

# State of the Circular Economy in Europe

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## **i. Abstract**

The topic of circular economy (CE) is undoubtedly gaining traction within the European Union, with sustainability oriented NGOs, pioneers, entrepreneurs, organisations and advocacy groups engaging with EU institutions and policy makers in an attempt to forward the cause. The subsequent paper first provides a general overview of the circular economy and the principles behind it, followed by the beginnings of sustainability related legislation in Europe and recent developments. The research is focused on a selection of fourteen European Union Member States. The countries are divided in to three groups in order to provide a representative sample of top, middle and worst performers in terms of circular economy performance. Each individual country is examined in three aspects, namely: available topical research, circular economy indicators and EU Parliament voting behavior regarding circular economy related legislative proposals. Finally, the main findings are presented and discussed, giving an answer as to whether the hypothesis stands true, while additionally providing an indication as to what the main factors behind resistance to the circular economy are.

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## **1.0 Research Context**

The basic philosophy behind the circular economy, in its purest form, is to gradually move away from the prevailing “take, make, waste” or linear economy, towards a system based on the elimination of waste. The transition encompasses the creation of new circular business models that rely on the use of renewable energies and materials. Three main principles form the pillars of a circular economy: design out waste and pollution, keep products and materials in use, and regenerate natural systems (Ellen MacArthur Foundation, 2017a).

According to research undertaken by the Ellen MacArthur Foundation, four essential building blocks of the circular economy have been identified, the first of which being circular economy design (Ellen MacArthur Foundation, 2017b). Companies need to dedicate resources towards the development of circular designs which are easily reusable, recyclable and that create economic value over multiple lifetimes. The learning curve for creating circular products is high, therefore training and research should be emphasised. Areas that require particular attention to ensure financially successful circular design include: material selection, standardised components, product durability, recycling separation methods and manufacturing processes that take in to account potential uses for by-products.

New business models are a necessity to facilitate the transition towards a circular economy, replacing the existing, wasteful models that the majority of companies have implemented. Major companies with a large market share which have integrated suppliers and distributors in to their value chain could drastically change the face of circular economy innovation. A push towards circular business models by large companies would thrust sustainability and resource efficiency into the mainstream, encouraging other companies to follow suit. Of course, most circular innovation will come from entrepreneurs, however market leaders who follow new developments and implement circular processes are vital.

Reverse cycles are another integral part of the circular economy that businesses need to develop. A reverse cycle is comprised of processes that either returns renewable materials back into the industrial production system or, if the material requires it, back into the soil. Processes to be adapted for reverse cycles include: logistics, sorting, warehousing, risk management, power generation and in some case even molecular

biology and polymer chemistry. Establishing a financially viable system that efficiently treats and reuses material will decrease waste, in line with circular economy principles.

Finally, enablers and favourable system conditions will play a crucial role in bringing the circular economy into the mainstream. In order for the reuse of materials and resource efficiency to become routine, market mechanisms will need to be put in place, however this will not be possible without the assistance of law makers, educators and influencers.

### 1.1 Research gap

A vast amount of information exists on circular economy policy and initiatives on an EU level, however information on individual Member States is for the most part fragmented and unorganised, making it difficult to provide a clear image of the country's performance that incorporates an array of aspects. Often, to the untrained eye, circular economy and waste management are interchangeable terms, though this is not the case. While the term "circular economy" is not instantly recognizable by the majority, the principles behind it will eventually become a part of everyday life, either voluntarily or by necessity. As pressure to conform to new laws and regulations is thrust upon Member States, some are finding the transition simple while others seem to be actively resisting. With large amounts of money being sent to these countries intended to improve sustainability, being able to positively identify the root of a country's resistance to the circular economy could save the EU extensive resources.

### 1.2 Research aim

The aim of this research is to identify whether the overall wealth of a country is an indicator of their circular economy performance, or do other factors exist that provide a better explanation.

### 1.3 Research question

Why are less developed EU economies resisting the transition to a circular economy?

### 1.4 Hypothesis

The less economically developed an EU Member State is, the worse it performs in terms of circular economy efforts.

## **2.0 Literature review**

### **2.1 Circular economy policy background**

Only in recent years has the circular economy become topic of conversation amongst EU policy makers. The foundation of the circular economy discussion in Europe is based on the “Roadmap to a Resource Efficient Europe”, a framework drawn up by the EU commission in 2011, which highlighted the necessity for an integrated approach across many policy levels. The roadmap outlines how Europe can transform itself in to a sustainable economy by 2050 (European Commission, 2016a). In 2014, the Commission withdrew its pending legislative proposal on waste, however at the same time commented that it is working towards presenting a new proposal package in 2015. Keeping to their promise, the EU Commission released their “Circular Economy Action Plan”, a programme that includes measures to increase global competitiveness, promote sustainable economic growth, create new employment opportunities and a timeline for when the actions should be completed. Additionally, the Action Plan covered the entire product life-cycle from production to consumption, as well as including plans for waste management and the market for secondary raw materials.

In 2018, an updated circular economy package was released by the commission, based on the Circular Economy Action Plan. It included an EU strategy for plastics in the circular economy, a communication addressing potential options for reforms to legislation regarding the relationship between chemicals and waste, a monitoring framework to track progress towards a circular economy and a report on critical raw materials.

Finally, on 4 March 2019, the EU Commission released a report on the implementation of the Circular Economy Action Plan. In the report, the Commission highlights the main achievements of the Action Plan, while also discusses the impending challenges of creating a circular economy that minimizes pressure on natural and freshwater resources, as well as ecosystems (European Commission, 2019a).

## 2.2 Top circular economy performers

### 2.2.1 France

France ranks well for all circular economy indicators apart from per capita waste production, coming in 20th place (Eurostat, 2017). It ranked 2nd in the Flash Eurobarometer for the percentage of SME's minimising waste (European Commission, 2018a) and 3rd in POLITICO's circular economy index (Hervey, 2018), two quality measures for the circular economy. Year over year the country has performed well improving in waste production, recycling rate of municipal waste, recycling rate of packaging and circular materials use rate (Eurostat, 2017). There were a total of 8 EPR schemes identified, covering 4 sectors (Monier et al., 2014). Additionally, France is internationally known as a leader in extended producer responsibility (EPR) (Bukhari, M. A., Carrasco-Gallego, R., & Ponce-Cueto, E., 2018).

France published its circular economy roadmap in April 2018, the preparation of which was undertaken by the Ministry for an Ecological and Solidary Transition and Ministry for the Economy and Finance. The Roadmap was created in close cooperation with the Intitut National de l'Économie Circulaire (INEC) and contains concrete objectives (Ministry for the Ecological and Solidary Transition, 2018). In the proceeding press release the government outlined its flagship measures including establishing a repair label for household electronics, elimination of the "Green Dot" as the only mandatory compliance scheme for packaging, acceleration of the collection of plastic bottles and cans, reducing the VAT rate for recycling, creating EPR channels and establishing re-use and repair targets (SagisEPR, 2018). Circular economy efforts are well supported by the French government, funding research and development through institutions such as ADEME (Agence de l'Environnement et de la Maîtrise de l'Énergie) (Eco-innovation Observatory, 2018a). Additionally, there a few local stakeholder networks, closely linked to the industrial sector that focus on driving the circular economy. France also offers specialised tax incentives for social enterprises that collect and sell used goods, exempting them from VAT as they are directly linked to the employment of disadvantaged people (RREUSE, 2017) and participated in the circular economy North Sea Roundabout project (The Parliament Magazine, 2016).

France did show moderate resistance to multiple legislative proposals by the European Commission including all those presented alongside the first circular economy package (waste, landfill, packaging and end-of-life vehicle) and rates of value added tax (mepvote.eu, 2019).

However, as with every country at this moment in time there are still barriers to transition. Individual behaviors towards CE principles have proven to be underwhelming, while overly convoluted legislative procedures that would need to be applied in France, particularly in the construction industry, may discourage companies engaging in the circular economy (Eco-innovation Observatory, 2018a).

### 2.2.2 Germany

Germany ranks first out of all EU member states in two circular economy indicators, namely the recycling rate of municipal waste (Eurostat, 2017) and POLITCO's circular economy index (Hervey, 2018). EPR schemes have a solid base, although the overall number is heavily weighted towards packaging with a total of 9 collective schemes, indicating strong competition (Monier et al., 2014).

Circular economy initiatives are plentiful and particularly well-coordinated at the national level. For example, the recently revised German national resource efficiency programme presents strategies to secure a sustainable raw material supply, increase resource efficiency, exploit synergies in other policy areas and several other measures that would benefit a circular economy (BMUB, 2016). Essentially, this programme details a concrete plan to achieve a circular economy and, despite not being named as such, can be considered a roadmap. A new Packaging Act has entered force as of January 2019 with increased recycling targets, incentives for reuse and design for recycling, and mandatory registration with the central packaging registry (Plasticnews, 2018). The VDI (Association of German Engineers) program to engage SMEs in resource efficiency forms the core of the European Resource Efficiency Knowledge Center (EREK, 2018). Finally, a voluntary Partnership for Sustainable Textiles, Textilbündnis, was launched in 2018 by the fashion industry and the government (Textilbündnis, 2019).

Drivers for Germany are its high level of import dependence for resources and a population that is becoming more and more receptive to environmentally friendly

consumption (Eco-innovation Observatory, 2018b). The country's voting behaviour has been very positive towards circular economy related proposals, displaying only a minimal level of resistance (mepvote.eu, 2019).

The only stain on Germany's record is its per capita waste production, with a total of 627kg per year, ranking 26th overall (Eurostat, 2017). Also, barriers to the circular economy are present. Green startups are underrepresented and conditions for investment by venture capitalist are not particularly attractive for future-oriented sectors (Eco-innovation Observatory, 2018b). Additionally, the major challenge for the transition to a circular economy is the notion that a circular economy is a linear economy with waste management. The continued focus on waste management and resource efficiency may disincentivise industries and individuals from introducing circular business models to prevent waste as long as recycling with waste management offers easy alternatives.

### 2.2.3 Italy

Italy performs very well in terms of circular economy indicator rankings, with all but one indicator, per capita waste production (Eurostat, 2017), placing in the top half of all EU member states. Particularly noteworthy is Italy's resource efficiency rank (Eco-innovation Observatory, 2018c), coming in 2nd overall. At first glance EPR numbers look impressive, however out of the total 40 schemes, batteries and WEEE account for 21 and 16 programmes respectively, so can be taken with a grain of salt. Nevertheless, EPR schemes in Italy cover a total of 5 sectors (Monier et al., 2014). The overall performance is even more impressive given the improvements since 2001, with for examples only 17% municipal waste recycling (EEA, 2018).

Circular economy initiatives are well-established on both a grassroots and corporate level as described by Enel S.p.A. and the Symbola foundation (Symbola foundation, & Enel S.p.A., 2018). Many "circular champions" are active at the regional level, for instance in the industrial Lombardia (Legambiente, 2017). An Italian Circular Economy Strategy was launched in 2017 as the outcome of a shared and participatory process with contributions of all institutions, firms, experts and citizens who deal with the issue. Remarkably, it stresses the need for fiscal instruments including the use of VAT rates for tax differentiation between circular and linear products or services

(Ministry of Environment and Ministry of Economy, 2018). Additionally, the Italian government is also showing support with the recent introduction of the "Italian Circular Economy Stakeholder Platform" workshop by the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA, 2018). The country's EU voting behaviour is positive overall, however single-use plastics and value-added tax votes did receive moderate resistance (mepvote.eu, 2019).

Italy certainly has impressive statistics, yet barriers to a circular economy do exist. The regulatory framework is difficult to navigate with environmental policies being implemented at regional, provincial and municipal levels (Eco-innovation Observatory, 2018d). The rate of research and development investments is low, partly resulting from the high percentage of small and family owned businesses that do not have the capital at their disposal and a low natural resources capacity compared to other advanced economies (Eco-innovation Observatory, 2018d).

#### 2.2.4 The Netherlands

The Netherlands has multitude of initiatives too vast to cover comprehensively and very respectable rankings in the majority of CE performance indicators. Year-over-year the country has improved in per capita waste production, recycling rate of both municipal waste and packaging, and circular material use rate (Eurostat, 2017). The circular material use rate is indeed particularly impressive for the Netherlands, coming in 1st with a total of 29%, far above the 2nd ranking country (Eurostat, 2017). EPR is well catered for with a total of 14 schemes covering 5 sectors (Monier et al., 2014).

As previously mentioned, The Netherlands has an abundance of circular economy initiatives. One of the most recognised being the national strategy document "A circular economy in the Netherlands by 2050" developed and published by The Ministry of Infrastructure and the Environment and the Ministry of Economic Affairs in 2016. The programme establishes measures aimed at developing a circular economy in The Netherlands by 2050 including: the objective to reduce the use of raw materials by 50% in 2030 and become 100% circular in 2050, unifying policy on an international level, interventions (legislation and regulations), waste as a raw material, smart design, conscious use, extending product life and various others (The Ministry of Infrastructure and the Environment, 2016). Additionally, The Netherlands was the first to introduce

Green Deal Circular Procurement, an initiative that fosters collaboration between organisations and encourages the purchase of circular goods and services which has since been copied by Belgium and Finland. (One Planet, 2018). The Netherlands also offers VAT reduction on minor repair services, particularly for bicycles, shoes and leather goods (RREUSE, 2017). Overall the country's voting behaviour towards circular economy proposals put forward by the EU commission is positive, although some resistance against EU proposals is clearly visible (mepvote.eu., 2019).

The Netherlands is right on track to becoming a fully circular economy, although this will not come without its challenges. Per capita waste production is high with a total of 520kg per year (Eurostat, 2017) and a poor performance was recorded in renewable energy (MVO Nederland, 2019). Barriers to achieving a circular economy are generic and probably present in all member states, such as counteracting regulations, lack of commitment from value chain partners and a lack of access to funding. Additionally, companies are finding it difficult to form a specific strategy to become circular and circular entrepreneurship is often still based on existing revenue models (Eco-innovation Observatory, 2018e).

#### 2.2.5 Slovenia

Slovenia is doing relatively well in terms of circular economy performance indicators. The country's two highest rankings are in the recycling rate of municipal waste and POLITICO's circular economy index coming in 2nd and 7th respectively (Eurostat, 2017). EPR on the other hand is somewhat limited, with 9 schemes covering only 3 sectors (Monier et al., 2014).

Slovenia's government joined the Ellen MacArthur foundation's circular economy 100 programme in 2016 and has shown genuine dedication towards CE. Representatives from the ministries of environment, finance, agriculture, economic development, transport and education all attended Slovenia's CE100 workshop held shortly after joining the programme. As a member of CE 100, the country's aims are to form a network of like-minded economic partners, create a number of CE tools to benefit SMEs, share best practices, build a national circular case study library and explore resource efficiency opportunities (Ellen MacArthur Foundation, 2016). Moreover, Slovenia is home to the influential "Circular Change" stakeholder

engagement platform, which aims to create a competence network in collaboration with a network of international partners in order to facilitate Slovenia's transition to a circular economy (Circular Change, 2019) and also contributed to the country's CE roadmap (Government of the Republic of Slovenia et al., 2018). Slovenia showed no resistance to CE proposals by the European Commission (mepvote.eu, 2019). The country also offers VAT reduction on a selection minor repair services including bicycles, shoes and leather goods (RREUSE, 2017).

Slovenia seems to be heading in the right direction, exhibited by the multiple circular economy initiatives and a high level of government involvement. Despite the recent surge in the prevalence of CE, barriers to achieving a successful transition are still to be overcome. These include decreasing government expenditure in R&D, a lack of financial incentives for green entrepreneurship, a continued "rule of the lowest price" in public procurement, very limited market for recycled materials, in particular for recycled plastics, and the inefficient transfer of knowledge from higher education to private sector (Eco-innovation Observatory, 2018f).

## 2.3 Middle ground

### 2.3.1 Austria

Austria can be recognised as a hub for environmental innovation within Europe, home to the "Green Tech" cluster located in and around Graz and the "Clean Tech" cluster situated in upper Austria (Austrian Business Agency, 2019). This is reflected in its high municipal waste recycling rate, ranking 3rd out of all member states (Eurostat, 2017), and in good rankings on resource efficiency (Eco-innovation Observatory, 2018c) and POLITICO's circular economy Index (Hervey, 2018). Austria has several extended producer responsibility (EPR) schemes in place for batteries, waste electrical and electronic equipment (WEEE), packaging, and end-of-life vehicles (ELV's) (Monier et al., 2014).

There are various initiatives to further foster the circular economy, mainly from NGO side such as the unique Vienna Repair Network (European Circular Economy Stakeholder Platform, 2019), RepaNet – the Austrian Re-Use and Repair Network (RepaNet, 2019) and the recently founded Circular Futures Platform (Circular Futures, 2019). Recently, the Austrian Water and Waste Management Association (ÖWAV)

released a position paper setting out clear measures to achieve the respective goals of its numerous stakeholders. These include building a respective data base, implementation of eco-design, defining quality standards, efficient and effective implementation of an extended producer responsibility (EPR) and several others (ÖWAV, 2018). Austria also has a well-established environmental technologies sector, with readily available financial support from the state to develop them further (Eco-innovation Observatory, 2018g). In addition, the Cabinet recently approved a ban on non-biodegradable plastic bags set to come into effect in Austria at the start of 2020. New legislation will ban plastic particles in cosmetic and cleaning products if the European Union fails to come up with a solution for this issue before 2020 (Associated Press, 2018). Regarding circular economy tax incentives currently only the city of Graz reimburses 50% repair costs up to maximum EUR 100 (RREUSE, 2018). At the EU level, Austria voted in favour of all recent EU proposals regarding Ecodesign, single-use plastics and waste, with little to no resistance. The only vote to receive moderate resistance was the Council directive amending Directive 2006/112/EC as regards rates of value added tax (VAT) (mepvote.eu, 2019). Moreover, Austria has shown leadership and ambition to drive the European Circular Economy agenda during its Presidency in 2018, and was praised for realising the adoption of the Single Use Plastics Directive (EEB, 2018).

However, while all this gives Austria a good starting position to become a circular economy, the country is by no means there. With 564 kg per person per year, Austria is amongst the highest waste producers (Eurostat, 2017). Additionally, SMEs perform below the EU average on waste minimization (European Commission, 2018a) and crucially, has not drawn up a circular economy roadmap. Existing initiatives are mainly driven by NGOs, small, not aligned and not coordinated, display a lack of recognition by the government. Additionally, CE seems to widely interpreted as waste recycling where Austria is perceived to be already amongst the top performers. A comprehensive approach towards CE in the public domain is missing. Awareness seems focused on waste and environmental concerns rather than economic opportunities in, for instance, the service sector- which accounts for approximately 63% of the country's gross domestic product (Statista, 2018).

Again, barrier to the circular economy are present in Austria including: a lack of corporate awareness, little focus on the circular economy from the government and missing market action, for example through public procurement (Eco-innovation Observatory, 2018g).

### 2.3.2 Luxembourg

Luxembourg ranks well in several areas concerning the circular economy, particularly resource efficiency, ranking 1st out of all member states (Eco-innovation Observatory, 2018c). Moreover, the country has recently released a roadmap of sorts highlighting issues and drawing out concrete plans to facilitate the transition to a circular economy (Ministère du Développement durable et des Infrastructures, 2018). EPR schemes cover 4 sectors, although the total number of current programmes available is fairly limited (Monier et al., 2014).

Circular economy initiatives are abundant with governmental and non-governmental organisations expressing interest and dedication to the cause. In 2017, Luxembourg was appointed Circular Hotspot of the Year (Luxembourg Circular Hotspot, 2018). Luxinnovation and the Luxembourg National Innovation agency introduced their “Fit 4 Circularity” programme tasked with accelerating companies’ transition to a circular economy. Objectives include exploring the possibilities of extending the life cycle of products, highlighting potential gains linked to circular supply chains, studying the benefits of collaborative platforms and proliferating the use recyclable materials for responsible production (Luxinnovation, 2017). Additionally, since June 2017, all Luxembourgish municipalities have adopted the “Climate Pact” (Le Gouvernement du Grand-Duché de Luxembourg, 2018), established by Luxembourg's Ministry of Sustainable Development and Infrastructure and “Myenergy”, the national entity for the promotion of a sustainable energy transition. The measures introduced include procurement of Cradle-to-Cradle certified material, sharing economy initiatives, the use of renewable sources within local circuits and several other circular economy focused strategies (European Circular Economy Stakeholder Platform, 2018). Luxembourg also offers VAT reduction on minor repair services (RREUSE, 2017) and voted wholly in favour of all proposals put forward by the EU Commission regarding the circular economy.

Overall, Luxembourg's circular economy efforts are certainly gaining traction, however some undeniable barriers do exist. The country's per capita waste production is high at 614 kg per year, placing it 24th amongst all EU member states (Eurostat, 2017). Additionally, the small size but strong influence of Luxembourg on bordering regions puts pressure on the demand for housing, services, infrastructure and transportation flow, increasing the energy demands. Therefore, any eco-innovation solutions developed to mitigate its own resource dependency should also take into account bordering regions, which adds a massive amount of stress to the task. (Eco-innovation Observatory, 2018h).

### 2.3.3 Portugal

Portugal finds its place in the middle-ground of other member states when it comes to circular economy performance rankings (Eurostat, 2017), however EPR coverage does stand out with a total of 10 schemes covering 5 sectors (Monier et al., 2014). Portugal released a CE roadmap titled "Leading the transition: Action plan for circular economy in Portugal: 2017-2020" in late 2017. The roadmap was published by an inter-ministerial group specifically created to focus on circular economy transition (Ministry of Environment Portugal, 2017), illustrating policy changes towards research and innovation, tax and other economic incentives, supporting circular economy networks and economic incentives.

Circular economy initiatives seem to be rather sparse on the side of NGOs, however the Portuguese government has displayed dedication to forwarding the circular economy, particularly regarding the establishment of the "Green Growth Coalition" in 2014. The coalition comprises of approximately one hundred organisations tasked with setting out a national strategy to stimulate economic growth while adhering to circular economy principles. Soon after the coalition's foundation, the on-going "Green Growth Commitment" agenda was formed, a result of an extensive public consultation. The agenda focuses on three major areas stimulating green activity sectors including: creating new jobs promoting efficient use of resources related to water and energy efficiency, increasing renewable energy use, and improving biodiversity quality (Ellen MacArthur Foundation, 2017). Regarding circular economy drivers, Portugal has a wide array of natural resources. Portuguese research institutions,

despite their size have managed to join European research networks and funding schemes for example “Horizon 2020” and INTERREG, while growing political support for CE is exhibited, particularly outside the scope of EU directives (Eco-innovation Observatory, 2018i). Overall, Portugal’s circular economy voting behaviour is very positive, displaying only minimal resistance (mepvote.eu, 2019).

Despite these positives aspects, barriers persist to hinder the transition towards a circular economy. The country does not offer tax incentives for circular products and services. Additionally, Portugal’s municipal waste recycling rate and circular material use rate are particularly underwhelming, while a lack of private-sector investment, little technological development in eco-industry sectors (notably water and waste), low public awareness and insufficient human capital to pursue innovative solutions continue plague the country (Eco-innovation Observatory, 2018i).

#### 2.3.4 Spain

Spain does well in terms of circular economy with the majority of performance indicators placing in the top half of all EU member states. The country’s best effort is in resource efficiency, ranking 5th overall (Eco-innovation Observatory, 2018c). EPR is another strong point for Spain, with a total of 13 schemes covering 5 sectors (Monier et al., 2014).

Spain is home to a solid number of initiatives both at a federal and region level. In September 2017 the Ministry of Agriculture and Fisheries, Food and Environmental Affairs held a CE based workshop, aimed at devising a new Spanish circular economy strategy with its participants. The workshop resulted in a total of 55 social and business stakeholders signing a pact on the circular economy. The commitment of the pact includes reducing the use of non-renewable resources, improving the analysis of the life cycle of products, incorporating eco-design criteria, updating digital infrastructures and promoting common initiatives that are conducive to developing a circular economy (La Moncloa, 2017). On a regional level, in 2018 the region of Extremadura released its own strategy for circular economy entitled “Extremadura 2030”. The underlining vision of the strategy is to convert the area into an example of a functioning circular economy for others to follow with concrete objectives outlined as: developing entrepreneurship in emerging sectors, leveraging research and innovation processes

related to green and circular economy, focusing on regional smart specialisation related to CE and connecting to experienced international CE stakeholders (European Commission (2018b)). Additionally, in respects to regional CE development, the government of Catalonia joined the Ellen MacArthur Foundations CE100 list, making large strides in developing a regulatory framework of policies and measures (Ellen MacArthur Foundation & Government of Catalonia, 2015). Spain's commitment to CE was demonstrated by a treaty with Finland and Portugal in 2018 (La Moncloa, 2018).

Spain offers tax reductions to companies and individuals who donate to charities. No differentiation is made between donating new and used goods, incentivising the reuse of functioning devices and extending product life (RREUSE, 2017). The country's CE voting behaviour is positive, with practically no resistance shown (mepvote.eu, 2019).

Spain is making solid progress regarding the circular economy, although a few particular areas are in need of attention, for example the recycling rate of municipal waste which is relatively low at just 30% (Eurostat, 2017). Additionally, several prominent barriers to CE continue to slow the process including: little stimulus from the federal government, lack of environmental awareness from both buyers and sellers, cost of CE development for SMEs, and a lack of technical skills needed expand the circular economy (Eco-innovation Observatory, 2018j)

## 2.4 Bottom performers

### 2.4.1 Bulgaria

Bulgaria is struggling regarding circular economy efforts. However, on a positive note, it has a low per capita waste production (Eurostat, 2017) and solid number of EPR schemes in place (Monier et al., 2014).

In all other circular economy indicators, Bulgaria ranks very low. Resource efficiency is of particularly concerning, ranking second to last amongst all EU member states (Eco-innovation Observatory, 2018c) and little focus on waste minimisation by SME's according to the Flash Eurobarometer (European Commission, 2018a). Barriers to CE implementation are mostly economic with limited funding available for enterprises to modernise equipment and a notably low level of domestic, private and foreign capital investments (Eco-innovation Observatory, 2018c). Government support

is lacking and initiatives are few and far between, with those in place focusing primarily on collaboration between businesses (Eco-innovation Observatory, 2018k).

Bulgaria has a long way to go to contend with the pioneers of circular economy within Europe. The country does however have a wealth of human capital, with a multitude of qualified engineers, scientists and R&D institutions increasing the potential for a well monitored transition to a circular economy (Eco-innovation Observatory, 2018k). Additionally, the country's accession to the EU improved quality of life for the populace, in turn ramping up demand for high quality products and services. Additionally, Bulgaria voted wholly in favour of all recent legislative proposals in the EU Parliament regarding the circular economy (mepvote.eu, 2019).

#### 2.4.2 Cyprus

Cyprus performs well below average in all relevant circular economy indicators, most notably per capita waste production with 640kg per year, the second highest waste producer per capita of all EU member states (Eurostat, 2017). In addition, the country has only 3 EPR schemes established with no coverage for multiple waste streams (Monier et al., 2014).

Cyprus does not have any ongoing circular economy focused initiatives although one-off events were identified (Cyprus Energy Agency, 2018). Cyprus provides several tools that help with accessing crucial information to increase innovation and growth. For example, “Ariadni” a government gateway listing e-services and relevant information, an online portal for SMEs and the digitalisation of public records (Eco-innovation Observatory, 2018l). The country also benefits from its natural capital for renewable energy, mainly wind and solar. Additionally, Cyprus has been allocated EUR 874 million from ESI Funds over the period 2014-2020 to be used in areas such as resource usage efficiency, competitiveness for SMEs and energy network infrastructure (European Commission, 2016b).

The lack of initiatives combined with a poor legislative framework towards eco-innovation, puts the country far behind other EU countries in terms of CE efforts. Cyprus has several barriers hindering the circular economy, mainly concerning structural factors. The R&D sector is relatively new in the country, resulting in a fragmented system that lacks coordination between stakeholders (Eco-innovation

Observatory, 2018l). The physical location and structure of the economy is also not conducive to innovation. The market is small and the island is remote from other countries which acts as a massive disincentive for tech companies to invest and establish a foothold (Eco-innovation Observatory, 2018l).

#### 2.4.3 Greece

Greece's circular economy indicator performance is poor with the majority of rankings coming in the bottom quarter. The most pronounced weaknesses are in circular material use rate (Eurostat, 2017) and POLITICO's circular economy index (Hervey, 2018) coming in last place and third to last respectively. Greece also showed considerable resistance to proposals by the EU Commission.

The country does, however have a display a few good attributes regarding the circular economy. EPR schemes seem to be well established and cover most major sectors (Monier et al., 2014). Moreover, several circular economy initiatives have been initiated. In early 2018 Greece released its "National Action Plan on Circular Economy", centred 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 CE and improving governance structures by establishing an Executive Secretariat for the Circular Economy (Circular Economy Club, 2018). Another example is City Plus, organised by the Social Economy Institute, a sustainable Greek city network that focuses on sharing resources, leveraging public, private and governmental capital to empower employability, enhancing social entrepreneurship and laying down the groundwork to shift the populace towards environmental sustainability (Social Economy Institute (Greece), 2019). Additionally, Greece has strong natural capital in renewable energies being well situated to take advantage of solar, wind and tidal (Eco-innovation Observatory, 2018m).

Although these recent efforts are positive, they are far from enough to make up for the country's pitfalls as is evident by the underwhelming rankings. Most of EY's conclusions from 2016 to move forward still stand, such as the need for law enforcement of hazardous waste legislation (EY, 2016). Malpractices by local authorities and law enforcement turning a blind eye still continues to undermine

sustainability efforts (Eco-innovation Observatory, 2018l). Despite the country's unstable economic history, Greece does receive EU Structural Funds with a total of 20.38 billion euro allocated to the country between 2014-2020 (European Commission, 2016c).

#### 2.4.4 Malta

Malta is trailing behind the vast majority of EU member states regarding circular economy indicators. The country ranks last in both the recycling rate of municipal waste and packaging, while per capita waste production is not much better in 25th at 621 kg per year (Eurostat, 2017).<sup>[SEP]</sup> Additionally, POLITICO's circular economy index places it 27th, second last only to Cyprus (Hervey, 2018). Just 8% of waste is being recycled or sent for composting, while the rest is disposed of at the Magħtab landfill (Times of Malta, 2018). EPR schemes are equally underwhelming with coverage for only 2 sectors being identified (Monier et al., 2014). However, Malta did do well in resource efficiency, ranking 4th (Eco-innovation Observatory, 2018c).

Circular economy initiatives are somewhat limited although a few concrete plans have taken shape. In 2016 the Ministry for Sustainable Development, the Environment and Climate Change released a short to medium term strategy and action plan titled "Greening our Economy - Achieving a Sustainable Future", covering several circular economy concepts (MSDEC, 2016). Furthermore, the aforementioned ministry recently published a long-term framework for advancing sustainable development in Malta titled "Malta's Sustainable Development Vision for 2050", focusing on identifying existing gaps in the country's sustainability efforts where further development is required (MSDEC, 2018). Additionally, in 2016 the non-profit organisation "Eco French Malta" was established. The organisations objectives include, providing support and information for sustainable development initiatives, assisting and supporting partners who need to progress on sustainable techniques, raising public and political awareness on ecology and sustainable development to name a few (Eco French Malta, 2019). Overall, Malta's EU voting behaviour is positive despite moderate resistance to the amendment of the rate of value added tax (mepvote.eu., 2019). The country also offers VAT reductions on minor repair services (RREUSE, 2017). Despite Malta's poor rankings, the Maltese European Commissioner

Karmenu Vella has shown commitment for the Circular Economy Action plan (Impel, 2018).

Malta faces multiple natural barriers that negatively impact eco-innovation and circular economy efforts. A strong dependence on external energy sources, lack of natural resources, in particular water and little usable space all contribute to the need for innovative solutions but at the same time make the transition harder (Eco-innovation Observatory, 2018n). Finally, access to financing options presents a hindrance to SMEs with approximately a quarter of them investing in resource efficiency experiencing higher production costs in the short term leading to need of external funds (Eco-innovation Observatory, 2018n).

#### 2.4.5 Romania

Romania is evidently struggling regarding circular economy efforts with the majority of CE performance indicators ranking in the bottom quarter of member states, although the country is the lowest per capita waste producer with just 261kg per year (Eurostat, 2017). EPR is equally underwhelming spanning three sectors with total of 9 schemes (Monier et al., 2014).

Circular economy initiatives are sparse, though a few well-defined examples do exist. In 2017 the European Investment Fund (EIF) signed three new SME initiative guarantee transactions with three large financial institutions. The agreements aim is to provide favourable financing options for Romanian SMEs by partial guaranteeing loans and lowering interest rates charged by the banks (European Commission, 2017). Additionally, the EIB provided an EUR 7.5 loan to Green Fibre International to fund a circular economy program. The loan is intended to help Green Fibre International to further develop its already valuable Polyethylene Terephthalate (PET) to Polyester Staple Fibre (PSF) operations and expand its recycling scope into electronic waste by establishing a processing unit to extract useable material, repair repairable devices and prepare other materials for recycling (European Investment Bank, 2017). Additionally, in 2011, the Green Energy Innovative Biomass Cluster was established, with the aim to promote the production and utilization of Romania's most important renewable energy, solid biomass (Green Energy Innovative Biomass Cluster, 2019). Romania's voting behaviour towards CE related proposals by the EU Commission is completely

positive with virtually no resistance (mepvote.eu, 2019). Currently, Romania offers no tax incentives for circular goods or services.

Without a concrete plan and policy measures, Romania will likely continue to lag behind circular economy frontrunners as several barriers continue to hinder CE efforts. These include: an uncertain political landscape, burdensome regulatory framework, lack of adequate infrastructure for waste management, high risk of non-compliance of environmental regulations by companies due to lack of awareness of proper procedure and difficulties in public-private cooperation (Eco-innovation Observatory, 2018o).

### **3.0 Methodology**

In order to gauge the circular performance of each country, three elements were examined: circular economy indicators, topical research by stakeholders and EU Parliament voting behavior.

Indicators were based off Eurostat's circular economy monitoring framework, which focus on four key areas: production and consumption, waste management, secondary raw materials, and competitiveness and innovation. Eurostat statistics are publicly available online for viewing. Indicators used for the study included: per capita waste production, recycling rate of municipal waste, recycling rate of packaging and circular material use rate. Each country's result was ranked and labelled between 1st and 28th, with 28 being the total number of EU member states.

Topical research by stakeholders was analyzed in addition to CE indicators. This includes reports and studies by various NGOs, EU institutions, environmental ministries etc. This section also covers several rankings by leading authorities in the area of circular economy such as: Eco-innovation Observatory's resource efficiency index, Politico's circular economy index and the EU Commission's Flash Eurobarometer 456, measuring the percentage of SMEs minimizing waste. Additionally, several other measures of circular economy efforts were identified through stakeholder research and added to each member states data sheet, attached in the appendix. These include whether a country has drawn up a circular economy roadmap, the number of extended producer responsibility (EPR) schemes currently

running and whether the country offers tax incentives for circular products and services.

The third and final aspect for measuring EU Member State's circular economy efforts undertaken in this study is EU Parliament voting behavior. Polling data for each country was collected regarding seven instrumental proposals that affect the circular economy, put forward by the EU Commission, in order to measure either their resistance or acceptance of EU driven CE legislation. The votes cover: eco-design, single-use plastics, value added tax, waste, landfill, packaging and end-of-life vehicles. Results of each country's voting behavior as it pertains to each individual vote were collected and broken down to display the number of votes for, against and abstained for each proposal.

## **4.0 Results**

Listed in this section are all key performance indicators and other relevant data points for Member States focused on in this paper. Additionally, EU Parliament voting data is available in corresponding appendices.

### 4.1 Top performers

#### 4.1.1 France

Eco-innovation Index resource efficiency ranking: 12th

POLITICO's circular economy index: 3rd

Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 2nd (83%)

Per capita waste production: 511kg, ranked 20th

Recycling rate of municipal waste: 42%, ranked 13th

Recycling rate of packaging: 66%, ranked 13th

Circular material use rate: 20%, ranked 3rd

Circular economy roadmap: Yes

EPR schemes: 8 in 4 sectors

Circular economy initiatives: Green Deal Achats Circulaires of Paris

Circular economy tax incentives: Yes

Relevant organisations: Institut national de l'économie circulaire, ADAME, cd2e - creation development eco-enterprises

#### 4.1.2 Slovenia

Eco-innovation Index resource efficiency ranking: 20th

POLITICO's circular economy index: 7th

Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 18th (51%)

Per capita waste production: 466kg, ranked 14th

Recycling rate of municipal waste: 58%, ranked 2nd

Recycling rate of packaging: 69%, ranked 8th

Circular material use rate: 9%, ranked 11th

Circular economy roadmap: Yes

EPR schemes: 9 in 3 sectors

Circular economy initiatives: Circular 100 programme, S4, Circular change platform

Circular economy tax incentives: Yes

Relevant organisations: Circular Change

#### 4.1.3 Italy

Eco-innovation Index resource efficiency ranking: 2nd

POLITICO's circular economy index: 5th

Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 6th (74%)

Per capita waste production: 497kg, ranked 17th

Recycling rate of municipal waste: 45%, ranked 10th

Recycling rate of packaging: 67%, ranked 11th

Circular material use rate: 17%, ranked 5th

Circular economy roadmap: Yes

EPR schemes: 40 in 5 sectors

Circular economy initiatives: The Italian Circular Economy Stakeholder Platform (ICESP)

Circular economy tax incentives: Yes

Relevant organisations: ReMade in Italy, Symbola

#### 4.1.4 Germany

Eco-innovation Index resource efficiency ranking: 10th

POLITICO's circular economy index: 1st

Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 12th (60%)

Per capita waste production: 627kg, ranked 26th

Recycling rate of municipal waste: 66%, ranked 1st

Recycling rate of packaging: 71%, ranked 5th

Circular material use rate: 11%, ranked 8th

Circular economy roadmap: Yes (The German Resource Efficiency Programme II)

EPR schemes: 13 in 4 sectors

Circular economy initiatives: - TextilBündnis, Recyclable Materials Act reforms

Circular economy tax incentives: Yes

Relevant organisations: Collaborating Centre on Sustainable Consumption and Production (CSCP), Wuppertal Institute for Climate, Environment and Energy

#### 4.1.5 The Netherlands

Eco-innovation Index resource efficiency ranking: 11th

POLITICO's circular economy index: 12th

Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 7th (65%)

Per capita waste production: 520kg, ranked 21st

Recycling rate of municipal waste: 53%, ranked 5th

Recycling rate of packaging: 73%, ranked 4th

Circular material use rate: 29%, ranked 1st

Circular economy roadmap: Yes (A Circular Economy in the Netherlands by 2050)

EPR schemes: 14 in 5 sectors

Circular economy initiatives: Nederland Circulair, Green Deal Circular Procurement

Circular economy tax incentives: Yes

Relevant organisations: MVO Nederland, Holland Circular Hotspot, Circle Economy, CIRCO, RVO Netherlands Enterprise Agency

#### 4.2 Middle ground

##### 4.2.1 Austria

Eco-innovation Index resource efficiency ranking: 9th

POLITICO's circular economy index: 9th

Flash Eurobarometer 456: % of SMEs minimising waste: 13th (59%)

Per capita waste production: 564kg, ranked 23rd

Recycling rate of municipal waste: 58%, ranked 3rd

Recycling rate of packaging: 67%, ranked 12th

Circular material use rate: 9%, ranked 10th

Circular economy roadmap: No

EPR schemes: 14 in 4 sectors

Circular economy initiatives: Circular Futures Platform, Resources Efficiency Action Plan (REAP), RESET2020, RepaNET, REVITAL.

Circular economy tax incentives: Yes

Relevant organisations: Circular Economy Coalition for Europe (CEC4Europe), Umweltdachverband

#### 4.2.2 Luxembourg

Eco-innovation Index resource efficiency ranking: 1th

POLITICO's circular economy index: 11th

Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 14th (57%)

Per capita waste production: 614kg, ranked 24th

Recycling rate of municipal waste: 48%, ranked 7th

Recycling rate of packaging: 62%, ranked 18th

Circular material use rate: 11%, ranked 7th

Circular economy roadmap: Yes (Plan national de gestion des déchets et des ressources)

EPR schemes: 4 in 4 sectors

Circular economy initiatives: Fit 4 Circularity, Wiltz circular economy hotspot

Circular economy tax incentives: Yes

Relevant organisations: Luxinnoavation, Institut National pour le Développement durable et la Responsabilité sociale des entreprises (INDR), Inspiring More Sustainability Luxembourg

#### 4.2.3 Portugal

Eco-innovation Index resource efficiency ranking: 13th

POLITICO's circular economy index: 16th

Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 15th (55%)  
Per capita waste production: 474kg, ranked 15th  
Recycling rate of municipal waste: 31%, ranked 19th  
Recycling rate of packaging: 61%, ranked 19th  
Circular material use rate: 2%, ranked 25th  
Circular economy roadmap: Yes  
EPR schemes: 10 in 5 sectors  
Circular economy initiatives: Portuguese Green Growth initiative, INCOVER project  
Circular economy tax incentives: No  
Relevant organisations: Circular Economy Portugal, Portuguese Association of Environmental Technology Companies (APEMETA)

#### 4.2.4 Spain

Eco-innovation Index resource efficiency ranking: 5th  
POLITICO's circular economy index: 10th  
Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 8th (65%)  
Per capita waste production: 443kg, ranked 12th  
Recycling rate of municipal waste: 30%, ranked 20th  
Recycling rate of packaging: 70%, ranked 6th  
Circular material use rate: 8%, ranked 12th  
Circular economy roadmap: No  
EPR schemes: 13 in 5 sectors  
Circular economy initiatives: Extremadura 2030, Spanish Circular Economy Strategy  
Circular economy tax incentives: Yes  
Relevant organisations: Circular Economy Foundation (FEC), Ecoembes, Circular Basque, TheCircularLab

#### 4.3 Bottom performers

##### 4.3.1 Bulgaria

Eco-innovation Index resource efficiency ranking: 27th  
POLITICO's circular economy index: 24th  
Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 26th (28%)

Per capita waste production: 404kg, ranked 8th  
Recycling rate of municipal waste: 32%, ranked 18th  
Recycling rate of packaging: 64%, ranked 17th  
Circular material use rate: 4%, ranked 22nd  
Circular economy roadmap: No  
EPR schemes: 9 in 5 sectors  
Circular economy initiatives: Cleantech Bulgaria  
Circular economy tax incentives: No  
Relevant organisations: Bulgarian Institute for Circular Economy, Green Synergy Cluster, Cleantech Bulgaria Cluster

#### 4.3.2 Cyprus

Eco-innovation Index resource efficiency ranking: 21th  
POLITICO's circular economy index: 28th  
Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 25th (29%)  
Per capita waste production: 640kg, ranked 27th  
Recycling rate of municipal waste: 17%, ranked 25th  
Recycling rate of packaging: 59%, 21st  
Circular material use rate: 2%, ranked 24th  
Circular economy roadmap: No  
EPR schemes: 3 in 3 sectors  
Circular economy initiatives: -  
Circular economy tax incentives: No  
Relevant organisations: Cyprus Energy Agency, TESURA Cyprus

#### 4.3.3 Greece

Eco-innovation Index resource efficiency ranking: 23th  
POLITICO's circular economy index: 26th  
Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 22nd (37%)  
Per capita waste production: 498kg, ranked 11th  
Recycling rate of municipal waste: 17%, ranked 26th  
Recycling rate of packaging: 60%, ranked 20th

Circular material use rate: 1%, ranked 28th

Circular economy roadmap: Yes (National Action Plan on Circular Economy)

EPR schemes: 8 in 5 sectors

Circular economy initiatives: City PLUS

Circular economy tax incentives: No

Most relevant organisations: Entrepreneur and Social Economy Group (EKO), Social Economy Institute

#### 4.3.4 Malta

Eco-innovation Index resource efficiency ranking: 4th

POLITICO's circular economy index: 27th

Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 11th (62%)

Per capita waste production: 621kg, ranked 25th

Recycling rate of municipal waste: 7%, ranked 28th

Recycling rate of packaging: 37%, ranked 28th

Circular material use rate: 5%, ranked 18th

Circular economy roadmap: Yes (Malta's Sustainable Development Vision for 2050)

EPR schemes: 2 in 2 sectors

Circular economy initiatives: Green Economy Strategy and Action Plan

Circular economy tax incentives: Yes

Relevant organisations: Eco French Malta

#### 4.3.5 Romania

Eco-innovation Index resource efficiency ranking: 22th

POLITICO's circular economy index: 18th

Flash Eurobarometer 456: % of SMEs minimising waste: Ranked 24th (31%)

Per capita waste production: 261kg, ranked 1st

Recycling rate of municipal waste: 13%, ranked 27th

Recycling rate of packaging: 56%, ranked 24th

Circular material use rate: 2%, ranked 27th

Circular economy roadmap: No

EPR schemes: 9 in 3 sectors

Circular economy initiatives: Green Fibre International recycling and circular economy project

Circular economy tax incentives: No

Most relevant organisations: IRCEM Institute, National Centre for Sustainable Production and Consumption, Green Energy Innovative Biomass Cluster

## **5.0 Discussion**

### **5.1 Commonalities of top performers**

After analyzing the data at hand for the five countries considered as top CE performers, a hand full of commonalities are apparent. All top performers have drawn up a comprehensive roadmap to facilitate the transition to a circular economy. These were all undertaken by the respective country's relevant ministries (environmental, ecological etc.) and in some cases with the cooperation of CE institutes. This shows that the country has a clear vision for the future regarding the circular economy and has actively put a plan in place to reach the goals set out in the EU Action Plan for the Circular Economy.

Another commonality of top performers is the high level of participation by governments and the recognition of their shortfalls. Governments of top performing countries show a high level of involvement and have established a multitude of circular economy initiatives aimed at businesses and the general public alike. Additionally, all countries either already offer tax incentives for circular products in some capacity or are looking to introduce measures that will offer fiscal benefits for circular products, such as VAT rate modulation. Strong government involvement shows that circular economy and resource efficiency are a priority for the country and that resources are being devoted to moving away from a linear economy.

Despite these countries being at the forefront of the circular economy in Europe, one negative commonality between them does stand out. All top performers, while expending resources towards the CE all have a high rate of per capita waste production. This is connected to high levels of consumption. The main philosophical idea behind a circular economy is the elimination of waste and closing the loop, so as that all energy

sources and materials are renewable. The pattern of high waste production is in stark contrast to the principal of a circular economy.

## 5.2 Commonalities of worst performers

Possibly the most detrimental factor shared by the bottom ranked circular economy countries is their poor legislative framework towards eco-innovation. All of the worst performers have no definite legislation in place to incentivise the circular economy which results in little desire for companies or the general public to change their ways. Additionally, the lack of promotion manifests in low recognition and awareness of circular economy by the general public.

Another worrying trend amongst these countries is the governments disregard of the importance of CE. The lack of initiatives offered displays an unwillingness to allocate resources towards circular economy efforts and a laissez-faire approach. Governments of these countries display a stubborn attitude and a reluctance to change from the principles of a linear economy, following the “take, make, waste” paradigm.

## 5.3 Voting behavior

The European Parliament is at the heart of circular economy, with Members of Parliament representing the interests of their respective countries by voting on proposals put forward by the EU Commission. By looking into the voting breakdown on legislation regarding the circular economy we can begin to draw conclusions as to whether voting behaviour in anyway relates to the circular economy performance of member states.

Despite it being reasonable to assume that positive voting behavior would correlate to good circular economy performance, according to the voting breakdown, this is not the case. All of the top performers, excluding Slovenia, display considerable levels of resistance to a selection of policy proposals. Bottom performers, show mixed results with Cyprus, Greece and Malta showing opposition in a number of votes, while Romania and Bulgaria’s vote breakdown is virtually completely positive. The conflicting results show, that overall, voting behavior cannot be accepted as reliable indicator for the level of country’s circular economy efforts.

## **6.0 Conclusion**

While on an EU level, CE recognition is abundant and concrete strategies for facilitating a transition towards a circular economy are in place, many governments of Member States are still resisting the change. This is where the problem lies, as governments are likely the most important stakeholder to determine the success of CE as a whole in a given country, as opposed to companies and the general public.

Considering the previously discussed commonalities of top and bottom performers, overall wealth of a country does not clearly correlate with their circular economy efforts, government recognition is far more representative, going against the originally formulated hypothesis. Member states with the highest level of government involvement, rank best in terms of circular economy efforts. The inverse is equally applicable, as countries with low government involvement rank lowest in terms of the circular economy.

The bottom performers identified, all receive EU structural funds in conjunction with the EU's "cohesion policy support for the circular economy", an investment framework running from the year 2014 to 2020, focusing on waste management, circular economy related innovation, SME competitiveness, resource efficiency and low-carbon investments (European Commission, 2016d). Additionally, for each bottom performing countries, apart from Romania, the lion's share of EU structural funds are allocated towards environment protection and resource efficiency, although, even in Romania's case EU funding towards environmental protection and resource efficiency is second only to network infrastructures in transport and energy (European Commission, 2019b). While vast amounts of money has been received by these countries, the development window is soon to close in 2020. As is evident by their poor performance, the funds have not been used effectively. It is likely that the lack of devotion and research regarding circular economy efforts by these governments resulted in allocating the funds to ill-advised projects or in areas that have not bared fruit.

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## **8.0 Appendices**

### Appendix A: Voting behavior of top performers

#### **France**

Voting behavior:

Ecodesign vote: For: 63, Against: 0, Abstention: 2

SUP vote: For: 70, Against: 0, Abstention: 0

VAT vote: For: 47, Against: 18, Abstention: 4

Waste vote: For: 43, Against: 0, Abstention: 19

Landfill vote: For: 46, Against: 2, Abstention: 18

Packaging vote: For: 42, Against: 0, Abstention: 18

ELV's vote: For: 43, Against: 0, Abstention: 19

#### **Slovenia**

Voting behaviour:

Ecodesign vote: For: 3, Against: 0, Abstention: 0

SUP vote: For: 8, Against: 0, Abstention: 0

VAT vote: For: 8, Against: 0, Abstention: 0

Waste vote: For: 8, Against: 0, Abstention: 0

Landfill vote: For: 8, Against: 0, Abstention: 0

Packaging vote: For: 8, Against: 0, Abstention: 0

ELV's vote: For: 8, Against: 0, Abstention: 0

#### **Italy**

Voting behaviour:

Ecodesign vote: For: 52, Against: 0, Abstention: 7

SUP vote: For: 49, Against: 13, Abstention: 1

VAT vote: For: 45, Against: 21, Abstention: 2

Waste vote: For: 55, Against: 0, Abstention: 5

Landfill vote: For: 56, Against: 0, Abstention: 5

Packaging vote: For: 54, Against: 0, Abstention: 5

ELV's vote: For: 55, Against: 0, Abstention: 5

## **Germany**

Voting behavior:

Ecodesign vote: For: 69, Against: 9, Abstention: 4

SUP vote: For: 78, Against: 8, Abstention: 0

VAT vote: For: 77, Against: 5, Abstention: 4

Waste vote: For: 74, Against: 7, Abstention: 1

Landfill vote: For: 76, Against: 7, Abstention: 1

Packaging vote: For: 74, Against: 7, Abstention: 0

## **The Netherlands**

Voting behaviour:

Ecodesign vote: For: 18, Against: 4, Abstention: 0

SUP vote: For: 19, Against: 4, Abstention: 0

VAT vote: For: 19, Against: 6, Abstention: 0

Waste vote: For: 19, Against: 5, Abstention: 0

Landfill vote: For: 19, Against: 5, Abstention: 0

Packaging vote: For: 19, Against: 5, Abstention: 0

ELV's vote: For: 18, Against: 5, Abstention: 0

Appendix B: Voting behavior for middle ground

## **Austria**

Voting behavior:

Ecodesign vote: For: 18, Against: 0, Abstention: 0

SUP vote: For: 18, Against: 0, Abstention: 0

VAT vote: For: 14, Against: 4, Abstention: 0

Waste vote: For: 18, Against: 0, Abstention: 0

Landfill vote: For: 18, Against: 0, Abstention: 0

Packaging vote: For: 18, Against: 0, Abstention: 0

ELV's vote: For: 18, Against: 0, Abstention: 0

## **Luxembourg**

Voting behaviour:

Ecodesign vote: For: 5, Against: 0, Abstention: 0

SUP vote: For: 5, Against: 0, Abstention: 0

VAT vote: For: 5, Against: 0, Abstention: 0

Waste vote: For: 4, Against: 0, Abstention: 0

Landfill vote: For: 4, Against: 0, Abstention: 0

Packaging vote: For: 4, Against: 0, Abstention: 0

ELV's vote: For: 4, Against: 0, Abstention: 0

## **Portugal**

Voting behaviour:

Ecodesign vote: For: 20, Against: 0, Abstention: 0

SUP vote: For: 19, Against: 0, Abstention: 0

VAT vote: For: 14, Against: 0, Abstention: 4

Waste vote: For: 17, Against: 0, Abstention: 3

Landfill vote: For: 20, Against: 0, Abstention: 0

Packaging vote: For: 16, Against: 0, Abstention: 3

ELV's vote: For: 19, Against: 0, Abstention: 0

## **Spain**

Voting behaviour:

Ecodesign vote: For: 40, Against: 1, Abstention: 0

SUP vote: For: 39, Against: 0, Abstention: 0

VAT vote: For: 36, Against: 0, Abstention: 3

Waste vote: For: 36, Against: 0, Abstention: 0

Landfill vote: For: 39, Against: 0, Abstention: 0

Packaging vote: For: 31, Against: 0, Abstention: 0

ELV's vote: For: 32, Against: 0, Abstention: 0

## Appendix C: Voting behavior of bottom performers

### **Bulgaria**

Voting behavior:

Ecodesign vote: For: 12, Against: 0, Abstention: 0

SUP vote: For: 14, Against: 0, Abstention: 0

VAT vote: For: 16, Against: 0, Abstention: 0

Waste vote: For: 16, Against: 0, Abstention: 0

Landfill vote: For: 16, Against: 0, Abstention: 0

Packaging vote: For: 15, Against: 0, Abstention: 0

ELV's vote: For: 16, Against: 0, Abstention:

### **Cyprus**

Voting behavior:

Ecodesign vote: For: 5, Against: 0, Abstention: 0

SUP vote: For: 5, Against: 0, Abstention: 0

VAT vote: For: 1, Against: 1, Abstention: 4

Waste vote: For: 5, Against: 0, Abstention: 1

Landfill vote: For: 6, Against: 0, Abstention: 0

Packaging vote: For: 4, Against: 0, Abstention: 2

ELV's vote: For: 4, Against: 0, Abstention: 2

### **Greece**

Voting behavior:

Ecodesign vote: For: 12, Against: 2, Abstention: 1

SUP vote: For: 13, Against: 3, Abstention: 0

VAT vote: For: 12, Against: 6, Abstention: 1

Waste vote: For: 11, Against: 5, Abstention: 0

Landfill vote: For: 11, Against: 5, Abstention: 0

Packaging vote: For: 15, Against: 2, Abstention: 0

ELV's vote: For: 12, Against: 5, Abstention:

## **Malta**

Voting behaviour:

Ecodesign vote: For: 6, Against: 0, Abstention: 0

SUP vote: For: 6, Against: 0, Abstention: 0

VAT vote: For: 3, Against: 3, Abstention: 0

Waste vote: For: 5, Against: 0, Abstention: 0

Landfill vote: For: 5, Against: 0, Abstention: 0

Packaging vote: For: 5, Against: 0, Abstention: 0

ELV's vote: For: 5, Against: 0, Abstention: 0

## **Romania**

Voting behavior:

Ecodesign vote: For: 25, Against: 0, Abstention: 0

SUP vote: For: 28, Against: 1, Abstention: 0

VAT vote: For: 30, Against: 0, Abstention: 0

Waste vote: For: 26, Against: 0, Abstention: 0

Landfill vote: For: 27, Against: 0, Abstention: 0

Packaging vote: For: 25, Against: 0, Abstention: 0

ELV's vote: For: 25, Against: 0, Abstention: 0

State of the Circular Economy in Europe

By

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