Foster Innovative Green Entrepreneurs

Entrepreneurship, Waste management and Sustainability management are among the most popular subjects in respondents’ countries. Additional subjects which are mentioned are Ecology, Environment protection, and Innovation Management.

Unfortunately, only minor percentage of respondents reported an extracurricular activities related to Circular Economy which are organised at schools of their countries (Table 1).

Table 1. Extracurricular activities related to Circular Economy by countries, %

<table>
<thead>
<tr>
<th>Country</th>
<th>Yes, %</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malta</td>
<td>11.11</td>
<td>Secondary schools and also at university level, during the so-called, 'degree plus'</td>
</tr>
<tr>
<td>Romania</td>
<td>35.29</td>
<td>During the time of “School in other way” are organised meetings between entrepreneurs and pupils, discussing on topics regarding the entrepreneurship and economic environment too.</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>29.41</td>
<td>Thematic trips in the nature</td>
</tr>
<tr>
<td>UK</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Greece</td>
<td>36.36</td>
<td>Universities, HEI etc., e.g. the Charokopio University’s Master degree on Sustainable development; Mesogios SOS</td>
</tr>
<tr>
<td>Spain</td>
<td>12.12</td>
<td></td>
</tr>
</tbody>
</table>

Eco-schools are the most popular extracurricular activity related to Circular Economy in Bulgaria (Table 12). Summer schools are popular in Romania and Spain.

Table 12. Types of extracurricular activities related to Circular Economy by countries, %
Seminars and school projects are mentioned as extracurricular activities as well.

The opinion of the respondents regarding the importance of proposed topics to circular economy education is quite diverse by countries (Table 13 and Table 14). The most frequent answers (measured by Mode) include the following topics:
- Introduction to circular economy
- Green entrepreneurs
- Recycling (closed loop recycling)
- Recycling (open)
- Recovery
- Principles of Eco-design.

### Table 13. Importance of the topics related to circular economy education by countries, Mode, %

<table>
<thead>
<tr>
<th>Topics</th>
<th>MT (44.44%)</th>
<th>RO (58.82%)</th>
<th>BG (41.18%)</th>
<th>UK (57.89%)</th>
<th>EL (36.36%)</th>
<th>ES (36.36%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to CE</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Principles of CE</td>
<td>4/5 (44.44%)</td>
<td>4/5 (41.18%)</td>
<td>4/5 (41.18)</td>
<td>5/5 (52.63)</td>
<td>5/5 (42.42)</td>
<td>4/5 (42.42)</td>
</tr>
<tr>
<td>New business models</td>
<td>5 (66.67)</td>
<td>5 (64.71)</td>
<td>4 (35.29)</td>
<td>5 (42.11)</td>
<td>5 (45.45)</td>
<td>4 (39.39)</td>
</tr>
<tr>
<td>Green Entrepreneurs</td>
<td>5 (55.56)</td>
<td>5 (64.71)</td>
<td>4 (41.18)</td>
<td>5 (52.63)</td>
<td>5 (36.36)</td>
<td>4/5 (39.39)</td>
</tr>
<tr>
<td>Servitisation</td>
<td>4/5 (33.33)</td>
<td>5 (35.29)</td>
<td>4 (47.06)</td>
<td>4 (36.84)</td>
<td>4 (27.27)</td>
<td>4 (30.30)</td>
</tr>
<tr>
<td>Reuse</td>
<td>5 (44.44)</td>
<td>5 (64.71)</td>
<td>5 (52.94)</td>
<td>5 (63.16)</td>
<td>5 (45.45)</td>
<td>5 (36.36)</td>
</tr>
<tr>
<td>Recycling (closed loop recycling)</td>
<td>5 (77.78)</td>
<td>5 (82.35)</td>
<td>5 (76.47)</td>
<td>5 (63.16)</td>
<td>5 (36.36)</td>
<td>5 (57.58)</td>
</tr>
<tr>
<td>Recycling (open)</td>
<td>5 (66.67)</td>
<td>5 (64.71)</td>
<td>5 (75.59)</td>
<td>5 (47.37)</td>
<td>5 (45.45)</td>
<td>5 (57.58)</td>
</tr>
<tr>
<td>Recovery</td>
<td>4/5 (44.44)</td>
<td>5 (64.71)</td>
<td>5 (47.06)</td>
<td>5 (42.11)</td>
<td>5 (36.36)</td>
<td>5 (39.39)</td>
</tr>
<tr>
<td>Design for CE</td>
<td>5 (55.56)</td>
<td>5 (64.71)</td>
<td>4/5 (29.41)</td>
<td>5 (57.89)</td>
<td>4/5 (27.27)</td>
<td>4 (33.33)</td>
</tr>
<tr>
<td>Principles of Eco-design</td>
<td>5 (88.89)</td>
<td>5 (41.18)</td>
<td>4/5 (17.65)</td>
<td>5 (47.37)</td>
<td>4/5 (27.27)</td>
<td>5 (27.27)</td>
</tr>
</tbody>
</table>

Note: 1 = unimportant to 5 = very important
Results are presented by Mode. Corresponding percentages are given in brackets.

The servitisation of products describes the strategy of creating value by adding services to products or even replacing a product with a service.

Closed loop recycling is a production system in which the waste or byproduct of one process or product is used in making another product. For example, recycling waste newspaper to make paperboard or other types of paper.

Open-loop recycling includes the conversion of material from one or more products into a new product, involving a change in the inherent properties of the material itself (often a degradation in quality). For example, recycling plastic bottles into plastic drainage pipes. Often called downcycling or reprocessing.

When the results are calculated as weighted mean several specific patterns could be found. Recycling is considered very important by all participating countries except Greece. New business models and Green entrepreneurs are important for Malta, Romania and Greece. Reuse and Design for circular economy are important for UK while Principles of Eco-design – for Malta.

### Table 14. Importance of the topics related to circular economy education by countries, Weighted Mean
Circular Economy Digital Training Toolbox to Foster Innovative Green Entrepreneurs

<table>
<thead>
<tr>
<th>Topics</th>
<th>MT</th>
<th>RO</th>
<th>BG</th>
<th>UK</th>
<th>EL</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to CE</td>
<td>3.89</td>
<td>4.06</td>
<td>3.18</td>
<td>3.95</td>
<td>4.09</td>
<td>3.51</td>
</tr>
<tr>
<td>Principles of CE</td>
<td>4.00</td>
<td>3.71</td>
<td>3.29</td>
<td>3.89</td>
<td>4.18</td>
<td>3.45</td>
</tr>
<tr>
<td>New business models</td>
<td>4.22</td>
<td>3.71</td>
<td>3.00</td>
<td>3.63</td>
<td>4.00</td>
<td>3.67</td>
</tr>
<tr>
<td>Green Entrepreneurs</td>
<td>4.11</td>
<td>4.18</td>
<td>3.41</td>
<td>3.79</td>
<td>4.09</td>
<td>3.73</td>
</tr>
<tr>
<td>Servitisation</td>
<td>3.67</td>
<td>3.29</td>
<td>3.12</td>
<td>2.84</td>
<td>2.09</td>
<td>3.42</td>
</tr>
<tr>
<td>Reuse</td>
<td>3.89</td>
<td>4.18</td>
<td>3.76</td>
<td>4.37</td>
<td>3.00</td>
<td>3.70</td>
</tr>
<tr>
<td>Recycling (closed loop recycling)</td>
<td>4.33</td>
<td>4.35</td>
<td>4.00</td>
<td>4.26</td>
<td>2.45</td>
<td>3.97</td>
</tr>
<tr>
<td>Recycling (open)</td>
<td>4.22</td>
<td>4.18</td>
<td>3.88</td>
<td>3.68</td>
<td>2.91</td>
<td>3.85</td>
</tr>
<tr>
<td>Recovery</td>
<td>4.00</td>
<td>4.18</td>
<td>3.65</td>
<td>3.63</td>
<td>2.82</td>
<td>3.64</td>
</tr>
<tr>
<td>Design for CE</td>
<td>4.11</td>
<td>4.18</td>
<td>3.06</td>
<td>4.16</td>
<td>2.73</td>
<td>3.27</td>
</tr>
<tr>
<td>Principles of Eco-design</td>
<td>4.44</td>
<td>3.47</td>
<td>2.06</td>
<td>3.79</td>
<td>2.73</td>
<td>2.61</td>
</tr>
</tbody>
</table>

Note: 1 = unimportant to 5 = very important
Results are presented by weighted mean.

C. Attitudes toward circular economy implementation

There is a positive attitude toward the following two statements (Table 15):
- Circular economy should be included in ALL school subjects.
- The school administration bodies should be actively engaged in circular economy implementation in their schools.

<table>
<thead>
<tr>
<th>Statement</th>
<th>MT</th>
<th>RO</th>
<th>BG</th>
<th>UK</th>
<th>EL</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circular economy should be taught as a separate subject.</td>
<td>4 (77.78)</td>
<td>4 (41.18)</td>
<td>4 (37.50)</td>
<td>4 (36.84)</td>
<td>4 (36.36)</td>
<td>3 (36.36)</td>
</tr>
<tr>
<td>Introducing a certification will substantially contribute to circular economy implementation.</td>
<td>4/5 (44.44)</td>
<td>3/4 (23.53)</td>
<td>4 (37.50)</td>
<td>4 (42.1)</td>
<td>4 (36.36)</td>
<td>4 (39.39)</td>
</tr>
<tr>
<td>Circular economy should be included in ALL school subjects.</td>
<td>4 (44.44)</td>
<td>5 (41.18)</td>
<td>4 (43.75)</td>
<td>5 (52.63)</td>
<td>5 (45.45)</td>
<td>5 (27.27)</td>
</tr>
<tr>
<td>The school administration bodies should be actively engaged in circular economy implementation in their schools.</td>
<td>4 (55.56)</td>
<td>5 (52.94)</td>
<td>5 (43.75)</td>
<td>5 (57.89)</td>
<td>5 (45.45)</td>
<td>4 (36.36)</td>
</tr>
</tbody>
</table>

Note: 1 = unimportant to 5 = very important
Results are presented by Mode. Corresponding percentages are given in brackets.

Based on the respondents’ answers the most important critical points for circular economy curriculum development could be summarised in the following --- intervention areas:

AREA 1: Raising Awareness
- First there needs to be awareness of the importance of safeguarding the environment and the importance of sustainable development which means safeguarding the future generations.
- Raising awareness and make the term well known as its concept may be difficult for youngsters.
- Change of ‘old’ mentality. Change of customs.
- Awareness, information, applicability.
- Engaging people and schools.

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- To educate influential opinion formers and political decision makers to provide an environment of incentive for a circular economy to grow and thrive and also have both print and visual (TV) media on side.
- Guidance to everyone through advertisements or TV.
- Educate people the factors cause harm to the environment.
- Educating the next generation is great - but this will be too late. Businesses need to be doing this stuff now. They're the people who need educating or sanctioning for their non circular economy products.
- To be introduced in higher institutions, and from primary to secondary school there should be an awareness for recycling, reuse and ways to sort out our wastes for recycling.
- Training for all ages and all contexts.
- Governments and the attitude of public administrations.

AREA 2: Argumentation
- There has to be a very strong argument in favour of introducing CE subjects into an already saturated curriculum.
- Consultation with stakeholders, exploit eco Skola concept.
- Tax incentive, clear information and processes, a set governing body.
- Possibly there remains a lack of appreciation of the benefits of having a circular economy - not only in Scotland and the UK but globally.
- Nothing should be allowed to be a product, or part of a product, unless it can be totally recycled, with ease, within a defined distance of where it is bought/used.
- School is saturated with subjects.
- Everything that becomes a subject of study is learned, passed and not applied.
- No specialists, no financing and no interest from the authorities.
- Unconcern regarding this concept at the administrative and Universitary level. No founds or stimulating measures for the economic environment.

AREA 3: Resources
- Teaching and learning resources
- Platforms and events
- More interactive training tools need to be found to make the training programmes more interesting. For example a recycling competition in teams where each team can gain points depending on how much it recycles. It should combine theory and practical.
- Highly qualified personnel
- New technologies on recovering from waste.
- Carry out workshops on the circular economy.
- Study cases
- Teachers are not trained and don’t participate to the achievement of a curricula in this field, they are not consulted by the forums which elaborate these curricula.
- Training of teachers in order to realize a curricula in this field, organizing of training programs for teachers able to implement the curricula.
- Financial resources, civic education, the indifference of the political class concerning these problems.

AREA 4: Vision, strategy, and organisation
- The principles should be instilled in children at primary schools and the should be further taught about CR in secondary schools.
- Cooperation between social parties, ministries and VET centers, design with the aim to reach European standards.
Circular Economy Digital Training Toolbox to Foster Innovative Green Entrepreneurs

- Need for a complete strategic plan, identification of needs, cooperation between the relevant parties, funding schemes available.
- Implementing campaigns for good practices.
- Its integration within existing programmes.
- Teaching the basic principles at an early age and reinforcing these throughout the time in education. Encouraging research into workable CE business models across sectors.
- It should be taught across all subjects and should be actively engaged in practice by schools.
- Early teaching within primary schools. On-site recycling and reuse.
- Agreements to invest in development.
- Not having information on the subject. Provide training for citizens including employees and workers.

The most evident opportunity zones for circular economy curriculum development could be summarised in the following groups.

OPPORTUNITY ZONE 1: Providing knowledge
- Recycling and environmental studies
- A CE would need to incorporate all zones to be effective and would require the participation of the entire population.
- It should be for all the countries, especially the under developing and developing countries please help the Nations to be involves in Circular Economic.
- Teach it to the youngest at school

OPPORTUNITY ZONE 2: Develop skills, attitudes, and habits
- Eko skola
- Separate waste collection, reuse
- Environment protection
- Connection of young people from the cities with the environment
- Curricula’s implementation could be achieved to the school’s decision, by introducing it as optional at the class meetings and into the extracurricular activities.

OPPORTUNITY ZONE 3: Engaging industries
- Industries such as construction, car industry, chemical industry, food industry
- Green energy, agricultural sector
- Circular economy as entrepreneurial opportunity, apply CE focused on the most prominent sectors of each area, in national level I would select the ICT areas/fields and the primary sector
- Hotels. Food industry.
- Industrial production.
- Rural area.
- Agriculture, industry, trade.
- Danube’s Delta
- It can be developed at administrative and advisory level and at the level of development and practical application in industry.
- Agro-food industry

OPPORTUNITY ZONE 4: Business models and key actors (challengers)
- To improve our use of resources and improve material efficiency
- Easiest to implement in small isolated communities such as islands as they already have an intrinsic awareness of resource efficiency.
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- Universities
- Liquid waste recycling area and carbon management to capture from the emission and store it into deep well.
- High school and university education.
- Specialized teachers.
- Innovation Managers.
- Environmental science or ecology and biology

Conclusion

There is a certain need to raise the awareness level about circular economy and green entrepreneurship.

There are official documents, strategies and organisations (incl. NGOs) which deal with the necessity to integrate principles of circular economy in syllabuses but continuous and focused practical steps and activities are needed.

Good practices of educational initiatives about circular economy and green entrepreneurship are evident in all partner countries but there is still lack of coherent and widespread approach about the implementaton of the principles of circular economy on a national basis.

The most common subjects or topics taught at EQF Level 4-7 target sustainability issues, environment protection and conservation, waste management, renewable energy, new business models, ecology.

The highest level of awareness regarding circular economy and green entrepreneurship is observed for UK respondents. The least aware about circular economy and green entrepreneurship are Maltese and Spanish respondents.

‘Innovative Green Entrepreneurship’ is associated mainly with the following terms and concepts:
  - Sustainability (Sustainable thinking, Sustainable use of resources, Sustainable environment)
  - Eco friendly processes; Eco business
  - Environment friendly businesses
  - Recycling
  - Reuse of waste
  - Ecology (Environmental protection, Ecological products)
  - Renewable energy

The most important characteristics which should be possessed by an innovative green entrepreneur company differ slightly by countries. **Environmental stability** is ranked on the first place by respondents from Malta, UK, and Greece but on third place by Romanian respondents. **Clear organisation strategy, vision, mission, goals, culture** is the most important characteristic according to Romanian and Bulgarian respondents. **Ecological and social awareness** is second by its importance according to the respondents (except those from Malta and Spain). **Quality products** are considered important as well (ranked on third place).

The main benefits of applying innovative green entrepreneurship are as follows:
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- contribution to societal issues,
- customer satisfaction,
- product / brand support, and
- influence on organisation values, culture, mission, goals.

According to the respondents Ministry of Economy and Ministry of Education are the most important actors of **formal education in the field of circular economy** followed by Teachers Training Institutions and Local education authorities. Media, local councils, business community, trade unions, political parties, business clubs and NGOs, Ministry of communication and agriculture, Trade Unions, Universities, neighbourhood associations, environmental groups and municipal institutions, local farmers with good practices are considered important actors for formal education as well.

Environment NGOs followed by social media and mass media are pointed out as the most important actors of **informal and non-formal education** in the field of circular economy.

The subjects within the Circular Economy which are taught in their countries at educational levels 4-7 are mainly optional.

Entrepreneurship, Waste management and Sustainability management are among the most popular subjects in respondents’ countries. Additional subjects which are mentioned are Ecology, Environment protection, and Innovation Management.

The opinion of the respondents regarding the importance of proposed topics to circular economy education is quite diverse by countries. The most frequent answers include the following topics:
- Introduction to circular economy
- Green entrepreneurs
- Recycling (closed loop recycling)
- Recycling (open)
- Recovery
- Principles of Eco-design.

Recycling is considered very important by all participating countries except Greece. New business models and Green entrepreneurs are important for Malta, Romania and Greece. Reuse and Design for circular economy are important for UK while Principles of Eco-design – for Malta.

There is a positive attitude toward the following two statements:
- Circular economy should be included in ALL school subjects.
- The school administration bodies should be actively engaged in circular economy implementation in their schools.
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UK / Scotland


MCAST Advanced Diploma in Environmental Sustainability

Course Description

Awareness of environmental sustainability and related environmentally-based sectors are growing rapidly in Europe, with the Maltese government recently introducing various laws and standards on reducing global warming, climate change, low carbon emissions and the need for conservation in general.

This course includes topics related to environmental monitoring and resources management that are fundamental to the development of environmental awareness, and provides practical skills and techniques that support environmental understanding. This programme prepares students for employment within environmental sustainability sector-based organizations, as well as within medium to large organizations that face many environmental challenges on a daily basis.

Course Delivery

During this two-year programme students will follow 19 units of study. Students will follow a structured taught programme that will consist of class-based lectures. This will be complemented with a period of work-related experience in the environmental sector and a comprehensive environmental project.

Assessment

All units within this programme are locally assessed through a number of formal assessments. For each unit of study a limited number of assessments (between 2 to 4) will also be carried out by learners to provide evidence of their learning. Learners will be assessed on their knowledge, skills and competencies they have attained through various modes of assessments which include practical assessments. Furthermore, learners will be assessed by designated mentors whilst on apprenticeship.

Learning Outcomes

Core Study Units

- Understanding the Principles of Sustainable Development
- Basic Environmental Impact Assessment and Water/Energy Auditing
- Basic Chemistry for Environmental Technicians
- Energy Management
- Basic Waste Management
- Understanding the Principles of Wildlife Populations, Ecology and Conservation
- Understanding the Principles of Physical and Biological Environmental Processes
- Sustainable Transport
- Work-related Experience in the Environmental Sustainability Sector
- Understanding Water Quality
- Pollution Control and Management
- Scientific Practical Techniques
- Undertaking an Extended Investigative Project in the Environmental Sustainability Sector.
Specialist Units

Choice of either Option A or Option B:
Option A: Resource Management (2 Units); Sustainable Construction Geology of Natural Resources
Option B: Fish Management (2 Units); Fish Biology and behaviour; Understanding Aquaculture Systems

Certification

Bachelor of Science (Honours) in Environmental Engineering
Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by the project “Circular Economy Digital Training Toolbox to foster Innovative Green Entrepreneurs” (ENG@GE). The purpose of this study is to get preliminary information which will serve as a background for developing a manual and training toolbox which will help entrepreneurs to develop and implement innovative green practices.

Research Procedures

This study consists of an online survey that will be administered to individual participants through an online survey tool. You will be asked to provide answers to a series of questions related to your training needs regarding innovative green entrepreneurship. Should you decide to participate in this confidential research you may access the survey by following the web link located under the “Giving of Consent” section below.

Time Required

Participation in this study will require 10-15 minutes of your time.

Risks

The project partners do not perceive more than minimal risks from your involvement in this study (that is, no risks beyond the risks associated with everyday life).

Benefits

There are no direct benefits from participation in this study.

Confidentiality

The results of this research will be used for the development of a manual and training kit in aggregate form (i.e. without identifying any individual) and may be published in project reports and articles. While individual responses are anonymously obtained and recorded online; data is kept in the strictest confidence. The results of this project will be coded in such a way that the respondent’s identity will not be attached to the final form of this study. Aggregate data will be presented as average values or will be generalised as a whole. All data will be stored in a secure location accessible only to the ENG@GE researchers and their advisor. Final aggregate results will be made available to participants upon request.

Participation & Withdrawal

Your participation is entirely voluntary. You are free to choose not to participate. The project team would be grateful if you finalise the survey in order to collect complete results.
Questions about the Study
If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact us via:

project e-mail address

Giving of Consent
I have read this consent form and I understand what is being requested of me as a participant in this study. I freely consent to participate. The investigator provided me with a copy of this form. I certify that I am at least 18 years of age. By clicking on the link below, and completing and submitting this confidential online survey, I am consenting to participate in this research.

Follow this link to the Survey:
SURVEY FORM

Dear Sir/Madam,

This survey is conducted as a part of the project “Circular Economy Digital Training Toolbox to foster Innovative Green Entrepreneurs” (ENG@GE) in order to get preliminary information. This will serve as a background for developing a manual and training toolbox which will help entrepreneurs to develop and implement innovative green practices.

The survey is anonymous. The information will be used confidentially only by the researchers.

Thank you in advance for your time and attention!
All your answers should reflect the situation in your country.
The following definitions are used for the terms “circular economy” and “green entrepreneurship”.
Circular economy: A circular economy is an industrial economy that is restorative and regenerative by design (promotes greater resource productivity aiming to reduce waste and avoid pollution), and which aims to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles.
Green entrepreneurship: Green entrepreneurship is the activity of consciously addressing an environmental/social problem/need through the realization of entrepreneurial ideas with a high level of risk, which has a net positive effect on the natural environment and at the same time is financially sustainable (greentproject.eu).

A. Attitudes toward Innovative Green Entrepreneurship

A1. Were you aware of the terms 'Circular Economy' and 'Green Entrepreneurship' before taking this survey?

| I was aware of ‘circular economy’ only | 1 |
| I was aware of ‘green entrepreneurship’ only | 2 |
| I was aware of both terms | 3 |
| I was not aware of any of them | 4 |

A2. When you see/hear the term ‘Innovative Green Entrepreneurship’ what is the first thing which comes to your mind?

____________________________________________________________________

A3. Which entrepreneurs from your country, in your opinion, could serve as the best example of innovative green entrepreneurs?

____________________________________________________________________

A4. What are the most important characteristics for an innovative green entrepreneur company to possess?

Please rank the FIVE most important characteristics, with 1 = the least important; 5 = the most important
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Successful, motivated, contented employees
Financial strength
Clear organisation strategy, vision, mission, goals, culture
Good public relations (customers, partners, shareholders)
Strong reputation
Quality products
Ecological and social awareness
Environmental sustainability
Adaptability, flexibility
Other (please specify)

A5. Which are the main benefits of applying innovative green entrepreneurship?

<table>
<thead>
<tr>
<th>Benefit</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition by the public and stakeholders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image and reputation enhancement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribution to societal issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff motivation and loyalty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial efficiency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influence on organisation values, culture, mission, goals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product / brand support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market position support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff recruitment and retention</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust-building among stakeholders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. Conditions for developing circular economy and current state of circular economy implementation in your country

B1. Keeping in mind your country/regional context, please evaluate each of the actors of formal education in terms of their importance for circular economy:

<table>
<thead>
<tr>
<th>Actor</th>
<th>Unimportant</th>
<th>Somewhat unimportant</th>
<th>Neither important, nor unimportant</th>
<th>Somewhat important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Education</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Ministry of Economy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Ministry of Environment</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Ministry of Health</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Teachers Training Institutions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Local education authorities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

B2. Keeping in mind your country/regional context, please evaluate each of the actors of informal and non-formal education in terms of their importance for circular economy:

<table>
<thead>
<tr>
<th>Actor</th>
<th>Unimportant</th>
<th>Somewhat unimportant</th>
<th>Neither important, nor unimportant</th>
<th>Somewhat important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer NGOs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Environment NGOs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Trade Unions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Subject</th>
<th>Compulsory</th>
<th>Optional</th>
<th>Cross curricular</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrepreneurship</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Waste management</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Sustainability management</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Green innovation</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eco-design</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Energy efficiency</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Innovative entrepreneurship</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Green entrepreneurship</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

B3. What subjects within the Circular Economy are taught in your country (educational levels 4-7)?

B4. Do you have any extracurricular activities related to Circular Economy which are organised at schools of your country?

No, we don’t have (go to Question B6)
Yes, we have
if ‘Yes’
Please specify the educational level ____

B5. Which of the following extracurricular activities related to Circular Economy are organised at schools of your country?

<table>
<thead>
<tr>
<th>Eco-schools</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Young entrepreneurial clubs (start-ups)</td>
<td>2</td>
</tr>
<tr>
<td>Summer schools</td>
<td>3</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>4</td>
</tr>
</tbody>
</table>

B6. Please evaluate each of the following topics in terms of its importance to circular economy education:

<table>
<thead>
<tr>
<th>Topics</th>
<th>Unimportant</th>
<th>Somewhat unimportant</th>
<th>Neither important, nor unimportant</th>
<th>Somewhat important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to CE</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Principles of CE</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>New business models</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Green Entrepreneurs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Servitisation</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Reuse</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Recycling (closed loop recycling)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
The servitisation of products describes the strategy of creating value by adding services to products or even replacing a product with a service.

Closed loop recycling is a production system in which the waste or byproduct of one process or product is used in making another product. For example, recycling waste newspaper to make paper-board or other types of paper.

Open-loop recycling includes the conversion of material from one or more products into a new product, involving a change in the inherent properties of the material itself (often a degradation in quality). For example, recycling plastic bottles into plastic drainage pipes. Often called downcycling or reprocessing.

C. Attitudes toward circular economy implementation

C1. Please indicate to what extent you agree or disagree with the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree, nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circular economy should be taught as a separate subject.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Introducing a certification will substantially contribute to circular economy implementation.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Circular economy should be included in ALL school subjects.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The school administration bodies should be actively engaged in circular economy implementation in their schools.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

C2. In your opinion, which are the most important critical points for circular economy curriculum development?

………………

………………

………………

C3. Keeping in mind your country/regional context, in your opinion, which are the most evident opportunity zones for circular economy curriculum development?

………………

………………

………………

Thank you for your participation!