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Creating "Circular Business" by young ENGINEers at the cross-border area of Greece-Bulgaria

D.4.2.1 – Market and GAP Analysis Report
Deliverable: Gap Analysis Report

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1. MAPPING THE EXPERIENCE IN THE CROSS-BORDER AREA

1.1 INTRODUCTION

The purpose of the Gap Analysis is to identify existing best EU practices and the new requirements under the Waste Framework Directive, with the aim to detect possibilities for improvement either in the existing circular systems or in areas where circularity does not exist at the moment and needs to be introduced.

Geographically, the aim of the Gap Analysis focuses on the following levels:

CBC Area: The Cross Border area of the INTERREG Programme "Greece-Bulgaria" with a focus in Northern Greece and in Southern Bulgaria. The main regions involved in the project include:

- The cities of Thessaloniki, Serres, Drama and Kavala in Greece and
- The cities of Blagoevgrad and Smolyan in Bulgaria

Greece: Given the fact that the gap analysis will focus in best Practices to identify gaps between them and current actions related to circular economy, research in a national level is required. The reason is that Greek Best Practices can easily be applied and replicated in the CB area.

EU and International level: Inspiration and innovation based on Best Practices is expected to be boosted by identifying and applying lesson learned from actions on a broader level, including countries and cities in EU and worldwide

For this purpose, the analysis will focus on the following:

Analysis of the current situation: In the **1st chapter** of the Gap Analysis a brief introduction on the status of circular economy for the cross-regional area will be presented. Therefore, the status of circular economy in Greece and Bulgaria will be presented. Moreover, experience from other projects will be analyzed in order to identify dynamics and potential for next steps and projects.

Identify best practices in circular economy: In the **2nd chapter** of the Gap Analysis a presentation of Best Practices identified in Greece and the EU are presented. Moving on from this presentation, best practices are categorized against the type of waste presented in the Market Analysis (i.e., Packaging waste, Construction and Demolition Waste, Waste Electrical and Electronic Equipment, End-of life vehicles, Waste Oils and Used Tyres). The identification of the best Practices intends to promote the exchange of knowledge and experience between the main industries and stakeholders in order to create synergies that foster the transition to a more circular economy.

Gap Analysis based on best practices in circular economy: In the **3rd chapter** of the Gap Analysis a comparison between identified Best Practices and current situation in the cross-border region is attempted in order to determine the level of alliance (identify the gaps and assess the distance) between current i) practices, ii) policies and iii) legislative framework.

Gap Analysis based on questionnaires: In the **final chapter** of the report, the Gap Analysis will be complemented by the results and gap identified by the structured questionnaire that was delivered and answered by Greek companies and industries in the CB area.

1.1.1 The current situation in Greece

Greece is lagging behind European targets, especially at the municipal level, in which the country produces more waste than the EU average, partly because of tourism, and landfilling of waste amounts to 78% of total waste. Waste recycling is progressing, amounting to 21% of all waste, with still low composting or waste-to-energy activity. Overall, 5.4% of material resources come from recycled waste materials (vs. 12.8% in the EU). Concerning the circularity of the economy, even though progress has been observed, the circular material use rate remains also below the EU average. Overall, the country is required to accelerate its pace and carry out immediately significant investments and reforms in order to meet its post-2020 targets that are in effect. Finally, a somewhat neglected aspect of waste management in Greece, with strong cultural and educational influences, is the prevention of waste generation - becoming more demanding in the tourism context - which is necessary to ensure sustainability even in the most successful management systems[1].

The promotion of sustainable consumption and production patterns is a common issue for European Union (EU) countries. This is the reason why an extensive range of policies on sustainable consumption and production, including energy and resource-efficient economy, circular economy, waste prevention and recycling, have been proposed at the EU level and to a great extent have already been adopted at the national level. In Greece, in specific cases like that of the single-use plastics, the relevant legal framework was enacted well before the EU directive transposition deadlines.

Nevertheless, systemic issues remain, mainly linked to waste management practices and circular economy. Greece brings to landfill a significant part of its municipal waste but aims at improving reuse and recycling, in line with the circular economy principles. The country is currently accelerating its pace and carrying out significant investments and reforms in order to meet its post-2020 targets. Concerning the relatively low

[1] Greece Voluntary National Report 2022: https://www.statistics.gr/documents/20181/13491320/VNR+2022+Greece+Report.pdf/d0b97502-84b4-866f-e32e-2d91dff2538a

circularity of the economy a newly adopted action plan aspires to accelerate its development. Finally, the promotion of a more sustainable lifestyle requires a reorientation of communication and education towards enhancement of smarter consumption, focusing on increasing awareness on the environmental effects of production and consumption choices.

In 2021, a law was passed (transposing EU Directives), establishing an integrated framework for waste management, and promoting the implementation of the principles of circular economy in Greece. In the context of this legislative initiative, and in line with the approved **National Waste Management Plan 2020-2030**[2] and the new National Waste Prevention Programme 2021- 2030, waste hierarchy is promoted in practice, i.e. waste prevention, reuse and recycling (to reach 55% in 2025 and 60% in 2030 including bio-waste), while, in parallel, measures for the reduction of landfilling have been adopted. Several reform measures support the ambitious targets set for increasing recycling and reducing landfilling, such as the implementation of the "Pay As You Throw" scheme, the application of the landfill-fee from January 2022, the expansion of the extended producer responsibility schemes with new categories of products (i.e. pesticides' packaging, furniture, mattresses, waste from greenhouses, fishing gear, smoking products) and the promotion of the separate collection of waste.

Particular focus in the National Waste Management Plan is given to **food waste**, where measures are adopted and incentives are provided for encouraging food donation and redistribution in order to reduce food losses along the whole production and supply chain, by 2030, and reduce by 30% food waste per capita in relation to food waste produced in 2022 at retail and consumer level. In addition, the new legislative framework supports the implementation of innovative approaches for further promoting recycling and re-use by sorting at source, active citizens' engagement and awareness-raising towards more sustainable consumption patterns, at the local/municipal level, through the establishment of the "Green Points" and the "Reuse Centers".

With regard to **plastic pollution**, Greece has incorporated in its national legislation, in October 2020, the EU Single Use Plastics Directive, much earlier than the date of entry into force of the Directive (July 2021) due to the importance attached to the reduction of plastic waste generated at source, and to the promotion of more sustainable and reusable materials. The law[3] aims to prevent and reduce plastic pollution, especially in the sea, and to promote the transition to a circular economy with innovative and sustainable business models, products and materials.

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2 https://www.eoan.gr/%CE%BD%CE%BF%CE%BC%CE%BF%CE%B8%CE%B5%CF%83%CE%AF%CE%B1/%CE%B5%CE%B8%CE%BD%CE%B9%CE%BA%CF%8C-%CF%83%CF%87%CE%AD%CE%B4%CE%B9%CE%BF-%CE%B4%CE%B9%CE%B1%CF%87%CE%B5%CE%AF%CF%81%CE%B9%CF%83%CE%B7%CF%82-%CE%B1%CF%80%CE%BF%CE%B2%CE%BB%CE%AE%CF%84%CF%89%CE%BD/

3 https://www.elinyae.gr/ethniki-nomothesia/n-47362020-fek-200a-20102020

In November 2021, a new **National Circular Economy Action Plan**[4] with a corresponding Roadmap was adopted, anchored at the 2018 National Circular Economy Strategy. The Action Plan, already approved by the Council of Ministers and about to be adopted by a legislative act, supports the shift towards a circular sustainable development model and ensures that the regulatory framework is streamlined and fit for this purpose, and that new opportunities from the transition are maximized. The new Plan includes a set of concrete actions to be implemented over the period 2021 – 2025 through increased cross-sectoral arrangements, and is building on recent national legislation.

In 2021, the Government issued the **National Plan for the promotion of Green Public Procurement**[5], for a three-year period, 2021-2023. This National Plan aims at establishing and implementing a minimum level of green criteria in public procurement of products, services and projects, promoting green business practices and "greening" the public sector.

The material resource efficiency data show the development and implementation of the respective policies in Bulgaria. The figures bellow show that Greece is lacking behind the EU average and needs to put significant efforts to catch up with EU average[6].

Use of materials

- 12.544 tones DMC/person (149 % of EU-28 average per person in 2017)

The following diagram depicts the rate of increase for Recourse productivity and domestic material Consumption for years 2010-2020:

[4] https://ypen.gov.gr/wp-content/uploads/2022/03/SXEDIO-DRASHS-KO-8.pdf
[5] https://diavgeia.gov.gr/doc/%CE%A8%CE%9C4%CE%A9%CE%9F%CE%9E%CE%A4%CE%92-7%CE%A4%CE%93?inline=true
[6] : http://www.eea.europa.eu/resource-efficiency

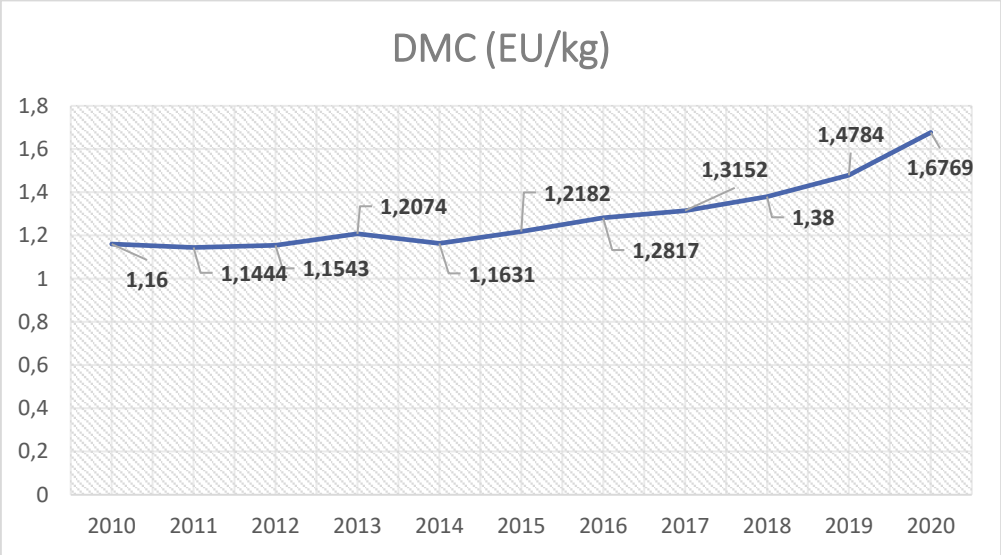


Figure 1.1 – Recourse productivity and domestic material Consumption (DMC)

Resource productivity

- 1.679 EUR/kg (EU-28 average – 2,04 EUR/kg)

Generation of waste excluding major mineral wastes by hazardousness

This indicator is defined as all waste generated in a country per inhabitant and year (in kg), excluding major mineral wastes, dredging spoils and contaminated soils. This exclusion enhances comparability across countries as mineral waste accounts for high quantities in some countries and economic activities such as mining and construction.

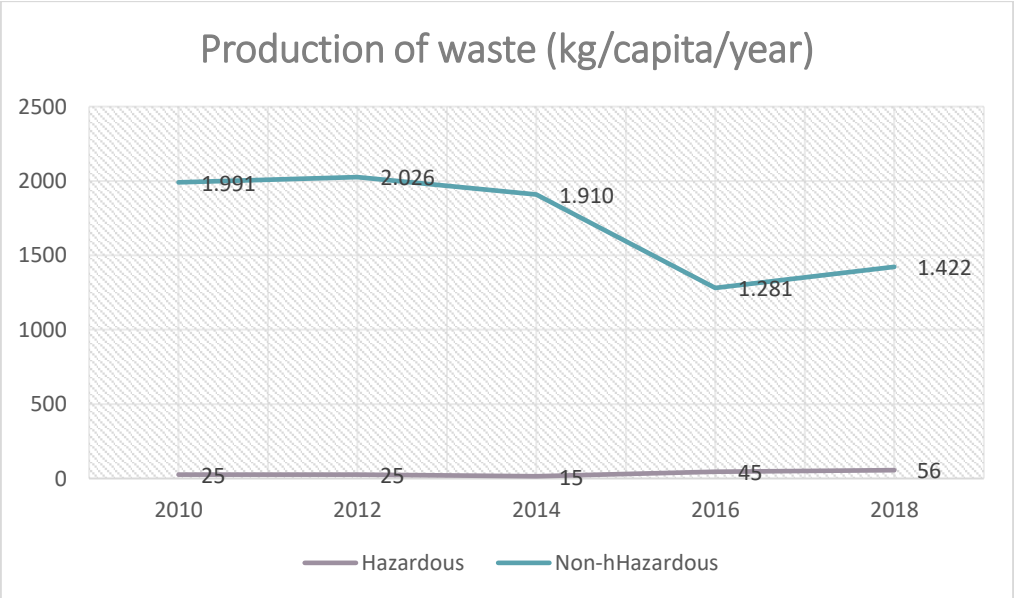


Figure 1.2 – Generation of waste excluding major mineral wastes by hazardousness - kg per capita

Circular material use rate

The circular material use rate (CMR) measures the share of material recovered and fed back into the economy in overall material use. The CMU is defined as the ratio of the circular use of material to the overall material use. The overall material use is measured by summing up the aggregate domestic material consumption (DMC) and the circular use of materials. DMC is defined in economy-wide material flow accounts. The circular use of materials is approximated by the amount of waste recycled in domestic recovery plants minus imported waste destined for recovery plus exported waste destined for recovery abroad. A higher CMU rate value means that more secondary materials substitute for primary raw materials thus reducing the environmental impacts of extracting primary material.

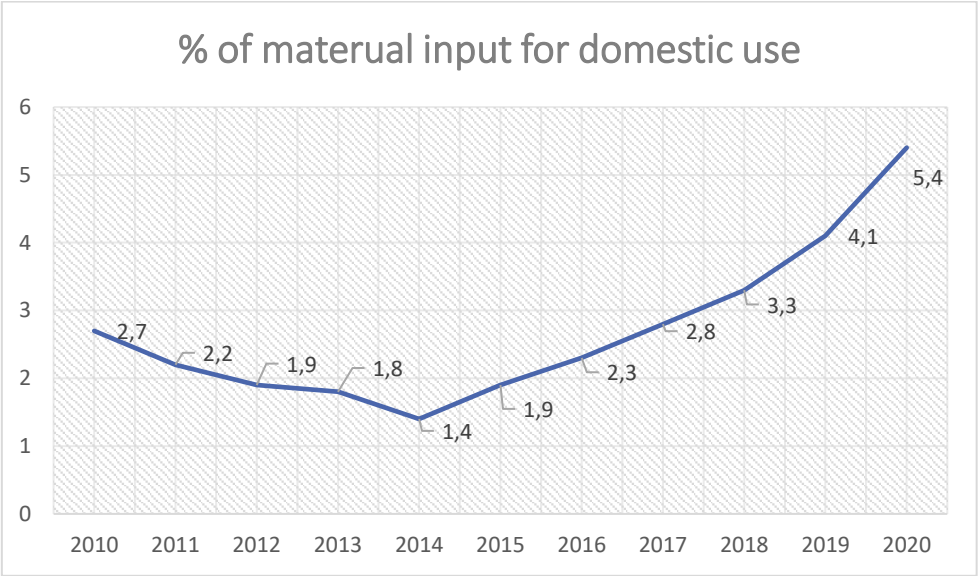


Figure 1.3 – *Circular material use rate (CMR) – % of the circular use of material to the overall material use*

Finally, according to "Ecopreneur[7]" Greece ranks 26th (between EU28) in the "POLITICO'S CIRCULAR ECONOMY INDEX[8]", which is a circular economy index, offering a different perspective on official datasets by giving more weight to waste prevention:

[7] https://ecopreneur.eu/wp-content/uploads/2020/09/Ecopreneur-Circular-Economy-Update-report-2019.pdf

[8] Hervey, G. (2018). Ranking how EU countries do with the circular economy. POLITICO's Circular Economy Index. Retrieved January 7, 2019: https://www.politico.eu/article/ranking-how-eucountries-do-with-the-circular-economy/.

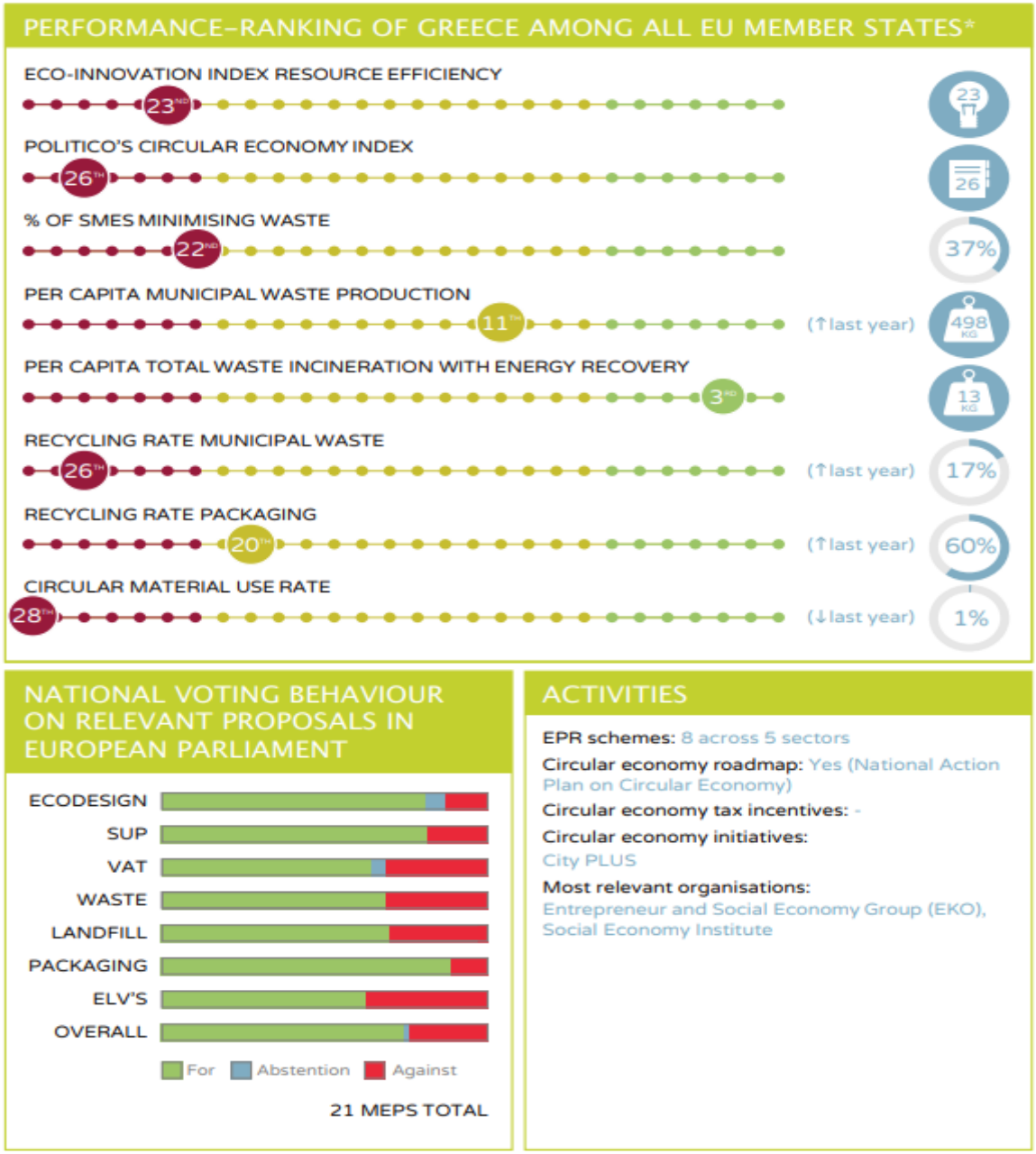


Figure 1.4 – *POLITICO'S CIRCULAR ECONOMY INDEX: Greece among EU28*

According to the ECOPRENEUR countries report (2019), Greece's circular economy indicator performance is poor with the majority of rankings coming in the bottom quarter of the EU18. The country is taking action however. Greek companies in many sectors are slowly approaching the EU-28 averages for resource efficiency[9].

[9] European Commission. (2019). The Environmental Implementation Review 2019. Country report Greece: http://ec.europa.eu/environment/eir/pdf/report_el_en.pdf

EPR schemes seem to be well established and cover most major sectors[10].

Moreover, several circular economy initiatives have been initiated. In early 2018 Greece released its "National Action Plan on Circular Economy", centered around a long-term adoption and implementation of circular economy principles. Priority actions include removing barriers to a circular economy through new regulatory and legislative interventions, designating funds for these interventions, enhancing knowledge on circular economy and improving governance structures by establishing an Executive Secretariat for the Circular Economy.

1.1.2 The current situation in Bulgaria

Bulgaria is a medium sized country in the EU according to land surface with 7 million inhabitants resulting in a relatively low population density. The average income level in Bulgaria is the lowest in Europe. It has a higher urbanization level as 75% of the population lives in a predominantly urban area. But artificial and build up area make up only 4% of the land surface while the most dominant land cover classes by far are woodland (40%), cropland (29%) and grassland (18%) areas.

In terms of economy, the most dynamic sectors are textile, pharmaceutical products, cosmetic products, the mobile communication and the software industry. The service sector has more than doubled its contribution to the country's economy in the last decade accounting for 69 % of the GDP and employing 64.5% of the workforce.

The material resource efficiency data show the development and implementation of the respective policies in Bulgaria. The figures bellow show that Bulgaria is lacking behind the EU average and needs to put significant efforts to catch up with EU average[11][12].

Use of materials

- 140 million tones DMC (2.1 % of EU-28 total in 2017)
- 19.672 tones DMC/person (149 % of EU-28 average per person in 2017)

[10] Monier, V. et al. (2014). Development of Guidance on Extended Producer Responsibility (EPR). Final Report by Deloitte BIO Intelligence Service in cooperation with Arcadis, Ecologic, Institute for European Environmental Policy (IEEP) and Umweltbundesamt (UBA) for the European Commission DG Environment, p. 41-45: https://ec.europa.eu/environment/pdf/waste/target_review/Guidance%20on%20EPR%20-%20Final%20Report.pdf

[11] http://www.eea.europa.eu/resource-efficiency

[12] https://www.eea.europa.eu/data-and-maps/daviz/domestic-material-consumption-2#tab-googlechartid_chart_11_filters=%7B%22rowFilters%22%3A%7B%7D%3B%22columnFilters%22%3A%7B%22pre_config_date%22%3A%5B2017%5D%7D%7D

Resource productivity

- 0,30 EUR/kg (EU-28 average – 2,04 EUR/kg)

Currently the main National strategies and action plans tackling the circular economy are:

- The National Development Programme: Bulgaria 2020;
- The Innovation Strategy for Smart Specialization of the Republic of Bulgaria 2014–2020 and the
- National Waste Management Plan 2014–2020

it has a low per capita waste production with of about 407 kg/inhabitant/year[13] and solid number of extended producer responsibility schemes in place. On all other circular economy indicators, Bulgaria ranks very low compared to EU average. Resource efficiency is of particularly concerning, ranking second to last amongst all EU member states and little focus on waste minimizations by SME's.

According to data from the Interreg Europe project "*REDUCES*[14]", the following indicators provide a clear analysis of the current status in Bulgaria:

Indicator	Value-Comparison
Circular material use rate	- 4,3 % v/s EU average – 11,7%
Employed in CE	1,76% of total employment, same as EU
As per September 2018 only 23 products are registered and use the ecolabel and 5 licenses are issued	Total in EU 71 707 products and 2167 licenses
Percentage of SMEs applying resource efficiency measures	65% (EU-28 is 89%)
Percentage of SMEs with public support for resource efficiency measures	42% (paper industry, construction, metal processing, textile, plastics)
Percentage of SMEs with more than 50% turnover from "green products	24% (EU-28 is 20)
84% of the Bulgarians are concerned about the impact of the plastics on the environment	EU-28 is 87%
89% are concerned with the impact of chemicals	EU-28 is 90%

13 https://www.moew.government.bg/static/media/ups/tiny/file/Waste/NACIONALEN_PLAN/NPUO_ENG_22_10_2014_06_01_2015.pdf

14 https://projects2014-2020.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1575024100.pdf

Finally, according to "Ecopreneur[15]" Bulgaria ranks 24th (between EU28) in the "POLITICO'S CIRCULAR

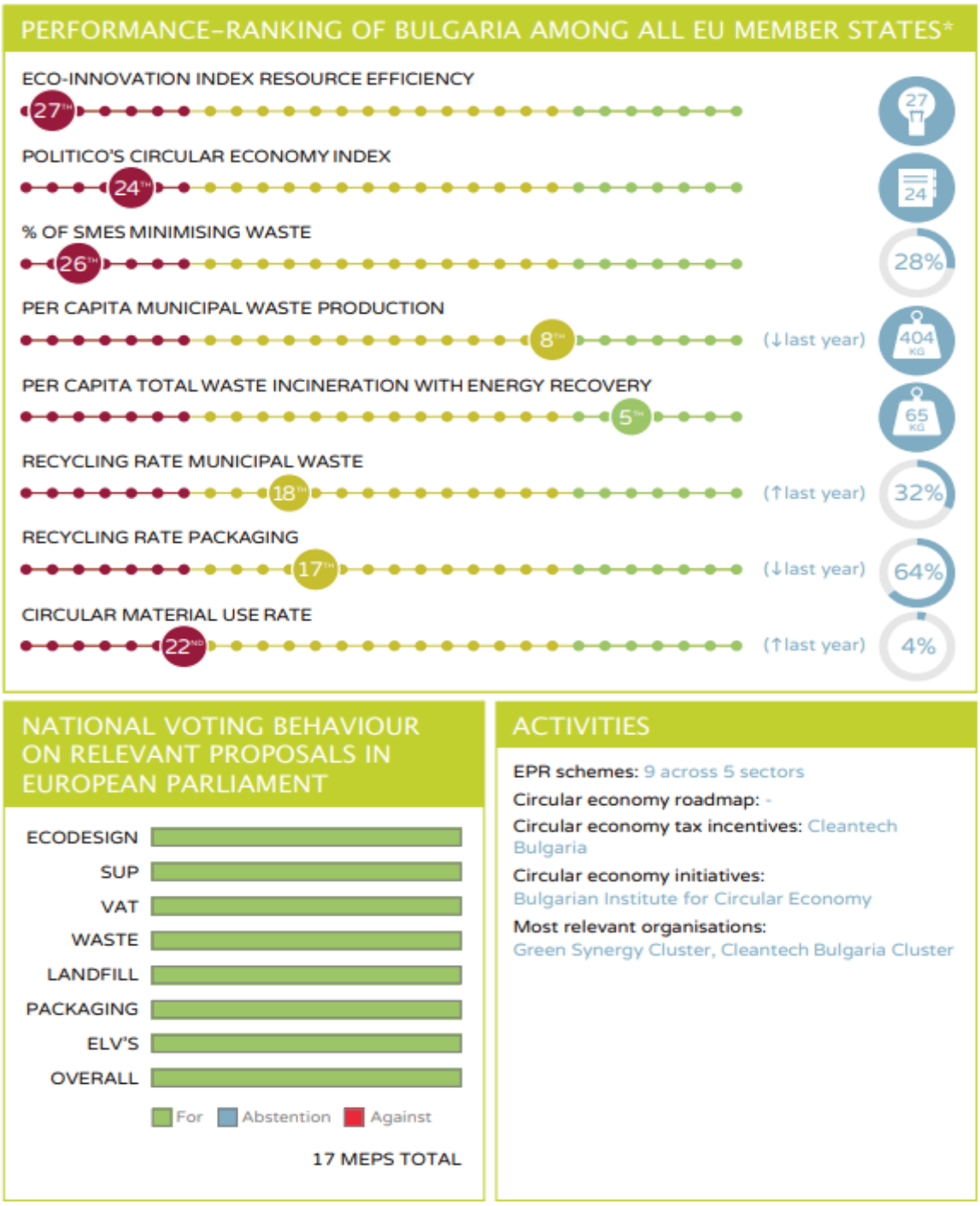


Figure 1.5 – *POLITICO'S CIRCULAR ECONOMY INDEX: Bulgaria among EU28*

[15] https://ecopreneur.eu/wp-content/uploads/2020/09/Ecopreneur-Circular-Economy-Update-report-2019.pdf

Finally, according to "Ecopreneur[16]" Bulgaria is struggling regarding circular economy efforts. On the bright side, it has a low per capita waste production with of about 400 kg per year2, a solid number of EPR schemes in place6.

On all other circular economy indicators, Bulgaria ranks very low. Resource efficiency is of particularly concerning, ranking second to last amongst all EU member states and little focus on waste minimizations by SME's according to the Flash Eurobarometer[17]. Barriers to circular economy implementation are mostly economic with limited funding available for enterprises to modernize equipment and a notably low level of domestic, private and foreign capital investments.

The largest contributing factor to the poor performance can be attributed to a lack of funding at the country's disposal for the circular economy. Government support is lacking and initiatives are few and far between, with those in place focusing primarily on collaboration between businesses[18].

1.2 PRESENTATION OF IMPLEMENTED PROJECTS IN THE AREA

The cross-border area has a rich experience in implementing projects related to the protection of environment, waste management as well as circular economy. Therefore, it is high time to capitalize on the lessons learned and take circular economy a step further.

In this direction, one of the most important projects implemented at the moment is the "LIFE-IP CEI-Greece - Circular Economy Implementation in Greece[19]" with the ambitious aim to contribute to the implementation of the National Waste Management Plan as well as the National Circular Economy Strategy

The main objective of the LIFE-IP CEI-Greece project is to reduce the amount of municipal waste sent to landfill and to promote waste prevention and re-use, based on circular economy principles. Specifically, the project will:

- Implement concrete waste management actions in line with the waste hierarchy principles, to ensure waste diversion to the levels set by national and EU law;

[16] https://ecopreneur.eu/wp-content/uploads/2020/09/Ecopreneur-Circular-Economy-Update-report-2019.pdf
[17] 5 European Commission. (2018a). Flash Eurobarometer 456, SMEs, resource efciency and green markets, January 2018: http://ec.europa.eu/commfrontofce/publicopinion/index.cfm/ResultDoc/download/DocumentKy/81280
[18] Eco-innovation Observatory. (2018). Research Efciency Outcomes. Country profiles for all EU member states retrieved in January - February, 2019:: https://ec.europa.eu/environment/ecoap/indicators/resource-efciency-outcomes_en
[19] https://circulargreece.gr/

- Develop demonstration project actions in four targeted fields (waste food prevention, reuse, hazardous household waste management, economic incentives), in nine municipalities (5 islands, 1 mountainous, 3 urban) and one region (Western Macedonia);
- Enhance the use of economic instruments in support of the circular economy, as well as of secondary materials' standards in this context;
- Develop a specific Food Waste Prevention Programme at national level and guide the revision of the waste management plans in due time;
- Build-up a knowledge base to support the monitoring of the circular economy, particularly in the field of waste management;
- Improve awareness of key stakeholders, authorities and the general public on the concept of the circular economy and its implication for waste management;
- Mobilize external financial resources to enable the creation of the necessary supportive infrastructure for the implementation of the NWMP; and
- Disseminate the project results, and organize capacity building workshops, to ensure their implementation and replication in other regions.

Expected results include:

- ✓ The establishment of three Enhanced Green Centers (EGCs) (one in the Municipality of Thessaloniki and two in the broader Athens area), estimated to serve a population of over 100 000 inhabitants in each. The waste collection rate of EGCs, destined for reuse and recycling is estimated at 8 250 tn in total, while the estimated quantities for preparation for reuse equal to 1 650 tn in total;
- ✓ Five Integrated Waste Management systems in four islands and one mountainous area to increase the amount of waste prepared for reuse and recycling by at least 55%, reduce the amount landfilled and therefore its environmental impacts, create at least 94 jobs, and promote behavioral change through an intensive communication campaign;
- ✓ Two integrated Household Hazardous Waste (HHW) collection and management systems, in the Region of Western Macedonia and in the Municipality of Athens, covering at least 60% of both areas populations and reaching at least 50% separate collection rates, with total managed HHW quantities of around 1700 tn and4 000 tn, respectively;
- ✓ Full implementation of a Pay-As-You-Throw (PAYT) system in the Municipality of Vari-Voula-Vouliagmeni serving approximately 48 000 inhabitants;

- ✓ The first baseline study for food waste generation in Greece in specific sectors (post-harvest losses, food processing industry, wholesale and retailers, households, and hospitality/catering sector);
- ✓ Creation of a platform for food waste prevention, linking at least 1 000 donors (producers, retailers, hospitality and catering sector) with 500 charities (social organizations, institutions and communities in need), to redistribute at least 40 tn of surplus food per year;
- ✓ A Food Waste Prevention Forum to be adopted by different sectors and stakeholders involved in the food waste generation chain;
- ✓ A Repair and Reuse Experiential Park in Thessaloniki for recovery of materials, reuse, preparing for reuse, sharing, and donations;
- ✓ Assessment for the development of National Circular Economy indicators to secure the integration of the NWMP and the NWPP with the NAPCE;
- ✓ Development of a web-based National Circular Economy Repository; and
- ✓ Ten new standards to enable the harmonization of definitions and classifications of products/by-products, end-of-waste criteria, and the drafting of qualitative standards for secondary raw materials.

Other projects, relevant to circular economy and implemented in the area include:

Project title	Description	Project URL
BIOREGIO (Regional circular economy models and best available technologies for biological streams)	BIOREGIO boosts bio-based circular economy through transfer of expertise about best available technologies and cooperation models. Main aims include: • improving knowledge related to circular economy of biological streams i.e. bio-based circular economy • increasing recycling rates of biological materials e.g., food waste/biowaste, municipal and industrial sludge and agricultural residues • transferring expertise about: ○ cooperation models, e.g., ecosystems, networks, administrative cooperation, ○ best available technologies, e.g., bio refinery, biogas production	https://projects2014-2020.interregeurope.eu/bioregio/
EMBRACE (European Med-clusters Boosting Remunerative Agro-Wine Circular Economy)	The EMBRACE project aims at testing a model and related toolkit for the establishment of 2 transnational meta-clusters working on the principles of the circular economy. The project, capitalizing model and instruments, will propose to Clusters, SMEs and Innovation stakeholders a set of instruments able to strongly introduce the principle and practices of the Circular Economy in two leading sectors of the Med Economy: Wine and Agro-food.	https://interregmedgreengrowth.eu/projects/italy/veneto/treviso/agrofood-1/embrace/
RE-LIVE WASTE (Improving innovation capacities of private and public actors for sustainable and profitable REcycling of LIVEstock WASTE).	The overall project objective is to improve the innovation capacities of public and private actors involved in the management of waste from intensive livestock farming (representing a major source of pollution, an environmental challenge for society and an economic problem for farmers), through stronger cooperation amongst the quadruple helix actors (academia, civil society, public authorities and the private sector). The project contributes to two key sectors in the Mediterranean regions (agriculture and livestock), by favouring innovative applications, which will make the livestock sector more productive, sustainable and competitive. The project tests pilot plants which transform livestock waste into organic high-value commercial fertilizers, contributing to smart and sustainable growth and to the creation of new business and market opportunities.	https://reinwaste.interreg-med.eu/

Project title	Description	Project URL
	The conversion of waste into high-value commercial fertilizers (an increasingly important issue for the quadruple helix stakeholders) is addressed by the project through a transnational network and by the design of a shared strategy to raise awareness. RE-LIVE WASTE contributes to reach the EU2020 strategy, addressing the targets related to employment and innovation as well as climate change and energy.	
REINWASTE: (REmanufacture the food supply chain by testing INnovative solutions for zero inorganic WASTE)	The project aims to bring a tangible contribution to the reduction of inorganic waste at source, favouring the adoption of greener innovative concepts in the agriculture and food industry, with a special focus On SMEs. Responding to consumer awareness, environmental regulations and market competition, REINWASTE aims to help agro-food enterprises improve their production processes, reducing environmental impacts of inorganic waste by focusing on the most efficient and sustainable tenets of the waste hierarchy: 1. Waste prevention, 2. Material recovery, 3. Recycling and 4. Waste valorization. In this regard, REINWASTE aligns with the circular economy model in the waste sector. REINWASTE contributes to overcoming the persistent lack of knowledge on the available solutions and the diversity and fragmentation of inorganic waste prevention procedures through a tailored mix of knowledge transfer services.	https://reinwaste.interreg-med.eu/
SinCE-AFC: Enhancing the Entrepreneurship of SMEs in Circular Economy of the AgriFood Chain	SinCE-AFC aims at involving SMEs of the Agri-Food chain in circular economy through the promotion of the appropriate managing and financial horizontal mechanisms. All the Agri-Food agents committed to production, processing, packaging, distribution and final consumption are expected to operate in a coordinated way to better adapt to circular economy.	https://projects2014-2020.interregeurope.eu/since-afc/
PEFMED (Uptake of the Product Environmental Footprint across the	EFMED is the largest transnational initiative ever carried out in the Mediterranean space to encourage a pool of companies from 9 Mediterranean agri-food regional systems belonging to 6 Mediterranean Countries (Italy, Spain, France, Portugal, Greece and Slovenia) to green the own production according to the new EU Product Environmental	https://pefmed.interreg-med.eu/

Project title	Description	Project URL
MED agro-food regional productive systems to enhance innovation and market value)	Footprint method (PEF), the unique next-generation method to assess the environmental performances of a product during its lifecycle. Between 2016-2019, hundreds of companies, LCA specialists, business analysts and national agri-food associations cooperate to foster targeted systemic eco-innovation interventions within industrial clusters, raise the market value of PEF-compliant productions and galvanize the regional Smart Specialization Strategies (RIS3) goals related to innovation in agri-food and industrial production.	
SMecoMP A knowledge Alliance in Eco-Innovation Entrepreneurship to Boost SMEs Competitiveness"	Small and medium-sized enterprises (SMEs) in the Balkan Med area face strong challenges, especially in the areas of innovation, entrepreneurship and environmental protection and investment in innovative and/or "green" products or services is very small. Furthermore, the recent economic crisis increased unemployment and created the biggest brain drain in the region in modern times, depriving SMEs and Higher Education Institutes (HEI) from young, talented, and well-educated personnel. The SMecoMP project addresses both challenges by developing a strong and resilient knowledge alliance among HEIs, vocational education training (VET) centers and SMEs, to promote eco-entrepreneurship, -management and –innovation, The overall objective is to promote eco-management and –innovation among existing SMEs and support young entrepreneurs in entering in the "green" and/or "blue" economy, creating new added value jobs, improving the area's competitiveness, ameliorating the brain drain phenomenon, contributing thus to the area's sustainable development. The SMecoMP's main outputs are: ✓ SMecoMP Transnational Network of academics, SME's staff and other stakeholders, that strengthens their collaboration and improves their capacities, development of a learning-outcomes based curricula and 4 training modules, focusing on Eco-Innovation and Entrepreneurship (EIE) knowledge and skills, catering to the needs of SMEs' staff and young entrepreneurs; ✓ Establishment of the SMecoMP pre-Incubator program for individual entrepreneurs to receive training, coaching and	http://www.interreg-balkanmed.eu/approved-project/42/

Project title	Description	Project URL
	mentoring; ✓ Customization of an ICT training platform to deliver blended learning courses on EIE.	
AGROFICCIENCY Enhancing the Competitiveness and Sustainable Growth in the Agrofood Sector through the promotion of Circular Economy	Project "Enhancing the Competitiveness and Sustainable Growth in the Agrofood Sector through the promotion of Circular Economy" with Acronym AGROFICCIENCY is implemented under the 6th Call of Cooperation Programme "Interreg V-A Greece-Bulgaria" 2014-2020. The project is related to the enhancement of Cross-Border Cooperation between Greece and Bulgaria with a main objective Promoting entrepreneurship, in particular by facilitating the economic exploitation of new ideas and fostering the creation of new firms, including through business incubators. The programme area is part of the most south-eastern, non-insular area of the EU. Agricultural development is one of the most significant issues in the area, as a great portion of its population is actively engaged in the industry, defining the wider agri-food sector as the heaviest industry in the region. The cornerstone of agricultural development lies in integrating contemporary techniques in the industry's operational processes to improve the agricultural sector's overall productivity and the wider ecosystem.	https://agrofficiency.eu/about-the-project/
CESME Circular Economy for SMEs	The CESME project addresses SME inclusion in the circular economy, by interregional meetings identifying good practices aiming to examine how best regional and local authorities and business development agencies can improve relevant policy instruments and design support packages to assist SMEs to enter the circular economy. Through the creation of a return-on-investment analysis - Circular Economy Toolkit quantifying the economic and social benefits of circular value chains as well as a White Book guiding SMEs step by step into circular economy, the CESME partnership intends to introduce new circular initiatives targeted for SMEs. These initiatives will be implemented and tested for feedback and adaptation in order to be replicable tools across EU as well as monitored against their expected impact. Finally, this is	https://projects2014-2020.interregeurope.eu/cesme/

Project title	Description	Project URL
	expected to lead to the improved effectiveness of the policy instruments addressed by the project partners.	

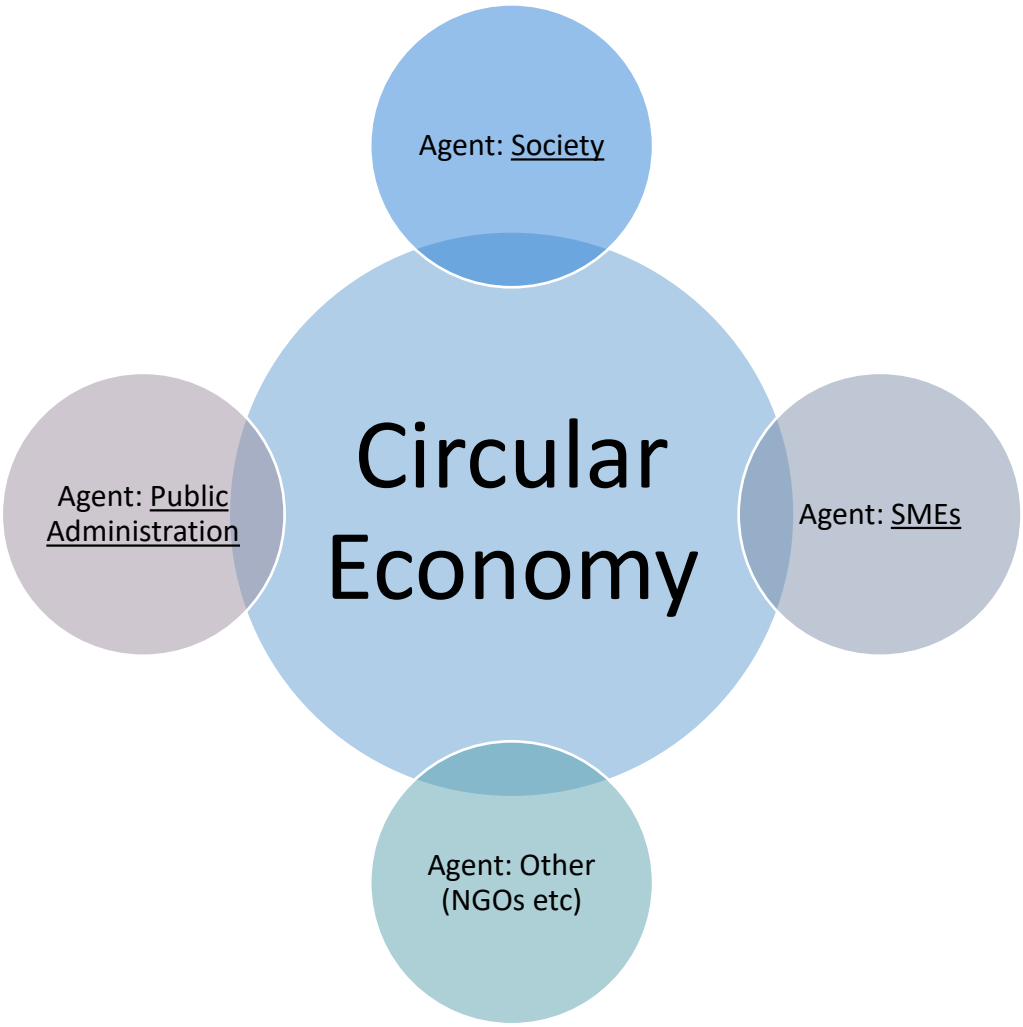
1.3 RESULTS OF THE MAPPING - NEXT STEPS

The transition to a Circular Economy in Greece and the area of application of the ENGINE-HUBs project requires an integrated and well-coordinated action between society, business sector and of course the Public Sector.

There is significant experience in the area of the project related to Circular Economy and thus, there is a great potential in capitalizing on this previous experience and drive new models for a more sustainable economic development.

Projects such as "BIOREGIO", "EMBRACE", "RE-LIVE WASTE", "REINWASTE" and "AGROFICCIENCY" prove this potential and render SBE the appropriate agent to lead such a transition and promote the exchange of Best Practices between the main stakeholders in order to create synergies that foster said transition.

With the aim of compiling the different actions identified as Best Practices, this deliverable will try to identify best practices in Greece, Europe and the World so that other stakeholders may benefit from these experiences and join the transition led by SBE and the other partners of the ENGINE-HUBs project.



2. BEST PRACTICES IN CIRCULAR ECONOMY

2.1 Objective

The objective of this report is two-fold:

1. **To identify actions as Best Practices**

The 1st objective is to apply appropriate principles and criteria in order to classify an action as Best Practice. Therefore, the "circularity criteria" will be defined in the methodology chapter along with the classification approach.

2. **To identify actions as Best Practices**

After identifying existing Best Practices for Circular Economy, the next step is to consider where improvements can be made or are needed to the existing situation in the area of the project as well as on a National Level.

2.2 Methodology for identifying best practices

2.2.1 Main Principles

The principles applied for an action to be classified as Best Practice include:

Principle	Brief analysis
Innovation	The action breaks the linear management of waste and introduces new ways of transforming waste into raw-material for industries, SMEs and other sectors
Participation	The action brings together critical partners and stakeholders into a co-design and co-creation process towards circularity
Education	The action aims at raising awareness, educating and informing stakeholders on circular economy and its benefits
Policy	The action aims at policy making and introducing new policy-making tools
Entrepreneurship	The action aims at fostering entrepreneurship and creating new business opportunities in the Circular Economy Sector
Transfer	The action aims at transferring a good practice to other areas or sectors by multiplying its positive results

2.2.2 Main criteria

The main criteria for an action to be identified as Best Practice are the criteria presented in the "New National Action Plan for Circular Economy[20]" and include:

Criteria	Brief analysis
	**Sustainable production and Industrial Policy** - Reduction and efficient use of resources - Sustainable production - Prevention of waste
	**Sustainable consumption** - Changes patterns of consumption - creates a change towards more sustainable and circular products, goods, resources and services. - Increases the lifetime of products and goods
	**Less waste with higher value** - Encourages effective application of waste hierarchy principle - Increases the value of waste by turning them into valuable raw material - Improves traceability of waste. - Minimizes waste disposal
	**Horizontal actions** • Improve waste management governance • Introduce new legislative and regulatory actions

2.2.3 Presentation of Best Practices

The common lay-out of Best Practices will be as presented below:

1. **Title of Best Practice: ….**
2. **Photo:**
3. **Organization - Owner of Best Practice: …**
4. **Area of Application:** National level (Greece) / EU Level (Country) / International Level (Country)
5. **Brief description:**
6. **Main principles:**

Innovation	Participation	Education	Policy	Entrepreneurship	Transfer

[20] https://ypen.gov.gr/wp-content/uploads/2022/03/SXEDIO-DRASHS-KO-8.pdf

7. Main criteria:

Sustainable production and Industrial Policy

Sustainable consumption

Less waste with higher value

Horizontal actions

6. Type of waste and matching of the Best Practices per sector

Packaging waste

Construction and Demolition Waste

Waste Electrical and Electronic Equipment

End-of life vehicles

Waste Oils

Used Tires

Organic waste

Other…

7. Web-site:

8. Other useful information

2.3 Identification of Best Practices

2.3.1 Identification of Best Practices in Greece

2.3.1.1 *Production of antiseptics from confiscated ethyl alcohol*

Title:	**Production of antiseptics from confiscated ethyl alcohol**
	Greece
Organization	**Ministry of Health - Greece (National public authority)**
Brief description	**The Greek Ministry of Health in cooperation with the Independent Public Revenue Authority decided to use the confiscated ethyl alcohol to produce antiseptics. The production of the antiseptics was held by the Greek Army Laboratories and was produced according to the World Health Organization (WHO) recipe. The produced disinfectants were then made available to hospitals, health centers and health facilities. Seven pharmaceutical companies based in Greece contributed to this effort with their production facilities. The companies are cooperating with the country's public revenue authority, AADE, who agreed to release large quantities of confiscated bottles of counterfeit alcohol held in warehouses to be used as raw material.**

Circular Principle			
Innovation	**Participation**		**Transfer**
Circular Criteria			

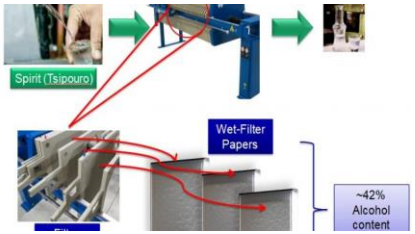
Type of waste	(Organic: Food & Beverage waste) (Pharmaceutical)

Other useful information:	The quantity of ethyl alcohol amounted to 122.6 tons and will be used for the preparation of antiseptics that will be available in the country's Hospitals, Health Centers and health units.

Web-site	https://www.moh.gov.gr/articles/ministry/grafeio-typoy/press-releases/6881-synennohsh-ypoyrgoy-ygeias-kai-dioikhth-aade-gia-thn-paraskeyh-antishptikwn-poy-tha-diatethoyn-se-nosokomeia-kai-kentra-ygeias

2.3.1.2 *Use of by-products of the wine and spirits industry as disinfectants for Covid-19 pandemic*

Title:	**Use of by-products of the wine and spirits industry as disinfectants for Covid-19 pandemic**
	Greece - Ierissos Chalkidiki
Organization	**Domaine Agrovision (Winery)**
Brief description	**A challenge that an industry has to phase due to Covid-19 is the high cost of the cleaning and the disinfection of their equipment and surfaces. Agrovision is a winery located in Ierissos Chalkidiki (Region of Central Macedonia) that tries to reduce this high cost via the re-use of its by-products. The objectives of this practice are reached as two disinfectants are produced by the wastes and by-products of the wine-industry. Wine industry generates various wastes and by-products such as wine lees, grape pomace and grape seeds. The above can further be used for the production of a spirit called tsipouro. During the distillation process, the first litter (called 'head') generated by the traditional copper vessels used for tsipouro production is rejected due to its composition in ethyl acetate and acetaldehyde as well as due to its high content in alcohol (80%, v/v). This rejected quantity is being utilized by Agrovision as disinfectant at the industrial surfaces.**



Circular Principle		
Innovation		**Transfer**
Circular Criteria		
Type of waste		

Other useful Similarly, a second by-product generated during the production of tsipouro, i.e. the filter papers, are also being used for

information:	cleaning and disinfecting the industrial surfaces. These filter papers contain alcohol since they come from the filtration of the spirit before the bottling process for the removal of various residues.The total amount of the waste treated is 280 litres of 'head' and 170 kgs of filter papers.
Web-site	https://www.interregeurope.eu/good-practices/use-of-by-products-of-the-wine-and-spirits-industry-as-disinfectants-for-covid-19-pandemic

2.3.1.3 *Use Safe and sustainable integration of food by-products into pig feed*

Title:	**Safe and sustainable integration of food by-products into pig feed**
	Greece - Ierissos Chalkidiki
Organization	**Institute for Bio-Economy and Agri-Technology (iBO -CERTH) & Pig farm in Chalkidiki**
Brief description	**Pig farming is an important sector of primary production in Greece, which faces significant economic problems as the cost of pork production in Greece is well above many EU countries. Since feed costs are about 60-70% of the total production cost, new practices are needed to reduce it. The use of food by-products in the pig feed mixture is a traditional practice that can reduce the cost of pig feed by replacing part of the cereals and/or the soybean. However, the introduction of food by-products into the pig ration should be done after ensuring the balanced nutritional composition of the diet so as not to adversely affect the yield and quality of the pork and, on the other hand, by preventing the use of unsuitable/contaminated food which may transmit extremely serious infectious diseases such as the African Swine Fever.**

Circular Principle				
Innovation		**Policy**	**Entrepreneurship**	**Transfer**
Circular Criteria				

Type of waste

Other useful information:	This good practice is a good way of saving food waste, it is easy to expand in the country and reach easily the breedfeeders' needs. The interesting point is that a label will be created, giving total traceability of the product. Totally ~1300kg of bakery meal have been produced and fed on a scheduled experimental basis to piglets.
Web-site	https://www.cpigfeed.eu/

2.3.1.4 Creativity Platform

Title:	**Creativity Platform**
	Greece - Thessaloniki
Organization	**Creativity platform - NGO**
Brief description	**Creativity Platform is a non-profit collective scheme that wishes to be an interdisciplinary platform for the exchange of ideas, action, research and applications around the issues of "creative capital" and "creative economy" in the city of Thessaloniki and the Greek space in general. Creativity can be a powerful tool for spreading green awareness. One of the more straightforward ways to do this is by using greener packaging. Creativity and sustainability are undeniably linked. As long as the environment has been a topic of discussion, artists and makers have paid tribute to it, reflecting their concerns as seen through a rich history of art and design. Therefore, reuse of waste is in the core of the initiative in finding new ways to bringing them to life through art and creative economy**

Circular Principle		
Participation	**Education**	**Entrepreneurship**
Circular Criteria		
Type of waste		(Textile waste)

Other useful information:	Creativity Platform has participated in many exhibitions in regional, national and international level, promoting its activity (International exhibition of Natural & Organic Products, Sustainable Design Drops, HELEXPO, Agrotica, etc). Operating several workshops, the initiative manages to support small businesses and producers towards new ideas of sustainable packaging and design.
Web-site	https://creativityplatform.org/

2.3.1.5 *Recycle of used clothes and fabrics*

Title:	**integrated management of used clothing and footwear**
	Greece
Organization	**RECYCOM**
Brief description	**RECYCOM, is the first Greek company that implements in an organized, scientific and professional way a system of integrated management of used clothing and footwear. The main field of activity of the company is identified in the collection, management and export of used clothing and footwear to recycling factories (due to the lack of a recycling center for clothing in Greece). RECYCOM, in collaboration with citizens, producers and supermarkets, charities and NGOs, local governments and public organizations, recovers clothing items, by placing clothing and footwear recycling bins, in municipalities. With proper management, only 2% ends up in the trash, while the remaining percentage is extracted for reuse. Material not suitable for reuse, is recycled to create cleaning clothes. Old clothes can also be used to make work uniforms, material for sound insulation and thermal insulation, stuffing for car seats, etc.**

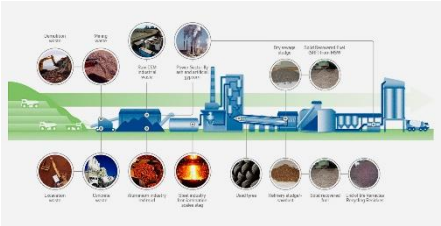
Circular Principle			
	Participation	**Education**	**Entrepreneurship**

Circular Criteria	

Type of waste	
	(Textile waste)

Other useful information:	Results at the moment: 30 employees / Facilities in Athens, Heraklion & Epirus / 15 company vehicles / Over 1,800 red bins throughout Greece
Web-site	https://www.recycom.gr/

2.3.1.6 Use of alternative raw materials and fuels for cement production

Title:	**Alternative raw materials and fuels reuse in the production of cement**	
	Greece	
Organization	**TITAN Greece (Cement company)**	
Brief description	**The use of alternative raw materials contributes towards saving natural, non-renewable resources. They are mostly by-products and waste of other sectors, such as fly ash, bottom ash of thermoelectric power plants, blast furnace slag, iron lamination scales, glass recycling waste, dredging spoils, demolition waste and concrete production waste. In recent years, we have developed and are implementing an innovative solution: we use recycled excess concrete and demolition waste in the production of cement, sending a clear message that buildings and concrete are recyclable. In other European countries, these materials are only used as aggregates in the construction of roads. Concrete returns from the units of our subsidiary INTERBETON, which would otherwise be sent to landfills, are already being used as alternative raw materials in the production of cement.**	

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**

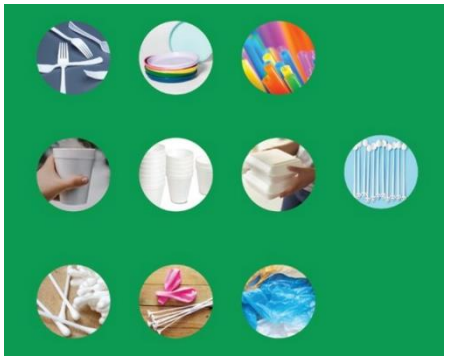
Circular Criteria

Type of waste	
Other useful information:	This technology, complementary and not competitive to recycling, utilizes in the clinker production kiln both the waste that would otherwise have to be buried, thus recovering the energy contained in them, and materials that are incorporated in the

	mineralogical structure of clinker in non-water-leachable form, thus avoiding the generation of waste or residues. Alternative fuels generally contain a high percentage of biomass, which brings about a reduction of CO_2 emissions.
Web-site	https://www.titan.gr/en/sustainability/environment/circular-economy/alternative-raw-materials-and-fuels

2.3.1.7 *Policy Measures on Plastics in Greece*

Title:	**New Law on plastic waste reduction**
	Greece
Organization	**Ministry of Environment (YPEN)**
Brief description	**The newly introduced law on single-use plastics (L. 4736/2020 – Official Gazette A' 200) follows the European Strategy for Plastics in a Circular Economy, COM (2018) is the 1st law on an EU level on such a level. More specifically the bill foresees: a) the ban on distribution sale or use of single-use plastics as of July 2021 and in January 2021 for the public sector and b) the ban of 10 single-use plastic items includes straws, cotton buds, cutlery, plates, all Styrofoam containers and cups, drink stirrers, balloon holders, as well as oxo-degradable plastics. The target is to reduce the use of plastic cups and food containers by 30 percent until 2024 and by 60 percent by 2026, as well as encourage a more circular economy while motivating businesses to redesign products and recycle.**



Circular Principle				
Innovation		**Policy**	**Entrepreneurship**	**Transfer**
Circular Criteria				

Type of waste

Other useful information:	Industries such as bottling companies in Greece already implement strategies to comply with the new legislation and introduced products using recycled plastic. Moreover, economic tools including taxation other measures have already been introduced
Web-site	https://ypen.gov.gr/plastika-proionta-mias-chrisis/

2.3.1.8 Reuse of dairy waste for protein production

Title:	**Network of modern dairy production & whey protein processing units**
	Greece
Organization	**Hellenic Protein Group of companies**
Brief description	**Hellenic Protein Group of companies was established in 1995 aiming to produce Greek milk protein products of high quality, as well as PDO cheese products. The raw material for the production of proteins and other products are mainly dairy by-products and dairy waste.**

Circular Principle				
Innovation		**Policy**	**Entrepreneurship**	**Transfer**
Circular Criteria				

Type of waste	

Other useful information:	In 2005, the Hellenic Protein Group of companies was exporting 95% of its products to China, Europe and the USA.
Web-site	https://www.hellenicprotein.gr/

2.3.1.9 Re-use centers in Western Macedonia

Title:	**Network of reuse centers in Western Macedonia**
	Greece
Organization	**DIADYMA SA**
Brief description	**Each citizen can participate by reusing materials to: Promote the idea and the benefits of reuse, Reduce landfilling, Collect high quality materials, Help people to have access to goods Create a positive local/social impact and Create new jobs for reusing valuable materials. More Analytically, the Reuse Centers (RCs) of Western Macedonia region are local, non-profit, centers for the collection and disposal of materials, which increase creativity, reduce waste, promote cooperation, improve living conditions and the environment through citizen's awareness and the active involvement of the whole society. RCs will be located within or by extension of the existing LWMU (in Kozani, Eordaia, Kastoria, Florina, Grevena), are a simple building infrastructure for the classification and storage of materials, which will have space for exhibition of materials. Their operation is carried out by DIADYMA with the cooperation of the Municipalities, while there is the possibility of support by of social economy institutions.**

Circular Principle					
	Participation	**Education**	**Policy**	**Entrepreneurship**	**Transfer**
Circular Criteria					

Type of waste	(Textile waste)

Other useful information:	The RCs have, among other things, an informative - educational role. Also, various events can be organized in these places for exchange of materials, thematic festivals / bazaars of materials for reuse and other actions that will substantially help in the change of the mentality and perception of the citizens about the consumer behavior, the waste management, and the usefulness of materials.

Web-site https://diadyma.gr/en/egkatastaseis/kentra-dimiourgikis-epanachrisimopoiisis-ylikon/

2.3.1.10 *Cluster of Bioeconomy and Environment of Western Macedonia (CLuBE)*

Title:	**Cluster of Bioeconomy and Environment of Western Macedonia (CLuBE)**
	Greece
Organization	**Clube.gr**
Brief description	**The Cluster of Bioeconomy and Environment of Western Macedonia (CluBE) is a non-profit legal entity established among local actors and stakeholders of the Region of Western Macedonia, Greece. CluBE emerged since early '00's from the continuous collaboration of regional players during previous projects. In February 2014, the cluster has been actually established as a legal form by 21 initial members from the Public sector, R&D and Entrepreneurship, covering the entire triple helix of the regional bioenergy and environment sector. CluBE is developing R&D and business activities in the fields of bioenergy and environment, in order to reinforce smart, bio, green and circular economy in the region and the neighboring area, namely through:** **Energetic exploitation of biomass for household and industrial use and especially for district heating systems for small, medium or large cities, Increasing the share of biofuels and biohydrogen in the energy mix of transportation fuels, Co-firing with lignite in existing power stations and/or future heating plants, Optimization of heating systems and Improvement of energy efficiency for households, public and private buildings**

Circular Principle					
	Participation	**Education**	**Policy**	**Entrepreneurship**	**Transfer**
Circular Criteria					
					
					
Type of waste					

Other useful information:	-
Web-site	https://clube.gr/en/

2.3.1.11 Green corners in Greece

Title:	**Small, municipal recycling points (green corners)**
	Greece
Organization	**YPEN**
Brief description	Densification of collection points such as green corners and the improvement of collection frequency of all recyclables, is considered necessary in order to improve quality and quantity, as well as avoid issues of overflowing bins in densely populated areas. This will in time, most likely result in a slight reduction of density or frequency of residual waste bins. Green corners will be placed in all municipalities with funding from different programs in order to increase recycling rates and inform citizens about circularity.

Circular Principle		
Participation	**Education**	**Policy**
Circular Criteria		

Type of waste

Other useful information:	-
Web-site	https://www.eoan.gr/category/%CE%BD%CE%BF%CE%BC%CE%BF%CE%B8%CE%B5%CF%83%CE%B9%CE%B1/%CE%BD%CE%BF%CE%BC%CE%BF%CE%B8%CE%B5%CF%83%CE%B9%CE%B1-%CF%80%CF%81%CE%B1%CF%83%CE%B9%CE%BD%CE%B1-%CF%83%CE%B7%CE%BC%CE%B5%CE%B9%CE%B1/ https://ypen.gov.gr/wp-content/uploads/2021/09/Final-Report_A1.1_Separate_Collection_20200624_final_short_edition.pdf

2.3.1.12 Turning olive pits into heating fuel

Title:	**olive pits make a perfect circular fuel**
	Greece
Organization	**KLIMIS (Private company)**
Brief description	Since its establishment in 1968, KLIMIS has been using the woody part of Greek olive pits as heating fuel for its kiln in order to bake lime stones, and produce lime pulp (putty lime) for use in building construction and lime powder (quick lime) for use in agriculture. The woody part of olive pits (a by-product from pomace factories) is a solid and sustainable biomass fuel, and therefore a renewable energy source derived from the process of collecting olive oil. KLIMIS compresses olive pits either in an oval shape to create briquettes or in a polygonal shape to create logs(with a hole along their axes) suitable for stoves, wood boilers, pyrolisis boilers and fireplaces. They are 100% natural products, free from chemicals and have a high heating power of 5153kcal/kg.

Circular Principle		
Innovation		**Entrepreneurship**
Circular Criteria		

Type of waste

Other useful information:	Since 1992 KLIMIS has also been collecting the black powder produced by the incomplete combustion of the woody part of olive pits in the kiln to create (EU-patented) barbecue briquettes which do not emit odours, or produce smoke or sparkles. They are easy to light up, free from chemicals, have a high heating power of 6366 kcal/kg, and emit 30% less carbon monoxide than wood charcoal.
Web-site	https://www.klimiscoal.gr/en/

2.3.1.13 Reuse of agricultural waste

Title: **Food waste turned into food for livestock and energy**

Greece, Skidra - Pella

Organization **Oikotexnia Gropalis (Private company)**

Brief description The company is a family business located in Stavrodromi village in the Municipality of Pella. The owner of the company is a farmer producing in his own farmland fruits and vegetables including peaches, tomatoes, peppers and eggplants and their products such as jams, sauces, aubergines and pickles. The production process takes place between July and September under HACCP programme ensuring food hygiene and safety. The food products are available for sale at local and open markets. The waste residues from the production process are recycled or reused. Vegetable residues are used as food for the farmer's livestock, while the peaches' puddles are used as raw material for generating heating energy in the household. The farm is open for visits on demand.

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			
Type of waste			

Other useful information: The circular economy actions implemented by the small food production company include the use of peach prunings and pits as fuel for self-use energy and heating, the use of glass over plastic packaging and their reuse through return to consumers and use of product residues (fruit peels) for compost production or as animal feed.

Web-site https://www.facebook.com/oikotexniagropalis/

2.3.1.14 *Circular model of wheat straws production*

Title:	**Food waste turned into food for livestock and energy**
	Greece, Kilkis
Organization	**Social Cooperative Enterprise**
Brief description	"Staramaki" is a unique straw made of wheat. It is produced by a Social Cooperative Enterprise in Kilkis, northern Greece. "Staramaki" aimed to offer to the consumers an eco-friendly alternative product to phase out plastic straws.Producers have exploited the by-product of the wheat crop that is largely cultivated in the area and created a product to replace plastic and paper straws that have a huge negative effect on the environment. The social enterprise consists of people from vulnerable groups, such as former unemployed- Greeks and refugees.Staramaki is part of the circular economy movement: a) "Incommon", another nonprofit company, exchanges the coffee residue from coffee places in Thessaloniki and Kilkis by offering them "Staramaki" for free, in order to recycle the waste and to convert it into briquettes and pellets. b) It is essentially made from the shafts of wheat that are normally thrown out.

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			
Type of waste			

Other useful information:	Evidence of success: A) The disposal of 1 billion plastic straws per year, B) The profit for trading Staramaki, support an innovative model of social housing for vulnerable groups of people, C) The production capacity is of 5,000 units per day and aims to quadruple it in the coming months, with the creation of a semi-automated production line, which will enable the daily production of 20,000 units. D) 100,000 pieces ordered by a large company and another 4,000 straws have been requested by the European Union Left

Web-site https://www.staramaki.gr/

2.3.1.15 Utilisation of asphalt mix for the production of new materials

Title:	**Food waste turned into food for livestock and energy**
	Greece, Skidra - Pella
Organization	**KAISIDIS Construction company (Private company)**
Brief description	The good practice involves the use of recovered asphalt mix in new production. The reclaimed asphalt mixture is the result of the asphalt or scraping asphalt. Demolition is carried out using road machinery such as the excavator while scraping is done using an asphalt cutter. After the material is transferred to the work site, this material is processed to separate the material containing the highest percentage of asphalt and graded in grain size. This treatment is done by using the granulator containing special shredders that do not polish the recovered bitumen but repel it. With this technology, the asphalt contained retains all its properties while the sieves give the material the correct grading required. The recycled asphalt mixture then goes into the production process of the new asphalt mixture. There in special mechanical equipment it is heated and then mixed with the raw materials, asphalt and aggregates

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			
Type of waste			

Other useful information:	The use of a 30% recycled asphalt mix increases up to 130% the properties and mechanical strengths of the new asphalt mixture. The primary raw material savings are 30% as well as the recycled bituminous mixture used in the manufacture of new ones. The use of recycled materials ensures the reduction of the use of primary sources of materials as well as reduction of waste deposits in the environment.
Web-site	https://kaisidis.gr/

2.3.1.16 Innovative makers space

Title:	**SKG makers**
	Greece, Thessaloniki
Organization	**SKG makers (Municipal project)**
Brief description	SKG Makers is the first community of makers in Thessaloniki, as an action of the Municipality of Thessaloniki, in the context of the implementation of a collaborative, circular Makerspace in the city. Apart from a makers space, the action includes a "business accelerator" of circular entrepreneurship with the aim to to support creators with business training, personalized support, and help them get to market with a sustainable product. The accelerator is open and accessible to everyone.

Circular Principle					
Innovation	**Participation**	**Education**		**Entrepreneurship**	**Transfer**
Circular Criteria					

Type of waste	-
Other useful information:	Thus, since 2018, the Municipality of Thessaloniki, and in close cooperation with the rest of the project partners active in Thessaloniki such as Q-PLAN International, the Center for Research and Technology – Hellas, and the University of Macedonia, is carefully planning and building on the foundations to support innovative entrepreneurship by implementing the first collaborative multi-space of creation and education named SKG Makers in 2021. With the general intention of creating a space that can provide open access to knowledge and tools, it started inviting creators, and opened the discussion on social environmental innovation, redefining perceptions of reuse, design, and recycling of materials by springboarding the creators of the city.
Web-site	https://skgmakers.gr/

2.3.1.17 *Circular electronic business*

Title:	**Vertical and integrated supplier of redundant IT & Telecom equipment**
	Greece, Thessaloniki
Organization	**Alfanet S.A (private comany)**
Brief description	Alfanet has the vision to become a global model of circular economy. A full vertical and integrated supplier of redundant IT & Telecom equipment. In this direction, the company strives to: A) Use refurbish used and redundant equipment and will redistribute them back to the economy, B) Recycle all parts of non-functional equipment by recovering the precious metals it contains and C) Meet the company's energy needs from renewable energy sources such as solar and geothermal energy

Circular Principle	
Innovation	**Entrepreneurship**
Circular Criteria	
Type of waste	

Other useful information:

Web-site https://www.alfanet.gr/en/go-green/circular-economy

2.3.1.18 Collecting food waste to feed those in need

Title:	**Boroume (μπορούμε) stop waste of food and feed those in need**
	Greece, Athens
Organization	**Boroume (non profit organization and volunteers)**
Brief description	Boroume ("We Can") is a non-profit organization whose mission is to reduce food waste and to fight malnutrition in Greece. Through the "Saving & Offering Food" program Boroume saves food on a daily basis from many sources and offer it to charities that help people who are facing food insecurity. Our actions help the most vulnerable in our society as well as the environment by reducing organic food waste. We approach the issue of food waste holistically through the following programs: "Stop Food Waste" - increasing awareness about food waste"Boroume at School" - educational program"Boroume Gleaning" - reducing food waste on the field"Boroume at the Farmers' Market" - reducing food waste at the farmers' markets "Boroume in the Neighborhood" - informing potential food donors in a neighborhood about our food saving mechanism Through our "We Are Family" program we provide nutritional support in an immediate transparent and dignified way to families in great need.

Boroume
saving food - saving lives

Circular Principle			
	Participation	**Education**	**Transfer**
Circular Criteria			
Type of waste			

Other useful information: Boroume saved and offered 11.577.445 portions of food (increase of 30% from 2020), which is more than 31.700 portions per day on average with an estimated value of 17.366.168€ (average cost: 1,5€ per portion). They also saved & offered 173.300 kilos of fresh fruits and vegetables from 29 farmers' markets in Attica and Thessaloniki with the help of 220 volunteers they also held 89 educational actions, which were attended by 1.607 student. Finally, Boroume's actions were supported by 230 volunteers

Web-site https://www.boroume.gr/

2.3.1.19 *Separate collection of organic waste*

Title:	**Compost bins in the Region of central Macedonia for separate collection of organic waste**
	Greece, Region of central Macedonia
Organization	**Solid Waste Management Association (FoDSA) in participation with municipalities**
Brief description	The brown bins will be used to collect organic waste from homes in the region, mostly food (cooked and raw), as well as plant trimmings. Each household participating in the scheme will be given a small bin for the kitchen and a biodegradable bag, while each apartment block will get another bin to be placed in a common area. The capacity of the latter is between 120 and 360 liters, depending on the size of the apartment block.

Circular Principle					
	Participation	**Education**	**Policy**		**Transfer**
Circular Criteria					

Type of waste

Other useful information:	The organic waste collected will then be taken to a processing plant to be turned into high-grade compost.
Web-site	https://fodsakm.gr/kafekados/

2.3.2 Identification of International Best Practices

2.3.2.1 *Recycle and reuse of textile waste*

Title: **Globe Hope recycling and reusing textile waste for the production of clothes and accessories**

Finland

Organization **Globe Hope (Private company)**

Brief description **By the turn of the millennium, textiles were already consuming many natural resources as the culture of disposable goods had already extended to clothing and accessories. The idea of reusing abandoned material was born, and in 2003 Globe Hope launched its first recycled clothing line at the Vateva Fair, made from recycled army and hospital materials. The products of Globe Hope are fully sustainable, as they are made from leftover fabrics, leftover leather, work clothes, fair carpets, coffee packages, seat belts, old posters and other advertising materials from big events.**

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			

Type of waste	(Textile waste)

Other useful information: All Globe Hope clothes, accessories and bags are upcycled from leftover materials. The company produces locally in Finland and Estonia. Globe Hope actively contributes to changing the perception consumers have of designer products, by advancing a circular business model where excess and waste materials are given a new life instead of being destroyed. Globe Hope has already received many awards: Amnesty International chose Globe Hope as the Designer

of the Year 2005, the Finnish Ministry of Culture accorded Globe Hope the Finland Award for Arts and Culture in 2006. In 2012, their products were branded with the Design from Finland label.

Web-site https://globehope.com/

2.3.2.2 *Plastic Repair System*

Title: **Industrial repair of returnable plastic packaging**

Mexico & Spain

Organization **Plastic Repair System (Private company)**

Brief description

Plastic Repair System (PRS) offers a repair service of returnable/reusable plastic items made of PE & PP. Founded in 2011, the business case in repairing plastics was visionary. PRS has developed and patented an innovative technology that allows to repair plastic returnable transport packaging (RTP) such as pallets, crates, boxes, etc. PRS's repair system recovers at least 98% of the original strength and 100% of the functionality with a 70% cost reduction compared to replacing a new one and 311 times less CO_2 emissions.

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			
Type of waste			

Other useful information:

Positive economic & social impact: - The repair service offers a cost reduction of approx. 70% avoiding, the purchase of new items. - Growing potential and scaling-up internationally. - A designed process and technology for process optimization. - Growing market even during economic crisis. - 14 workshops working as a network in the offer of the patented and standardized repair service. - High labor-intensive process creating local employment. - Working and collaborating with special employment centers as members of the workshops Network. - Training and building capacities for new employments. - Scaling-up process, creating employment in other locations worldwide

Web-site https://www.plasticrepair.eu/

2.3.2.3 *Insect farming for protein production*

Title:	**Insect farming for protein production**
	Italy
Organization	**Nutrinsect (Private company and R&D center)**
Brief description	**Nutrinsect is a company based on the idea of feeding the planet in a sustainable way by insect farming as a new source of protein. The insects are fed with organic waste/byproducts from the agri-food industry. The purpose of the breed of insects is to use them as nutritive additives in the production of flours. Depending on the type of feeding of the insects the flour would have different properties. So far, pasta and energy bars have been created including this flour. The new plant of the Italian Nutrinsect is located in a rural area in Navarre becoming a great business opportunity to offer high protein solutions with increasing acceptance of the society.**

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			
Type of waste			

Other useful information: Insects have up to 70% of protein meanwhile the cows have only a 15- 20%. Consuming food with insect protein has a lot of benefits for the human health. It ensures the good functioning of the gut microbiota and seems to be favorable to control the levels of cholesterol, ensuring and fostering a healthy lifestyle and a balanced diet. Being rich in calcium, iron and vitamins B12, insects are a real panacea for bone growth, for the prevention of iron deficiency anemia and of megaloblastic anemia. Insects are more sustainable economically than livestock, since all process by-products

(wastecricket droppings and their shedding of fur) are highly valorised as organic fertiliser with potential bio-stimulant properties.

Web-site https://www.nutrinsect.it/

2.3.2.4 *Turn vegetable losses in useful material*

Title:	**Transforming waste vegetable into animal feed, energy, and functional ingredients**
	Spain
Organization	**TRASA (private company)**
Brief description	**TRASA has access and manages food industry vegetable losses, creating value by transforming their organic byproducts into new products through different specialized business units (animal feed, energy, functional ingredients, agri-biologicals (biofertilisers, biostimulants, others)). The business model, following the criteria of sustainability and social objectives is to recover value added products from vegetable by-products; to research, develop and startup new technologies related to these materials; to promote industrial activities aimed at prevention, research, technological development, minimisation, recycling and valorisation of vegetable by-products.**

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			
Type of waste			

Other useful information: Other benefits include: - Reducing waste management costs for agri-food industries. - Creating value from waste. - Animal feed at lower price and higher quality based on vegetable byproducts (From food processing). - Creating economic value in rural areas. - Rural employment resilience. - Healthier animals, healthier meat for food, positive

impact on health. - Increasing synergies between farmers, cattle breeders and food processors. - Internal technical-economic evaluation for each new business model. - Industrialisation of the production processes for achieving real scale project.

Web-site https://trasa.es/

2.3.2.5 *Polish circular hotspot*

Title:	**Polish circular hotspot**
	Poland
Organization	**Polish circular hotspot (Network)**
Brief description	**Polish Circular Hotspot is a public-private platform gathering entities that thanks to cooperation and access to shared resources can achieve more both for the introduction of circular economy concept and for their own interests. The mission of Circular Hotspot is to support the global community, business, cities and governments in the transformation towards circular economy through practical and scalable solutions that will help solve one of the greatest challenges of our time: the shrinking natural resources and environmental degradation.**

Circular Principle				
	Participation	**Education**	**Policy**	**Transfer**
Circular Criteria				
Type of waste				

Other useful information:	Polish Circular Hotspot is not the only Circular platform in Europe. Similar initiatives in the Netherlands, Slovenia, Scotland and Norway have been already successful for years.
Web-site	http://circularhotspot.pl/

2.3.2.6 Creating a circular economy for the wind industry

Title:	**CREATING A CIRCULAR ECONOMY FOR THE WIND INDUSTRY**
	Scotland
Organization	**Zero Waste Scotland (publicly-funded organisation)**
Brief description	**Shifting culture and changing attitudes are important steps to creating a circular economy as trust in remanufactured and refurbished goods being low. Aging turbines and rising obsolescence are driving organisations to look at sustainable options to fill the growing parts requirement in older wind farms. An effective means of recirculating parts at scale, while maintaining quality and traceability, was required as part of any solution to attract large organisations. Renewable Parts, with help from Highlands and Islands Enterprise through the Co-Innovate Fund, completed a 12-month programme which developed an effective and scalable solution of remanufacturing yaw gears to bring them back to market as high-quality parts. The project aimed at developing an optimised transferable process that would look at the data of failed components, as well as physical inspection of the available specimens, to understand the possible cause of failure.**

Renewable Parts Ltd

Circular Principle			
Innovation		**Entrepreneurship**	
Circular Criteria			

Type of waste

WEEE

Other useful information:	-
Web-site	https://www.renewable-parts.com/

2.3.2.7 *Financing the circular economy*

Title:	**Circular Economy Investment Fund**
	Netherlands
Organization	**Circular Economy Investment Fund (Circular Investment B.V.)**
Brief description	**Supporting the transition to a circular economy requires – among other things – redirecting capital flows towards sustainable investment. For the private sector, this means integrating environmental, social and governance factors into the investment decision-making process on top of economic ones. It also requires mobilising available public funding sources to make sure circular projects, whatever their technical readiness level, get the resources they need to unlock scalable solutions. Circular Economy Investment Fund s funding CE projects globally**

Circular Principle
Entrepreneurship
Circular Criteria

Type of waste

Other useful information:	-
Web-site	https://www.circular-investment.com/

2.3.2.8 eCommerce platform for Circular Economy

Title:	**Dayrize platform**
	Netherlands
Organization	**Circular Economy Investment Fund (Circular Investment B.V.)**
Brief description	**Dayrize is an eCommerce platform with a carbon-neutral footprint that is based on the principles of transparency and sustainability. The platform was born from a simple idea: what if we could create real change just by changing the way that we shop? Dayrize curates a range of products that help consumers transition to a more sustainable lifestyle. By using a strict set of criteria to rank and rate every product, consumers can make purchasing decisions that are good for them, and good for the planet.**

Circular Principle
Entrepreneurship
Circular Criteria

Type of waste

Other useful information:	Dayrize offers a new approach to sustainable shopping online, making it easy and enjoyable to buy goods that do good. Everyone can make a little bit of difference with every purchase – and that all adds up to a huge change for the better. The technology is complex and ground-breaking, but the output is simple: a single, meaningful figure we call The Dayrize Score. Every product gets its own unique score, which means for the first time ever we can all accurately compare the impact of products.
Web-site	https://dayrize.io/

2.3.2.9 *Turning used oil into soap*

Title:	**Turning used oil into soap**
	Spain
Organization	**Almotech (Private company)**
Brief description	**Almotech is dedicated to the development, manufacture and marketing of products to recover oil at source through a patented system and formula. Almotech transforms used cooking oil into soaps of different uses and varieties: home or cosmetic use. The produced soap can be liquid or in bars, depending on the user´s needs. The equipment has been completed designed by Almotech company and has collaborated with different organisations searching for the most optimised and sustainable processes.**

Circular Principle			
Innovation		**Entrepreneurship**	
Circular Criteria			

Type of waste	

Other useful information:	In each process that a user carries out a soap production cycle, as well as obtaining 750ml of natural soap of the highest quality, it will prevent 150L of water from being contaminated by the dumping of oil.
Web-site	https://yenxa.eco/ https://almotech.es/

2.3.2.10 *Decontructing homes to recover valuable material*

Title:	**Decontructing homes to recover valuable material**
	Canada
Organization	**Unbuilders (Construction Company)**
Brief description	**Unbuilders is a Canadian company based in Vancouver that aims to decrease the amount of waste associated with the demolition of buildings and initiate an industry-wide transformation of how the construction industry handles its waste. Instead of demolishing buildings for scrap, Unbuilders deconstructs houses by taking the buildings apart piece by piece. This allows them to maintain the integrity of the materials being removed, ensuring materials can be re-used in future construction projects.**

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			

Type of waste

Other useful information:	The demolition industry generates millions of tonnes of waste annually in Canada, 37% of which is valuable lumber. Companies are throwing away usable, renewable resources and charging their customers to do so. Unbuilders deconstructs and salvages most of the building's components yielding less than 5% waste on average. On each project, Unbuilders diverts 50 tonnes of waste and salvages 10 tonnes of lumber.
Web-site	https://unbuilders.com/

2.3.2.11 Buildings as Material Banks

Title:	**Buildings as Material Banks: Mainstreaming the concept of material passports**
	Network
Organization	**BAMB (EU funded project)**
Brief description	**BAMB is an EU-funded initiative to promote circular economic ideas in the construction industry. Founded in 2015, it has fifteen partners in seven EU nations and has been working to develop a systematic shift in the construction and demolition of buildings. The environmental impact of construction in the EU is significant, as the construction sector represents 40% of greenhouse gas emissions, 45% of the EU's total controlled waste, and uses 50% of extracted resources. BAMB values buildings not only in what they are currently able to provide, but what they could provide in the future. BAMB views buildings not as static objects with singular purposes, like that of a school or a mall, but as a temporal and dynamic storage of materials that can be easily changed to fit evolving market needs. It is common for demand of buildings use to decline before the natural life cycle of the building has expired. This results in buildings being demolished before necessary, which creates a massive amount of refuse that is often relegated to the landfill**

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			

Type of waste

Other useful information:	A key concept used by BAMB is the material passport, a novel method to track and save materials used in the building process. This is a digital document that chronicles the precise materials used in a particular building.
Web-site	https://www.bamb2020.eu/

2.3.2.12 *Closing the bread loop*

Title:	**Manufacture of craft beer with bread**
	UK
Organization	**BAMB (EU funded project)**
Brief description	**The startup Toast Ale have an unusual and appealing idea of how to combat this problem - by brewing beer. It's a relatively simple process, so much so that the first batch of Toast Ale was arranged in just 10 days by Founder Tristram Stuart and his team. The company start by collecting surplus bread from delis, bakeries and sandwich makers. It's then incorporated into the brewing process with malted barley, hops, yeast and water. It doesn't take any special technology or space-age methods, but this simple switch can replace around a third of the malted barley used for beer.**

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			
Type of waste			

Other useful information:	There are other companies that do the same, e.g.: "The Brussels Beer Project", "Raid Cuadrara" etc.
Web-site	https://www.toastale.com/

2.3.2.13 Developing a Circular Economy Strategy for a Municipality

Title:	**Circular economy strategy for the city of Mataró**
	Spain
Organization	**City of Mataró**
Brief description	**To develop the strategy, it was necessary to first identify the key elements and assets of the city, while considering the most important economic sectors. Then, a benchmark report of other European cities embarking on the circular journey was done to extract meaningful insights potentially useful for Mataró It was also important to elaborate a governance model to determine how the strategy will be managed and executed on a politician, technical and citizen level. Multiple interviews with key stakeholders were crucial, mainly with public administration employees, but also with companies and knowledge centers, so as to validate and align the approach, the circular vision, aspirations, courses of action and proposals of circular projects.**

Circular Principle					
	Participation	**Education**	**Policy**		**Transfer**
Circular Criteria					

Type of waste

Other useful information:	To elaborate the first of circular economy action plan (2022-2024) for Mataró, several existing circular economy initiatives were identified, and 20 circular projects were designed and planned, of which the execution will be crucial to get started.
Web-site	https://www.mataro.cat/sites/mataro-circular-2030

2.3.2.14 *Co-creating the Bioeconomy Strategy of Catalonia*

Title:	**Participatory process of the Catalonia Bioeconomy Strategy 2021-2030**
	Spain
Organization	**Catalan Government & The Forest Science and Technology Centre of Catalonia**
Brief description	**The assignment was to carry out the participatory process of the Catalonia Bioeconomy Strategy 2021-2030 (EBC2030) in order to identify the interest groups and to develop a map of agents throughout the value chain and of the different sectors. During the participatory process, 388 key agents were identified to form part of the different sectoral workshops including: construction, bioenergy, by-products and waste from the agri-food sector, bioproducts and territory as well as with the citizens. As a result of these co-creation workshops, the Strengths, Weaknesses, Opportunities, and Threats of the circular bioeconomy were identified in Catalonia, and an initial proposal for the strategic objectives and lines was prepared.**

Circular Principle					
	Participation		**Policy**		**Transfer**
Circular Criteria					

Type of waste

Other useful information: The Catalonia Bioeconomy Strategy for the 2021-2030 period, enriched with the participation of various stakeholder groups, will enable improvements to be made in the competitiveness and sustainability of the first sector, contributing to the creation of jobs, connecting agents in distant sectors and giving impetus to the generation of knowledge as a driving force for change.

Web-site https://govern.cat/govern/docs/2021/09/14/13/55/aaec0897-7a0a-42cf-ae89-454b16ca1d70.pdf
https://participa.gencat.cat/uploads/decidim/attachment/file/2596/informe_participacio_EBC2030.pdf

2.3.2.15 *Denmark: Public procurement as a circular economy enabler*

Title:	**Public procurement as a circular economy enabler**
	Denmark
Organization	**Ministry of Environment of Denmark & Environmental Protection Agency**
Brief description	**Initiated by the Danish government, the programme aims to shift public procurement to support the transition to a circular economy. Through the partnership, members work to integrate procurement policies that emphasise circular economy criteria such as the use of non-toxic chemicals, extended product lifespan, and the cycling of biological and technical materials. The Partnership for GPP is a collaborative initiative between Danish regions, municipalities and the Ministry of Environment and Food on common objectives for green procurement. The current 14 p artners have committed themselves to integrate green goals in their procurement policies as well as greening their procurement on 11 specific product groups. Criteria include recyclability , number of chemicals, product lifespan and total cost of ownership – all elements essential for the transition to a circular economy. The partnership's total volume of procurement is significant at EUR 5 billion.**

Ministry of Environment of Denmark
Environmental Protection Agency

Circular Principle			
	Policy		**Transfer**
Circular Criteria			

Type of waste

Other useful information: -

Web-site https://fm.dk/media/18268/groenne-indkoeb-for-en-groen-fremtid-strategi-for-groenne-offentlige-indkoeb_web.pdf

2.3.2.16 *Developing the world's first biodegradable beer bottle*

Title:	**Public procurement as a circular economy enabler**
	Denmark
Organization	**Carlsberg (Beer company)**
Brief description	**One of the challenges the Carlsberg Group focuses on is packaging, as around 45% of their CO_2 emissions come from the company's packaging. They want to reduce this number by encouraging consumers to recycle more, minimise material usage and by developing new environmentally friendly packaging types. The Carlsberg Group have initiated a partnership with Danish company ecoXpac, Innovation Fund Denmark and the Technical University of Denmark to develop the world's first fully biodegradable beer bottle made from wood fibre – the Green Fiber Bottle. The bottle will be as light as a PET bottle, while having the advantage of being created from bio-based sources. The project is one of the activities in the Carlsberg Circular Community, which is the Carlsberg Group's partnership platform to develop more sustainable products with partners from across the world. The community aims to eliminate the concept of waste by creating sustainable products and a more circular economy in an increasingly resource-scarce world.**

Circular Principle			
	Policy		**Transfer**
Circular Criteria			

Type of waste

Other useful information:	Carlsberg has two new research prototypes of the Green Fiber beer Bottle, which are the first 'paper bottles' that are able to contain beer.
Web-site	https://www.carlsberg.com/en/green-fibre-bottle/

2.3.2.17 *Clothing that grows with your child*

Title:	**A product-service-system enabling parents to lease kids' clothes**
	Denmark
Organization	**Vigga (private company)**
Brief description	**VIGGA was born as a circular concept. The idea was to create a new way of consuming, based upon sharing and circulating high-quality products. Through a circular subscription concept, VIGGA offers high-quality children's clothes, produced under proper conditions, at an attractive price. This is possible because the same piece of clothing will be shared by several children and the quality of the clothing is so high: - For a monthly subscription fee, the customers get 20 pieces of clothes in their child's size - When the clothes become too small, they are replaced by new sets of clothes one size bigger**

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			
Type of waste		(Textile waste)	

Other useful information: What's more, a VIGGA package does not just contain any kind of baby clothes. All of the pieces are made from organic fabric and designed with a circular business model in mind. VIGGA strictly monitors the quality of its products to make sure as many kids as possible can enjoy them. The brand even teamed up with Design School Kolding to extend the life of their clothes. When an item is in too bad a shape to be passed on to another customer, it is carefully recycled.

Web-site https://www.close-the-loop.be/en/case/285/vigga also check: https://thelittleloop.com/

2.3.2.18 *Innovative plant-based textiles*

Title: **Innovative natural textiles from waste pineapple leaves**

Philippines

Organization **Ananas Anam**

Brief description

Ananas Anam was born at the Royal College of Art (London) as a start-up. Ananas Anam Ltd, established in 2013, has developed Piñatex®, a natural plant-based and versatile material from a sustainable source. Piñatex follows a strong social and ecological agenda and can be mass-produced, making it a cost-effective textile and alternative to leather. Ananas Anam has integrated the circular economy concept since its foundation, by giving economic value to a waste. 13 m tons of leaves waste is generated every year in the Philippines by pineapple plantation and about 54 m tons worldwide. In Philippines, this waste was partially used as mulch, back into the ground, and there is not an estimation of the impact that it may cause. Ananas-Anam uses pineapple leaf fibre to produce Piñatex (a non-woven material). The pineapple leaf fibres that are used in the production of Piñatex represents 2% of the waste. The discarded part can be used as fertiliser and it is easier to degrade as compost under specificconditions. So, in this way economic value is adding to a waste.

Collaboration Award
PETA Fashion Awards

Ananas Anam awarded the Collaboration Award of the PETA Fashion Awards 2021, for Nike's 'Happy Pineapple' collection of sneakers made from Piñatex.

Circular Principle			
	Policy		**Transfer**
Circular Criteria			

Type of waste	
Other useful information:	-
Web-site	https://www.ananas-anam.com/

2.3.2.19 *Circular Innovation in The Wine Industry*

Title:	**Wines of Alentejo Sustainability Program (WASP).**
	Portugal
Organization	**Vinhos do Alentejo**
Brief description	**WASP aims to support economic agents in improving the environmental, social and economic performance of the region's winegrowing activity and to promote the recognition of the sustainability performance of the region's wines and to articulate the entire wine chain in the Alentejo within a philosophy of social, environmental and economic well-being at a local and regional level, with emphasis on the incorporation of eco-efficiency principles with the aim of promoting a more efficient use of resources, encouraging the reduction and reuse of coproducts by reducing internal operating costs. WASP is voluntary and in order to begin implementation, it is compulsory to carry out a self-assessment. This was developed to be a standardised method to be completed with a performance levels assessment organised into different chapters applied to viticulture, cellar and viticulture&cellar and with primary and secondary Intervention chapters with different criteria.**

Circular Principle			
	Policy		**Transfer**
Circular Criteria			
Type of waste			

Other useful information: This strategy showed almost immediate results, with the Programme counting 93 members at the end of 2015, a number that has been increasing every year reaching, nowadays, 460 members. At the moment 3 members are

certified. The programme was also been award with several awards during the last years. On December 2019, it was awarded with the title of 2019 European Ambassador for Rural Innovation for the LIAISON project.

Web-site https://sustentabilidade.vinhosdoalentejo.pt/en/wasp-certification

2.3.2.20 Sustainable plastic products

Title:	**Sustainable product design from plastic waste**
	Netherlands
Organization	**Better Future Factory**
Brief description	**The company helps clients finding new ways for transforming waste streams into valuable and scalable products, in particular plastic waste streams. Next to this the company also initiates their own projects, which sometimes grow into individual start-ups, dedicated to one product or service. Better Future Factory has 3 start-ups for projects around plastic recycling for clients. Refil is the second start up which is the industrialized version of Perpetual plastic, making high quality 3d printing filament (input materials for 3d printers) from plastic waste. It's been in the market for 3 years and is selling globally via resellers and its own web-shop. The newest start up is called New Marble, where old plastic bottles are converted in marble looking wall tiles via a unique process developed by Better Future Factory. With New Marble already from the start collaborations are formed with people outside the company, which have a complementary skill set and give the business development a push**

Circular Principle			
	Policy		**Transfer**
Circular Criteria			
Type of waste			

Other useful information:	-
Web-site	https://betterfuturefactory.com/

2.3.2.21 Reuse of dead cellphones

Title: **Closing the Loop -Circularity for cellphones**

Netherlands, Amsterdam

Organization **Closing the Loop (Private company)**

Brief description **Closing the Loop (CTL) collects 'e-waste' (dead phones) in African countries and ensures that this waste is turned into metals. This 'urban mining' is a great alternative for 'virgin mining'. Urban mined metals are arguably the cleanest, lowest CO2-emitting, fairest, inclusive and conflict-free metals in the world (especially considering the e-waste is from places where the waste cannot be recycled properly). Extracting gold from waste saves up to 90% carbon, when comparing to classical mining. It also offers "waste Compensation" that makes the new device you buy (or lease) waste-neutral. To 'compensate' your new device, the same amount of electronic waste is collected and recycled. The service does not require you to change your supplier, nor do you need to alter your procurement process. The service fee is often less than 1% of the device's price. The service also leads to positive impact, as the collected waste is from countries that lack waste recycling infrastructure.**

Circular Principle			
Innovation		**Entrepreneurship** **Entrepreneurship**	**Transfer** **Transfer**
Circular Criteria			
Type of waste			

Other useful information:	What CTL has done since 2012, is to show that is it possible to collect over 2 million dead phones in countries that lack the formal infrastructure, the laws and regulation around electronic waste management and the consumer awareness on proper recycling
Web-site	http://closingtheloop.eu/

2.3.2.22 *Sustainable furniture design*

Title: **Sustainable furniture**

Slovenia, Ljubljana

Organization **Donar (Private company)**

Brief description

The company was established in 1989 in Slovenia, in response to the needs of office interior development. Starting as a small business, Donar has developed in one of key players in design furniture with highest environmental standards. Today Donar employs 20 people and works with several government and non-government associations including universities and institutes to achieve best practice in designing products with minimum impact on environment. Over 70% of products are exported to all continents, mostly Scandinavian countries, UK, US, Australia, and Italy. The goal is to contribute to a carbon neutral and waste free society. Donar follows the 'cradle to cradle' model with design thinking (double diamond) principles and focusing on design management. Design is not just about lines and beauty, but foremost about its social impact. Sustainable design is the only response to overwhelming growth of consumerism. Products that show best practice are NicoLess, ChatLoop, Collodi all made from recycled felt (PES) using trash as an industrial material of the future. It is important to have a clear strategy and goals while developing products. Donar also educates its employees, designers, suppliers and customers in order to achieve maximum impact on society

Circular Principle					
Innovation		**Education**		**Entrepreneurship**	**Transfer**
Circular Criteria					
Type of waste					

Other useful information:	-
Web-site	https://donar.si/

2.3.2.23 *Recycling services for the production of packaging and other products*

Title:	**Provision of recycling services to the value generation of waste**
	Argentina, (Tierra del Fuego)
Organization	**Pulpo S.A. (Private company)**
Brief description	**ECOPULPO seeks to generate positive impacts on the reduction of scrap originating in the industrial processes of its clients and which would otherwise end up in landfill or be incinerated. The company currently processes paper and cardboard and plastic (PEBD, PEAD, PS, PSAI, PP, ABS, PET), among other materials. Ecopulpo has achieved a 95% reinsertion into the productive circuit for consumables discarded by its principal clients. Over 300,000 m³ of material goes through its plant to be recycled. In this way many products made locally (for example pipes, hangers, chairs) are made out of this recovered material, thereby avoiding the use of virgin raw materials derived from oil.**

Circular Principle			
Innovation		**Entrepreneurship**	**Transfer**
Circular Criteria			
Type of waste			

Other useful information:	-
Web-site	https://pulpak.com.ar/

2.3.2.24 *Integrated waste management combined with measurement of GHG emissions*

Title:	**Integrated waste management by calculating those GHG emissions and implementing measures to reduce them**
	Portugal (Porto)
Organization	**LIPOR – Intermunicipal Waste Management of Greater Porto, Portugal**
Brief description	**LIPOR – Intermunicipal Waste Management of Greater Porto, Portugal, is responsible for the management, recovery and treatment of the Municipal Waste (MW) produced in the eight associated municipalities. Every year, LIPOR treats about 500,000 tons of MW that are produced by around 1 million inhabitants. Based on modern municipal waste management concepts, LIPOR associated the circular business model to its integrated system, under the motto of LIPOR's strategy - Towards Sustainability – which depicts a sustainable management, that combines the three main principles of sustainable development and defines LIPOR's current and future action. Lipor is responsible for direct and indirect greenhouse gas (GHG) emissions, whether originated from waste management activities (WtE- water to energy, composting, sorting, landfill) or complementary activities (as transport and mobility, e.g). Lipor assumes its responsibility for the management of the impact of its activity by calculating those GHG emissions and implementing measures to reduce them.**

Circular Principle					
Innovation	**Participation**	**Education**	**Policy**		**Transfer**
Circular Criteria					

Type of waste

Other useful information: -

Web-site https://www.lipor.pt/en/recover/circular-economy/

3. GAP ANALYSIS

3.1 Introduction

In the previous chapters, a set of national and international Best Practices related to Circular Economy were presented. In no way this guide in Best Practices is exhaustive. However, it presented a good set of actions taken by citizen's initiatives, public bodies and private organizations.

The objective is to promote economic inclusion, innovation and sustainability through the dissemination of good business practices and for the exchange of experiences and learning among countries, and at a bi-regional level. In addition, the cases make significant positive impacts, in particular in local development.

With a focus in existing Greek practices and the new requirements under the National framework legislation for Waste Management as well as the National Action Plan on Circular Economy, the next step is to consider where improvements either could be made or are needed to the current national dynamics in order to achieve higher level of circularity.

3.2 Methodology on identifying gaps for industry sectors - Circular economy questionnaire

The Gap Analysis attempts to compare existing practices from EU and other areas to interesting features from other Best Practices globally under the requirements of the current legal and institutional framework.

All examined International best Practices are presented in a tabular form, where they are ranked against different levels of gap between existing condition in Greece and the best practice. Ranking takes place according to a color code presented in the following table with green indicating there is no gap and red indicating a significant gap between the example practice and current practice in Greece, followed by a brief analysis:

Best practice	Level of application in Greece	Brief analysis
BP is familiar in Greece and institutionalized		
BP is familiar in Greece but it presents limited (or isolated) application		
BP is in line with existing situation but is not applied		
No evidence of this BP happening in Greece		
Other		

3.3 Mapping the gaps between current condition and the Best Practices

No	Best practice	Level of application in Greece	Brief analysis
1	Recycle and reuse of textile waste (Globe Hope)		There are several examples of small and very small enterprises active in the field of textile waste recycling. However, due to the lack of a recycling center for clothing in Greece, examples such as RECYCOM need to be based on private initiative. The National Plan for Circular Economy and the National Waste Management Plan has placed targets for recycling of textiles. RECYCOM is expanding to all Municipalities and tries to address the management issue of waste from old clothes and textiles. Finally, no financial or other incentive is provided to citizens of companies to promote this system
2	Plastic repair system		Greece ranks third highest in Europe based on the percentage of municipal solid waste that ends up in landfill (80% in 2017), after Malta and Cyprus. In contrast, in several countries in Europe, such as Sweden, Denmark, Germany, Belgium, Finland, the Netherlands and Austria, the percentage of land disposal in MSW management is lower than 2%. Moreover, Greece is in the second lowest position in the EU. after Cyprus, in terms of per capita volume of plastic waste recycling (4 kg per person in 2016), against 16 kg per person on average in the EU. and 32 kg per person in Austria, which pioneers plastic waste management systems. European waste and circular economy policy has set ambitious targets for plastic recycling and the use of recycled plastics. In particular, it is predicted that the recycling of plastic packaging should rise to 55% in 2030. A target for the use of recycled PET in plastic bottles has been set at 25% in 2025 and 30% in 2030. Measures are being promoted to increase the share of reusable plastic packaging, such as guarantee return schemes, while Member States are required to institute national annual targets for the percentage of reusable packaging. Finally, a ban is introduced on the use of certain single-use plastic products, such as plastic cutlery and plates, straws and expanded polystyrene food and drink containers, while restrictions are placed on other single-use plastic products, such as cups and food containers made of other plastics.
3	Insect farming for protein production		Greece has no example of Insect farming and there is no legislative framework supporting this action.
4	Turn vegetable		Vegetable and other food waste is used for the

No	Best practice	Level of application in Greece	Brief analysis
	waste into food and other useful material		production of compost and fertilizers. There is no case where they are used to produce proteins and/or other nutrients and food. The closer example to this practice appears with the practice of the Hellenic Protein Group of companies established in 1995 with the aim to produce Greek milk protein products of high quality from dairy waste and by-products.
5	National circular hotspot		Most of EU countries have circular hotspots to promote circular concepts, foster dialogue between stakeholders and push the dialogue further for transforming existing legislation. In Greece, there is no such center or hotspot
6	Circular economy in the Wind energy		Wind energy investments are still very expensive. As a result, investment in wind parks is lagging. Combined with the licensing and development hurdles, project developers are still hesitant in investing in new technologies. Therefore, apart from investment production of wind farm equipment is not taking place in Greece. Furthermore, no incentives are provided for investing into more circular and sustainable products for the development of Renewable Energy Stations.
7	Financing the Circular Economy		There are many EU co-financed programs to support investments related to Circular Economy. However, emphasis is placed on the 'end-of-life' stage, rather than on the design stage. As a result, there is no "specialized" funding mechanism focusing in circular economy and circular investments.
8	eCommerce platform for Circular Economy		Even though there are many initiatives and EU funded programs focusing in the development of Circular Economy related application, there is no similar platform for with a carbon-neutral footprint that focuses in the environmental footprint of shopping habits.
9	Turning used oil into soap		There is no national scheme or formal accreditation process for oil collection. Used-oil coming from cooking or industrial uses is collected through private initiatives. However, initiatives focusing in reuse of waste such as used oil in cosmetics or similar products are very rare and mainly in very small scale.
10	Deconstruction to recover useful material		This is a practice that is not applied in Greece. Moreover, there is no legislative framework supporting this action or other financing incentives.
11	Buildings as banks for materials		This is a practice that is not applied in Greece. Moreover, there is no legislative framework supporting this action or other financing incentives.
12	Brewing bread (or other food waste) for making bread		Brewing of food waste into beer or other drinks is not common in Greece. There are isolated cases and limited pilot-examples of such products.

No	Best practice	Level of application in Greece	Brief analysis
13	Circular economy strategies for Municipalities		Even though there are policy tools and strategies in place (national and municipal waste management plans, National strategy for circular economy etc.) at the moment they mainly focus in recycling. Finally, local and/or Municipal Plans for circular economy have not developed yet.
14	Developing a bio-economy strategy		Even though there are policy tools and strategies in place (national and municipal waste management plans, National strategy for circular economy etc.) at the moment they mainly focus in recycling. Finally, National and/or local and/or Municipal strategy for bioeconomy has not developed yet.
15	Public procurement as a circular economy enabler		There is a national Action Plan for the promotion of Green Public Procurement[21]. However, GPP is not yet adopted by the majority of Public Authorities. Therefore, even though the legislative framework is in place, there is a need for pushing GPP in all levels of public procurement (National, Regional and Municipal)
16	Biodegradable beer bottle		Greece has created the ERP systems and necessary fiscal tools for increasing the use of plastic bottles containing 30% or more recycled plastic. From June 2022 a new tax for "recycling" of plastic with PVC has been introduced. However, biodegradable bottles for drinks have not been adopted by Greek bottling companies.
17	Lease-rent clothes for children		This is a concept that does not exist in Greece. Even though, in the last years several small shops selling re-used clothes have appeared, clothing rental is unknown for Greece.
18	Production of plant-based textiles		Production of Plant-based textiles is very common in EU and other countries. However, there is no such production unit or industry in Greece. Small initiatives and small shops may trade Plant-based textiles. However, most of the Plant-based textiles and clothes are imported.
19	Circular Innovation in The Wine Industry		There is no certification scheme encouraging circularity in the wine industry. There are other, environmental friendly certifications for biological, biodynamic etc. wines.

[21] https://www.mindev.gov.gr/wp-content/uploads/2021/03/%ce%a6%ce%95%ce%9a466%ce%92_08022021_%ce%91%ce%a0%ce%9f%ce%a6%ce%91%ce%a3%ce%97_%ce%95%ce%93%ce%9a%ce%a1%ce%99%ce%a3%ce%97-%ce%a3%ce%a7%ce%95%ce%94%ce%99%ce%9f%ce%a5-%ce%94%ce%a1%ce%91%ce%a3%ce%97%ce%a3_%ce%a0%ce%a1%ce%91%ce%a3%ce%99%ce%9d%ce%95%ce%a3-%ce%94%ce%97%ce%9c%ce%9f%ce%a3%ce%99%ce%95%ce%a3-%ce%a3%ce%a5%ce%9c%ce%92%ce%91%ce%a3%ce%95%ce%99%ce%a3.pdf

No	Best practice	Level of application in Greece	Brief analysis
20	Sustainable product design from plastic waste		Production from recycling plastic or other packaging material is taking place in Greece. However, the factories process the useless plastic material (plastic scrap) in different qualities, colors and forms (e.g., grains, crumbs). The useless plastic material can come from plastic buckets or nylon bags, that are possibly made of polypropylene (PP), polyethylene (LDPE, HDPE), polystyrene (EPS). At the moment there is no industry or factory producing directly new products from recycled plastic
21	Reuse of dead cellphones		Old cellphones can be recycled in Greece, However, there is no facility, industry or other facility to extract valuable materials from the phones and re-use them.
22	Sustainable furniture design		Sustainable furniture design takes place in Greece and there are many applications for producing furniture and other products from recycled material. 3D printing of furniture from used packaging waste and plastic is also becoming more known in Greece
23	Provision of recycling services to the value generation of waste		As stated before, Production from recycling plastic or other packaging material is taking place in Greece. However, the factories process the useless plastic material (plastic scrap) to produce raw material and not other products.
24	Integrated waste management combined with measurement of GHG emissions		Integrated waste management in Greece is the task of Regions, Municipalities or the most recent Regional Association Agencies (FODSA). However, the carbon footprint of their operation is not calculated. At the moment, there is no legislation or other institutional framework to support such an action.

3.4 Conclusions

In terms of the gap analysis, 24 best International Best Practices were presented and analyzed. It appears that there are a number of substantial gaps between the National current practice and good practices in other Countries. This indicates there is significant scope for the Greece to learn from best Practices and, at the same time, improve Circular Economy performance.

More specifically:

- No gap (**green**) appeared in cases of recycling textile and other material such as plastic for the production of new products and furniture.
- Small gaps (**yellow**) existed related to practices where existing systems for collecting waste and recycling them (organic, plastic and textile) are in place. In such cases, recycling is taking place. However, reusing and adding value though the production of new products was not the case. In the case of Green Public

Procurement, Greece has taken significant steps through the design of a GPP strategy, which however

- Bigger gaps (**orange**) existed in cases where, more specialized circular systems are in place in other best practices such as:
    - Circular certification schemes.
    - Circular economy strategies and bioeconomy strategies for the Public Sector.
    - Plant-based production of goods and textiles
    - Finally, there was a gap in relation to funding mechanisms (private and public) specializing in supporting circular economy initiatives.
- Significant gaps (**red**) appeared in many cases, including:
    - Insect farming and other, innovative practices, related to food production.
    - Industrial application for the re-use of materials
    - Innovative application in the construction sector for recovering useful material, especially during de-construction.
    - There is no scheme in Greece for renting clothes especially for kids.
    - Finally, carbon footprint calculation is not combined with circular economy.

3.5 Barriers to a more circular economy

In the following chapters, driven from the previous analysis, a set of obstacles in the introduction of more circular practice in the Greek reality is examined and presented:

3.5.1 Regulatory obstacles

- Complexity and instability of the legal framework, including frequent legislative changes and the complexity of the Greek environmental law. This may lead to obstacles for attracting investments in the field of circular economy.
- Poor monitoring of CE data combined with poor reporting on the overall National performance. This applies not only for the Public Sector but also for private

companies. The Digital Waste Registry (HMA[22]) is slowly changing things in this direction

- Policies based on linear models Policies are usually created considering a linear economic model. The lack of fit of the linear regulatory framework hinders the implementation of circular models. All formal requirements are easier to fulfil for linear business models, while day-to-day operations of circular businesses may face additional legislatory challenges. Example: If a material is defined and marked as waste, there is a substantial administrative burden to officially re-transform such a material for reuse. It discourages companies to use raw materials that are still valuable, as the costs often outweigh the potential reward.

- Lack of support for circular business models There are only few governmental financial incentives in place to stimulate the development of more circular business models. Moreover, not only are there not enough of such incentives, they are also limited to specific areas. In many cases, only very precisely indicated ideas related to environmental issues may possibly receive governmental support. Currently the most supported areas are renewables and electromobility. Even in the cases mentioned, the circularity itself is not considered in the assessment for granting financial support. Example: The government has imposed a special tax on plastic bags as it wants to discourage customers from using them. However, the revenues from the tax are not used directly to incentivize other, more circular solutions.

- While designing new legal framework and strategies, it is crucial to make it as simple as possible, in order to avoid the first barrier mentioned, which is the complexity of law.

- New regulations and policies should focus on waste minimization, as well as the recovery and reuse of resources, which at the moment are overshadowed by recycling.

- From an SMEs perspective flexibility could minimize the risks related to the current legislative framework. Those solutions may include:

    - introducing flexible working environment;

    - maintaining flexible framework of cooperation with subcontractors and suppliers;

    - keeping a possibility of using alternative sources of supplies

[22] https://wrm.ypeka.gr/

- It appears that there is **NO** mentioned connection between circular economy and carbon footprint. Carbon footprint and measurement as well as reporting related to GHG emissions combined with CE must be incentivized and rewarded.

3.5.2 Lack of know-how

Lack of knowledge on circular economy and circular solutions Another obstacle in transforming businesses into more circular ones is simply the lack of know-how. For companies, to be able to implement or support a circular business model, it is crucial to have a proper knowledge on circular economy as such. Information on what is needed to implement a new business model or transform the already existing one is indispensable. The lack of knowledge about the benefits of circular economy and solutions aimed at transitioning from linear to circular economy has been identified as one of the barriers to the implementation of circular economy practices among SMEs in particular.

A possible solution for this problem is education, understood as spreading the knowledge on circular economy itself and its benefits from a business perspective. A company experienced in development and/or implementation of circular business models can educate other stakeholders by:

- Sharing its story and experiences using external communication platforms, such as social media;
- Presenting solutions during conferences, webinars, trade fairs;
- ***Supporting start-up incubators;***

3.5.3 Lack of technical skills

As the general level of knowledge on circular economy is low, a frequent obstacle is the lack of skills which allow to identify, assess and implement more advanced technical solutions and technologies. Even if a project is assessed viable from a financial perspective, operational difficulties in implementation, related to the lack of adequately trained employees or subcontractors, may appear. Knowledge on how to transform the firm's current production operations into a circular direction may be crucial. There is no simple solution to tackle this problem. However, all types of knowledge exchange platforms, knowledge centers, common education projects etc. may offer a significant support.

3.5.4 Linear approach to day-to-day business

Linear business thinking: Another reason why limited cooperation on new projects is a barrier to circular economy transition is that individuals, businesses and governments

are all used to operating and making decisions within a linear system. For a majority of processes cooperation is neither assumed nor needed, or done in a limited scope. Implementing circular principles in the old linear system leads to difficulties as people along with organizations are not able to use potential synergies related to the implementation of a new cooperative solutions. To tackle this issue two factors are necessary:

Promotion of Transparent circular economy and circular business models: Communication on circular economy and circular businesses within the organization, which means, integration of circularity in company's strategy and goals. ESG and other financing tools are appropriate in this direction

Example sharing among organizations and networking. It is obvious that a circular organization involves more parties that interact in a more complex way than the traditional linear one. To bring them together, all parties must operate on the same wavelength and share a common sense of urgency of circular economy transition. Only people who know and understand circular economy can properly engage in the transition process. External actions which allow business partners and organizations to share circular network and cooperation models are needed.

Wrong and obsolete perceptions of the circular economy model and its benefits: Even at a business level, the circular business model is not seen as a valuable aspect of the product or service itself. In the business world it is still seen very often as a part of Corporate Social Responsibility activity or an additional expense which does not necessarily lead to any specific financial profits or savings. With such a perception the willingness of business partners to invest or cooperate in such projects is limited. To change this perception, introduction of changes in criteria for assessment of business models from a circular perspective is imperative. In this direction the collection and analysis of data about new business model is needed. Monitoring, reporting and publicizing the results is also a means to becoming more circular so that other can imitate your Best Practices

3.5.5 Focus on short term return and cost reduction

In many cases companies, especially SMEs and funding institutions (especially banks) may focus mostly on short term return and cost reduction. The investor's perspective is often limited to the next year or even quarter.

On the contrary, circular business initiatives require investments over a longer time frame, as the payback will often be spread over a longer period of time. Consequently, it is more difficult to find partners to cooperate on and investment in new circular models. It may therefore turn out more difficult to find financing for them.

To overcome this obstacle, it is important to promote a better understanding of the concept of circularity and to create circular initiatives based on the full lifecycle of a product/service.

From a **financial** perspective, circular businesses need to present their business model in a way that makes their future financial benefits clear. Moreover, long-term metrics and objectives should be a vital part of this new kind of assessment. Another possibility worth considering is to start a cooperation with a bank that takes the environmental footprint of a potential project into account during project assessment.

From an **operational** perspective, it is essential to concentrate on the full product lifecycle at the very beginning of the design process. The production process should be adjusted so that it reflects the overall cost reduction related to better design, production and management of the product or service through its whole lifecycle.

3.5.6 Insufficient consumers' awareness

For the majority of countries and especially in the EU, a clear trend of growing environmental awareness among consumers has emerged. Consumers show a growing demand for sustainable and more circular products.

However, traditional obstacles stand in the middle of this transition including higher prices, or misperceptions about the value of recycled, reused or repaired products.

In this direction and given the obstacle of the higher price, the most important challenge is to attract customers that are willing to participate in the new movement. The aim must be to explain to them that the advantages outweigh the costs of a product or service. In case of circular businesses this main message is often supplemented by showing the circularity of a business model and explaining why it is so important. To successfully convey this message, the following best practices can be recommended[23]:

1. Identifying the right target group and building a community out of it.
2. Using the right strategy to promote a product and attach the consumer.
3. Leading by example, proving feasibility.

[23] Kas *et al*. (2018): Barriers and Best Practices for the Circular Economy.