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# **AGILE4CIRC**

## **Agile leadership transformation for business in circular economy**

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### **Adult and new business opportunities in Circular Economy (CircEc) and Social Responsibility (SR) report Greece**

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## Introduction

A circular economy is an economic system aimed at minimizing waste and making the most of resources. This regenerative approach is in contrast to the traditional linear economy, which has a 'take, make dispose of' model of production.

The scope of the report is the initial methodological framework based on a research on Circular Economy and Social Responsibility at the Policy Maker level. The results of the report will be used as to designing the training course (IO2). National circular economy ecosystem will be examined focusing in the existing needs, lessons learnt, new Business Opportunities for adults in the new economy and best practices.

AGILE4CIRC operates in understanding how the ecosystem of the Circular Economy and Social Responsibility is implemented in Greece which provides clues for capitalizing in market niches, potential business replicability in an adaptation of existing models attending the local needs and regulations.

The research focuses on "detecting opportunities for Adult entrepreneurs in the new economy". The reason for this focus lies on the concept that many adult EU funded projects are concentrated in general in providing "basic skills" and mentoring to an adult just to become "another one to compete with thousands on the market for a job" without a "value proposition" that gives them a competitive advantage.

The research is needed because spots the existing business model across different economic realities and enables to detect market niches and potential partnership target group cooperation. Understanding the state of the art of the Circular Economy through a Matrix that classifies and organize them is what the research brings, clarity.

The Methodology identifies how local stakeholders can contribute to the implementation of the new economy mindset generating a win-win situation.

In general the objective of the current report is is to understand the potential of the circular economy in Greece where the business is, best practices, and market niche

### 1. Definition of methods to be used in the research and creation of tools

Data will be obtained mainly by interviewing local stakeholders and collecting data from policies, national reports, case studies, best practices, training materials and market research and forecasts. For the data analysis we will use both qualitative and quantitative research methods, including desk research, survey research and secondary data. We will use qualitative methods for a complete, detailed description of observations, including the context of events and circumstances that makes Circular Economy and Social Sustainability feasible. The quantitative methods used will be related to analysis of researches where hypotheses were tested, features were

classified and observations were explained in the area of Circular Economy and Social Sustainability.

## 2. CircEc& SR at Policy Maker level

### - The pillars of circular economy policy

Greece's strategy in the circular economy is an element of national transformation aimed to improve the growth model. The main strategies are:

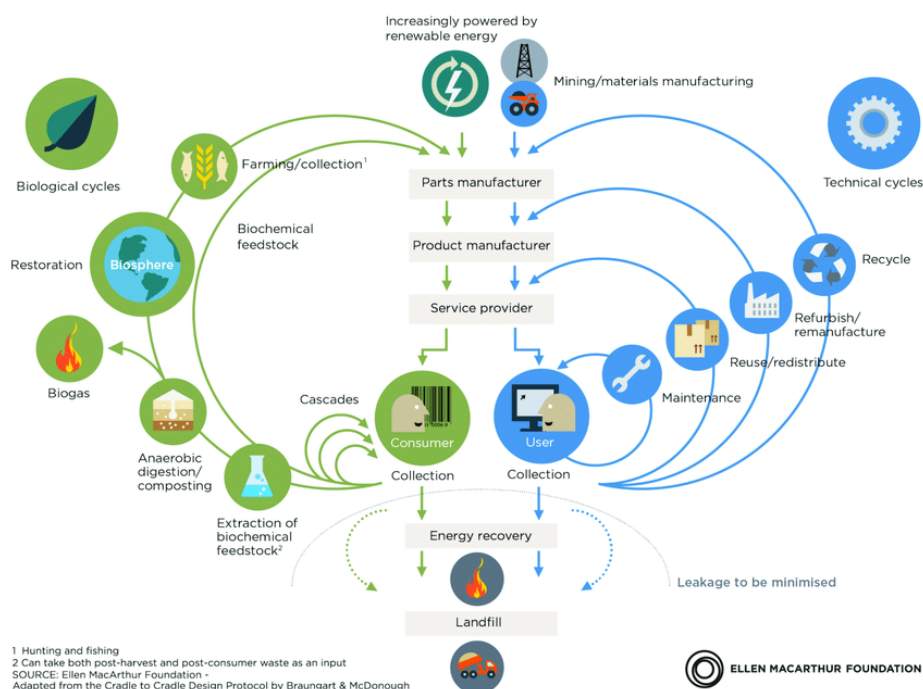
- Sustainable management of resources in order to make them more efficient. Based on the revision of the value chain such as waste management, reuse of buildings and water recycling
- Strengthen circular entrepreneurship with the aim of producing more durable products with longer lifespan and promoting the eco-building
- Circular consumption aimed at fully informing citizens about the benefits of renewable food consumption and the disadvantages of excessive consumption of resources, and how they can be avoided<sub>1</sub>

The objectives set under these Strategies are:

- Extending the product life cycle through eco-friendly designs so they are durable, repairable, recyclable and reusable
- The effective management of waste aimed at their reuse and recycling
- Operational instructions for improving the energy efficiency of production processes
- Familiarity with innovative forms of consumption
- Appearance of a configured consumption model that will report true features such as lifetime and energy efficiency
- Informing the public about the benefits of the circular economy in relation to the linear economy and raising the awareness of the society
- Incorporate honest transition monitoring indicators

The long-established strategy of the circular economy needs to be included in National Government Planning, Ministries policies and any economic and development programs. Successful transition to the circular economy requires the simultaneous implementation of actions at all stages of the value chain: in the extraction of raw materials and in the design of products and materials (PRODUCTION), in the movement and consumption of goods, in repair, reuse or reconstruction by updating them public, research and innovation (CONSUMPTION), in the processing and recycling (WASTE MANAGEMENT) and reuse of materials, as well as water (SECONDARY

RAW MATERIALS). All this starts in the cities, being considered a very privileged place for the circular economy because it is an area of concentration of most of the population.<sub>2</sub>



Source: The circular economy (Ellen MacArthur Foundation 2012)

### - The action plan for the circular economy

Working groups of 9 ministries were set up for the actions of the national strategy under the coordination of the environment ministry and adopted as public policy. The actions aimed at the next two years concern the following areas:

- Regulatory and legislative measures to boost the circular economy and reduce red tape
- Financial incentives
- Improving knowledge, management and exchange processes
- Strengthening the governance of the circular economy and networking

The 34 actions are described in detail, such as funding improvement actions, technical knowledge actions and governance actions:

- 1) **Complete a legislative framework for waste management**, promoting prevention of waste generation and encouraging their reuse and recycling.
- 2) **Elaborate a National Action Plan for the promotion of Green Public Procurement and national policy making by**, which the public sector procures products or services by using green criteria when evaluating tenders.

- 3) **Elaborate proposals to reduce food waste**, with the aim of combating food waste.
- 4) **Adaptation of the framework for public and private construction works**, in order to ensure the recovery of valuable resources and the proper management of waste from the construction or demolition of buildings.
- 5) **Clarify the distinction between waste and product to facilitate the transition and use of secondary raw materials**. Including new legislation on post-use resources collected and intended for recycling and how waste will be classified.
- 6) **Water reuse and sludge utilization**, for use for irrigation, industrial or port use or for energy purposes.
- 7) **Development of innovative applications and cutting-edge technologies for waste management**. Through a series of actions and research programs to exploit the combination of all factors in areas such as universities, public bodies, science and technology parks, businesses, civil society and its design.
- 8) **Indicators of circular economy such as resource productivity**, energy demand, and carbon dioxide emissions are high indicators at international level. It is proposed to investigate them in relation to business activities and to utilize the National Documentation Center.
- 9) **Develop a methodology for measuring and monitoring food waste**, in order to create more transparent and comparable data. In order to reduce uncertainties and enable a better understanding of the magnitude of the problem and the scale of potential opportunities.
- 10) **Developing and integrating eco-design criteria**, such as product life cycle analysis, avoiding the introduction of hazardous substances in the production of products, the ability to repair products, incorporating renewable energy sources in public works (eg photovoltaics), extending the labeling of products. certification of recycled building materials, reduction of emissions from ships by mounting scrubbers.
- 11) **National standards for the environment and the circular economy**, to enhance the supervision of industrial and other products, in order to avoid the movement of products with hazardous materials and substances.
- 12) **Integrate the circular economy dimension into environmental impacts**, to simplify business permit and infrastructure permit procedures. The action will include an analysis of the integration of the circular economy with better regulation, integration of criteria into the licensing of business activities (eg building projects, roads and other infrastructure).
- 13) **Promoting the use of brokerage at regional or city level to promote the circular economy as an unpaid consulting**

**service.** "Resource brokers" generally help concentrate on factors, develop supply and demand for secondary materials. At the same time, the expertise of these experts is required in order for municipalities to accelerate the development of cyclicity in business and industrial activities.

- 14) Creation of urban spaces as 'creative reuse centers', and converting them into 'Green Centers',** in order to encourage repair, reuse, rotation, training in repair. So it will be a meeting point for consumers and producers to get feedback on design, design so that urban areas can encourage eco-design.
- 15) Promote the use of waste as a secondary fuel in industry.** The use of waste contributes substantially to saving non-renewable fuels, reducing greenhouse gas emissions and reducing production costs mainly in highly energy-intensive industries such as the cement industry.
- 16) Establishment of an institutional regulatory framework to facilitate the production of biomethane (green gas) from organic waste and its injection into natural gas or its use as propellant fuel.** The use of biomethane and green gas in general is a rapidly expanding energy option globally necessary to achieve the greenhouse gas reduction targets and the Paris Agreement. Promoting biomethane would not only help reduce gas emissions and reduce gas imports, but would also solve one of the problems Greece faces in managing organic waste from agricultural industries (poultry, mills, dairies) or the residential sector (including hotels and expired foods).
- 17) Compost specification of pre-selected organic and domestic waste,** to ensure the quality of compost produced by pre-selected organic waste composting plants and to facilitate its function.
- 18) Upgrading and strengthening of the bioeconomy sectors. Preparation of a National Action Plan for national policy making.** In this context, the following two actions are proposed:
  - Development of targeted training to encourage sustainable bioeconomy and biotechnologies that support it, in the selected areas of interest of the Greek region, according to their needs, infrastructure and characteristics (agri-food, bioenergy, textiles, chemicals, etc.) in safety conditions.
  - Develop the current legislative framework, with the aim of encouraging innovative business initiatives and the regulatory framework, taking into account trends in countries with developed biotechnology and the prospects of the bioeconomy in the near future.
- 19) Utilizing Institutional Framework Law 4513/2018 on Energy Communities locally through Energy Efficiency**



**Technologies and Improvements**, where incentives are provided for the utilization of agricultural and industrial waste for the use of electricity for electricity infrastructure.

- 20) Waste management, recovery and reuse.** Products that are unnecessary for some (eg clothes, furniture, appliances, etc.) should be collected and distributed to be used by needy or low-income citizens with basic livelihood needs.
- 21) Adaptation of cost types to calculate the life cycle cost of a public or private project**, in order to take a series of measures to ensure the use of materials and products for the construction of a second use.
- 22) Incorporate the principles of circular and cooperative economics into Sustainable Urban Mobility Plans, to meet the needs of people for mobility and the transport of goods to urban areas and their surroundings**, thus improving the quality of life. A long-term vision is developed for the balanced, integrated and sustainable development of urban transport and mobility on the basis of social, economic and environmental criteria covering all modes and means of transport.
- 23) Promoting and developing a circular economy in ports**, in order to create policies that will lead to balanced development and make the islands viable for all days of the year, should take account of the above features as well. It is considered necessary to integrate them into the design, operation and development of ports, as well as the communities of producers and users of port services and logistics services developed around or in cooperation with ports.
- 24) Opportunities to finance circular economy actions**, with particular emphasis on small and medium-sized entrepreneurship and the social economy. With Partnership agreement (PA) funding, transnational programs, European research funding programs, the Development Bank and other funding opportunities.
- 25) Circular tax incentives**, which will focus on:
  - Summarize other Member States' good practices in using tax arrangements as incentives for the cyclical transition.
  - Formulating justifications and proposals for a cyclical tax shift, eliminating VAT on food donations, reducing taxation on repair services, financial incentives for businesses, incentives for financial institutions financing cyclical projects.
  - Identify ways in which the state can inform, guide and encourage businesses to make cyclical changes and their benefits.
- 26) Forum for the development of the circular economy**, in order to create synergy between economic, social and scientific actors aiming at the transition to the circular model. It also aims to develop a dialogue between public and productive actors to improve the competitiveness of the domestic industry, expand knowledge and

technology, increase the added value of the economy and create new markets and products with a high degree of penetration into international markets.

- 27) **Development of a Circular City Guide**, providing guidance on cycling developments by supplementing and utilizing other existing sources. The guide will focus on both planning and implementation aspects and is expected to include, inter alia: cyclical good practices and business models, a cyclical roadmap, financing guidance, cyclical guidance, monitoring framework and etc.
- 28) **Specific awareness-raising programs on food waste**, and measures to prevent food waste more accessible to citizens. In the context of an integrated strategy with guidelines on how texts can apply food collection measures to public bodies such as schools, hotels, public canteens, but also to households and retailers.
- 29) **Creating and promoting energy efficiency improvement guides in production processes**. Exploitation of textbooks and technical guides prepared by the country's institutions and associations, as well as major educational institutions.
- 30) **Developing proposals and measures to enhance knowledge and information on circular economy issues**. Demonstrate the importance of transitioning from linear to circular economies, promoting transparency in processes, developing public awareness, training and raising awareness through the development of information campaigns and awareness-raising actions of producers, consumers and society, rich and varied.
- 31) **Promoting Collaborative Economics**, which is the motivating power behind many Circular Economy initiatives, enhancing the cyclical consumption and reduction of CO<sub>2</sub>. Promoting innovative forms of consumption, such as "product as a service" involving small businesses and self-employed, with the aim of maintaining or modernizing a building stock of equipment and products, and actions for shared mobility associated with smart and clean transport.
- 32) **Establishment and operation of a secretaryship**, that will address virtually all aspects and needs of the Circular Economy Plan. Tasks such as monitoring and coordinating the timetable of actions and planning, precisely defining the deliverables of all actions, evaluating Actions with criteria such as existing readiness for implementation and expected outcome etc.
- 33) **Education and training programs for administrations**, with the need for municipal, regional and decentralized licensing bodies and control agencies to implement and enforce the cyclicity criteria for licensed activities.
- 34) **Establishment of a Circular Economy Observatory**, for the organized collection of analytical data from investors and services.



The processing of data to draw conclusions on the evolution of the circular economy. The extraction of performance indicators and the annual compilation and publication of an aggregated report containing all economic, environmental and social indicators.<sup>1</sup>

**- The study of SEV -Hellenic Federation of Enterprises on Sustainable Development for environmental licensing**

The and the SEV Sustainable Development Council have commissioned and carried out a specific thematic study to explore how the environmental licensing institutional framework has been introduced and implemented in Greece, seeking proposals that will further simplify, improve and improve its effectiveness its implementation process.

The purpose of the study is to record the projects and activities and how they are categorized in Greek environmental legislation, the times required for environmental licensing, to compare the environmental impact assessment process with selected Member States and taking into account the Member States. impressive technological developments ensuring that the environmental footprint of productive activities is reduced by encouraging the utilization of secondary raw materials, the introduction of automation, the reduction of consumption of natural resources, and environmental protection in general, to increase the scope for reducing the burden of licensing, both for businesses and the public administration itself, while ensuring the highest environmental protection that characterizes our country.

In addition to the SEV executives, the SEV Board for Sustainable Development, the Hellenic Roof Industry, ECHMES LTD and an extensive network of business executives, experts, technocrats, academics, collaborators for the implementation of the study.

The stages of the methodology are:

- 1) Assessment of the current status of project categorization, where 10 groups of projects and activities subject to environmental authorization are examined, in accordance with the current institutional framework and compared with those provided for in European legislation (law 2011/92 / EU).
- 2) Recording, analysis and evaluation of environmental licensing, where a representative sample of 1140 Environmental Conditions Decisions was examined.

3) Benchmarking where it is based on:

- Recent Law Studies and Publications
- The Environmental Laws of selected Member States such as England, Austria, Denmark, Ireland and Cyprus, and comparison with Greek Law and Legislation.

4) Conclusions - Proposals based on them, proposals for adaptations and improvements to the environmental licensing process.

5) Consultation laboratory<sub>3</sub>

### 3. What has been done in Greece

In Greece, deficiencies and delays in applying the principles of the circular economy have already been identified, while the adoption of this model in various business sectors seems to be non-existent. The set of proposals adopted by the European Commission in December 2015 to facilitate the transition to a circular economy reflects the long distance Greece still needs to travel. This shows that the shift to an extrovert production model, such as that of the circular economy, is a major challenge for Greece in the coming years.

According to estimates by the think tank Ellen MacArthur Foundation, European GDP could grow by 11% if it adapts to this economy model by 2030, when it is currently up 4%. The shift to a circular economy could also bring about a whole EU benefit up to 1.8 trillion euro in about 12 years from now. However, Greece is slowly adapting to this model because it is lagging behind in adopting a policy in favor of the circular economy compared to other European countries (eg recycling), and is delaying or even failing to implement its proposals and directives EU for the circular economy. Greece performs well in wood and paper recycling, but is significantly behind in the recycling of glass, metal and plastic packaging at 32.2%, compared to the rest of the EU that recycle 37.3% of plastics and municipal waste at 19-20% when compared to other EU countries amounts to 41.8%. In Greece, 58.6% of packaging is recycled, while the EU recycles 65.3%, which shows that our country is significantly different from the rest of the countries in achieving the target of increasing the packaging recycling rate to 75% by 2030.<sup>4</sup>

#### - Partnership Agreement 2014-2020

Based on the Partnership Agreement 2014-2020 the main development needs that Greece is expected to meet and the opportunities that presented are organized into 11 thematic objectives. The Thematic Objective 3 refers to "Improving the competitiveness of small and medium-sized enterprises including those in agriculture and fisheries and aquaculture". More

specifically, it aims to improve the competitiveness of SMEs and focuses on areas of expertise on which to build competitive advantages with a global horizon and long-term viability. Areas which, as a matter of priority, appear to be able to generate significant investment interest and growth prospects are tourism, energy, agri-food, the environment, supply chain development, information and communication technologies, health and the pharmaceutical industry, creative and cultural industries, as well as materials and construction. Financing entrepreneurship in the period 2014-2020 will be a key element of the development effort. The budget allocated to TO3 corresponds to 2,420,967,802.72€ .<sup>5</sup>

- **Some applications of circular economy in Greece:**

*i. **National Waste Management Plan***

Until 2011 solid waste collection and transportation was carried out with 325 Municipal cleaning services throughout the territory. At the same time, 73% of the country recycled the blue bins, while only 3.2% of the population was able to recycle in 4 different bins. Waste of electrical and electronic equipment was exported abroad for recycling due to the inability of existing facilities to manage it. Non-hazardous industrial wastes used for alternative raw materials and fuels as well as secondary materials in cement plants, steel mills, etc. were collected at just 150 plants throughout the country, thus meeting the needs of only proprietary companies, so long-term storage of waste was a frequent management option.<sup>6</sup>

Greece has not properly managed hazardous waste because it is unable to adopt a proper plan of action, has not set up adequate facilities to deal with the hazardous waste produced, and cannot deal with the old cached waste until an effective one is in place management. So it was found that waste management in Greece was irrational, and there had to be substantial changes. These changes required targeted interventions in areas such as information and public awareness, registration of waste production and management, extension of networks and facilities management, environmental compliance audits and support for secondary markets.

In 2012, Law 4042/2012 came into force that modernizes waste management legislation, clarifying some important concepts and provisions, such as the definition and classification of waste. It has set clearer requirements for the entire waste management cycle, with the aim of encouraging prevention of production and preparation for waste reuse, significant impetus for recycling, the logic of promoting a circular economy and more efficient management of resources. Within the framework of the policy and actions of the Ministry of the Environment is also the treatment of long-term problems in waste management, with the goal of completing the program of eliminating the uncontrolled disposal of municipal waste and tackling the problematic operation of waste management facilities.<sup>12</sup>

In 2015, the National Waste Management Plan was amended and approved by 2020, after elaborating an earlier study, and taking into account the views and suggestions of services, bodies and citizens, enriched the content. The new national waste management plan concentrates the radically different political conception of the new governance towards an alternative model of modern and environmentally friendly waste management, with priority areas being decentralized activities at the municipal level whose role is to improve quality and quantity. with emphasis on source sorting, discrete sorting and processing of organic fraction, small-scale processing and recovery units, encouragement of social participation and in particular, to guarantee the public nature of waste management. The ambitious objectives of the ECHR fully adopt the waste management philosophy of national and Community legislation, going beyond the logic of integrated municipal waste management units in favor of sorting recyclable and biodegradable waste. They thus respond to modern and pressing needs and to the *acquis communautaire*, so that waste management in our country is put at the service of the environment and sustainable development, whilst drastically reducing the cost of management for the benefit of society and citizens.

However, 2016 was observed in Greece in 11 other EU countries landfill is still the most common waste disposal method. The table below shows the percentages that countries recycle, use waste for other uses, and which do not recycle at all.

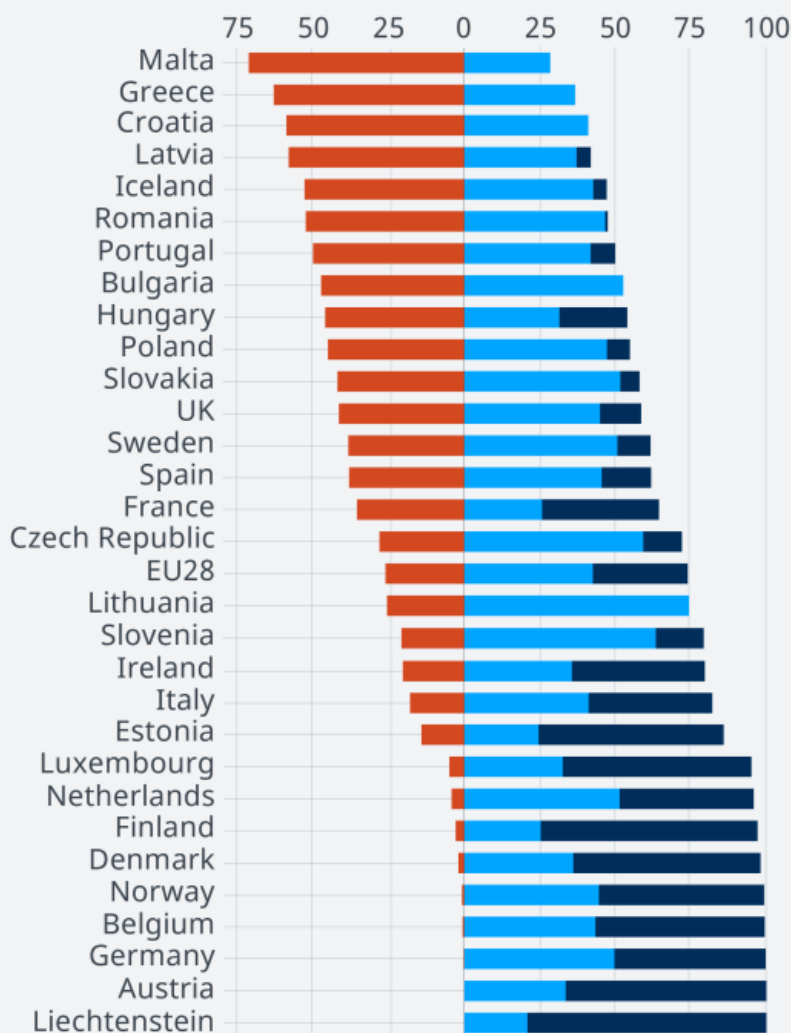
## Plastic: Wasted or recovered?

Share of plastic packaging waste that is

■ Not recovered (e.g. ends up in landfills)

■ Recycled (e.g. materials reused)

■ Otherwise recovered (e.g. incinerated for energy)



Source: Eurostat (env\_waspac), latest available data  
for each country (2015 or 2016)

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### Actions:

- An in-depth assessment of how the solid waste legislation is actually implemented
- Assessment of the need for a regulatory framework that better meets the requirements of the use of secondary resources

### Obstacles:

- Current legislation on solid waste focuses on protecting public health and the environment but does not meet the objectives of a circular economy
- Once products or materials are classified as waste, it becomes very difficult, if not impossible, to redirect them to the economic cycle for reuse or recycling<sup>7</sup>

### Projects

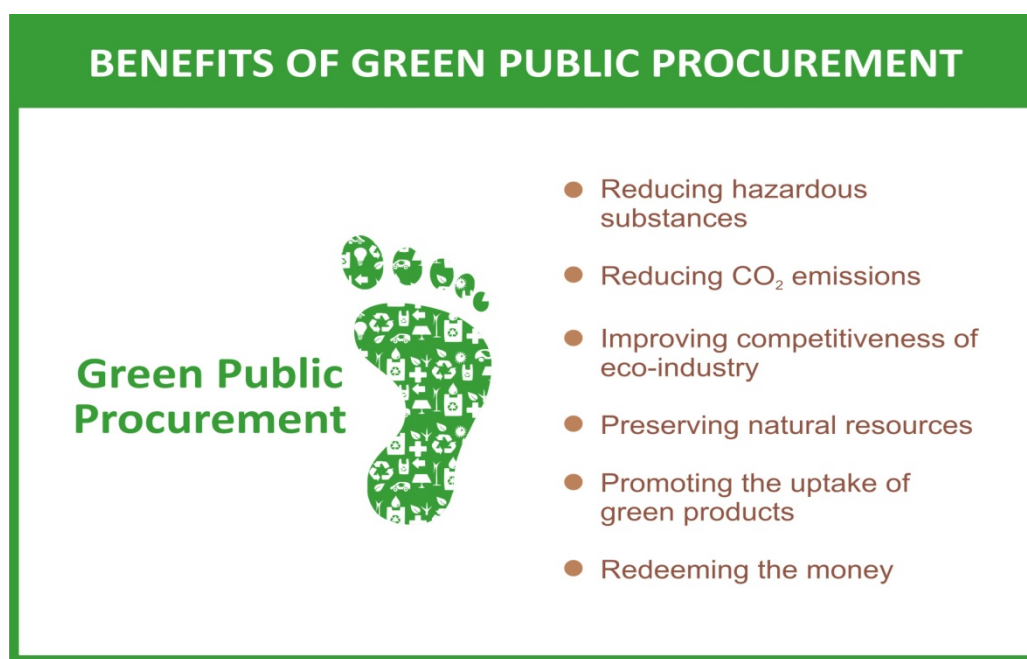
- **The LafargeHolcim group** uses waste that would end up in landfill as fuel or raw materials, responding to the global challenge of optimal waste management. We look at products that complete their lifecycle as resources, redefining their character as raw materials for other processes or industries. For its part, the Hercules group, which is a member of LafargeHolcim, replaces fossil fuels with the recycling of industrial, commercial and municipal waste, as well as agricultural waste, contributing to sustainable development.<sup>9</sup>
- **Titan** applies the circular economy to extend the product life cycle, while saving non-renewable natural resources by reducing, reusing, recycling and recycling raw materials, energy and waste. It has already exploited the circular economy model through different stages of production. Thus, the final product, namely concrete, a key material of human activity, contributes to tackling and adapting to climate change and energy saving.<sup>10</sup>
- In June 2019, two international scientific conferences were organized in Crete, focusing on the environment, climate change and important environmental projects on the island. The first conference is being implemented in the framework of the LIFE project '**ADAPT2CLIMA**', whose main objective is to adapt agriculture to climate change. The second conference on Solid Waste Management, with an important section on how hotel waste can be turned into animal feed using solar energy, as well as an anaerobic digestion plant in the industrial area of Heraklion.<sup>11</sup>

### **ii. National Action Plan for the Promotion of Green Public Procurement**

Every year, at the pan-European level, public sector spending on goods, services and projects accounts for about 17% of European GDP. These include, inter alia, supplies of electronic and electrical equipment, computer equipment, construction, textiles, food, energy, paper, furniture, transport and cleaning materials. All of these goods, services, and projects have significant environmental impacts throughout their entire life cycle, from production, use to disposal. It is responsible for greenhouse gas emissions, pollution, biodiversity reduction and depletion of natural resources. MTFs are a tool that can provide the incentives



needed to significantly reduce these negative impacts. The European Community, in cooperation with all stakeholders, has already set common criteria for ten categories of products and services. National agencies are responsible for the procurement and execution of public procurement contracts and can and must use their strong purchasing power to drive change in production and consumption patterns while promoting green growth and at the same time competitiveness and innovation.



Source: Green Public Procurement – A Potential Game Changer for India

So here comes the Green Procurement, that is, the processes by which the public sector procures products, services or jobs, using green criteria when evaluating bids. Under the Community institutional framework, public procurement services may use environmental criteria in the award of tenders and in the evaluation of tenders, while satisfying the basic principles of transparency, non-discrimination and non-discrimination.

Back in history, the debate on the use of green public procurement in the European Union intensified after 2003, when the European Commission encouraged Member States to develop action plans for public procurement on ecological criteria. In 2011, the Ministry of the Environment promoted Green Public Procurement, a government priority, aimed at reducing the environmental footprint of the government and at the same time enhancing producers and suppliers of green products and services. This led to the idea that public authorities could use their spending, which accounts for 19% of gross European product, of around 2 trillion € to invest in greener solutions. In 2014, the European Commission published a list of Green Criteria for 21 product categories, of which 8 product and service categories contribute to

primary energy savings. However, Greece is high on the list of countries where businesses that market green products owe more than 75% of their turnover to them, while there is a growing interest in SMEs in offering such products in the future. On the other hand Greece it is far behind other European countries in the use of so-called "green contracts" in public works-studies and services. It is characteristic that our country should have prepared a National Action Plan already in 2006, when today seven Member States (Britain, Denmark, Finland, Netherlands, Austria, Germany, Sweden) currently have 45% of the total value and 55% of their contracts are "green". A characteristic feature of the very slow reflexes shown by the Greek state on this major issue is the fact that the national public procurement strategy was decided in January 2017 by the Governing Council of Economic Policy.<sup>12</sup>

According to the Ministry of Environment, Greece unfortunately lags far behind in planning and implementing green public procurement. In order to make up for lost time, improve the quality and environmental standards of domestic production, in order to become competitive at European level, all stakeholders are required to contribute both to the formulation of the national action plan, to the definition of objectives and the implementation of the plan. , as well as informing the market.

#### Actions:

- Connection with cyclicity by adding cyclical criteria

#### Obstacles

- The limited number of environmental criteria established for products or services
- Insufficient information and understanding of product life cycle costs and the relative costs of environmentally friendly products or services
- Insufficient awareness of the benefits of environmentally friendly products and services<sub>7</sub>

#### Projects

- The University of Patras, representing Greece, and 8 other EU countries are involved in the project Green Public Procurement for the Effective Use of Regional Development Resources (**GPP4Growth**), are part of Interreg Europe and co-funded by the European Regional Development Fund. The aim of the project is to improve and implement policies that promote eco-innovation and environmental development.<sup>13</sup>

### ***iii. National Water Reuse and Soil Management Strategy***

Waste water reuse can be a rational tool for water resources management. The rationale for the re-use of properly treated municipal or industrial waste water has intrinsic benefits related to water resources conservation, environmental protection and economic benefits. However, the reuse of waste water requires a comprehensive and rational design, which takes into account the potential risks and limitations.<sup>12</sup>

The institutional framework for the reuse of sewage and sludge was completed in 2011 and states that processed waste should promote the utilization of treated waste water and thereby save water resources in ways that minimize negative impacts on the environment. Limits were also set for microbiological contracts and conventional parameters for the various reuse methods, as well as the corresponding degree of waste water processing required. The reuse processing can be carried out on household, municipal or some industrial waste water. Waste water processing is also compatible with activities such as:

- agricultural use (irrigation) in crops consumed after heat or other processing,
- supply of groundwater to selected boreholes,
- urban use in fire fighting and street cleaning,
- industrial use with applications involving the use of cooling water.

Until then, about 40% of sludge was harvested through drying and then by combustion in cement industries, but with the completion of the drying plant in Thessaloniki, the figure was raised to 50% promoted for recovery and additional quantities, preferably in agriculture.<sup>14</sup>

#### Actions:

- Proposals to improve existing water legislation to encourage and facilitate water reuse
- The European policy needs to be better adapted to the circular economy of water management and water reuse
- Develop a position paper and contribute to current water legislative processes

#### Obstacles:

- The current legal framework for water does not sufficiently meet the objectives of a circular economy with regard to the reuse of water in cities
- The lack of minimum quality requirements for water in its various uses and management processes, such as different quality standards for recycled water, simply results in a ban on reuse

- The lack of clear responsibility and the risks posed by each player have implications for quality assurance, monitoring, maintenance, etc.
- Unwillingness to allow the application of new technologies (regulations tend to focus on the description of technologies rather than adherence to the required standards),<sup>7</sup>

### Projects

- In 2000, **the Mesogeos S.A.** was founded which up to now through the sustainable management of natural resources gives water more than 1 time value.<sup>32</sup>
- The **European HYDROUSA** program is part of the “Horizon 2020” program and is the rational management of water resources through the recovery of water, materials and energy from waste water, as well as the increase of water reserves in the Mediterranean region. The project will be implemented in 3 Greek islands of Tinos, Mykonos and Lesvos, which are facing major water scarcity problems. This system (HYDRO5) will have a minimum production of 70 cubic meters per year which will supply water to a 200 sqm greenhouse and the systems (HYDRO1 & HYDRO2) will produce irrigation water for urban forestry.<sup>33</sup>

#### **iv. Other projects based on circular economy**

- In April 2019, the first recycling and circular economy center in Greece opened its doors. The groundbreaking **Recycling and Circular Economy Center, Zero Waste Lab**, promises a unique experiential experience for the citizens of Thessaloniki, with an innovative workshop open to the public showing what our waste-free world would be - a world where nothing is lost. Visitors have the opportunity through an experiential tour to learn about waste prevention, management, recycling and reuse and how to integrate the principles of circular economy into their daily lives in smart and effective ways. They have the unique opportunity to see the volume of waste produced per capita in Greece per year, of which 45% is organic waste, 23% paper, 14% plastic, 3.5% metal, 3, 5% glass, 2% electronics and 9% other items. At the same time they will learn about micro-plastics, the small pieces of plastic that are very often found on the beaches of Thessaloniki and how they threaten the environment as they end up in the food chain of small and large organisms and even humans themselves. And how with the use of new technologies such as 3D Printing, plastic waste can be converted into new raw material and gain a second life.<sup>16</sup>
- On 1 August 2019, **the SinCE-AFC project (“Enhancing the Entrepreneurship of SMEs in the Agri-Food Chain”)** was formally launched, approved under the 4th call for the INTERREG EUROPE

program. This project aims to involve SMEs in the agri-food product chain (production, processing, packaging, distribution, and final consumption) in the circular economy by promoting appropriate horizontal management and financing mechanisms. The partnership includes 9 bodies and 7 EU countries (Greece, Italy, Ireland, Hungary, Romania, Poland and Bulgaria).<sup>18</sup>

- The University of Thessaly has a Postgraduate Program "**Sustainable Environmental Change Management and Cyclical Economics**" aiming at an in-depth diagnosis and understanding of environmental issues, the way they are related to humans, from the 2018-2019 academic year. It examines the nature, causes and impacts of major forms of environmental change, how these changes interact at global, regional and local levels, and how they impact ecological systems and what are the sustainable solutions to these changes.<sup>20</sup>
- In September 2017, a workshop on **Industrial Coexistence and Cyclical Economy**, Examples in Western Macedonia" was organized in the municipality of Kozani. The workshop was held in the framework of the implementation of the European projects SYMBI (Industrial Symbiosis for Regional Sustainable Growth and Resource Efficient Circular Economy) financed by the Interreg Europe Program and M3P (Material Match Making Platform) funded by the LIFE program implemented by the Municipality of Kozani and DIADYMA SA respectively.<sup>17</sup>
- Replace is the new European program for the Circular Economy (Interreg Europe) launching in Crete and aims to integrate, develop and exploit the results of the successful **H2020 SCREEN program**. **Develop** and implement policies and actions focusing on identifying, exploiting and financing circular value chains and related projects. And to achieve synergistic use of financing for the circular economy, linked to the RIS3 Regional Specialization Strategies, and to enhance performance in the areas of innovation, competitiveness, economy and employment.<sup>19</sup>

#### v. Circular Economy Forum

The 1st Circular Economy Forum was held in April 2019 and featured new innovative practices, the European Union's broader circular economy strategy, financial instruments, and the 37 actions of the National Strategy for the Circular Economy. Organized by the Ministry of Environment and Energy and the European Commission in cooperation with the Economic and Social Committee of Greece for the purpose of dialogue on issues such as:

- The European Action Plan for the Circular Economy,
- the incorporation of the Cyclical Economy into the Growth Strategy and its adoption as a public policy,

- The adoption and formulation of the Opinion of the Economic and Social Committee on the National Strategy for the Cyclical Economy,
- The submission of the National Strategy for the Cyclical Economy to the European Commission during the Council of Ministers of the Environment of 20 December 2018 and a proposal by the Commissioner for Environment, Maritime Policy and Fisheries Carmenu Vella.

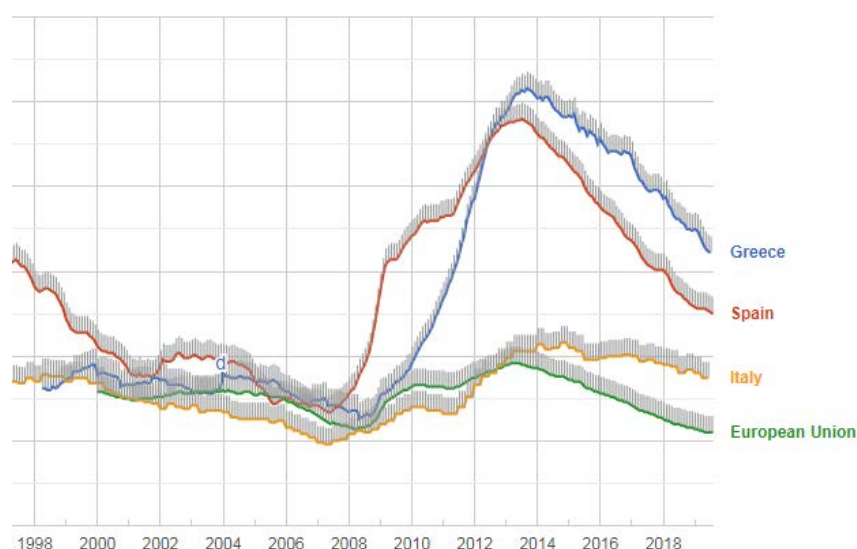
The Forum was an opportunity to exchange views on important issues such as how to introduce the circular economy to Greece, its ability to contribute to waste management and job creation, the production of goodwill through new and innovative business models, and the presentation of good practices from organizations and businesses in the country, which are examples of a circular economy. It should be noted here that Greece is one of the 10 European countries that have a National Cyclical Economy Strategy.<sup>15</sup>

#### 4. Level of low-skilled or low-qualified adults involved

Unemployed in Greece in April 2019 amounted to 833,858 persons and their number decreased by 107,290 persons compared to April 2018 (decrease of 11.4%) and by 26,925 persons compared to March 2019 (decrease of 3.1%). In the first quarter of 2019, unemployment had slightly increased. The total number of employees is estimated to be 3,891,618 and the number of employees increased by 74,993 compared to April 2018 (2% increase) and 26,926 persons compared to March 2019 (0.7% increase). The economically inactive (unemployed or job seekers) amounted to 3,215,369 persons and decreased by 10,218 persons compared to April 2018 (0.3% decrease) and by 3,606 persons compared to March 2019 (decrease 0.1%). For women, the unemployment rate (21.7% in April 2019 from 24.4% in April 2018) remains significantly higher than that for men (14.5% from 16.1%), according to RES. By age, the highest rates were recorded in the groups of 15-24 years (30.4% in April 2019 from 40.3% in April 2018) and 25-34 years (24.2% from 25%). Following are the ages 35-44 years (16.3% from 18.2%), 45-54 years (14.2% from 16.5%), 55-64 years (13.8% from 15.8%) and 65-74 years (12.4% from 9.7%).

Below is a table showing unemployment rates in Greece from 1998 to 2018 in relation to Spain and Italy, which have the highest unemployment rates and in relation to the EU average





Source: OECD Greece

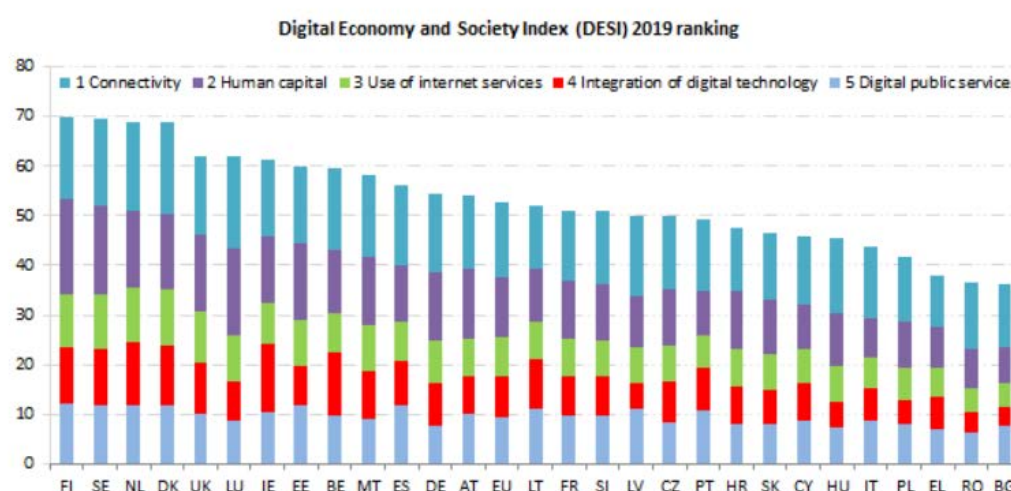
According to the 2019 European Monitoring Report on Greece, the rate of educational poverty, is basic reading and writing skills and sufficient knowledge in science, reaches 32% on average while in Europe it is 20%. But Greece is much better than Europe in the early dropout rate of 18-24 year old students. The Greek percentage is 4.7% and the European average is 10.6%. Also, most Greeks aged 30-34 hold a university degree compared to the European average (44.3 and 40.7% respectively).<sup>21</sup>

43% of Greeks believe that their education or training did not provide them with the skills needed to find a job that meets their professional qualifications. Greece ranks first in the EU, followed by Spain (38%) and Italy (35%). The corresponding figure in the EU is 23%, with the lowest rates in Sweden (10%), Denmark (11%) and Germany (13%). Nearly half of Greek respondents (49% versus 56% in the EU) believe that their professional qualifications would be recognized in other countries. 6% of Greeks and European citizens attempted to work or study in another Member State, but failed, either because their qualifications were not recognized by potential employers or educational institutions or because respondents were insufficient. information on recognition of their qualifications abroad. Also, 81% of Greek respondents rate 'good' the quality of education they received at school, compared to 86% in the EU. Only 29% of Greeks and 39% of Greeks rated 'good' quality of education. European citizens. According to EU citizens, the most important aspects of education and training concern, in particular, teachers 'ability to arouse students' interest and make them active. Other areas that can be improved are learning environments to stimulate creativity and interest (49% in Greece and 41% in the EU) and practical professional experience in a company or organization (46% in Greece and 37% in the EU).<sup>24</sup>

Greece is significantly behind and has lagged behind in the use of Information and Communication Technologies at work. In addition, it

belongs to the group of countries (along with Italy, Turkey, Chile, Slovenia and South Korea), which have a high proportion of workers in high-risk occupations for automation, and thus unemployment. Furthermore, Greece is mentioned (along with Chile) as countries where not only employees but in general a large proportion of the population do not have basic digital skills, which means that they need to promote a broader policy on digital skills upgrading. to their entire population. According to the report, it is not enough for the general population to have access to the Internet, but the population should also make the most of the opportunities of digitization.

The DESI indicator below shows the progress made by the Member States in their digitization. The index evaluates countries on five criteria: connectivity, human capital (internet use, digital citizen skills), use of online services, integration of digital technology (in business, e-commerce, etc.) and digital public services (e-government).<sup>24</sup>



Source: European Commission

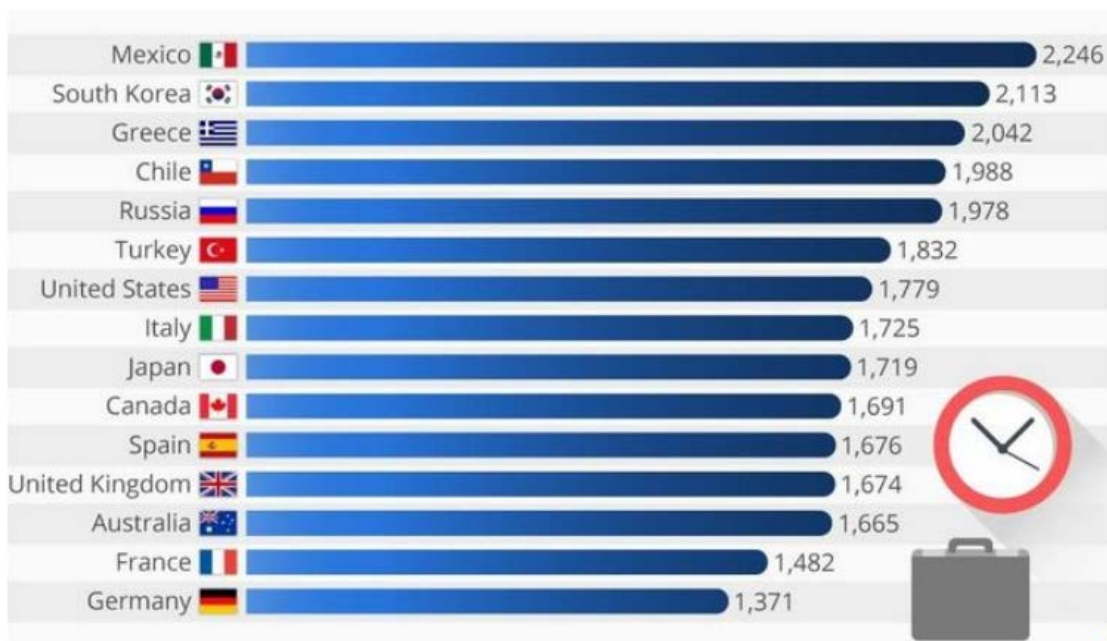
Greece ranks 27th out of 28 EU member states. Overall, in recent years, Greece has not made much progress compared to other EU Member States. Last year, progress was slightly slower than average. EU integration of Greeks into more sophisticated digital technologies remains low. Greece's performance is reported to be well below the EU average, but it is making progress. In 2017, the percentage of the Greek population using the internet on a regular basis (67%) was one of the lowest among European countries (EU average 81%). The number of people with at least a basic level of digital skills has remained it stands at 46% and Greece remains below the EU average (57%). Our country still has the lowest share of specialized Information and Communications Technologies (1.4%) in the EU, while still suffering from a "brain drain".

Greece is dramatically lagging behind other countries in participating in international value chains, and Greeks do not have the skills needed to make the economy more extroverted. Developing skills through education

and training is not just a matter of adequacy of state resources. It is more a matter of financial health, an economy that is growing rapidly, rather than sluggishly, because of the variety of structural barriers to economic and investment activity. Only in an economy where businesses invest, pay good wages and look for skilled workers do the right education and training structures for the workforce are created side by side. To this end, the state, employers, trade unions and education and training bodies need to work together to provide training opportunities for workers in their work and re-training adults who need new skills.<sup>22</sup>

The Greek education system provides sound knowledge bases but lacks in organization, extroversion, evaluation and labor market linkage mechanisms to understand needs and provide the appropriate skills. Greeks are flexible and adaptable, especially when we operate in conditions of more organized educational and work structures, as demonstrated by the success of Greek universities in the US, and capable of overcoming challenges, as evidenced by the numerous academic publications in scholarly publications. Public education has previously served as a lever for social mobility for a large proportion of the Greek population.<sup>23</sup>

New data from the Organization for Economic Cooperation and Development, which records the work of its 35 members from the "western world" as we are used to calling the most advanced in economic terms, states that Greece is at the top of European states in average. Greeks work 2,035 hours a year. In contrast, the Germans work only 1,363 hours.



Source: OECD Greece

Interestingly, in our country, 11% of the workforce is part-time, while the Netherlands tops the list with 37.7%, followed by Switzerland with 27% and

Australia with 25.9%. Self-employed in our country account for 34.1% of total employment, with Greece being second behind Colombia where self-employment rises to 51.3%.

## 5. New Business Opportunities for low-skilled or low-qualified adults in the CircEc

In 2011, according to a McKinsey survey, the 8 top sectors in Greece that would create jobs by 2020 (in 2 years from now) were: the pharmaceutical industry (for generics), aquaculture, medical tourism, care the elderly and the elderly, the creation of a regional freight transit center, waste management, specialized food categories and the development and development of classical curricula.<sup>28</sup> Today, recent studies indicate that there are indeed some occupations that will have positive job market prospects in the coming years and offer better working conditions, higher earnings and faster career prospects. These are the following:

- **Shipping and Tourism**, still the two main and main pillars of the Greek economy, all of which offer ample employment opportunities
- **Health professions** that are high on the list as they continue to absorb enough people. Demand remains high, as aging populations and rising life expectancy may lead to increased employment in the industry
- **Nutrition**, as modern lifestyle and fast pace of life do not allow many to deal with their diet and health
- **Computer science**, is another area that has managed to remain virtually unaffected by the crisis. Demand for people dealing with digital technology, communications, social media and e-commerce is growing
- **Energy and Green Technology**, is also an industry that is growing dynamically and is expected to lead in the coming years. Green growth and entrepreneurship (RE, recycling, energy efficiency of buildings, waste management and energy recovery, energy saving, etc.) are of strategic importance for the growth of a future economy and the creation and maintenance of thousands of jobs
- **Food & beverage industry**, are stable values in the labor market and are one of the key drivers of the Greek economy. According to a recent IOBE survey, in 2011 the share of the Food & Beverage workforce in total manufacturing employment reached 28%, which gradually increased to 36% in 2016

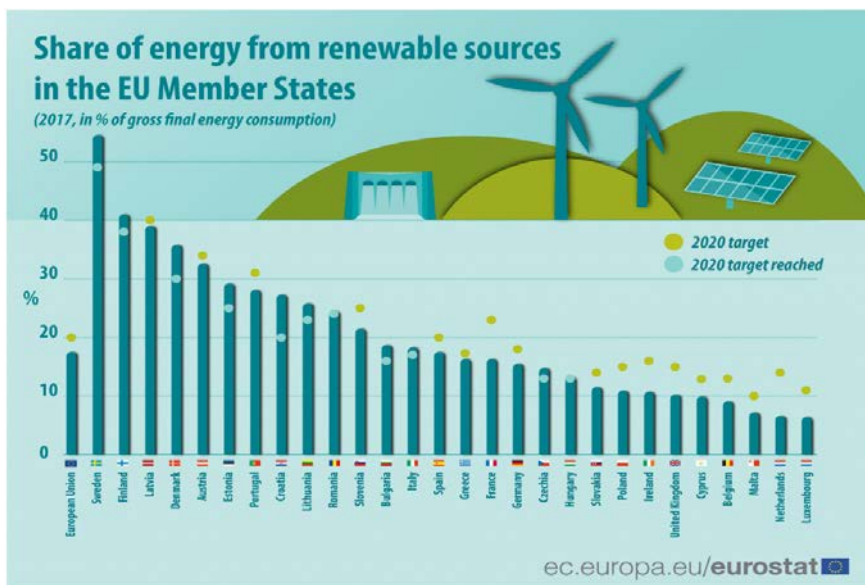
The aforementioned sectors will have the opportunity, not only in the coming years, to preserve existing ones but also to create new jobs.<sup>27</sup> While the advantage of the energy and green technology and food & beverage

industries is addressed to low-skilled or low-qualified adults who want to invest in the circular economy.

The **food and beverage** industry is one of the key pillars that are important for the Greek processing and development of the country. Highlights of the role of the domestic food and beverage industry on the world map of processing are: high quality products, the Greek brand name, as well as the organized promotion of Greek food. The growth prospects of the food and beverage industry are promising, which, together with the more effective cooperation of industry representatives and competent bodies, can contribute not only to improving efficiency but also to having a new development model, boosting the Greek economy.

The **energy and green technologies** industry from the need to develop renewable energy. Renewable energy sources include wind energy, solar energy (thermal, photovoltaic and condensed), hydroelectric power, tidal energy, geothermal energy, environmental heat absorbed by heat pumps, biofuels and renewable energy waste. The use of renewable energy has many potential benefits, such as reducing greenhouse gas emissions, diversifying energy supplies and reducing dependence on fossil fuel markets (in particular, oil and gas).

Below are the percentages of renewable sources in Greece in relation to the EU for 2017



Source: Eurostat, Share of energy from renewable sources, 2017

The circular economy in Greece can fuel a qualitative leap in the economy, which will be a growth transformation. It creates new jobs, fosters SMEs, new jobs and the social economy, which is still very low in Greece.

Further advantages are the decentralization of processing created by reuse and recycling, while being compatible and friendly to Greek productive



tissue characterized by small business size. It supports the competitiveness and viability of businesses by providing cheap raw materials, tackles the upcoming increase in the prices of scarce raw materials and helps save costs in the industries. It also creates new business and business material with real product rather than services while converting consumers into users adopting consumer trends towards environmentally friendly products.

- **Green Employment**

Green employment is those activities in the primary, secondary, tertiary and quaternary sectors that contribute to the preservation or even restoration of the environment. Green jobs relate to professional activities that:

- Protect ecosystems and biodiversity
- They contribute to the rational use of energy and natural resources
- Reduce water consumption
- They lead to a low-carbon economy
- They limit the production of waste and pollutants

Adding to the above is the qualitative dimension of decent work, that is, work that provides equal opportunities for men or women in conditions of freedom, security and respect for human nature. Ensuring dignity at work is central to enhancing poverty reduction efforts and is an important means of achieving integrated and sustainable development.

Basically green jobs are:

- ✓ Jobs in companies producing products or offering services that benefit the environment or conserve natural resources
- ✓ Jobs whose tasks consist in creating more environmentally friendly processes, or using less natural resources from the provider

According to the United Nations Environment Program, green work is "work in the fields of agriculture, construction, research and development, as well as administration and services that contribute substantially to maintaining or restoring environmental quality. In particular, but not exclusively, this includes jobs that help protect ecosystems and biodiversity, reduce energy, materials and water consumption through high-efficiency strategies or exempt the economy from carbon dioxide production or lead to minimization or complete degradation avoiding all forms of waste and pollution ".<sup>29</sup>

- **Green entrepreneurship**

Green entrepreneurship is that form of economic activity that puts the protection of the environment and nature at the heart of its strategy in general. Green entrepreneurship is the company's positive attitude towards environmental protection, with regard to its products or services, as well as



with its production processes. The green business has a positive attitude towards protecting the environment in all its activities.

In 2001, the European Council adopted a sustainable development strategy and added an environmental dimension to the Lisbon strategy, recognizing the need to fundamentally reform the economy in order to create about 15 million new jobs by 2010.

According to the Green Paper on Entrepreneurship in Europe, entrepreneurs are the driving force behind a market economy and their achievements offer a wealth of society and jobs and consumers a variety of options. Many large corporations have adopted formal corporate social responsibility strategies, in response to the growing public expectations of the impact of business on society and the environment. This approach implies the optional integration of social and environmental considerations into business practice and stakeholder engagement. Such actions may, for example, include a commitment to increase production activity in an environmentally friendly way.<sup>30</sup>

- **New or emerging green business activities**

The National Documentation Center informs and supports Greek businesses to turn to greener and more "cyclical" solutions, receiving personalized guidance, can effectively manage their innovation, leverage research results from leading European and non-research institutions. They are thus able to design products with a view to durability, re-use and overall saving of natural resources. According to studies conducted for Greece, new jobs are expected to emerge in the following activities:

- Air Quality Management
- Water Resources Management
- Solid Waste Management
- Management and Protection of Habitats
- Generated Energy Management
- Travel Management
- Dealing with Natural Disasters and Environmental Accidents

The following text makes an attempt to present the interventions and investments required to make significant progress by 2025 towards turning the linear economy (resources, products, waste, environmental degradation) into a circular economy (less resources, more durable products, less waste, environmental protection, recycled recycling, recycling, reuse of materials).

The success of the project and the pace of its implementation are based on the adoption of the principles of the circular economy by private companies that are invited to invest in new emerging profitable opportunities, in collaboration with the state and supranational authorities (European Union)

who are called upon to create an environment that ensures the profitability of investments, not through subsidies, but by achieving and synchronizing the development of a critical mass of circular economy interventions to guide investment As underwriting.

Finally, the whole process of the circular economy may lead to reclassifications in income, education and employment as products become more resilient (shorter jobs) and there will be a need for new skills in material recovery and reprocessing, and energy production, by waste (more employment), which should be taken into account. In essence, the transition to the circular economy is a technological process, with all the advantages and disadvantages that technological progress brings, and as such it must be tackled, however, in the context of realistic ecosystem sustainability goals that must be in place with harmony with an achievable speed of transition to the new desired productive and consumer model.

The 10 promotions are about a new wave of investment in the circular economy that focuses on three major categories: cyclical mobility (transport), cyclical nutrition and circular buildings (built environment), which does not mean that there are no other interventions. This is a new wave of investment in the circular economy that, along with the investments already under way, could put the European economy on a credible path to transition from the linear to the circular economy.

1. **Integrated mobility systems.** It is an integrated system where public transport and multi-user cars coexist (uber, etc.). The investment required focuses on the production of zero-emission cars (powered by electricity, hydrogen and other technologies), the creation of related infrastructures (eg car battery charging stations, public transit passenger cars in sharing economy cars, lanes). exclusive traffic for zero-pollution cars, etc.) and, finally, electronic navigation applications and digitized payment systems for the integrated travel system. At European Commission level, the Horizon 2020 program provides for € 119 million in R&D spending for medium and small businesses on innovation in transport and smart cities and on digital road automation.
2. **Design and production of circular cars.** These are zero-emission cars made with durable materials that aim at recycling and re-using them. Circular cars will include components that could be replaced by retrofitted parts and will have features that allow them to improve their functionality and performance. Circular cars will thus be able to be used for a long time, being made from more durable materials and with a view to easy recycling and reuse, as opposed to the current production model based on the planned obsolescence incorporating expiry date of the product. It is estimated that investments of € 35 billion could be made in 2025.

3. **Replacement of car parts.** These are manufacturing processes designed to remanufacture a used product so that it can be reused as new, unlike recycling, where the product is decomposed into reusable raw materials. It is noted that the recycling process uses 85% less energy than processing and lower water consumption. Research shows that with reduced input costs and increased labor use, relocation enjoys a 50% higher profitability. It is estimated that investments of € 1 billion could be made in 2025.
4. **Implementation of regenerative farming practices.** This is a combination of farming practices that restore soil and rejuvenate the ecosystem, including organic farming, permaculture, no till polyculture and other practices designed to stop soil erosion. and reduce agriculture's dependence on chemical fertilizers, pesticides, herbicides, etc. The European Commission's Horizon 2020 program also includes funding of € 70 million for robotic research and development expenditure technology for precision agricultural methods in cultivating and harvesting agricultural products.
5. **Utilization of nutrients from organic waste.** It is about recovering nutrients and energy (biogas) from organic waste using various methods. In Europe today, 44% of organic waste is collected and either composted or recycled, with the remaining 56% either buried on land or burned, constituting a huge waste of built-in chemicals of potential energy production. The European Commission's Horizon 2020 program includes funding of € 50 million for research and development in digital monitoring of the liquid waste cycle to increase nutrient recovery.
6. **Rural crops in urban indoor farms.** It is mainly about the production of fruit and vegetables without the use of soil and regardless of weather conditions in vertically enclosed urban areas, using the technologies of aviation, hydroponics and hydroponics (for fish production), often in integrated systems minimizing the use of nutrients and nutrients. / pesticides, at the same time releasing land use for other purposes.
7. **Development of new sources of protein.** This is to meet the overcooked demand for meat and fish, which sooner or later will not be able to meet the supply side, with alternative sources of full protein such as insects, algae and microalgae (aquatic monocytes). It is estimated that € 2 billion can be invested by 2025 if demand for these alternative protein products reaches 1.5 million tonnes with an investment cost of € 1500 per tonne.
8. **Redesign and construction of buildings with the principles of circular economy.** These are buildings designed and constructed so that throughout their lifecycle they can be removed, used or unwanted materials and replaced with recycled materials that will also be renewable or recyclable, while allowing improvements to the

layout or functionality of the building. At the same time, these buildings will be designed to have energy autonomy or even to sell their surplus energy to the networks. These buildings will minimize waste, greenhouse gas emissions and energy consumption, not only during their lives but also during their construction and demolition phases. Investments of € 105 billion are envisaged by 2025 if production capacity was 800,000 circular buildings per year.

9. **Recovery and reuse of construction materials.** It is the operation of factories to recover materials from rubble produced during the process of building and demolishing building structures. Recycling and re-using construction materials can save construction companies a significant part of the cost of rubbish removal either on shipping costs or on landfill charges. Investments of € 2 billion are envisaged by 2025.
10. **Development of circular cities.** It is about applying the principles of circular economy to the spatial planning of cities, so as not only to integrate the effects of the shift to circular economy in terms of transport, food and the environment, but also to provide additional cyclical actions such as the management of water and local energy infrastructure, as well as the areas that will be liberated during the transition to a circular transport economy, while at the same time rationalizing the expansion of cities into new areas. Hess. It is estimated that € 10 billion could be invested by 2025 if 30 cities adopt green urban planning practices.<sup>26</sup>

- ***Circular Business ModelCanvas***

The circular business model canvas is extended and adjusted to the circular economy version of the business model canvas. There are three main challenges to overcome in order to enable the transition from a linear to a circular business model, the take-back system and customer segments, the cost structure and revenue streams, and the changes a company implements towards more circular business model and adaptation factors which can hinder this process.<sup>31</sup>

|  |  |  |  |   |
|--|--|--|--|---|
| <b>Partners</b> <ul style="list-style-type: none"><li>• Cooperative networks</li><li>• Types of collaboration</li></ul>  | <b>Activities</b> <ul style="list-style-type: none"><li>• Optimising performance</li><li>• Product Design</li><li>• Lobbying</li><li>• Remanufacturing, recycling</li><li>• Technology exchange</li></ul> <b>Key Resources</b> <ul style="list-style-type: none"><li>• Better-performing materials</li><li>• Regeneration and restoring of natural capital</li><li>• Virtualization of materials</li><li>• Retrieved Resources (products, components, materials)</li></ul> | <b>Value Proposition</b> <ul style="list-style-type: none"><li>• PSS</li><li>• Circular Product</li><li>• Virtual service</li><li>• Incentives for customers in Take-Back System</li></ul>                 | <b>Customer Relations</b> <ul style="list-style-type: none"><li>• Produce on order</li><li>• Customer vote (design)</li><li>• Social-marketing strategies and relationships with community partners in Recycling 2.0</li></ul> <b>Channels</b> <ul style="list-style-type: none"><li>• Virtualization</li></ul> <b>Take-Back System</b> <ul style="list-style-type: none"><li>• Take-back management</li><li>• Channels</li><li>• Customer relations</li></ul> | <b>Customer Segments</b> <ul style="list-style-type: none"><li>• Customer types</li></ul> |
| <b>Cost Structure</b> <ul style="list-style-type: none"><li>• Evaluation criteria</li><li>• Value of incentives for customers</li><li>• Guidelines to account the costs of material flow</li></ul> |  | <b>Revenue Streams</b> <ul style="list-style-type: none"><li>• Input-based</li><li>• Availability-based</li><li>• Usage-based</li><li>• Performance-based</li><li>• Value of retrieved resources</li></ul> |  |   |
| <b>Adoption Factors</b> <ul style="list-style-type: none"><li>• Organizational capabilities</li><li>• PEST factors</li></ul>   |  |  |  |   |

Source: adapted from Osterwalder and Pigneur, A framework of the circular business model canvas

## 6. The Pocket Library: collection of documents, reports, book, and websites on circular economy



Source: Elmont Memorial High School

The research was created with the aim of citing examples of successful transfer of circular economy to businesses in Greece. It also aims at identifying the strategies and policies that are at the heart of the implementation of the actions. The sections analyzed are:

- ✓ Report on the most important circular economy policies and strategies in Greece
- ✓ Analysis of actions and applications and reference to some examples of the functioning of the circular economy in Greece
- ✓ Reference to the level of skills and education in Greece, and comparison with other EU countries.
- ✓ Analysis of business opportunities created by the application of the circular economy

The data collection was done by various government agencies for various purposes. The data used in the research were collected from various sources, including national strategies, action plans, statistical databases. The approaches, knowledge and tools mentioned have been used by recent research. The quantitative information used on the circular economy was from reports, models and indicators. The data sources used were mainly collected from:

## 1. **Documents and Reports**

- **Hellenic Federation of Enterprises**, <https://en.sev.org.gr/>, *SEV – Hellenic Federation of Enterprises has consistently fostered business development in Greece since 1907. Sev representing a broad spectrum of the country's economic activity, including manufacturing and services.*
  - [http://www.sev.org.gr/Uploads/Documents/Epiteliki\\_synopsi\\_lanouarios\\_FINAL.pdf](http://www.sev.org.gr/Uploads/Documents/Epiteliki_synopsi_lanouarios_FINAL.pdf), *Proposals to accelerate environmental licensing by reassessing projects and activities according to their environmental impact.*
  - [https://www.sev.org.gr/Uploads/Documents/52248/SpecialReport\\_paideia\\_dexiotites\\_V\\_03072\\_019\\_F.pdf](https://www.sev.org.gr/Uploads/Documents/52248/SpecialReport_paideia_dexiotites_V_03072_019_F.pdf) *Lack of education and skills are an obstacle to productive transformation and modern competitive production.*
  - [http://www.sev.org.gr/Uploads/Documents/50726/Weekly\\_04\\_01\\_2018.pdf](http://www.sev.org.gr/Uploads/Documents/50726/Weekly_04_01_2018.pdf), *Yes to the circular economy (not to the recycling of wrong policies).*
- **European Center for the Development of Vocational Training**, <https://www.cedefop.europa.eu/en>, *Cedefop works to strengthen European cooperation and provide the evidence on which to base European VET policy. Cedefop's added value is the high quality of its comparative analyses and expertise gathered through research and networking.*
  - [https://www.cedefop.europa.eu/files/9067\\_el.pdf](https://www.cedefop.europa.eu/files/9067_el.pdf), *A strategy for green skills. The Cedefop Study on Relevant Skills Contains Lessons Learned for a Successful Transition to the Green Econom.*
- **Ellen Macarthur Foundation**, <https://www.ellenmacarthurfoundation.org/>, *The Ellen MacArthur Foundation works business, government and academia to build a framework for an economy that is restorative and regenerative by design.*
  - <https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf>, *Economic and business rationale for an accelerated transition.*
- **McKinsey & Company**, <https://www.mckinsey.com/gr>, *McKinsey & Company is a global management consulting firm. they are a trusted advisor to the world's leading businesses, governments, and institutions.*



- [https://www.mckinsey.com/~media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Big%20data%20The%20next%20frontier%20for%20innovation/MGI\\_big\\_data\\_exec\\_summary.ashx](https://www.mckinsey.com/~media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Big%20data%20The%20next%20frontier%20for%20innovation/MGI_big_data_exec_summary.ashx), *The next frontier for innovation, competition, and productivity.*
- **Eurostat**, <https://ec.europa.eu/eurostat>, *Eurostat is the statistical office of the European Union situated in Luxembourg. Its mission is to provide high quality statistics for Europe.*
- [https://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable\\_energy\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics), *Renewable energy sources include wind power, solar power.*
- **Organisation for Economic Co-operation and Development**, <https://www.oecd.org/greece/>, *The Organisation for Economic Co-operation and Development (OECD) is an international organisation that works to build better policies for better lives.*
- <https://data.oecd.org/greece.htm>, *A wide range of indicators on agriculture, development, economy, education, energy, environment, finance, government, health, innovation and technology, jobs and society.*

## 2. Books

- **Waste to Wealth, The Circular Economy Advantage**, [https://books.google.gr/books/about/Waste\\_to\\_Wealth.html?id=DmKkCgAAQBAJ&printsec=frontcover&source=kp\\_read\\_button&redir\\_esc=y#v=onepage&q&f=false](https://books.google.gr/books/about/Waste_to_Wealth.html?id=DmKkCgAAQBAJ&printsec=frontcover&source=kp_read_button&redir_esc=y#v=onepage&q&f=false), *This book examines five new business models that provide circular growth from deploying sustainable resources to the sharing economy before setting out what business leaders need to do to implement the models successfully.*
- **CIRCULAR ECONOMY, THE NEXT BIG BUSINESS OPPORTUNITY**, [https://books.google.gr/books/about/Forget\\_Mars.html?id=4cYxxgEACAAJ&source=kp\\_book\\_description&redir\\_esc=y](https://books.google.gr/books/about/Forget_Mars.html?id=4cYxxgEACAAJ&source=kp_book_description&redir_esc=y), *This book acts as a vital survival guide for all companies and businesses as they make the transition to more sustainable and eco-friendly practices.*
- **Οικονομική πολιτική για την ανάκαμψη της Ελλάδας**, <http://www.livanis.gr/ViewPreRelease.aspx?Id=2968798>, *This Book is a first attempt at a comprehensive analysis and formulation of the development strategy that Greece needs. It also sets out the general macroeconomic policies to be adopted as well as the required structural restructuring of the economy.*

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- **Circle Economy**, <https://www.circle-economy.com/>, *A social enterprise, organised as a cooperative, Circle Economy accelerates the transition to circularity through on the ground, action focused, development of practical and scalable solutions.*

4. **Forum of Circular Economy**, <https://www.circular-economy.gr/>, *The Forum's online expression can support the development of a network, involving economic and social actors and the scientific community, for the transition to the circular model of production and operation of its society.*

#### 5. **Scientist Journal**

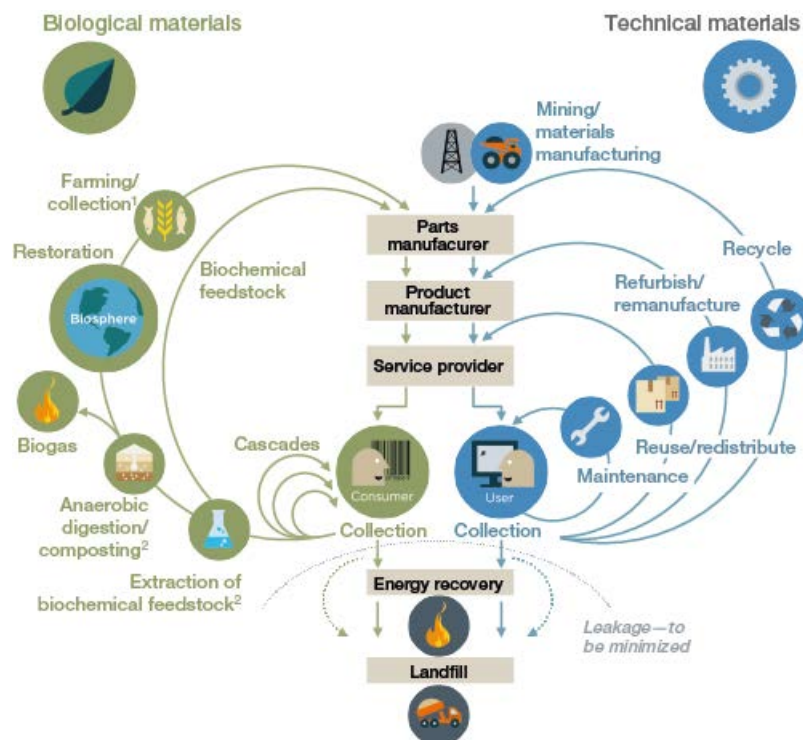
- **McKinsey Blog**, <https://www.mckinsey.com/about-us/new-at-mckinsey-blog>, *A collection of stories about our people, our capabilities, our research, and the ever-changing face of our firm.*
- **Ecopress**, <http://ecopress.gr/>, *Technical and financial information journalism portal.*
- **Energypress**, <https://energypress.gr/>, *Energy newsletter.*
- **GreenAgenda.gr**, <http://greenagenda.gr/>, *analyzes the themes and concerns that actually touch almost every form of human activity.*

## 7. Tools and methodologies for CircEc and SR applications

- **Circular Economy Principles**

A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept

with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse and return to the biosphere, and aims for the elimination of waste through the superior design of materials, products, systems and business models.

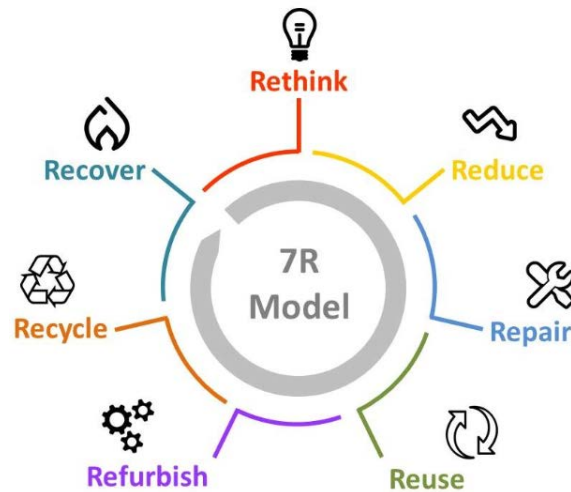


Source: The circular economy (Ellen MacArthur Foundation 2012)

Such an economy is based on a few simple principles, as shown in the above figure. First, at its core, a circular economy aims to design out waste. Waste does not exist: products are designed and optimized for a cycle of disassembly and reuse. These tight component and product cycles define the circular economy and set it apart from disposal and even recycling, where large amounts of embedded energy and labour are lost. Second, circularity introduces a strict differentiation between consumable and durable components of a product. Unlike today, consumables in the circular economy are largely made of biological ingredients or 'nutrients' that are at least non-toxic and possibly even beneficial, and can safely be returned to the biosphere, either directly or in a cascade of consecutive uses. Durables such as engines or computers, on the other hand, are made of technical nutrients unsuitable for the biosphere, such as metals and most plastics. These are designed from the start for reuse, and products subject to rapid technological advance are designed for upgrade. Third, the energy required to fuel this cycle should be renewable by nature, again to decrease resource dependence and increase systems resilience (to oil shocks, for example). 35

- **The 7R Model**

Due to scarce natural resources and changing consumer perceptions and market expectations we are seeing significant changes in the production and consumer chains. The circular economy proposes an innovative approach to raw materials, products and waste and a vision of regeneration, as opposed to today's linear model, based on the 7R principle: <sup>34</sup>



Source: LinkedIn, The 7R Model for a Circular Economy

1. **Rethink** solutions at every system level by exploring alternatives and restating problems.
2. **Reduce** resource use by applying lean design principles and extending product life spans.
3. **Repair** components and parts so that products can be used longer by one and the same user.
4. **Reuse** products by transferring them in their original (or modified) form to another user.
5. **Refurbish** products by replacing malfunctioning components and parts by new ones.
6. **Recycle** materials or resources by disassembling components and separating parts.
7. **Recover** embedded energy from non-recyclable waste material where feasible.

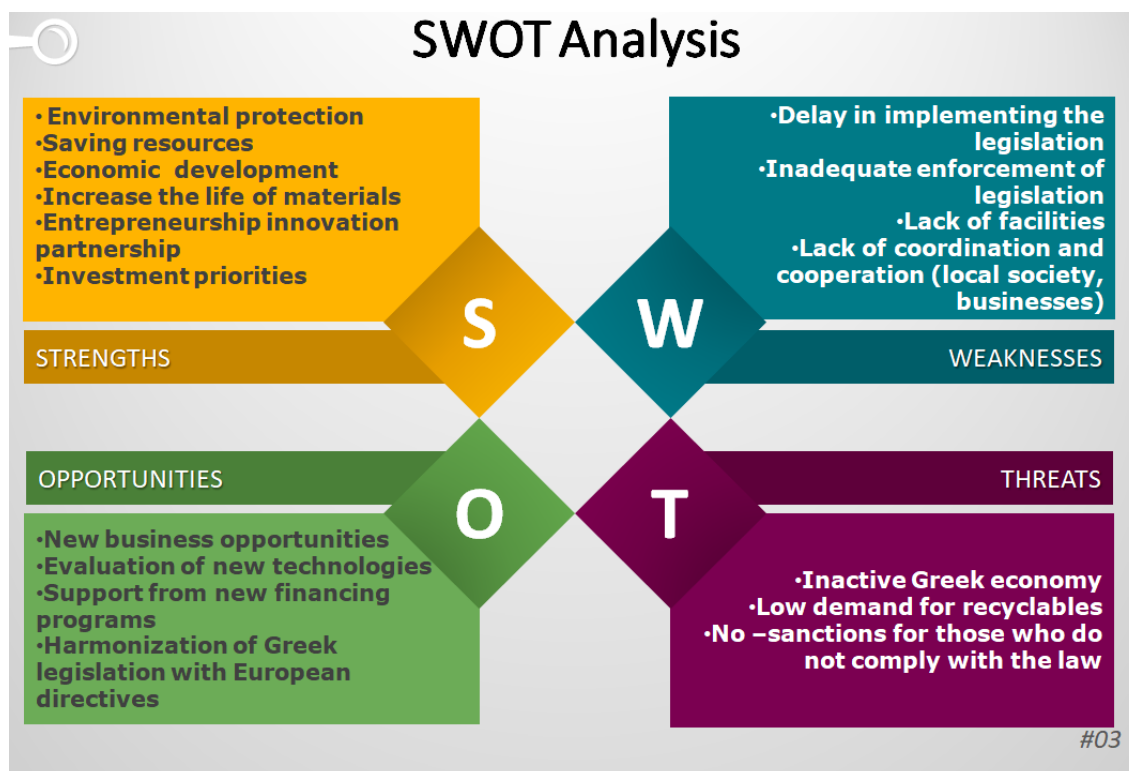
The 7R model is the basic principle underlying all circular economy theory. The biggest effort is focused on reusing products and waste so that resources do not fall dramatically. The circular economy transcends economic fragmentation and transcends it into sectors for the benefit of a holistic view of the product life cycle.

#### • The Swot Analysis for Greece

In Greece, the Circular Economy is an opportunity and a necessity. It is part of the relevant European strategy - which is moving fast - and responds to the Greek characteristics of the economy. This is a major

and imperative necessity due to the long delay in Greece and the limited resources available and the particular geographical features of the country. The development of the circular economy is one way to protect the environment, improve the quality of life and humanize the living conditions. For example, most countries in the EU they have made leaps in municipal waste management, and unfortunately here in Greece is lagging behind due to lack of planning, determination of the state and local communities. In general, there is a general lag in adopting circular economy models, depriving the economy and society of the added value it entails.

The University of Thessaly team developed a SWOT analysis, which is a methodological tool for recording the current situation, for the factors affecting the circular economy in Greece:



The conclusion is that the circular economy in Greece can fuel a qualitative leap in the economy, which will be a developmental transformation. It creates new jobs, fosters small and medium-sized entrepreneurship, new jobs and the social economy, which is still very low in Greece.

- **Business Model Canvas**

We understand that so far Greece, while making some progress, is still at an early stage. At this point the business model canvas is helping to create a new dynamic, creative and functional approach.

|  |  |  |  |   |
|--|--|--|--|---|
| <b>Partners</b> <ul style="list-style-type: none"><li>Cooperative networks</li><li>Types of collaboration</li></ul>  | <b>Activities</b> <ul style="list-style-type: none"><li>Optimising performance</li><li>Product Design</li><li>Lobbying</li><li>Remanufacturing, recycling</li><li>Technology exchange</li></ul> <b>Key Resources</b> <ul style="list-style-type: none"><li>Better-performing materials</li><li>Regeneration and restoring of natural capital</li><li>Virtualization of materials</li><li>Retrieved Resources (products, components, materials)</li></ul> | <b>Value Proposition</b> <ul style="list-style-type: none"><li>PSS</li><li>Circular Product</li><li>Virtual service</li><li>Incentives for customers in Take-Back System</li></ul>               | <b>Customer Relations</b> <ul style="list-style-type: none"><li>Produce on order</li><li>Customer vote (design)</li><li>Social-marketing strategies and relationships with community partners in Recycling 2.0</li></ul> <b>Channels</b> <ul style="list-style-type: none"><li>Virtualization</li></ul> <b>Take-Back System</b> <ul style="list-style-type: none"><li>Take-back management</li><li>Channels</li><li>Customer relations</li></ul> | <b>Customer Segments</b> <ul style="list-style-type: none"><li>Customer types</li></ul> |
| <b>Cost Structure</b> <ul style="list-style-type: none"><li>Evaluation criteria</li><li>Value of incentives for customers</li><li>Guidelines to account the costs of material flow</li></ul> |  | <b>Revenue Streams</b> <ul style="list-style-type: none"><li>Input-based</li><li>Availability-based</li><li>Usage-based</li><li>Performance-based</li><li>Value of retrieved resources</li></ul> |  |   |
| <b>Adoption Factors</b> <ul style="list-style-type: none"><li>Organizational capabilities</li><li>PEST factors</li></ul>   |  |  |  |   |

Source: Osterwalder and Pigneur, A framework of the circular business model canvas

- ❖ **Value Propositions:** Cyclical products allow extending the product life cycle through the 7R model. This, however, requires a modular design and selection of materials that allow for scaling, re-use, reconstruction, recycling or safe disposal. In addition, product design should allow for the use of less raw materials or energy or minimize emissions.
- ❖ **Channels:** One of the strongest shifts towards a circular business model regarding channels is virtualization. Another possibility is to communicate virtually with the customer (e.g., using web advertisements, e-mails, websites, social media)
- ❖ **Customers Relationship:** Building and maintaining relationships with customers can underlie the main principle of the circular economy. This relationship encompasses producing on order, and engaging customers to vote for which product to make. Additionally, can be enhanced the social-marketing strategies and leverage relationships with community partners.
- ❖ **Revenue Streams:** Revenue streams depend on the value proposition. Moreover, revenue streams may be related to retrieved value, generated from products, components and/or raw materials collected back. Despite how low or high the value, it must be sufficient to make the material loops economically reasonable. Retrieved value may also be related to energy captured from waste disposal.
- ❖ **Key Resources:** The assets required to create, offer and deliver value propositions via chosen channels, to build and maintain relationships and to receive revenue flows, correspond with the principles guiding the circular economy in two major ways. One is



focused on input choices and the second on regenerating and restoring the natural capital. Another way to achieve this is direct substitution of resources with better-performing materials, which are less harmful to the environment, more feasible to use and have the same or better technical requirements. Natural capital regeneration and restoring concerns using energy from renewable sources, land restoration or reclamation, saving water, operating in more efficient buildings, and choosing sustainable production locations like eco-parks

- ❖ **Key Activities:** The key activities which directly or indirectly lead to creating, offering and delivering the value propositions, may apply the circular economy principles in several ways. Some are oriented on increasing performance, product design, technology exchange, and the other on remanufacturing, recycling or even lobbying. Increasing performance can be obtained through good housekeeping, better process control, equipment modification and technology changes, sharing and virtualization. Appropriate product design enables using less raw material or energy, to reduce emissions and toxic materials, prolonging product life, eliminating waste before resource-life extension, and to circulate the product, components and materials in a 100% closed material loop.
- ❖ **Key Partnerships:** Cooperative networks allow businesses to receive advantages from supplies, and support a company in research, product design, marketing, office support, supply routes, financial functions, production processes, and management. Thus, collaboration enhances obtaining key resources and performing key activities. For instance, off-site recycling is done by other parties that recycle the industrial wastes at the post-consumer stage or recycle the specific wastes, which then are sold to other industries.
- ❖ **Cost Structure:** Cost structure is usually mentioned when the implications and potential benefits of circular economy are described. Whenever a company decides to change the cost structure it might require further organizational changes, such as for materials, energy consumption, staff behavior etc., and in turn elicit more circular changes to the business model. This process could start with the analysis of the cost structure.<sup>31</sup>

Finally, we conclude that the cyclical economy in Greece can offer a qualitative leap into the economy, which will be a development of transformation. It creates new jobs, fosters small and medium-sized entrepreneurship, new jobs and the social economy, which is still at a very low level in Greece.

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## 9. Appendix