THE EUROPEAN FILES

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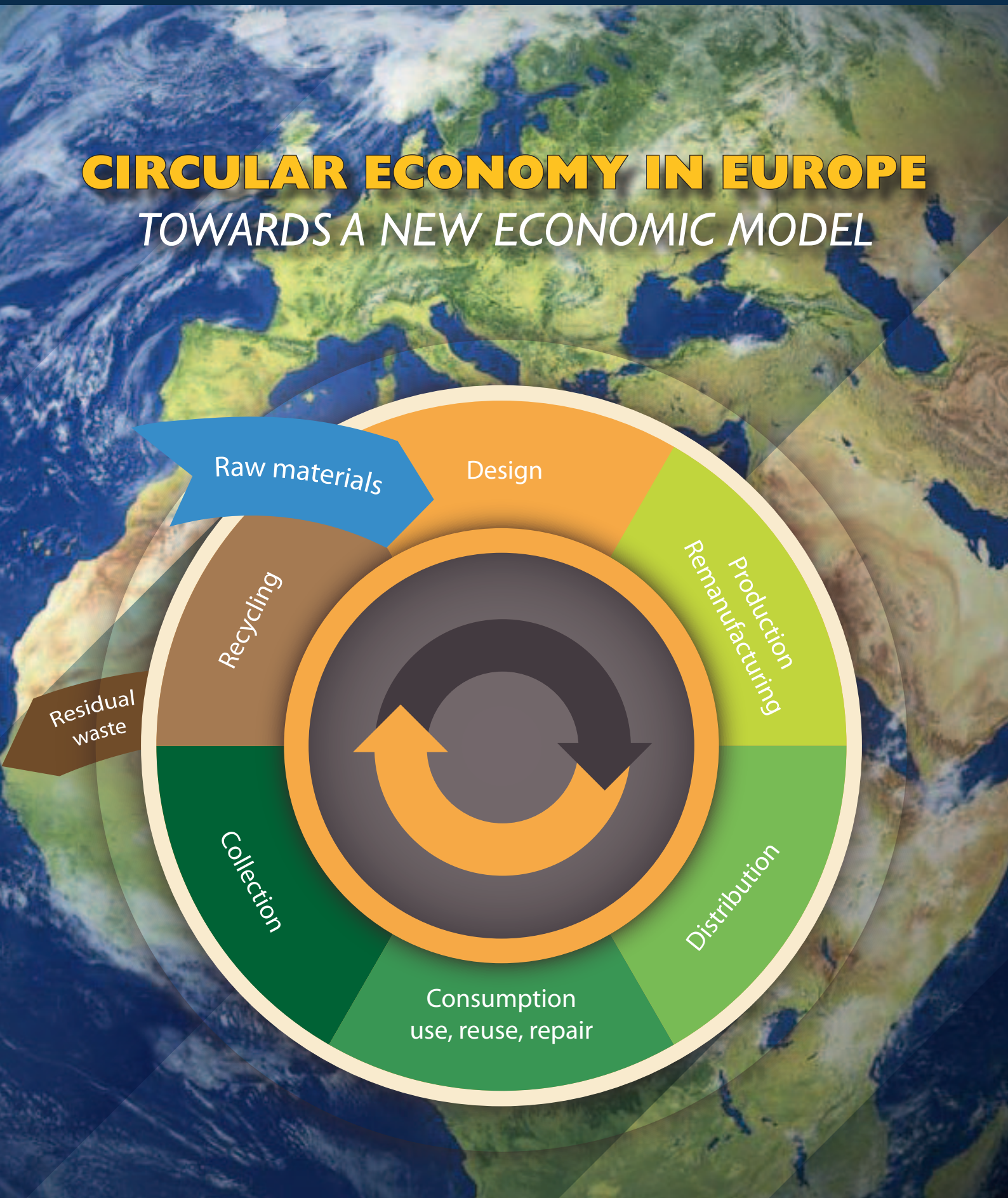
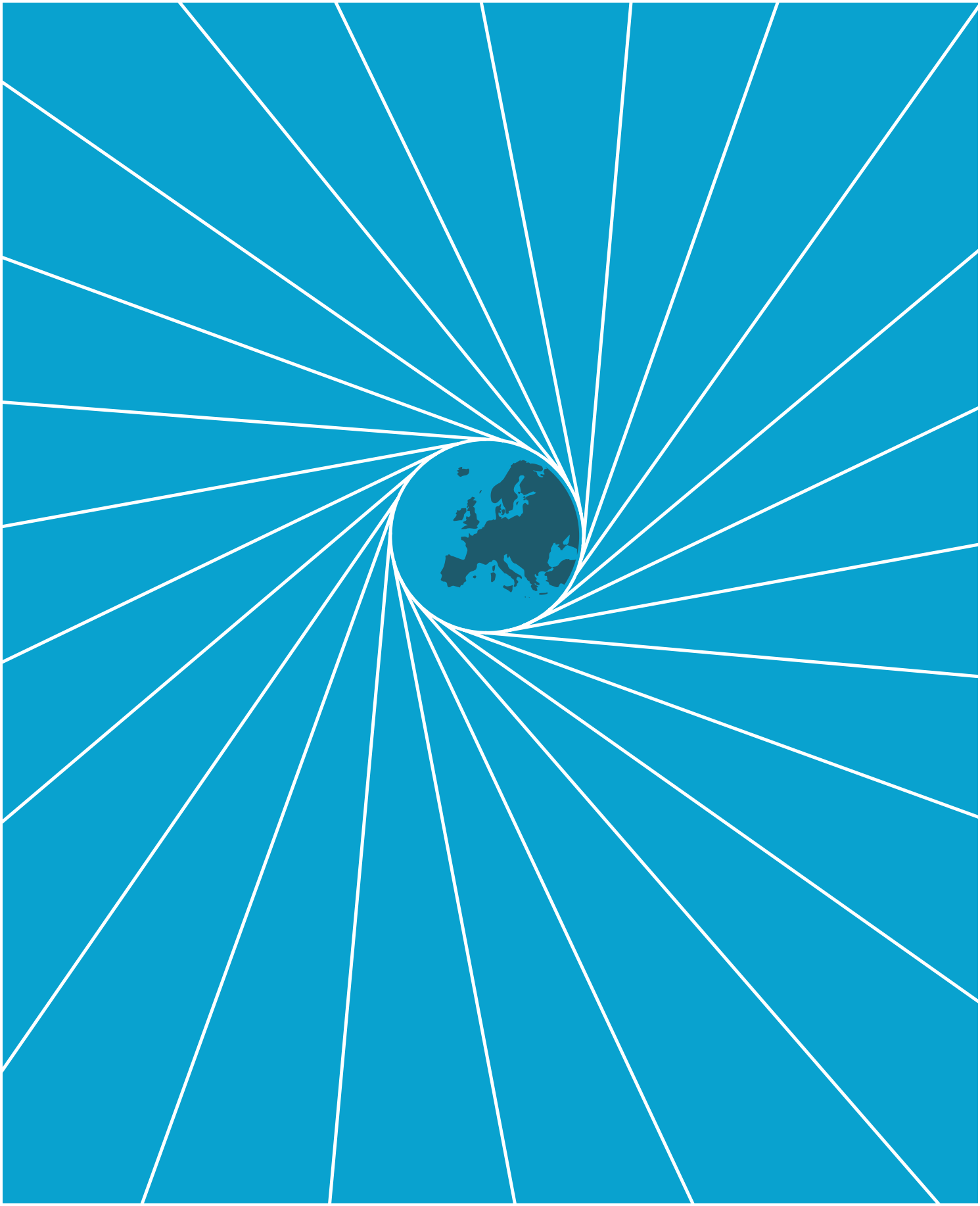
CIRCULAR ECONOMY IN EUROPE

TOWARDS A NEW ECONOMIC MODEL



GROWTH WITHIN:
A CIRCULAR ECONOMY VISION FOR A COMPETITIVE EUROPE



ELLEN MACARTHUR FOUNDATION

SUN

McKinsey Center for Business and Environment

EDITORIAL

The concern over Europe's primary resource dependency is not new. Coupled with a growing awareness of our environmental impact and energy addiction, it comes as no surprise that the European Commission and Parliament are set to present a more ambitious policy package to create a "Resource Efficient Europe" by the end of 2015. The solution proposed is nothing short of a strict evolution of our current "linear economy" into a more resilient Circular Economy.

The limitations of our planet's resources and the scaled effects of innovation cannot sustain our current consumer culture. Poor waste management and inefficient business practices hold down our ability to grow our economic added value. There is a great gap between our economic and environmental well-being. In response, international research organizations and foundations, such as the Ellen MacArthur Foundation, have formalized an economic model that produces no material waste. At a time where economic policymakers seem to lack the resources and clarity to pass ambitious growth packages, this evolution thrusts an originally environmentally driven concept into the main arena of European legislation.

The unique processes of this economic model require a paradigm shift in our way of doing business. In concrete terms, businesses would need to think circular at design stage to create products in line with the Ecodesign approach, taking the entire lifecycle of the product into consideration, in order to support waste prevention as well as products' re-use and recycling. In addition, the coordination of actors involved in waste management must be clear and strict. These guiding principles should transcend all facets of the economy. In this issue of The European Files, we present to policymakers and industry specialists the potential and practicality of a new economic model for a more sustainable Europe.

Across the globe, improving waste management to foster recycling remains a priority. Consumer waste at the local level is a challenge and a cost, just as certain industrial and commercial waste presents a greater danger to the environment as a whole. In Europe, statistics demonstrate great differences between Member States, some of them performing well while others are still lagging with very low recycling rates and a majority of their wastes being landfilled.

Specialists and policymakers alike agree that communication between institutions and service-providers is key in taking advantage of the waste streams generated by consumers. Europe must take the lead and drive the change towards a society that sees waste as a resource, not a burden. The European Union must in particular clarify the definition of waste for an efficient and streamlined treatment process. This includes engaging with the large amount electronic waste we produce as a great potential source of valuable raw materials as well as the highly intrusive plastic waste disseminated across the continent and seas presenting a grave danger to our food stock. Aligning the policy package for a Circular Economy with all of these issues reiterates the forward-thinking approach communicated by the European Commission and Parliament.

Policymakers at all levels are fully aware of the circulating reports about this new economic model. The advantages of this great step forward outnumber by far the disadvantages sticking to the linear model we mostly use today. It is known that the fastest growing and most resilient companies are those that function in a Circular model. There is also strong evidence, explored in this issue, that this evolution, if applied throughout the economy, will provide new boosts in employment and GDP. Small and big firms as well as NGOs are subject to this change, but it is up to the legislators to ensure that the legal framework and economic incentives facilitate the transition. Finally, the strongest arguments for this new model explore the many opportunities created exclusively within this new paradigm, pioneering concepts such as a sharing economy where capital is productive one hundred percent of the time. Similarly, regional actions, such as Flanders' excellent record in waste management, and national ones, such as Luxembourg's economic initiatives, provide a variety of applied and successful practices inspired by the Circular Economic model.

This issue of The European Files encourages the EU to take a comprehensive approach and engage each sector of the economy as an opportunity for growth under this new economic model. Without a confident legislative driver, the environmental conditions ahead will only exacerbate our current economic and social situation.

Laurent Ulmann

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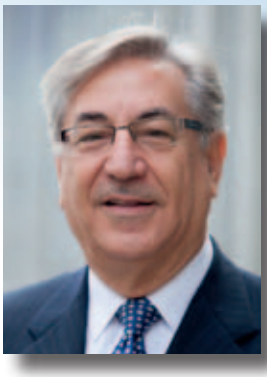
How can the circular economy contribute to sustainable growth and job creation in Europe?



Karmenu VELLA
Commissioner for Environment, Maritime Affairs and Fisheries

Jyrki KATAINEN
Vice-President and Commissioner for Jobs, Growth, Investment and Competitiveness

The European Commission has committed to come forward with an ambitious circular economy package by the end of 2015. The rationale behind this initiative is that we firmly believe that moving towards a circular economy is the only way our economy will grow and create sustainable jobs in the future.

For decades we have been using resources in an inefficient manner. For example an average car is parked over 90% of the time, most office buildings are empty half of the time and we throw away a third of our food. The current linear model does not make economic, environmental or societal sense.

By transitioning to a circular economy, Europe can contribute to a paradigm shift. We are absolutely convinced that the circular economy, if designed right, can enable a triple win. There are economic gains to be made from using raw materials and resources more efficiently and being less dependent on imports. There are environmental gains from moving away from a linear economy where we throw away products that could be repaired or recycled. There are social gains to be made from preventing waste, further improving local waste management, recycling, repair and re-use services.

This paradigm shift is in fact already underway, and we can observe that the circular economy is no longer the niche market that some imagine. It is gradually becoming the economy, period. There are currently over 4 million people working for eco-industries in Europe. The green economy has also proved to be resilient: it is one of the few sectors that has kept growing and creating new jobs through the economic crisis. The additional employment opportunities created by moving further towards a circular economy are significant.

We are confident that the circular economy can also help European industries regain a competitive edge and ensure that we are frontrunners in providing environmentally and economically sustainable solutions. This requires both regulatory certainty and investments for the future.

The Investment Plan for Europe addresses precisely these two elements. The European Fund for Strategic Investments (EFSI), the new fund at the heart of the investment plan, will target high-risk investments in forward-looking projects. This opens a new funding avenue to transition towards a circular economy.

All of this serves to underline that there is great potential for the EU to make this transition. But at a time where value chains are global, we need to have both a European and a global response to our common challenge: how will we find tomorrow the resources we need? How can we use them less, and better?

The EU now exports about 9.5 million tons of waste to China involving mainly paper, copper, and plastic. These materials could also be useful for the European economy. Collaborating with China and other emerging economies and understanding these flows better is essential.

Beyond China, leaders of the G7 have recognised the importance of resource efficiency for the competitiveness of industries, for economic growth and employment, and for the protection of the environment, climate and planet. They have recently established the G7-Alliance on Resource Efficiency. In September, the United Nations will agree to a set of Sustainable Development Goals, and sustainable consumption and production, globally, is at the heart of these goals. These global initiatives will give momentum to the efforts to move towards a circular economy, both within and outside the EU.

As we believe that the future of the European economy will indeed be circular, we must also do our best to create the right framework for it to thrive. The European Commission is already today taking decisive steps towards this goal.

A public consultation on the circular economy is underway to gather input from stakeholders. Once the consultation has closed, we will thoroughly analyse all the feedback we have received. On the basis of the consultation and work carried by our services, we will present by the end of the year a package with a revised waste directive and an action plan to "close the loop" beyond waste. The waste policy will promote and support the transition, reflecting country specific needs. We are working on clear long term targets, and ambitious recycling goals. The action plan will set the circular agenda for this mandate. All the initiatives that will be listed in the action plan will then be prepared through the ordinary procedures, fully in line with the better regulation principles.

We are fully committed to come up with a holistic plan with concrete measures that address the full circle of the circular economy. This matters for the future of our environment, and the future of European jobs and growth.

Circular economy as a contribution to economic policy

Barbara HENDRICKS
German Federal Minister for the Environment, Nature Conservation, Building and Nuclear Safety

There can be no doubt that the economy needs to adapt to changing ecological and social conditions. Without innovation and a forward-looking focus it will lose its power, productivity and competitiveness. Strengthening the economy is equally beneficial for both social partners and the environment. Only a strong economy with high requirements and standards deploying modern technologies can promote highly qualified employment and enable production processes to be resource efficient and environmentally friendly.

From an environmental policy perspective, it is always a question of achieving qualitative growth rather than purely quantitative growth. The goal of a future-oriented economy is therefore to develop, manufacture and offer products that are as environmentally sound and resource efficient as possible. Qualitative growth is the only solution to the problem of the pervasive throwaway mentality. To aggravate matters further, global demand will continue to rise for decades as a result of the growing world population and purchasing power.

One key task for economic policy is to use state measures to promote and support this process of continuous economic adaptation to the challenges of the future. This can be achieved by fostering innovation, for example through research, but also by establishing and amending the legal framework. In this sense, economic policy should be viewed as a policy - above and beyond the approach of the social market economy - that affects many areas: social policy, labour market policy, environmental policy and research policy. However, in an age of globalised economic relations that exceed the regulatory reach of national governments it is difficult for these policy areas to establish the necessary framework. This is where the EU and international agreements have an important part to play.

What challenges is the economy facing now and in future? What adaptation measures are needed? Alongside global issues such as equity, the financial sector, peace and migration, the protection of environmental media and raw materials is a top priority. The negative impacts of our throwaway society of excess - rapid resource consumption, climate change, pollution, mountains of waste - show that this kind of society is simply not viable for the future. Does economic policy based on growth have any chance here? Can we imagine an economy with the guiding principle of protecting our environment?

One example of green economy is the circular economy that has been developed in a few countries including Germany. Firstly, almost all types of waste now have an extremely high recycling quota (currently replacing 14 percent of raw materials used) and the remaining waste is treated before it is disposed of to ensure it no longer poses a threat to the environment. Secondly, a lucrative business sector has emerged with over 15,000 facilities and 200,000 employees using the world's most advanced technologies and generating a turnover of almost 40 billion euros. The environment, resources, the economy and citizens - all sides benefit in equal measure!

So why hasn't this model established itself (yet) in other sectors and countries? There are a number of different, interlinked prerequisites for a green economy. Like with every market, demand for green processes and products first has to develop, as does the willingness to pay prices that enable adequate supply. In concrete terms this means the legal framework lays down requirements, e.g. technical standards in line with the best available technology, and obligations, e.g. fee systems, that cover the costs in accordance with the polluter-pays principle. Within the legal framework that guarantees equitable competition conditions and establishes sanctions, the economic stakeholders compete to provide the best solution. Society and policy-makers that recognise the need for a modern circular economy are essentially also willing to pay for corresponding demand.

Implementing the legal framework is essential because equitable competition conditions and sanctions are the only way to enable high standards to prevail over low ones. In most countries the polluter-pays principle is either not being applied or its application is not being enforced - or both. The investments needed for a circular economy in separate collection systems, sorting and recycling facilities, thermal treatment processes and high-tech landfills and - even more importantly - the financing for their long-term operation, has to be secured. This is often where the problem lies. Capital is only made available when long-term financing is guaranteed, drawing from four possible sources: cost-covering prices or fees, revenues from secondary raw materials, product responsibility and taxes.

Modern economic policy that tackles ecological challenges needs the circular economy because the circular economy continuously renews part of its material basis. However, modern economic policy also requires action in other environment policy areas: resource efficiency, eco-design, chemicals safety, energy policy, changes to production and consumption patterns, to name just a few.

To be able to make the most efficient possible use of resources and energy at every stage of the economic cycle - raw material extraction, production, product design, trade, consumption and ultimately circular economy - a further resource is required: human intelligence! This is probably the most important resource needed to make the circular economy an integral component of economic policy.

Luxembourg as a testing ground for the Circular Economy

Francine CLOSENER
Luxembourgish Secretary of State for Economy

Located in the heart of Europe, Luxembourg has managed throughout its history to set up a favorable business development policy. The diversification of the Luxembourg economy is best illustrated by the presence since the 1950s of a multitude of economic activities, in particular in the field of chemistry, plastic and synthetic materials, mechanical engineering and processing of ferrous and non-ferrous metals, the automotive industry, precision instrument engineering, electronic delivery services, glass industry or wood industry.

The desire to further diversification of services led the Grand-Duchy a decade ago to further enhance the fields of energy, environment and sustainable development, by focusing besides topics like mobility or smart technologies in particular on the circular economy.

The circular economy is already a competitive imperative for Luxembourg. The Grand-Duchy is leading the way to circularity in some industries, and has a further potential to diversify employment across traditional industries like construction, primary manufacturing, retailing and logistics as well as in advanced industries like ICT, robotics and 3D manufacturing.

In 2014, the ministry of the Economy led a study to investigate the current situation and the economic potential of a circular economy model in Luxembourg and to develop roadmaps for an implementation strategy. The potential is substantial for using the circular economy to *further improve competitiveness, employment, cost savings and environmental impacts* says the study performed by the international institute EPEA with support from Returnity Partners and in consultation with more than 50 stakeholders in Luxembourg. The study shows:

- Secondary raw materials are central to survival for leading Luxembourg industries. Those industries have substantial circular flows and business models to build on. For example, Luxembourg is already a testing ground for circularity know-how in everything from healthy interiors to steel renting and building materials substitution, with knowledge-based ICT and leasing industries driving circularity logistics and services ; The circular economy starting position in Luxembourg is 'excellent' with capabilities and motivation in place. Luxembourg's exemplary society based on equity, cultural tolerance, economic stability and diversity, responsive government, manageable size and especially quality make the country a powerful testing ground for circularity ; However, maximising the circularity potential depends on initiating pilot projects and an enabling framework in collaboration with industry and researchers, to accelerate the transition towards a diversified circular economy at scale ;

- Luxembourg has a high interdependency with the Greater Region for circular materials flows as well as a high potential to improve economic benefits from those flows.

Present situation and circularity benefits for Luxembourg

The study found the circular economy already provides benefits for Luxembourg at the level of economic systems, products, materials and basic ingredients. Circularity activities support 7,000 – 15,000 jobs driving more than €1 billion in economic activities in Luxembourg primarily in manufacturing but also buildings, retailing and other areas. Companies whose activities revolve around circular materials include large manufacturers: ArcelorMittal, Eurofoil, Guardian Industries, Norsk, Tarkett or Tontarelli. Circular operating methods are used by business parks. Luxembourg leads Europe in automotive leasing intensity and is starting car sharing. Automotive suppliers have a returnable packaging network for components. Many important retailers have local product and supplier networks. Productivity management institutions have successfully improved resource collection and valorisation and are driving awareness in the broader public.

Luxembourg, the Greater Region and Benelux enjoy a proportionately large share of circularity-designed products and systems compared to most of Europe. The proportionately large share of circular activities in the Benelux derives from two catalysts: a survival imperative created by dependence on secondary raw materials, and frontrunner activities using the cradle-to-cradle innovation approach. Those products and systems still require optimising but meanwhile they are driving millions of tonnes of circular resource flows for manufacturers in Luxembourg, as well as millions of euros in savings for city governments like Venlo in The Netherlands, and materials and energy savings for logistics equipment companies like VanDerLande.

Potential Circularity Benefits

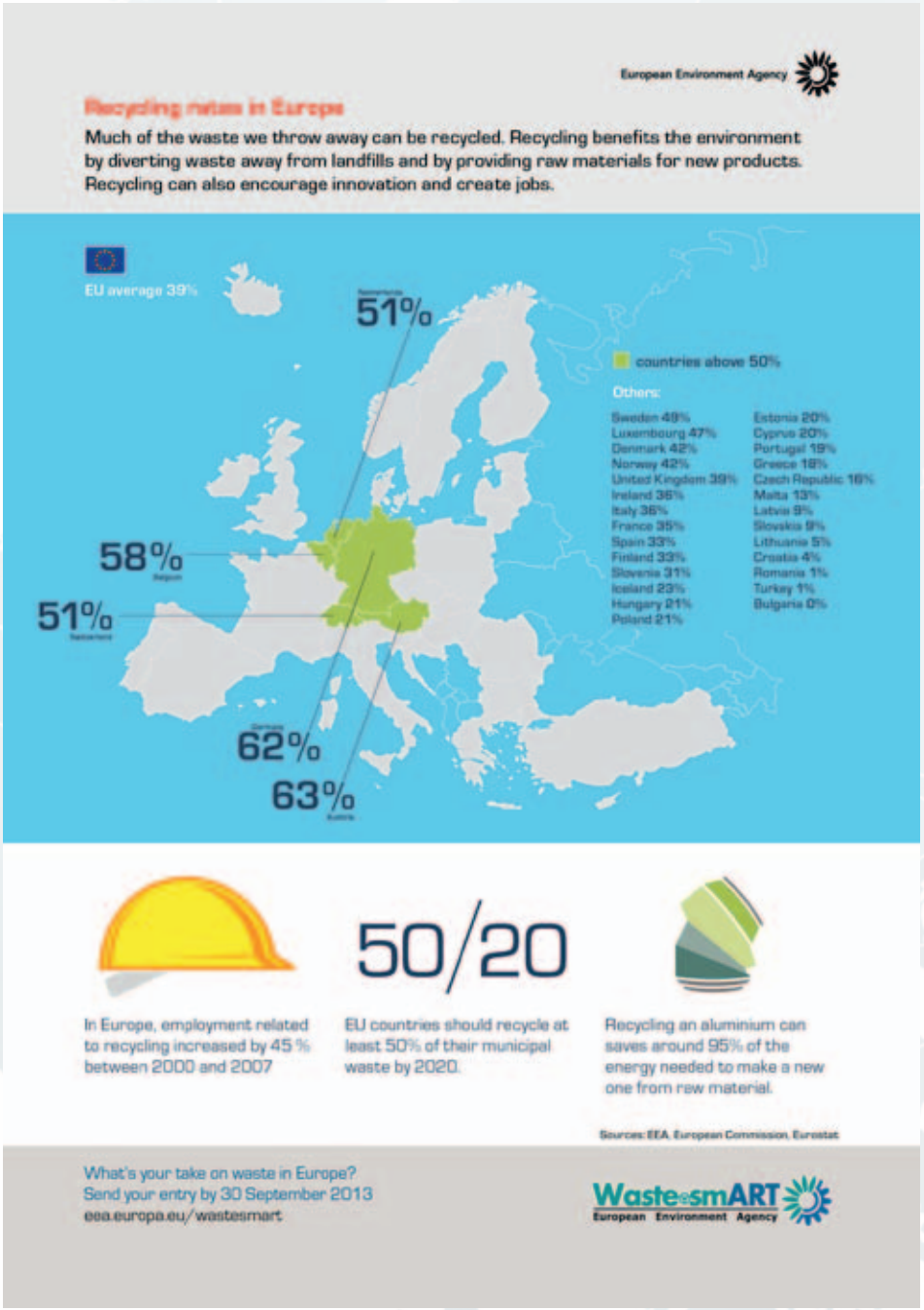
The opportunity for Luxembourg is to adapt successful circularity models to improve materials quality by improving resource productivity. Accelerating circular economic practices in Luxembourg at scale is estimated with the potential to generate €300 million to €1 billion EUR annual net-material cost savings in the medium term and to create more than 2.200 jobs in the next 3 years, if robustly applied in the construction, automotive, manufacturing, financial, logistics, R&D, and administrative sectors. Improved resource productivity will strengthen Luxembourg's resilience and jobs *especially in the high-unemployed youth category*.

Potential Big Wins for Luxembourg cut across different sectors:

- **Traditional**: reverse logistics, construction value improvement, retailing gains and optimizing scrap and cullet streams ;
- **Transitional**: capturing new value streams with reverse logistics, designs for disassembly, phosphate re-use and positively defined biobased ingredients and materials ;
- **Transformational**: near-shoring with transformative technologies like ICT-based 3D additive manufacturing and systematic introduction of performance-based usage models.

The Secretary of State of the Economy Francine Closener stated: "We want to turn Luxembourg into a centre of excellence for circular economy within the Greater Region. Our key pillars to succeed are our excellent geographic location and multi-cultural capacities with extremely high share of transit volume, or the excellent R&D and piloting capabilities across wide spectrum of relevant topics, from material intensive applications to high-end service provisioning."

Financing the transition to the circular economy is a key. Luxembourg has recognized this challenge and has therefore involved its innovative and know-how driven finance sector in the circular economy roadmap. Together with the national and international actors, including the Luxembourg based European Investment Bank, existing financing tools are being assessed and new once envisaged in order to support the manufacturing industry, especially SME's, on its way to the circular economy. Specially designed subsidy tools are currently being developed and a conference on the topic of financing the circular economy will be held in December 2015 during Luxembourg's presidency of the EU Council.



A smarter approach to managing our resources

Rory STEWART
Parliamentary UNDER SECRETARY OF STATE FOR ENVIRONMENT AND RURAL AFFAIRS, UK

Across the 28 Member States in Europe, with diverse and disparate views and approaches, there is one thing we can all agree on: managing our resources better and for the long term is crucial.

As the global population rises, the demand for the materials we need increases so does their cost. Important assets become limited and vulnerable and we see the long term prices of energy, water and materials going up.

It is therefore essential that we make the best use of our materials and resources, prevent and deal with waste and recycle properly. How we best achieve this, is one of the key questions facing policy makers now.

The *circular economy* concept is increasingly central for the UK and European economies. It argues that resources should be kept in circulation for longer, that resource use is maximised and the end of life of materials is delayed or, dare I say it, postponed indefinitely. Nations become more productive and our natural environment is protected.

For business, growth in the circular economy means opportunities for new markets through the development of innovation and new ways of doing business. Businesses and organisations can cut costs, enhance brand value and reduce their exposure to fluctuating commodity prices. The European Commission's own analysis estimates that resource efficiency improvements all along the value chains could reduce material inputs needs by 17%-24% by 2030 and a better use of resources could represent an overall savings potential of €630 billion per year for European industry.

There are also clear environmental benefits of moving towards a more circular economy, from tackling carbon and water use, through to reducing pollution of our soils, rivers and seas.

It is therefore important that, collectively, we support the transition to a more circular economy. But, the key question is how can we deliver this future for the benefit of all?

We now have an opportunity. Across Europe discussions are developing the shape and direction of resource management.

We hear a lot about whether targets should be set, how waste prevention should fit, what action should be taken on product design. But we also must draw back and ask ourselves how should these actions be framed?

Legislation has played a key role in driving the changes in the way we have managed waste over the last two decades. Less waste is going to landfill and more waste is being recycled, this is a great achievement. Legislation will continue to have a role, for example around hazardous waste. But a word of caution: we must ensure that legislation is necessary, fit for purpose, effective and well-targeted. While it has its place, it is not always the best solution. Sometimes other approaches are more effective. And sometimes national-led approaches can be the answer.

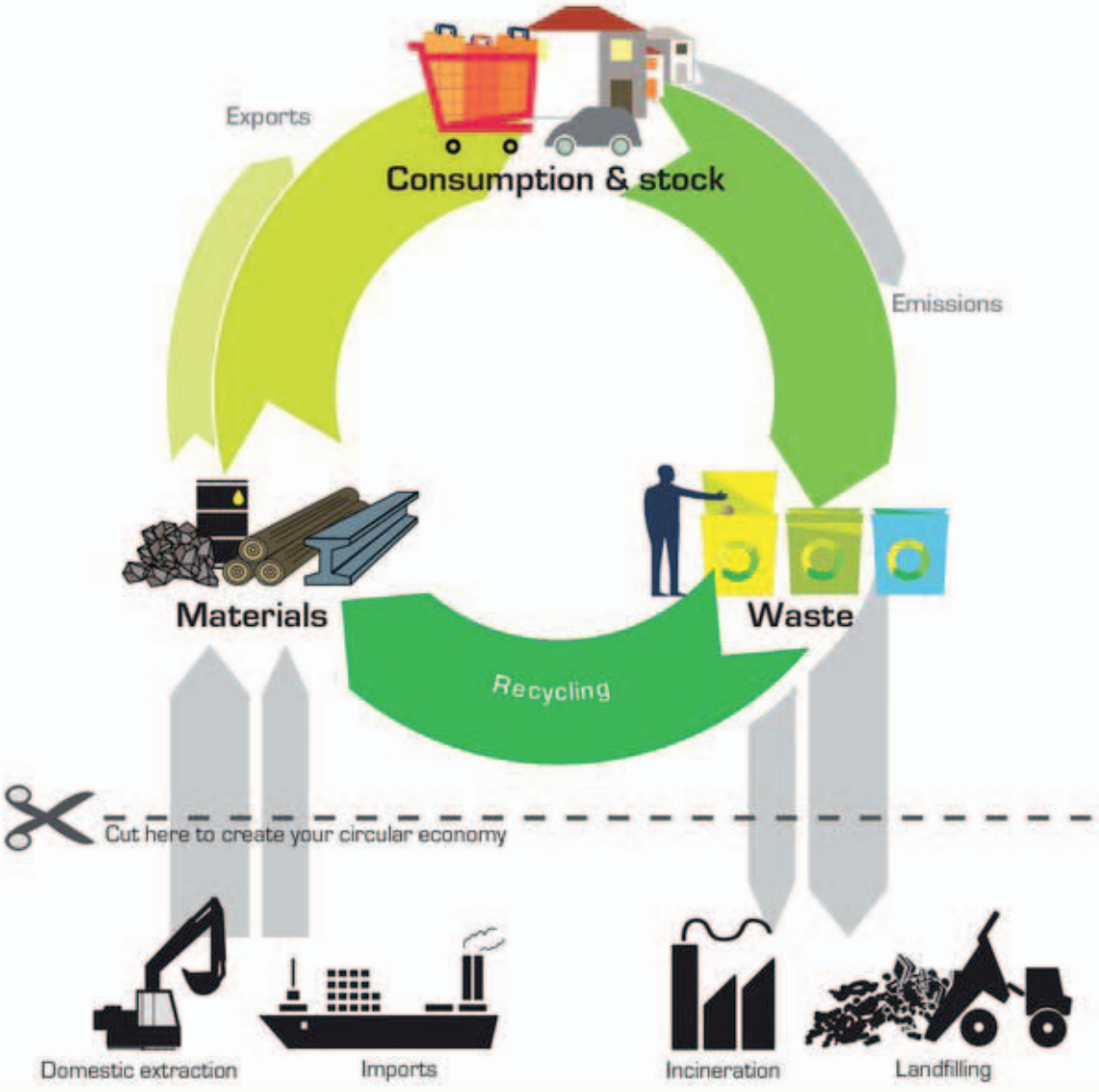
Here in the UK we have some excellent case studies showing how a voluntary approach with business is making a real difference. The UK has large-scale voluntary interventions that have been in place since 2007 aimed at reducing food waste across supply chains and within households. Voluntary commitments with industry coupled with consumer campaigns have for instance reduced household food waste by 1.3mt since 2007 (15%) and reduced supply chain food and packaging waste by 7.4% since 2010. We are taking a similar approach in the clothing and electrical goods sectors. And we are not alone in recognising the value of this approach - there a plenty of other examples from other Member States such Spain, the Netherlands and Finland.

There is also a value in providing guidance and guidelines, either as a substitute for legislation or to make existing legislation work better. I look forward to a varied, flexible and pragmatic approach to addressing these questions.

We have seen a remarkable journey from a landfill based system to one where we recycle, prevent waste and use fewer resources than ever before. And the industry continue to innovate year on year. Of course there is still an enormous job to do. And rather than rush to agree a new set of rules, we should work together to listen to the views of our businesses, local governments, civil society and environment organisations. We should grasp this opportunity now to understand the challenges, the opportunities and the solutions that are long-lasting, cost-effective and innovative. If we can do this, we can unleash the potential of the circular economy, improving resource efficiency, reducing environmental damage and protect human health.

How can we make our economy circular and resource efficient?

Currently, we are using more resources than our planet can produce in a given time. We need to reduce the amount of waste we generate and the amount of materials we extract.



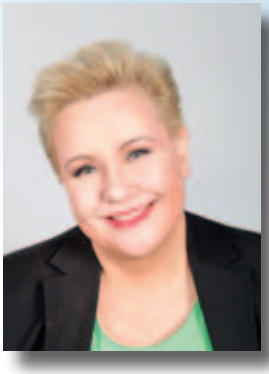
12.4
tonnes of materials per capita were **extracted** in the EU.

3.2
tonnes of materials per capita were **imported** to the EU.

1.3
tonnes of material per capita were **exported** from the EU.

Read more: eea.europa.eu/themes/households and eea.europa.eu/themes/waste

Circular economy: A win for our economy, a win for our environment



Sirpa PIETIKÄINEN
MEP - (EPP) -ENVI rapporteur - on "Resource efficiency: moving towards a circular economy"

It has been forecasted that global demand for resources will triple by 2050. That demand, however, cannot be satisfied. We already consume some 1.5 planets' worth of resources every single year, and following the estimates, would need around four planets full of resources to satisfy the growing demand by 2050 under business as usual.

We are in overshoot mode, and that mode has to be switched to a more sustainable one. What we need is a for a true paradigm shift, one that will benefit both our economy as well as our environment.

Europe is extremely dependent on imported raw materials and energy, much more so than many of our competitors. Resource scarcity increases prices - that is simple economics. Almost 90 percent of European companies expect their material input prices to continue rising, according to a Eurobarometer survey. With raw materials running short, Europe is either going to be hit the hardest by resource scarcity or benefit the most from resource use efficiency.

If we look at these facts, it is clear that European economy can't survive - let alone grow - unless we take some radical steps to increase our resource efficiency and move towards a true recycling economy. We have to stop wasting precious resources and start using them more efficiently.

In this challenge there is also a huge opportunity, however. The one who can deliver solutions for the resource efficiency dilemma, is also the winner of the new economic race: this means solving the problem of doing more with less – getting more added value with less resources. In circular economy there is no waste, products are designed to be durable, reusable, repairable and recyclable, and when they come to the end of their life the resources contained in these products are pumped back into productive use again.

Business-driven studies demonstrate significant material cost-saving opportunities for EU industry and a significant potential to boost EU GDP. The Commission has for example calculated that increasing resource productivity by 30% by 2030 would create 2 million new jobs while boosting our GDP by 1%.

Many businesses have already recognised these facts and started to act accordingly. They have taken a leap to a different mind-set, to one where the whole logic of successful business is turned upside-down. These firms have created new business models to deliver greater resource efficiency and circular models including increased renting, sharing, leasing, bio-innovations, remanufacturing...

In order to support this change we also need to change the rules of the game, however. That is the work of us politicians. Regulation is never neutral. A lot of our thinking and also a big part of the current legislation is created for the needs of consume-and-throw-away -society and therefore has to be changed to fit the new world order.

To drive the business revolution, we need to create a stable and predictable regulatory environment. We need commonly-agreed and harmonised indicators to measure the change. We need clear targets. We need to draft such legislation that will make sure that what is considered waste nowadays is not considered such anymore - but seen as a resource. This requires a change to how things are being produced: products need to become more durable, easy to upgrade, reuse, refit, repair, recycle and dismantle for new resources. A reformed and enlarged EU ecodesign directive is a crucial tool to ensure resources stay in the loop.

Perhaps the most compelling reason to embrace resource efficiency and circular economy models is that we don't really have a choice. Further pressure on supplies of resources as demand increases in emerging markets will force us – sooner or later – to use those resources more carefully.

The treatment and management of electronic waste - circular thinking put in practice

Karl-Heinz FLORENZ

MEP, EPP shadow rapporteur on the waste targets review and rapporteur on the directive on electric and electronic waste

Resource Efficiency has become a big boost in Europe after the former Commissioner Janez Potočnik presented his "Circular Economy Package" last summer. Also G7 realised the challenge and potential and formed the "Alliance on Resource Efficiency" this year. And right so, there is a need, especially for Europe to deal with its resource restraints and to address the situation systematically, as we face a fundamental change in the way we produce and consume.

The Electric and Electronic Waste directive (WEEE directive), first time discussed in 2000 and revised 2012, was one of the first European legislations to deal with the idea of circular streams. It all starts with the design and the substances in electronic products, the RoHS directive intends to reduce hazardous substances in these products, facilitating recycling and the cycle of materials. But the shorter life-cycles of electronic products (mobile phones are used less than 2 years!), the growing middle class (by 2030 we will be five billion middle class people - five times more than in 1990) and the shortage of our resources (2050 we will need three times as much if we do not change our patterns) tell us clearly that we cannot go on with our business as usual. The world-wide E-waste figures demonstrate this clearly as lately published by the UN University Report[1]: 41.8 million tones were produced in 2014 and are expected to keep on rising. This amount is comparable to that of 1.15 million 40-ton 18-wheel trucks — enough to form a line of trucks 23,000 kilometers long, or the distance from New York to Tokyo and back. And so far there is no end in sight as electronic waste is one of the fastest growing waste streams. The biggest amount of E-Waste was produced in Asia in 2014 but if one looks at the per capita figures, Europe is with 15.6 kg per inhabitant the worldwide biggest producer.

Ignoring this waste stream is stupid: for environmental and for economic reasons.

The intrinsic value of the world wide E-waste in 2014 is 48 billion Euros because E-Waste consists of huge amounts of valuable materials. Did you know that alone 300 tones of gold which equal to eleven percent of the world's total 2013 gold production are imbedded in it? In fact, we have an urban mine: one ton of WEEE contains up to 50 times as much gold as one ton of rocks from a mine. Up to 60 elements from the periodic table can be found in complex products and some of these elements are rare or even not to be found in Europe. We depend heavily on raw material imports something that we can drastically reduce by properly collecting and recycling our E-waste. But only a sixth of it is worldwide properly recycled and made available for reuse. Europe so far has a collection rate of 37 percent by weight of amounts put on the market in 2010 although some Member States reach 50 percent already. When we discussed the reform of the WEEE directive we understood that we have to step up our efforts. We have to fight illegal shipment, especially out of Europe where the waste is treated in a substandard and highly health-risking way; we have to raise our collection rate but also the recycling rates with an important focus on the quality of recycling by improving our treatment standards. This makes pure economic sense: waste is a resource that we have to value!

I am very glad to see that resource efficiency is now understood as an important topic for Europe and we should recognize that it is also an international debate as the latest development in China shows. The discussion is not anymore in banned in the corner of a green dream but instead it is clearly understood that we have no choice but to deal with the topic seriously. If done right we boost our economy, create jobs and protect our environment - this was already proven by the WEEE directive. If I would put it in a picture, circular economy is a medal with two sides, environment and economy are interdependent and they profit both at the same time. During the financial crisis, the European environmental goods and service sector was one of the few that grew, adding about 1.3 million jobs, generating export earnings and contributing to Europe's competitiveness.

WEEE or the End-of-life vehicles directives are excellent examples of resource efficient waste laws but we have to consider the entire system, rather than just sectors as we face a fundamental change. Therefore, I expect from the European Commission a long-term, comprehensive and systematic approach to be presented by the end of the year for the waste package as well as for the circular economy that embraces the challenges and opportunities laying ahead of us.

1 http://unu.edu/news/news/ewaste-2014-unu-report.html

The EU Investment Plan: new funding opportunities for secondary raw Materials

Daniel CALLEJA CRESPO
Director General for Environment, European Commission

Moving towards a circular economy is at the heart of the resource efficiency agenda established under the Europe 2020 Strategy for smart, sustainable and inclusive growth. Using resources more efficiently and creating the market for secondary raw materials will bring new growth and job opportunities and is of great importance to both the EU economy and the environment. For this reason, the Commission will adopt a new, ambitious circular economy strategy late in 2015. This will aim at transforming Europe into a more competitive resource-efficient economy, addressing a range of economic sectors, including waste and the development of well-functioning markets for secondary raw materials. The proposal will look more concretely at the entire value chain in order to «close the loop» of circular economy.

Secondary raw materials are crucial for securing a sustainable supply of raw materials for EU industry and improving energy security. The Commission recognised the importance of secondary raw materials in the Raw Materials Strategy developed in 2008. The strategy aims at increasing the recycling rates to reduce the demand for primary raw materials, help reuse valuable materials which would otherwise be wasted, and reduce energy consumption and greenhouse gas emissions from extraction and processing.

It is clear that to support the use of secondary raw materials in the EU, well-functioning markets for these materials need to be developed, as well as more investment in areas such as waste collection infrastructure, reverse logistics, sorting, recycling or new technologies. Investment in projects related to secondary raw materials is thus among the priorities of the European Commission and will be given a boost with the new Circular Economy package to be adopted before the end of the year and the implementation of the €315 billion EU Investment Plan. Daniel Calleja Crespo, Director General for Environment (DG ENV), explains in that context the importance of raw materials to the EU and the funding opportunities for raw materials projects under the Investment Plan.

New funding opportunities under the EU Investment Plan

The financial and economic crisis in Europe has led to a drop in investment levels in the EU by about 15% since 2007. To help the EU economy get back on track, the European Commission launched an EU Investment Plan, the so-called "Juncker Plan". The objective of the 3 to 5 year programme is to steer European public spending towards investments which will bring back investor confidence in Europe.

One important component of this plan is the European Fund for Strategic Investment (EFSI), which will support strategic investments in key areas, as well as risk finance for small businesses. This should help maximise the impact of public spending, unlock private investments and improve the use of other EU financial instruments.

The Commission recognises that investment in projects that support the transition towards a circular economy, including projects targeting both primary and secondary raw materials, can improve the competitiveness of the EU economy and help boost economic growth while protecting the environment at the same time. Such investments are particularly recognised by front-running eco-innovative businesses, which improve their competitiveness through greater resource efficiency in production and consumption patterns. Many companies have developed new materials from secondary raw materials or have designed their products for circular use, better positioning themselves to reap the economic benefits of the transition to a circular economy.

Eco-innovative businesses, however, face challenges entering existing markets and developing new ones. The support of the European Fund for Strategic Investment will thus be particularly important for projects in the area of raw materials. These projects are sometimes

viewed as risky by traditional financial actors, despite their key importance for the competitiveness of the European industry. By supporting investments in the circular economy, EFSI can help stimulate new markets for new materials, including secondary raw materials.

Securing funding for innovative solutions

In recent years, the Commission has worked on a number of initiatives that have helped pave the way for more investment in raw materials projects. In particular, several actions have focused on the problem of securing a sustainable supply of raw materials through innovation, and on research and development (R&D).

For example, the European innovation Partnership (EIP) on Raw Materials, launched in 2013, brings together EU countries, companies, researchers, and NGOs to promote innovation in the raw materials sector. Its main objective is to help increase industry's contribution to the EU's GDP to around 20% by 2020 by securing better access to raw materials. The Partnership has already identified 95 actions to foster innovative solutions in the raw materials sector. These can be technological or non-technological, and include innovative actions to prevent waste from mining, improve recycling technologies, design products for an optimised use of raw materials, prevent illegal shipments of waste or optimise material recovery.

The innovation priorities identified by the partnership are reflected in the R&D funding through the EU research and innovation programme Horizon 2020. The programme, with a budget of approximately 600 million euros over 7 years, will help reach one of the key targets of the Partnership - the launch of up to 10 pilot plants by 2020.

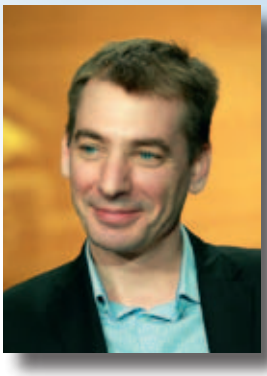
The LIFE programme represents another important possibility for funding circular economy, resource efficiency and eco-innovation projects, including raw materials.

As the raw materials industries are facing an increasing skills shortage, the Commission is working on raising awareness of the importance of raw materials for European society, the economy and the environment. The Commission also supports the development of new skills in engineering, material science and Earth observation. To address these challenges the European Institute of Innovation and Technology has formed the Knowledge and Innovation Community (KIC) on Raw Materials. The Community brings together more than 100 partners from leading businesses, research centres and universities from 20 EU countries. Its mission is to boost the competitiveness, growth and attractiveness of the European raw materials sector via innovation and entrepreneurship. Several leading universities and companies in the field of recycling and materials science are members of the KIC.

Another EU initiatives involves setting up a European Minerals Investment Platform that could help boost investments in raw materials supply projects, thereby contributing to securing supply for European industry. It would invest in sustainable exploration activities, mine development and recycling installations in Europe.

All these above mentioned projects can bring new innovative ideas to the table and help us develop the market for secondary raw materials and increase their use. The EU Investment Plan is the tool to help boost funding in the right projects. We can already say that there are encouraging prospects for investments in secondary raw materials. The European Investment Bank has analysed and approved the first projects and transactions, which will benefit from the EU budget guarantee under the European Fund for Strategic Investments.

Circular economy – what we can achieve with ambitious recycling targets and what is crucially needed beyond



Benedek JÁVOR
MEP (Greens/EFA), Vice-Chair of the ENVI Committee

The notion of circular economy is key to EU resource policies. In a circular economy existing materials and products are circulating in the economy longer than in the current economic model as the cascading use of materials is promoted and waste is minimised. Recycling plays a crucial role in the model, thus in this paper I have a closer look at this aspect, showing its benefits as well as it limits. I also provide some policy recommendations.

Withdrawal of the original package and what European Parliament expects from the new one

The European Commission published its original Circular Economy Package in July 2014. The package included a new recycling target of 70% for municipal solid waste, an 80% recycling target for packaging waste, marine and food waste reduction objectives, measures to phase out the landfilling of compostable and recyclable material and a new, harmonised methodology for recycling levels. Then, contrary to what European Parliament and the Council clearly signalled, **the new Commission withdraw the proposal**, partly using the reasoning that the recycling targets were impossible to achieve. Nevertheless, the Commission promised to return with a new package including an action plan by the end of this year.

WELL, we look at **current recycling levels** (the frontrunners are Belgium, Austria and Germany with recycling rates of 57%, 59% and 64% respectively - data retrieved from the European Environment Agency, 2013) and based on local **success stories** from across Europe an ambitious, at least 70% recycling rate in municipal solid waste is **already within reach today**, not to mention the 2030 or even longer timeframe we can expect in the upcoming, new package.

Potential benefits and limits of recycling in achieving a circular economy

Recycling provides multiple benefits. It reduces the demand for primary materials, manufacturing with recycled materials **saves costs, energy, water** – all contributing to the competitiveness of the resource-scare European economy.

Recycling conserves natural resources, it leads to **lower CO2** and other pollutant emissions. It brings us closer to non-toxic material cycles.

It **diverts materials away from landfilling** and also from incineration. It creates substantial jobs and **economic opportunities**. Evidence shows that recycling creates four times more jobs than the jobs needed in the business-as-usual waste management and disposal industries.

However, I am convinced that substituting primary materials by recycling and providing better market conditions for secondary materials can **offer a partial solution** only. It is less appealing than repair, reuse and remanufacture processes as it generally downgrades materials and requires far more energy input.

The circular economy package should definitely go beyond recycling. **The goal is not purely to ensure higher recycling rates** and better end-of-life treatment but to close the loop, **transform the whole production system, adapt consumption to actual needs** and prevent unnecessary resource and energy use **via technological and social innovations** across the value chain.

Conclusions, policy recommendations

With regard to the above, we can conclude that the benefits of recycling and in more general terms, resource-efficiency and circular economy are recognised in the EU, but we see scattered action in this direction.

Elements of the original package should be kept – as a minimum. And what else should the new package and the related action plan contain?

We definitely need a legislative proposal with clear, quantitative targets that **ensures moving up the waste hierarchy** and thus fosters waste prevention, reuse, preparation for reuse and recycling**. The new package should address** not only household but also **industrial and commercial waste streams.** Priority material streams could also be set up.

The aspects of restoration and **recycling should appear in the product design phase already – better product design standards** (and improved design requirements for packaging) can make **products more durable, easy to disassemble, upgradable, repairable and recyclable**. **Toxic materials** or other substances potentially impeding or weakening the recyclability of products **must be avoided.**

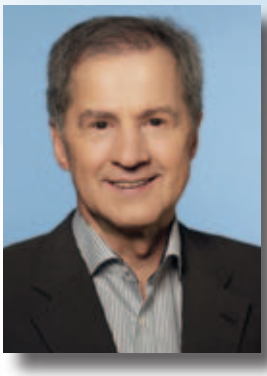
More room could be given to **demand side measures** such the stimulation of demand for secondary, recycled materials as well as for reused and remanufactured products and product parts. Promotion of **industrial symbiosis** could also be an option. **Relevant and reliable information** such as life-time, end-of life treatment, recyclability, disassembly, environmental impacts should be made available to stakeholders in order to enable informed purchasing, upgrades and repairs. These imply the **strengthening** and broadening the **eco-design and eco-labelling directives** to various product types and to the resource-efficiency dimension.

There is also a need for a clear fiscal framework in accordance with polluter pays principle, **phasing out environmentally harmful subsidies and introducing fees on resource inefficient activities such as landfilling and incineration of recoverable and recyclable materials** and preventing the use of EU funds for such purposes It is essential that the package includes landfill and incineration restrictions, in order to **avoid technology lock-in** in inflexible, expensive infrastructure.

These points are also **in line with the clear signal sent to the European Commission on the 17 of June by the Environment, Public Health and Food Safety Committee of the European Parliament** – backed up by other committees including the **Committee for Industry, Research and Energy** calling for a truly more ambitious proposal, or binding targets on waste reduction and increasing recycling, separate collection of biowaste, an absolute reduction in the consumption of resources, phasing-out of toxic substances and strong product policy.

Now it is up to the Commission to come up with a new package accordingly, offering a mix of approaches, regulatory tools and other **incentives** with synergic effects **together with targeted financing** to **move towards sustainable production patterns and orient consumer behaviour.**

Societal benefits of the circular economy



Jo LEINEN
MEP (S&D) Substitute of the ENVI Committee

Today's economy and consumption patterns are based on a linear 'take, make, dispose' model with a 'fast turnover' principle. Many gadgets, especially mobile phones or tablet computer, are designed to be replaced - and thus not used anymore and often littered- after two or three years only, well ahead of their expected lifetime. This leads to some critical resources getting scarce and more expensive while increasing volumes of waste and pollution are likely to impose threats to welfare and wellbeing.

There is no doubt that the European economy and traditional consumption patterns cannot continue like this. Already nowadays, it takes the Earth one and a half year to regenerate the resources we extract and use within a year. To ensure our own well-being and give citizens in developing countries as well as future generations the possibility to enjoy the same benefits as we do, we need to start operating within our planet's boundaries and decoupling economic growth from resource use. The solution is a circular economy, where products are designed to last and can be repaired, reused, recycled, dismantled and remanufactured. The facts are convincing: The EU is poor in mineral resources and therefore the biggest importer of raw materials. Making Europe more resilient towards the growing global demand for natural resources is an imperative of the 21st century.

An industrial transition towards a well-functioning economic system where materials are sustainably sourced, reused and recycled in order to limit the amount of virgin raw materials 'entering' the cycle as well as the end of life waste 'leaving' the cycle. At the European level, already a 30% improvement in resource productivity by 2030 delivers an increase in GDP of almost one percent by 2030, creates more than 2 million additional jobs and brings us on track to a more resource efficient Europe with ecological, economic and social benefits. Reducing the extraction of critical raw materials will ease the pressure on the environment. It's increasingly evident that there is a limit to growth in terms of availability of natural resources, which means our companies must respond to an increasing scarcity of natural resources. Reuse, recycling and remanufacturing thus reduces the threat, from a business point of view, to competitiveness, profits and business continuity.

Most of all, citizens and society will benefit from the circular economy in terms of being able to buy services instead of products, moving beyond ownership, exploring leasing and having the opportunity to make responsible consumption choices.

In the future product policy, products are designed to last, to be repairable, reusable, recycled and remanufactured. The consumer should be informed about the ecological footprint of the product of interest. Once the product is bought, there should be the opportunity to get upgrades and updates to improve its performance. Planned obsolescence or the need to replace the product every two or three years to get a better performance will be things of the past.

Another option is to move beyond the concept of ownership to a sharing society or a lease society. Various successful models of car-sharing have been launched across Europe and get increasing support. As the consumer biggest interest in products is the service they provide. We do not enjoy our car; we enjoy driving around, we enjoy transporting things or getting from A to B in a comfortable way. The same idea applies to the lease society. When a product is leased instead of bought the liability for its performance remains with the company and the consumer enjoys the service - at a lower cost compared to buying the product. Companies have the economic interest to make their products more durable and easier to reuse and recycle, because their expenses will be minimized when they use as little virgin raw materials as possible and the product is in good shape when it will be returned to the company. The incentive to launch a new version of a product - a cell phone or tabled computer for example - every few months, is gone. A company will outpace its competitors if it develops either a durable and long-lasting or an easy upgradable and reusable device. In return, it will be less dependent on volatile and increasing raw material prices. The consumer will enjoy the service of a sustainable product without needing to buy it.

In order to set the right incentives to decouple economic growth from natural resource use, a coherent policy framework for the transition towards a circular economy is needed. A policy framework with a carrots-and-sticks approach: binding targets to become more resource efficient combined with rethinking taxation in a way that it will be beneficial for all: shifting taxation from labour to the consumption of non-renewable resources and removing VAT from recycled materials. Shifting taxes would accelerate the transition to a circular economy and help balance the threat of losing jobs in a digitised and automated economy. In addition, all the services around a product in a circular economy – from sustainable design, to maintenance, upgrading, repair, reuse and remanufacturing – require more labour and will thus create new jobs.

The EU needs to start the transition to a circular economy to ensure sustainable growth, resilience and benefits for the society.

Why Europe needs a market-driven circular economy?

Dominique MAGUIN
President of the European Recycling Industries' Confederation (EuRIC)

The conjunction of current economic and environmental challenges gives rise to a unique situation that political leaders have never faced before. Both of them have very concrete impacts:

- Youth unemployment which is well-above 20% by mid-2015 across the EU-28 and even more important in the Euro area where it is peaking above 22%, while it was down to around 15% at the beginning of 2008[1].
- Unpreceded environmental pressures leading to climate change, already causing undeniable changes in the environment, and which, if no serious global action is taken, will lead to irreversible impacts both on nature and populations[2].

These two challenges have to be tackled simultaneously because of their acute consequences for people and ecosystems well-being. The circular economy is one of the economic models, if not the only one, which can make a difference both for the economy and the environment. It is hence crucial to get it right.

European recyclers have a lot to share when it comes to making the circular economy become a reality. Their core business is to turn wastes into new resources. By doing so, recyclers are the link which re-introduce recycled materials into the production chains again and again.

The benefits they bring to the economy and the environment are well-known. Recycling offers local job opportunities, which cannot be outsourced, as recycling usually takes place close to the source of collection of recyclables. It has the double advantage of providing a sustainable source of domestic raw materials for Europe's manufacturing industries – be it to metal, plastics or paper manufacturers – and to improve Europe's raw materials trade balance. Both aspects are crucial to achieve a genuine EU industrial renaissance by 2020. Recycling also comes with massive environmental benefits not only by saving natural resources but also by drastically reducing energy consumption and pollution. To quote only two examples, recycling of aluminium saves up to 92% of CO_2 emissions and 95% of energy while recycling of steel saves up to 58% of CO_2 emissions. These figures must find a strong echo in climate change policies, be it in Europe, currently revising its emissions trading system for the period after 2020, or at world level, a few weeks ahead of the UN Climate Conference, in Paris (COP21).

However, it must be kept in mind that recycling is first and foremost a business activity driven by an ecosystem of thousands of Small and Medium-sized Enterprises (SMEs) as well as of larger companies. All of them are local and global actors. They produce locally commodities which are traded globally. **This is the reason why an ambitious new circular economy package needs to be market-driven in order to deliver its very objectives.**

For doing so, the new package will need, through a mix of push and pull measures, to:

i) Keep a strong hand on the basics of the waste legislation while setting market incentives to pull the demand for recycled materials and correct market failures;

ii) Alleviate administrative burdens, a major hurdle for recycling companies, especially SMEs, while ensuring undistorted competition in the waste and recycling markets.

i) Regarding the former, the 'paradigm shift' that sees waste as a resource must be better reflected into the waste legislation by measures which push treatment up the waste hierarchy. Banning the landfill of recyclables should be a landmark measure of the new package but not the only one. EuRIC also calls for phasing out, at EU level, the incineration of unsorted wastes to ensure that only non-recyclable residues are

1 Eurostat, Unemployment statistics. Data up to July 2015.

2 Intergouvernemental Panel on Climate Change (IPCC), Climate Change 2014 Synthesis Report – Fifth Assessment Report.

incinerated, which in turn, would contribute to the objectives of the Energy Union. Ambitious recycling targets for the horizon 2030, supported by strictly-defined and collector neutral definitions, in particular for household wastes, are also key for investments by companies and public authorities. The temptation to set country-specific targets, unless limited to implementation timeframes, should be resisted to avoid further increasing waste market distortions in the EU.

Confidence in recycled materials and certainty are another crucial element where end-of-waste criteria for certain streams, such as plastics, compost, construction aggregates but also paper, have a key role to play. Not only they alleviate administrative barriers to handling of safe and clean secondary raw materials but they also bring confidence into the quality of recycled materials and stimulate recycling markets by easing the reintroduction of materials in the production chain.

This brings us to the key question of how to foster markets for secondary raw materials and drive the demand for recycled materials. First, by thinking circular at the design stage and laying down eco-design requirements to support products' re-use and recyclability. Second, by incentivizing the demand for recycled materials use, via pull mechanisms, including green public procurement criteria, consumer information about the environmental footprint and recyclability of products as well as lower tax rates, especially VAT, for recycled materials and green products. Third, by correcting regulatory distortions embedded in EU legislation which place a higher cost burden on downstream users of secondary raw materials. For example, the recent cumulative cost impact assessment for the steel industry, commissioned by the European Commission, has clearly demonstrated that, despite huge benefits in terms of energy and CO2 savings and growth potential, the cost of EU regulation is much higher for EAF steelmakers using recycled steel scrap (17,4€/t) than for BOF steelmakers using mainly primary raw materials (10,7€/t).

ii) Regarding the latter, much less has been said so far. However, removing regulatory burdens and ensuring undistorted competition will play a decisive role in realising a circular economy which makes economic sense. Nobody challenges the fact that wastes treatment must come with a high level of protection, which goes hand in hand with confidence-building in secondary raw materials. The objective is rather to make legislation smarter in order to boost recycling.

A first priority should be to improve the interplay between EU's waste and chemical laws, which were mainly based on a linear economy model. This is a complex issue which deserves a holistic approach – from products' design to their re-use and recycling – in order to address practical challenges arising from material flows in a circular economy.

Another concrete example relates to EU procedures for waste shipments. Their day-to-day use by recycling companies proves to be overly complex and makes it increasingly difficult to organise transboundary shipments within Europe, while in parallel illegal shipments could be better tackled. Those obstacles foster the implementation of sub-optimal treatment types and hamper the emergence of well-functioning markets for secondary raw materials. To remediate this situation and create a competitive internal market, EuRIC calls in particular both for faster intra-EU transboundary shipments and for replacing paper-based procedures by electronic ones. In addition to contributing to the Digital Single Market Strategy, moving to electronic control systems would align administrative procedures with the pace of business.

Recyclers also call for undistorted competition. Competition will be a decisive success or failure factor of a circular economy. By ensuring a level playing field across the EU and an efficient allocation of resources and roles between all stakeholders, EU basic principles of competition, internal market and public procurement are, at least, as important in the perspective of realising the circular economy as they were for the completion of the single market or more recently for opening-up sectors, such as transport or energy, which were traditionally public monopolies. Hence, EuRIC calls upon the European Commission to make undistorted competition an integral part of the future circular economy. This means ensuring that when an entity, public or private, engages in waste and recycling-related activities the same rules apply for all without special rights. This also means supporting the establishment at EU level of binding minimum requirements for Extended Producer Responsibility (EPR) Schemes. EU-wide baseline operating conditions are key to ensure that EPR Schemes continue supporting higher collection and recycling targets, think circular at the design stage while fostering, in parallel, transparency, equal access to recyclables and fair competition to avoid the creation of new monopolies, whose market power can be particularly detrimental to SMEs.

Last but not least, undistorted competition is also relevant when it comes to the trade of secondary raw materials. A circular economy cannot stop at EU borders especially since recycling is part of a global industry. Access to the world markets is even more crucial to avoid price distortions between Europe and the rest of the world. It ensures that the EU's recycling industry, by fully benefiting from market opportunities offered within and outside the EU by environmentally-sound customers, remains competitive and market-driven.

In the context of the public consultation launched by the European Commission, EuRIC has put forward concrete proposals to move towards a circular economy. All of them benefited from the expertise of its Members Federations from 18 EU & EFTA countries, representing 5 500 private companies, which provide 300 000 local jobs, recycle 150 million tonnes of a variety of waste streams per year and generate an aggregated annual turnover of about 95 billion Euros, in Europe. Put together, those proposals provide a clear path towards a market-driven circular economy which delivers much needed jobs and investments while minimising environmental impacts.

Shaping the Path Towards Sustainability

Karl-H. FOERSTER
Executive Director of PlasticsEurope

The European Commission's announcement of a new and more ambitious Circular Economy Package opens up new opportunities to put Europe on the path of a truly sustainable and resource-efficient future.

For many years, the plastics industry has been saying that plastics are too valuable to be thrown away. Back in 2012, and willing to exploit the great potential of plastic waste, we fixed the target "Zero Plastics to Landfill" in Europe. The experience of nine EU countries which introduced landfill bans to recyclable and other recoverable waste, including plastics waste, demonstrated that it generates huge ecological and economic benefits. In fact, we have already seen a significant reduction in the amount of plastic waste being landfilled in Europe, mainly because of national landfill restrictions: between 2006 and 2012, the amount of plastics waste being landfilled in Europe was reduced by 26% to a total amount of 9.6 million tonnes and as a result, plastics recycling rose by as much as 40% and energy recovery increased by 27% in those EU countries. The challenge today is to have a landfill ban at EU level.

A landfill ban by 2025 on recyclable and other recoverable post-consumer waste would prevent a total of around 60 million tonnes of plastic waste from ending up in landfills. It would also lead to an annual additional amount of over 5 Mtonnes of plastics recycling. The remaining plastics waste which could not be sustainably recycled could generate around 330 TWh of energy annually equivalent to roughly 23% of Europe's gas imports from Russia.

We need to acknowledge that today's recycling technology works well for products such as PET and HDPE bottles which are easy to collect and sort. However, for other products, recycling is not always the most eco-efficient solution due to, for instance, additional water and energy needs during the process. In this regard, a recent study has shown that the recycling optimum level for plastic packaging, from an eco-efficiency perspective, currently lies between 35% and 53%, depending on the country's collection, sorting and recycling capacities.

While waste and the way it is managed are important aspects within the framework of the circular economy, it is even more important to consider the resources saved during the whole life cycle of a product. Plastics are often perceived as cheap and disposable materials. Common misconceptions lead to forget the many benefits that plastics provide to our society. In fact, plastics are one of the most resource efficient materials. For example, plastics used for insulation saves over 200 times the energy used to produce it. If we think in the automotive sector, the simple fact that plastics make cars lighter have a positive effect on greenhouse gas emissions as plastics help to reduce the fuel demand. In packaging, where plastics increase the shelf life of fresh food and decrease the weight of packaging, plastics help save in Europe an amount of energy and GHG emissions, respectively equivalent to the heat for 40 million people and the CO2 emissions of Denmark compared to alternative materials, even if recycling rates for plastic packaging are lower than other materials.

It is important to choose the most resource efficient and safe materials over the full life cycle of a product in order to fulfil the requirements from the market and not to focus only at the production or end-of-life phase. We therefore call on the institutions to carry out an eco-efficiency analysis to determine "eco-efficient" plastics recycling targets.

To shape the path towards a truly sustainable Europe, we need to educate citizens so they understand all the benefits that plastics bring and that they are too valuable to be thrown away.

Plastic Waste: Towards a long-term and more ambitious policy

Margrete AUKEN
MEP, (Greens/EFA) Member of the ENVI Committee

The consumption of plastic bags in the European Union is excessive and has severe consequences for our nature as well as quite significant costs for local communities and municipalities which have to pay the cleaning bill. Every year nearly 100 billion plastic bags are consumed, a number expected to grow to 111 billion plastic bags by 2020 if no action was taken. On average, every European citizen consumes 175 single-use plastic bags per year (not counting the very lightweight ones used to wrap e.g. fruits and vegetables), and 89 percent of these plastics bags are often only used a single time before ending up as waste. Our local communities pay the bill of cleaning which amounts to €45 million each year.

In nature plastic makes up 70 percent of the garbage pollution in several European oceans and again up to 70 percent of this can be plastic bags. The plastic waste respects no borders, especially not in waterways, and thus Europe-wide regulation should in fact be common sense.

For more than forty years EU waste legislation has aimed at reducing the amount of waste, but with the plastic bag law for the first time we actually take action with binding EU rules aimed at reducing plastic waste. The plastic bag law is therefore nothing less than a historic breakthrough in tackling the pervasive problem of plastic waste in our environment, and I really see the agreement on this file as a victory for both nature, for the Greens and for the EU.

Under the new rules EU member states may either apply reduction targets (reducing single-use plastic bags by 50 percent in 5 years and 80 percent in 7 years) or introduce mandatory pricing (no free handout of plastic bags). Both measures have proved very successful in those jurisdictions in which they are already in place. Those member states which want to go further and ban single use bags can do so as well.

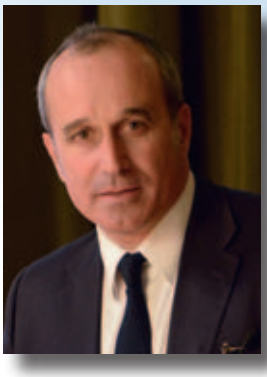
If a member state choses to put a price on plastic bags we as customers have to decide each time we buy for instance a shampoo or a light bulb if it's really worth it to spend another 10/20/25 cents on a plastic bag. This is what has been done in Ireland, and after introducing a price on plastic bags the consumption was reduced by 91 percent in 5 months. As this case show us, thus with the right policy the targets of the new EU-wide law should be easily achievable. And if the law is properly implemented, we can expect a yearly reduction of at least 40 billion single-use plastic bags each year after 2019 and of almost 70 billion single-use plastic bags each year after 2025.

Working with this file it has clearly been the EU Commission which has been the biggest challenge. The Commission made a good impact assessment already in 2011 that showed the way forward: allowing national bans and have EU-wide reduction targets and pricing measures. But unfortunately the Commission decided to disregard its own impact assessment in the proposal it presented for the Parliament and Council in which there were no effective reduction measures at all. We turned – also thanks to the good cooperation with the Italian Presidency - the proposal into something more meaningful, and then even in the final negotiation round there was actually a threat from the Commission that it might veto the agreement. In this case we would have needed unanimity in Council. It took a decision at the highest level, by the Commissioners themselves, to make the Commission come around and support an effective regulation. The plastic bag law was the first law adopted under the Juncker Commission - and unfortunately this behaviour in the negations gave us a sad illustration of the new Commission's motto to be "big on big things, small on small things". Apparently an ambitious law on "small things" like plastic waste was too big for the Commission's taste.

But this legislation is a win-win-legislation. It will mean: less pollution, savings for public authorities and massive savings for retailers as well. The only cost will be for the consumers in the sense that we will need to think about our behaviour and change our habits if we don't want to pay a small price for the plastic bags.

I hope that this file for which I had the honour to be the rapporteur for the European Parliament will only be the first step to fight the plastic waste. The next challenge will be to make legislation about micro plastic, which potentially is a serious threat to both environment and health as micro plastic is absorbed in the food chain. And finally this new plastic bag law should also just be a first stepping stone for a more preventive approach to waste regulation as part of the idea about the circular economy. A circular economy is not only about recycling of waste but also about not producing all this waste in the first place.

Climate and packaging materials
The double benefit of recycling



Eric BRAC DE LA PERRIÈRE
General Director of Eco-Emballages

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At the beginning of the 1990s and facing increasing volumes of waste, Antoine Riboud, then chairman of Danone, and Jean-Louis Beffa, chairman of Saint-Gobain, suggested an incredible innovation to the young ecology minister, Brice Lalonde: give businesses the responsibility for recycling packaging materials rather than creating a new tax. So it was that Eco-Emballages was created, a 100% private company, 100% general interest, uniting mass retail and distribution businesses to develop recycling as part of Extended Producer Responsibility (EPR).

"*Even if household waste represents less than 1% of all waste, the businesses have acted as precursors. With Eco-Emballages, they were mobilised from 1992 to combat global warming even before this subject occupied the media limelight, with convincing results*", emphasises Eric Brac de La Perrière, Managing Director of Eco-Emballages.

In reality, the 1st objective of Extended Producer Responsibility is waste management and this has proven to be an effective means of reducing greenhouse gas emissions, which has been shown by a CDC Climat Recherche study published in June 2015.

The Paris Climate Conference 2015 will be held next December. The challenge? To sign an international agreement to limit the temperature increase to two degrees between now and 2100. This summit meeting has with crucial issues to tackle and is an opportunity to wonder about the solutions that each of us can contribute to decarbonise the economy. Do the EPR industries play a role in the struggle against climate change? This is the starting point for a study conducted by Vivian Dépoues and Cécile Bordier, from CDC Climat Recherche[1], directed by Benoît Leguet, who selected the oldest EPR industry, household packaging materials, as a case study.

"*We recognised that the link between the EPR sector and climate change was poorly identified*", explains Benoît Leguet, Research Director at CDC Climat Recherche. "*The benefit of recycling packaging materials is neither recognised nor well known*". The relatively low proportion of waste processing in greenhouse gas emissions (2.6%) may explain this lack of visibility. This is the study's first observation: EPR, while it was initially considered with the aim of waste management, is also a factor in the battle against climate change. Recycling 3.2 million tonnes of household packaging materials in France during 2014 actually avoided 2.1 million tonnes of greenhouse gas emissions. The researcher continues: "*The climate is actually a joint beneficiary from the effects of the packaging materials EPR industry*", particularly as the benefits can be extended even further. *"The study is clear - having an industrial approach takes the entire life cycle of a product into account. And involves everyone. This approach can be very effective!"* Vivian Dépoues is thrilled to say.

Recycling 3.2 million tonnes of household packaging materials in France during 2014 avoided 2.1 million tonnes of greenhouse gas emissions.

The second observation made by CDC Climat Recherche is that recycling may conceal a more significant benefit not revealed by national surveys: recycling reduces the waste to be processed, but also saves raw materials, included with industrial emissions.

Besides, reducing emissions begins at the design phase for the packaging. Reduction at source is an integral part of action taken by businesses, once again offering multiple benefits of reducing consumption of natural resources, waste production and greenhouse gas emissions. Moreover, a reduction target of 106,900 tonnes was achieved in 2012. "*As an economist who believes in the future, I think we can always go even further*", continues Benoît Leguet. *"But packaging materials must be reduced cautiously. We have to consider their role in protecting the product and informing the consumer. Reducing*

packaging too much can lead to losing the product and then all the resources used early in the supply chain for its production will have been mobilised in vain!"

Key players

Second factor identified by the study: develop the tonnages recycled by increasing the number of household packaging materials collected. This subject is the focus of the Relaunch Plan started by Eco-Emballages in 2014. Just like the increase in the pool of recyclable packaging materials, by developing the recycling of plastic packaging materials. In this way, broadening the sorting instructions to all plastics constitutes a third factor that, by itself, could avoid up to an additional 750,000 tonnes of CO_2 by combining recycling and supplementary energy recycling.

As the study summarises, "*the combined analysis of incentives and efforts to reduce greenhouse gas emissions highlighted the role of everyone involved throughout the material cycle.*" And therefore to determine what can boost their action. "*Most of the reductions in emissions are made by industry, through material and energy savings enabled by recycling. This last link in the chain is the most important*," picks up Benoît Leguet, "*but the whole chain is needed for success, from the consumer who has to throw packaging into the bin, to local authorities who must develop collection and sorting.*" Local authorities are also key players.

"*The must be reminded about the climatic benefit of recycling,* he goes on. *"Local authorities don't always understand that they can take on recycling to benefit the climate as part of regional Climate Plans. In fact, our study shows that the most active local authorities are those that have integrated the waste management and recycling approach into a broader context combining their [French] regional energy climate plan (PCET) and their sustainable development initiatives."* And consumers?

Here again, the study emphasises work early in the supply chain: "*When we penalise the consumer, the worst has already been done*", comments Benoît Leguet. "*The issue is to involve consumers, certainly in sorting household waste, but also much earlier in the supply chain, in their consumer choices.*"

Furthermore, the contribution of EPR to combatting climate change has the advantage of being based on an original and virtuous economic model that has little impact on public finances.

"*If industrial recycling sectors have been developed, it is thanks to the availability of material to be recycled at a competitive price. Through EPR, businesses have borne nearly 80% of the net cost or managing waste household packaging materials by paying more than 670 million euros. And the collected material is resold by local authorities for more than 200 million euros*", recalls Jan Le Moux, Eco-design and recycling Director at Eco-Emballages. So, a circular economy started in 1992!

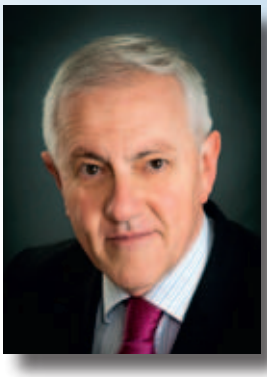
Last May, French President François Hollande encouraged industry to 'take action". How? By changing from sharing the burden to sharing solutions. In his opinion, the climate challenge should also be seen as "*an opportunity for creating jobs and wealth, for inventing new means of production and consumption*".

"*While the household packaging materials EPR sector will not resolve the entire question by itself, its contribution is certainly effective. More than ever, it has a role to play! Eco-Emballages is involved in the solution for businesses and for the consumer by providing them all a sorting bin to reduce the impact of consumption and avoiding pollution*" concludes Eric Brac de La Perrière.

(1) CDC Climat Recherche is a subsidiary of the French Caisse des Dépôts. CDC Climat Recherche provides independent expertise in analysing economic questions linked to climate-energy policies.

"Most of the reductions in emissions are made by industry, through material and energy savings enabled by recycling. This last link in the chain is the most important."

Resourcing Europe



Pierre EYMERY
Director for Public Affairs, VEOLIA

The 13th of August 2015 was the day when the demand on nature exceeded what Earth can regenerate[1] in one year, and every year this date comes earlier than the year before. The question is how can we ensure economic and social growth without putting further unsustainable stress on natural resources that are becoming increasingly scarce and expensive to extract in a context of a fast growing and ever more consuming World's population? Without doubt our economy can no longer sustain the strain of the two extremities of depletion of natural resources and the environmental impacts generated by economic activities. In a world where economies are increasingly interconnected and always more urbanized, we have to be ever more inventive, and among all more responsible and efficient in the way we use the World's resources.

According to the latest Ellen MacArthur Foundation report, one of the benefits of circular economy would be a growth in resource productivity by up to 3% annually[2]. At Veolia, closing the loop is already the lead principle of our activities. Our company offers integrated, innovative and sustainable solutions in the area of water, energy and waste management. From service supplier to resource producer, Veolia is able to propose models where revenues are driven by performance or incentivized on the level of resources spared.

"In nature nothing is created, nothing is lost, everything changes." Circular economy is to develop new innovative partnerships to close the loop to indefinitely and sustainably reuse materials into new ones -second raw materials-, with the same properties of virgin materials and in a sustainable manner.

This paradigm shift is based both on continuous innovation and on a **new way of collaboration,** where partnerships play a key role to create and share value.

As an illustration of how business can shift from depollution to solve scarcity issues, Veolia has, in cooperation with the French Atomic Energy Commission devised a process for recycling used lithium batteries, to produce ultra-pure lithium that is directly (re)usable in industry. The Lithium produced can once again be used for example in the batteries of electric cars.

We have also developed long term commercial partnerships with our industrial customers based on shared risks and benefits.

Osilub, a joint venture between Veolia and Total regenerates used oil into high-grade lubricants. This brings an answer to the motor oil production under-capacity in France and addresses the EU waste legislation giving priority to the regeneration of waste oils[3].

In order for businesses, governments and communities to act, more and better circular growth models must be developed to ensure access to resources, to preserve and replenish them.

1/ Access to resources by encouraging territorial ecology and mutualizing energy, waste and water infrastructure at local level. Veolia favors such local loops to reduce our client's resource consumption and pollutant emissions.

Our business models are evolving to guarantee access to resources instead of selling them. An example of this is solvent leasing (for example to the pharmaceutical industry) where we collect and regenerate waste solvents. Veolia guarantees the same quality and reliability of materials and meets the clients' specifications but is paid for a service not for a raw product.

2/ Resources protection by reducing their consumption and depletion. The transition to a low carbon economy is a prerequisite that has to be conciliated with the high and growing demand for energy. The development of efficient heating and cooling networks is a promising path to reach this goal by using biomass as an alternative to coal. As a substitute for fossil fuels, biomass significantly reduces CO2 emissions, and shields users from the price fluctuations that are inherent to the oil and gas markets. Besides, the development of combined heat and power allows a significant improvement in energy efficiency compared to standalone production of heat or electricity.

In order to preserve resources, everything that we use or consume should be recycled or recovered, so that more materials could be turned back into a resource. If we want to use and recycle the limited resources available in an optimum and efficient way, we must place the recycling and recovery of waste at the core of the new business models. Even wastewater is a resource: from the production of drinking water out of recycled wastewater[4] to the production of bio-plastics out of wastewater sludge. Indeed, by recycling wastewater, we turn a nuisance into a resource, we increase productivity per cubic meter of water withdrawn from nature, and we decrease freshwater intake.

1 Global Footprint Network

2 Ellen MacArthur Foundation Report "Growth within: a circular Economy vision for a competitive Europe" June 2015

3 http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098. Article 21.3

4 Such a system already exists in Windhoek, Namibia in order to secure supplies of drinking water

3/ Renew resources by prolonging the lifespan of materials and products. Dialogue between manufacturers and the waste sector should be intensified particularly at the stage when products are designed in order to enhance easy repair or recycling. Better design would also facilitate the twin benefits of a smaller environmental footprint, and savings in the use of raw materials. Products that are easier to recycle at the end of their useful life will lead to better supply chain pricing, as the quality of recycled material improves, and is more able to meet critical business demands.

Our economies are confronted with a boom in the demand for resources, which is countered by uncertain supplies and insufficient use of **second raw materials.** Yet, by turning waste into a resource, which are competitively priced and have a smaller environmental footprint than their virgin equivalents, one can help reduce the EU's reliance on imported virgin raw materials and deliver value.

In Rostock (Germany) Veolia is converting 1 billion plastic bottles each year into flakes that are then used to make new bottles. Using recycled PET prevents around 70% of CO_2 emissions compared to standard virgin PET. The benefits are striking; more than 31,000 metric tons of oil and thousands of cubic meters of water are saved each year through this process, while reducing costs for the supply and transportation of raw materials.

In order to make the circular economy come true and turn waste back into resources, we need a clear and stable legislative framework to encourage investment.

1/ One of our key recommendations is the **harmonization of definitions**. The first thing we would advocate is to adopt common definitions between the interlinked texts of EU acquis, to alleviate diverging interpretation in national transpositions. A recurring example is the divergence of classification between recovery and disposal. For many years this divergence has led to an unlevel playing field for the treatment of Flue Gas Treatment residues[5]. The links between the various pieces of EU legislation should be carefully studied, notably regarding waste and non-waste in order to prevent perverse outcomes from disjointed and inconsistent definition and targets. In this regard, we wish to see one **single calculation method** for recycling targets leading to consistent reporting to EUROSTAT.

2/ To embrace circular economy, municipal waste, which only represents 10% of all the waste generated in the EU, should not be the only targeted waste stream. **Non-hazardous commercial and industrial waste** that represents a large amount of recoverable material and energy should also be encompassed in the forthcoming Commission legislative proposals on circular economy.

3/ Pull measures should be introduced in order to further develop second raw materials markets, for example the promotion of *green public procurement*, incorporation of recycled materials in different kinds of products through *recycling certificates system* or *reduced VAT rates* for second raw materials.

4/ Recovering **energy from waste** will contribute to a significant reduction in EU energy consumption, in particular from the use of fossil fuels. In particular, Refuse Derived Fuels, produced from refuse sorting and treatment centres constitute a resource that should have a bigger role within the EU waste and energy policy framework. **Heat recovery** from data centers or from water systems are also being increasingly used. **Incentives to promote the use of District Heating Networks** are much expected in order to optimize the production of both local thermal energy and co-generated electricity.

5/ Recycling used water should be promoted through standards addressing health and environmental risks. An EU legal instrument should aim at setting minimum quality standards based on scientific studies depending on the purpose of the reused water, in particular agricultural irrigation (70% of total water use). It would help reach acceptance among public opinion, and thus facilitate the creation of future opportunities to save water. It would also contribute to create a level playing field for food-products, imported or locally produced.

6/ Flexibility of the waste hierarchy is essential: it has to balance the overall impact on the environment with the technological and economic conditions driven by the objectives of treatment. We should **stop opposing treatment options but look for synergies** among them. In order to move up the waste hierarchy, it is important to ensure **qualitative** requirements for recycled materials.

Furthermore, some countries do not yet have the best available infrastructure; differentiated national recycling objectives along more adequate **investment financing mechanisms** are therefore prerequisites to an ambitious and sustainable legal framework.

7/ Primarily, **key resource performance indicators** should be established in Member States where they do not exist and should be harmonized so as to ensure a minimum level of comparability among services such as water, waste or energy management. These systems should be made fully transparent and accessible to the public, as it is the case in the UK and French water sectors, to enable users and citizens to get better performance from their service suppliers, whether public or private.

5 For many years French hazardous Flue Gas Treatment residues, mainly coming from municipal waste incinerators, have been exported at higher environmental costs to Germany to be "recovered" in disused salt mines. There is no possibility to oppose these shipments, because in France treatment installations for hazardous waste are classified as disposal.

How can we reduce and make better use of waste?

The best way to reduce the environmental impacts of waste is to prevent it in the first place. Many items that we throw away could also be re-used, and others can be recycled for raw materials.

481 kg

of municipal waste is generated per person per year in the EU.

42%

of treated municipal waste in the EU is recycled or composted.

Recycling an aluminium can saves around 95 % of the energy needed to make a new one from raw material.

Sources: Eurostat (2012)
Read more: www.eea.europa.eu/waste

Waste Prevention: consumer information and long-lasting products

Monique GOYENS
Director General, BEUC

Sylvia MAURER
Head of Sustainability and Safety, BEUC

European consumers have a lot to win from a well-designed circular economy in which strategies for a lifespan extension of consumer products play a major role. Products should be designed to provide a lasting value to consumers. This means products should function reliably and be designed for ease of maintenance, repair and upgradeability. This will be the most effective waste prevention. In addition to design requirements, improving consumer information on the expected lifetime of products will be an important precondition to reward longer lasting and more resource efficient products.

A recent United Nations report revealed that that the world's mountain of electrical and electronic waste reached a new peak of 42 million tons in 2014. Topping the list for per capita-waste are European countries which are usually not seen as the environmental laggards such as Norway, Switzerland, Denmark, the Netherlands, Sweden and Austria[1]. Consumer products put significant pressure on the environment for two major reasons: consumers own more and more products and they make sometimes only short use of them. One could quite rightly ask: Is this only the consumer's responsibility who is keen to have the best and latest products on the market? However, sustainable consumption and production are two sides of the same coin and current economic and political framework conditions do not enable people to easily adopt sustainable lifestyles.

Our member organisations receive consumer complaints that products fail shortly after the end of the guarantee period and cannot be repaired because devices cannot be opened and spare parts are not available or too costly. A particular problem is related to smart phones, tablet computers and similar devices for which no updates seem to be available after some time which can lead to incompatibility with other devices or for which the updates take too much space and make the devices slow.

Despite missing comprehensive EU-wide data, it is estimated that consumers lose considerable amounts of money due to the need to continuously replace products with newer ones earlier than necessary. Whether manufacturers *programme* obsolescence purposefully to continue selling in saturated markets or if they just accept premature failure due to the use of inferior materials related to cost pressure may be difficult to proof. However, it is irrelevant as far as the objectives of consumer protection and environmental preservation are concerned. The decisive point is that product lifetimes currently do neither live up to what consumers expect nor to what is technically possible and feasible in a cost effective manner.

To prevent waste, policy makers should take action in four main areas as we need better:

- Consumer information
- Design of products
- Legal guarantee rights
- Repair services at local level

More concretely, the EU urgently needs to adopt new rules which ensure more information about the expected lifetime of products and about the availability and costs of spare parts. Without such information consumers are not enabled to reward manufacturers who produce long lasting and reparable goods. Such standardised information is needed in particular because in non-transparent markets a high purchase price is not always a good indicator for the durability of products. Consumer surveys show that there is large interest from consumers to receive such information. When asked what criteria consumers take into account when purchasing new appliances, 'durability' is often mentioned as the second criterion after energy efficiency.

In addition, the EU needs to systematically address lifespan extension in key product policy instruments such as Ecodesign and Ecolabelling as well as technical standardisation. The Ecodesign Directive is in particular a powerful and successful instrument to address product lifetimes and we should not miss the opportunity to tackle durability in the ongoing revisions for household appliances as well as the future EU Ecodesign work plan.

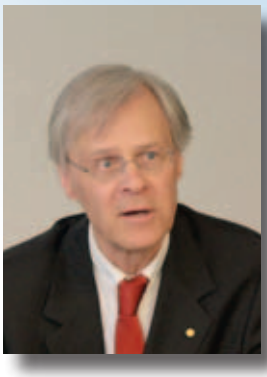
The EU 1999 Directive on Consumer Sales foresees a minimum legal guarantee period of two years. After six months, it is the consumer who has to proof that a product has been defective from the outset which makes it difficult in many cases for consumers to make use of their rights. Only two countries, Portugal and France have expanded the period for the reversal of proof to two years and only few countries have longer guarantee periods. Therefore, a revision of the EU rules on guarantee rights is urgently needed. To ensure effective protection for consumers when purchasing goods across the EU, the Consumer Sales Directive should extend the length of the legal guarantee period and be accompanied by a reversal of the burden of proof to ensure that within that period a consumer can effectively exercise their guarantee rights without unnecessary burdens.

Finally, action will be needed to ensure that repair will become more attractive. In this respect consumers should have better access to high quality repair services at local level and the availability of spare parts at reasonable prices needs to be ensured.

With the circular economy package, the EU will have a major opportunity to develop new policies which will serve consumers, the environment and the economy. We should not miss it!

1 http://i.unu.edu/media/unu.edu/news/52624/UNU-1stGlobal-E-Waste-Monitor-2014-small.pdf

Closing the Loop Through Waste Management and Source Separation



Weine WIQVIST
President of Municipal Waste Europe

Since the first waste framework directive in 1975, which focused on the collection and safe disposal of municipal waste for hygienic purposes, the focus of European waste legislation has been on municipal waste. Waste management is a vital part of the services of general interest provided by local authorities and an important factor in the sustainable development of a municipality. In most Member States this encompasses household and similar waste from other sources in the municipality. Two important aspects of this waste stream must be kept in mind: one, that it arises in every household or similar entity every day, hence it is dispersed by nature and two, that it is only 10% of national waste generation according to current European statistics.

Another important fact we must keep in mind when discussing or developing our ideas on closing the loop and forming a circular economy in Europe, is that we are a continent of consumers who import two thirds more than we export. This turns our 10% municipal waste stream into a source of valuable resources.

European legislation sets the aims for management of the contents of the municipal waste stream and due to its dispersed nature, municipalities have the responsibility, as it is a service of general interest, for organising its collection method and the treatment for residual waste. Within this management system, each step of the European waste hierarchy must be used optimally in order to achieve the greatest possible recovery of materials and energy from the waste while minimising landfilling. Municipalities' knowledge of their citizens, the layout of their urban or rural environment and how to communicate the benefits of separate collection and waste management to them is crucial to the success of the system.

Municipalities are not the only actors in the chain of responsibility for achieving recovery of resources from the waste with the aim of reducing disposal and creating a circular economy which keeps these resources in use for as long as possible. Cooperation with producers through producer responsibility and their implementing organisations plays a key role in enabling the correct and economically viable collection of their materials, separated at source by the citizens. Both the organisation and the communication of the separate collection systems is a joint effort and those Member States that have taken this on board demonstrate high recycling rates.

Due to this recent re-focusing on waste as a resource, it became apparent that the existing waste legislation needed to be significantly revised. What we name municipal waste must be clear within the waste framework directive, so that it can be properly organised. All terms must be defined once and be stated in the waste framework directive alone. How we gather statistics and calculate recycling must be clear and uniformly implemented across Europe to be comparable. What we name recycling and recovery must also be clear in order to correctly plan waste to energy capacity and thereby recover the energetic value of non-recyclable waste, both as part of an integrated waste management system and as part of an Energy Union Policy which aims at more energy security and independence for Europe.

Our expectations and responsibilities as public bodies, private companies whether producers or services must be clear so as to set a sound basis for cooperation. This infers clear and binding minimum requirements for producer responsibility at European level which include the setting, at national level, of clear roles and responsibilities for all actors in the chain of collection and treatment of recovered raw materials from the municipal waste stream.

To achieve a circular economy therefore, Municipal Waste Europe proposes defining municipal waste as follows and based on the OECD definition:

Municipal waste covers waste from households, including bulky waste, *construction and demolition waste from households,* similar waste from commerce and trade, office buildings, institutions and small businesses, yard and garden waste, street sweepings, the contents of litter containers, and market cleansing waste. The definition excludes waste from municipal sewage networks and *its treatment as well as waste from construction and demolition activities, industrial and commercial waste which is not similar to household waste.*

The minimal rules required to establish a clear and workable basis for cooperation amongst the actors in recovery of materials from the municipal waste stream are based on the workings of the producer responsibility organisations. These begin with a national legal framework which sets the rules of procedure, permits the organisations and enforces the correct implementation of the Waste Directives. Thereon it includes transparency in financial and material flows and accountability as per the achievement of recycling targets.

An additional level of transparency is achieved when recyclable quantities from large industrial and commercial sources are reported separately to sorting and recycling efforts which stem from municipal waste.

Put together, these separate steps form a clear picture and a definitive step in the direction of closing the materials loop and forming a circular economy.

New study reveals opportunities for increased European competitiveness in a circular economy, as momentum continues to grow in Brussels

Ashima SUKHDEV
Project Manager at the Ellen MacArthur Foundation

The idea of a circular economy has permeated through Brussels this summer. The European Commission's much anticipated circular economy package is due at the end of the year, and the European Parliament continues to push for truly ambitious legislation on the topic. Discussions bring together advocates for regenerative European growth and competitiveness, with growing momentum indicating that a transition to a circular economy could be the next major political project for Europe.

On June 25th, the Ellen MacArthur Foundation, the McKinsey Center for Business and Environment, and SUN, presented the results of a major new study at the European Commission's stakeholder conference on the circular economy. The report's findings have been timely: as the European Commission considers its circular economy strategy and consults with stakeholders until August this year in order to inform their package, *Growth Within: A circular economy vision for a competitive Europe* has provided a fact-base helping to inform the choices that need to be made.

Research to date by the Ellen MacArthur Foundation has quantified clear economic benefits of a transition to a circular economy – which aims to keep products, components, and materials at their highest value at all times. This latest research presents, for the first time, a vision of what the circular economy could look like for three of Europe's core needs: food, mobility and the built environment, which together account for 60% of household spend and 80% of resource use.

The report acknowledges that on the current linear path, technological disruption will bring benefits, but finds that the potential gains for growth, household incomes and the environment are much greater with a circular model. Europe's current linear growth is highly dependent on finite resources, exposing it to resource volatility, limited gains in productivity, and huge loss of value through waste.

Dame Ellen MacArthur elaborated on the potential of the circular economy for Europe at the conference in June – *"The economy is undergoing profound transformation as the technology revolution reaches scale. This report has shown that by applying circular economy principles we can catalyse this change, achieve a real system shift, and open a new era of growth and development, decoupled from resource constraints."*

Growth Within reveals that by adopting circular economy principles, Europe can take advantage of the impending technology revolution to create a net benefit of €1.8 trillion by 2030, or twice the benefits seen on the current development path (€0.9 trillion). This would be accompanied by better societal outcomes including an increase of €3,000 in income for EU households. This would further translate into an 11% GDP increase by 2030 versus today, compared with 4% in the current development path.

Dr. Martin R. Stuchtey, Director of the McKinsey Center for Business and Environment explains –*"The insights of the report have been derived through extensive desk research, over 150 interviews, a new approach to modelling the economic impact of the circular economy, the largest comparative study on employment effects, and three in-depth sector analyses. We found that businesses that work on the basis of circular principles are amongst the fastest growing in the economy."*

The circular economy would also have significant impacts on the environment for Europe: carbon dioxide emissions would halve by 2030, relative to today's levels (48% by 2030 across the three basic needs studied, or 83% by 2050). Primary material consumption measured by car and construction materials, real estate land, synthetic fertiliser, pesticides, agricultural water use, fuels, and non-renewable electricity could drop 32% by 2030 and 53% by 2050, compared with today.

The circular model would also have system-wide impacts on opportunity costs – for example, compared to the current development path, the cost of time lost to congestion would decrease by 16% by 2030, and close to 60% by 2050.

The study also conducted an initial assessment into the employment implications of a circular economy, and found that "existing studies point to the positive employment effects occurring in the case that the circular economy is implemented", based on 65 reviewed academic papers.

This report offers a clear vision of the three sectors examined, for businesses and policy-makers alike. For policymakers inspired by this vision, the Ellen MacArthur Foundation's new and complementary report, Delivering the circular economy: A toolkit for policy-makers, also offers an actionable, step-by-step methodology to help make the transition towards a circular economy.

These studies continue to build on the momentum felt in Brussels around the circular economy; it has been evident over the last few months that the Commission has made the circular economy a priority. First Vice President Frans Timmermans, Vice President Jyrki Katainen, and Commissioner Karmenu Vella were all present and engaged in discussions at the stakeholder conference in June, with Frans Timmermans indicating that he "*passionately believe[s] in the opportunities of the circular economy*".

Over 800 stakeholders were present on the day, and the room remained full until Vice President Jyrki Katainen closed proceedings by clearly stating that he is *"convinced that the circular economy can enable a triple win: economic, environmental and social"*.

The level of engagement felt at the stakeholder conference in Brussels has continued throughout the summer. On July 9th, the European Parliament passed an important resolution on the circular economy that called for a 30% increase in resource productivity by 2030. The resolution was voted 394 to 197 in favour of a report that formalised the Parliament's expectations for the revised Commission package.

Frans Timmermans has found his European mission: circular economy

Gerben-Jan GERBRANDY
MEP, (ALDE) Member of the ENVI Committee

First Vice President Timmermans was met by a hail of criticism when he axed the waste package late last year. He wanted to show that this Commission would have a different modus operandi and solely focus on the political headlines. It was not a complete surprise that he had set his target on the waste package and placed it on his deregulatory "kill list". He had already expressed his trepidations over the energy efficiency regulations concerning vacuum cleaners during the European election campaign for instance; apparently a textbook example of overzealous regulatory expansion from Brussels, when in reality the underlying legislation saves the equivalent of the yearly electricity consumption of Italy. The Commissioner has shown a remarkable change in mentality within months however. After announcing that he would replace the withdrawn package with a much more ambitious one, he was found giving an inspired plea for the circular economy in the European Parliament during the last plenary before the summer recess. Timmermans not only emphasized the enormous economic opportunities of the circular economy; it was a basic necessity to boost European competitiveness. An economic system that is designed to maximize reusability of products and raw materials and minimize value destruction is an inevitable path that Europe needs to embrace if it wants to stand a chance in the face of rising economic power from other, namely Asian, actors.

This 180 degree spin from Timmermans did not come out of the blue. The circular economy offers Europe unparalleled economic advantages while reducing environmental pressure on a massive scale. Such a correlation and combination of economic rationale and environmental responsibility has not always been deemed possible, nonetheless this notion is becoming increasingly prevalent in the public debate. The McKinsey report that was published in the end of June suggests that the economic benefits would be huge; €1.8 trillion of growth and a 38% reduction of CO2 emissions both by 2030. Furthermore the circular economy could create more than 2 million jobs. Such figures surely inspire.

But where does this new spin come from and why haven't we heard about it before? The advantages that the circular economy could bring are definitely not new. Numerous reports and statistics have been published over the years, each time signalling the increasingly greater benefits to be had. Despite this the circular economy has always been placed in an environmental dimension in the past. The focus had been the ecological necessity to transition from a linear to a circular economic model; sustainability had been used purely in the environmental context. Earlier proposals had come from the Environment Commissioner, which meant that economists showed little interest. In is in this precise detail that a change seems abound. Commissioner Vella was nowhere to be found in the European Parliament. It was the Commissioner responsible for Jobs, Growth, Investment and Competiveness that stood next to Timmermans during the plenary. It seems that the College of Commissioners, notably those responsible for economic policy, have decided to not only take on board but fully accept the fact that the circular economy can be a fantastic driver for economic growth and jobs.

So where exactly are the biggest gains of the circular economy? The clearest and potentially largest advantage is the efficient use of primary resources, materials and goods. Our linear economy is essentially finite, based on dissipation. This naturally comes with heavy price. One third of all food is wasted for example, with fruits and vegetables the figures even amount to 46%! Then image the ordinary car, where 86% of the fuel never even reaches the wheels. Through resource recovery and reuse we can save countless costs and reduce another economic and environmental burden simultaneously. Hypothetically this counts double for Europe; no other continent is as dependent on third actors for its resources. The yearly import of fossil fuels alone is worth more than €400 billion. Even in sectors where recycling has been relatively successful, there is room for improvement, such as 30% for steel and 60 to 75% for PET and paper. Efficient use is less use, there are no two ways about it. Energy use can be relatively easily be reduced by around 30% by implementing smarter design in building for instance. Large efficiency gains can also be made through systemic change. The so-called sharing economy offers many opportunities. A car is parked for 92% of the time on average; new technologies would allow sharing to become more feasible and accessible, thus reducing squandering. Innovative technology can and must play a key role in the circular economy. Digital solutions and breakthroughs such as 3D printing mean that custom and bespoke approaches become standard. This not only means less waste, it offers significant demand-side opportunities, improving consumer position. Clearly a win-win.

The prospects of the circular economy are so massive that any other economic transition pales in comparison. That is why McKinsey has identified the circular economy as the next big political project of the EU. Frans Timmermans is lucky that it has fallen in his lap. Theoretically, deregulation is his main mission; however it might be better if he spends his Monday's cutting red tape and the rest of the week labouring over the circular economy. Then he and the EU will be able to once again demonstrate their huge value.

“For a greener Planet: Enhancing Recycling at EU-scale to better close the loops of Circular Economy”

Jean-Luc PETITHUGUENIN
CEO and Founder of PAPREC Group.

It is the leading pure play recycling company in France, with a nationwide coverage and a comprehensive recycling offer.

In 2014, PAPREC’s 106 agencies have processed 6 Million tons of waste, generating a 900M€ turnover in 2014. The Group employs 4000 people and works with 20000 clients. PAPREC activities have generated 77000 Tons$_{éq}CO_2$ and allowed 3.23 Million Tons$_{éq}CO_2$ to be avoided.

After 7 years of multiple crisis, it is now time to find a new economic model that brings us together, and that involves every stake-holders, from citizens to companies and States, in order to reconcile environmental and economic stakes.

The challenges of the upcoming COP21 next autumn say it all : we will have to work all together, hand in hand, in order to fight against climate change. Governments from all around the world will hopefully come to an agreement and set in motion strong measures to reduce our global carbon footprint.

As Europeans, we also have to come up with a new economic model that takes the uncrossable limits of the Earth’s natural resources into account, and that improves the environment which future generations will inherit from us. The EU has a major key-role to play by building new relationships between countries and enchancing both international cooperations and local initiatives.

There is a growing consensus today that the circular economy is that new model, which consists in producing less waste ; better sorting and managing our waste so that it can be reused or re-employed, before being actually processed by recycling plants into raw materials.

We should skip the debate about what is a « circular economy » to focus on the real issue : how to build an efficient circular economic model. Indeed, circular economy has always existed and actually consists in a combination of various circles – hence various definitions, all of them relevant, depending on the circle’s diameter. We have to consider all those circles at once : (1) small circles when it comes to local jobs and production, (2) national or international (EU) when it comes to legislation, (3) a few regions or countries when it comes to cooperation, leaderhip or projects, (4) the entire world when it come to carbon footprint consequences.

The EU level thus appears as particularly relevant. 28 countries seating at the same table offer a real opportunity, which will bring genuine added-value if we all move towards the same direction.

The long-awaited new package on circular economy will have to set up new common rules and new ambitious common objectives, so as to reduce waste and boost recycling rates.

The recycling industry lies at the very core of circular economy by being the link that closes the loop. Recycling turns waste into new raw materials that can be re-introduced in industrial manufacturing processes.

Recycling creates permanent local jobs, close to waste production sites ; it requires evermore qualifications, as the sorting chains and recycling plants increasingly relies on new technologies, hence offering a wide variety of jobs. Recycling considerably enhances resource efficiency and allocation, substantially reduce greenhouse gas emissions by saving energy: for instance, the production of aluminium out of bauxite requires 4 times more energy than aluminium-recycling. Last but not least, the exports of raw materials produced from recycling favours the trade balance.

Nevertheless, promoting recycling require a strong political will and political incentives, as well as high investments from the recycling companies. Recycling can’t rely on public subsidies : it would be economically inefficient, while Member States could make a better use of their national budgets, especially on social aspects . Having said that, it is important to bear in mind that companies will only invest in their industrial assets if they have clear long-term objectives set by the legislation.

Through the package on circular economy, the EU has to take strong measures such as :

– allowing countries to work together and facilitating waste transfers within the EU, as long as it is being transferred for recycling purposes. Indeed, there’s no point in having two similar recycling plants on each side of a border. A relevant « catchment area » has to be taken into account when it comes to recycling and circular economy ;

– preventing cash payments when it comes to waste : it is the only way to stop illegal waste traffic. It is already the case in France : let’s ban cash payments at EU level ;

– implementing strong measures in order to increase the cost of landfilling and the cost of incinerating. Legislation has to both set up objectives in terms of reducing the amount of waste being landfilled, but must also increase the costs of landfilling at EU level, in order to increase the competitiveness of recycling over other treatment types, which are lower in the waste management hierarchy ;

– setting objectives in terms of recycling content in public tenders, as green procurement can be a very efficient incentive to promote recycling. Other incentives such as lower taxes on products using raw materials from recycling have to be implemented ;

– ensuring an undistorted competition between all stakeholders involved in recycling activities, which is of paramount importance to guarantee an efficient allocation of resources and have recycling companies competing on a level playing field.

The recycling industry is one major-key to build a real efficient circular economy. The benefits will be at every scale : local jobs ; better environment, lower carbon footprint, as well as a positive trade balance for a number of material streams, which contrasts with the trade deficit caused by virgin materials imports.

A European industry fit for the circular economy

Slawomir TOKARSKI

Acting Director for Innovation and Advanced Manufacturing at the DG Internal Market, Industry, Entrepreneurship and SMEs, European Commission

The successful transition to a circular economy needs a European industry that is fit for the challenge and that can create business out of it.

The global industrial landscape is evolving fast, driven by disruptive digital-based business models. To be competitive, companies need to cooperate across sectors and to use the scarce resources available much better. Putting this together in a smart way will lead to a profitable circular economy. 'Profitable' because the circular economy will only take off when companies realise that the secondary raw materials they obtain within the circle are of good quality and cheaper than original or imported materials.

A circular economy implies significant innovation in the way companies design and craft their products. This affects both emerging and traditional sectors. At policy level, we need an appropriate response from different fronts to unlock the full potential of European companies to compete successfully. Among others, three key elements are: SMEs, Key Enabling Technologies (KETs) and the social enterprises.

SMEs

While large companies seem to be more and more engaged in the circular economy, SMEs are lagging behind. According to the results of a Eurobarometer survey, only 24% of SMEs are selling their scrap material to another company versus 44% of large companies.. Great concepts such as 'zero waste' cannot ignore the reality that SMEs face: recycling waste may be a problem as quantities are small, type of waste often very diverse and SMEs may not have the time or manpower to identify the best solutions to improve their resource efficiency. We need to lower the entry point into the circular economy for the benefit of all SMEs, especially smaller ones. With this objective, the Commission adopted last summer the Green Action Plan for SMEs, which offers concrete actions that enable SMEs to be profitable in an economy that cares about the environment. For example, 2016 will see the creation of the European Resource Efficiency Excellence Centre which will build upon EU-wide expertise to strengthen support for SMEs willing to use their resources better. Also the SME Instrument under Horizon 2020 supports the development, demonstration and commercialisation of eco-innovative business ideas, and the Enterprise Europe Network, with offices in more than 50 countries, is facilitating the matching of eco-technologies and services between buyers and suppliers across borders.

The Green Action Plan makes use of business intermediaries, such as clusters, to facilitate the integration of SMEs in greener value chains, for example, through the Horizon 2020 action 'Cluster facilitated projects for new industrial value chains' with annual calls for proposals. Strengthening strategic cluster collaboration within Europe in key areas, including resource efficiency and green technologies and services, will help SMEs enter third country markets.

KETs

Key Enabling Technologies (KETs)[1] are instrumental in modernising Europe's industrial base. KETs underpin the shift to a greener economy, for example for circular manufacturing using recycled materials, biomass or CO2 as inputs, and for production processes which minimise the consumption of materials and waste generation. A major challenge is to allow European knowledge and research in KETs to translate into marketable goods and services, including in SMEs. Much can be done, from further supporting demonstration and pilot production activities to setting up networks of technology infrastructures across the EU, leveraging smart specialisation strategies in regions (60% of them include a KETs-related priority) and stimulating investment in KETs projects (also with the European Fund for Strategic Investment and through Important Projects of Common European Interest). To make the circular economy profitable and effective, KETs need to be further developed and deployed in Europe.

Social enterprises

While allowing a more inclusive work market, social enterprises seek a positive measurable societal impact, rather than maximisation of profit. They provide goods or services to reduce environmental impacts and create social values through the use of innovative business models. Their work is often concentrated on sustainable sectors such as renewable energy, waste management, recycling, organic food or sustainable eco-tourism. Social entrepreneurs are a key engine in innovative business models that link up with next-generation technologists and with other companies up and down the supply chain. In the recycling industry, they were often pioneers on the market, hiring fragile workers, when the circular economy was just bourgeoning. The traditional corporations now mirror them, via social intrapreneurship business units or internal start-ups managed differently, with profits reinvested mainly in the social objectives. This is true social innovation tackling social and environmental issues while fostering a 'better' growth, more inclusive, more sustainable and – in doing so – a definitely 'smarter' growth for Europe. This year's 3rd edition of the European Commission' Social Innovation Competition focuses on 'new ways to grow' aimed at putting forward new solutions to societal challenges. We received more than 1400 ideas, many of them fully embedded in the circular economy.

For a successful circular economy in Europe our industry needs to be fit for the challenge. As policy makers, it is our duty to provide support adapted to their needs.

1 Key Enabling Technologies include nanotechnologies, industrial biotechnology, advanced materials, advanced manufacturing, photonics and micro- and nano-electronics.

Circular economy as an appealing business case
Flanders offers inspiring examples

Mark DEMESMAEKER
MEP, (ECR) Substitute of the ENVI Committee

"Trash is cash", said first Vice-President Timmermans at the Commission's recent stakeholders' conference on circular economy. I fully agree. Raw materials are one of the most important cost drivers for production. Hence, discarding such valuable resources does not make any sense. Not from an ecological, societal or economic point of view. Moreover, the EU is in a precarious position since it is highly dependent on the import of raw materials and a significant number of natural resources face rapid depletion. Nonetheless, overall every EU citizen produces five tonnes of waste per year on average, of which only one third is recycled.

This makes the transition to a circular economy crucial. Apart from the important intrinsic environmental benefits, making our economy more circular essentially boils down to economics and competitiveness. It concerns access to - or the sustainable availability of - raw materials, the re-industrialisation and further digitalisation of Europe, the creation of new jobs and challenges linked to climate, energy and scarce resources. If we genuinely want to boost European competitiveness and hence contribute to growth, prosperity and wellbeing, we need to urgently unlock the strategic stock of resources and use them in a more sustainable and efficient way. Many businesses already invest in innovative models and techniques to close the loop, because the circular economy offers an appealing business case. I still consider this to be the most powerful argument to convince non-believers.

The resolution adopted by the European Parliament on July 9, clearly highlights the economic arguments outlined above. I have supported the resolution of which the following key messages stand out for me: we need smart policy which reduces burdens and barriers, stimulates innovation as well as new business models which create long-term legal certainty. We must have the means to effectively measure and reduce the overall use of resources, we require a well thought-out product policy, and we must incentivise smarter waste management.

Flanders, the nation I represent in the European parliament, offers some examples which I believe can inspire others.

Flanders has a strong track record on waste management. 65% of our household waste is recycled, making us the top performer in Europe (EEA data 2013, EU average stands at 35%). How did Flanders obtain these results? Above all, it is important to acknowledge that a mix of policy instruments is required at various policy levels, respecting the subsidiarity principle. Flanders uses economic instruments (like landfill fees, pay as you throw schemes and investments in recycling plants), legal instruments (like separate collection schemes) and communication campaigns. Flanders equally transformed its waste management into fully-fledged sustainable materials management, which required both policy and organisational changes.

Against this background, some successful pioneers in Flanders clearly underline the powerful business case the circular economy offers.

First, the Ocean Plastic Project from Ecover raises awareness on the importance of product policy and design. The bottle - made with 10% recycled ocean plastic, the remaining plastic recycled from other sources - illustrates how a relatively small player can genuinely contribute to tackling global challenges of marine litter and plastic soup. With the project, Ecover creates leverage to convince bigger players to step up their efforts.

Furthermore, reuse is booming in Flanders. In 2014 Flemish „kringwinkels" („circular shops") collected 65, 930 tonnes or 55 million reusable goods, 2.8 % more than the year before. Almost half of those products were sold and found a new home. This is not only good for the environment; the „kringwinkels" also offer a strong contribution to the social economy.

Third, Flanders is also the home of companies engaging in innovative recycling. A recent visit to Umicore Hoboken has really impressed me. Umicore converted itself from a mining and smelting company, to become the world leader in precious metal refining. The company recovers almost 20 metals, including gold and platinum, from a whole range of products (electronic scrap from laptops and mobile phones, spent auto catalysts ...) and puts them back in the cycle.

Finally, we see some powerful new business models: I can refer to the PVC company Deceuninck who rightfully argue that PVC is a valuable material that should not be landfilled or incinerated. As of 2012, old dismantled windows can be returned to their new recycling factory, the firm thereby also ensures security of material supply.

These examples clearly illustrate the genuine window of opportunity for moving fast forward on the circular economy. Given what is at stake, we must be ambitious. At the same time, if we want to ensure substantial progress in the real world - rather than just on paper - we need to reconcile ambition with realism. Our proposals need to work and be achievable. I represent a top-performing nation, therefore my level of ambition is high. But something European environment agency Hans Bruyninckx said often crosses my mind: „if you think you are leading, but nobody is following, you are just taking a walk". Reconciling ambition with realism does not equal lowering our level of ambition. On the contrary, it is a strong commitment to make the circular economy happen in practice. So that trash can be even more cash.

Bioeconomy: circular by nature

Dirk CARREZ
Executive Director,
Bio-based Industries Consortium

Patrick VAN LEEUWEN
Coordinator Public Affairs and Communications,
Bio-based Industries Consortium

The Circular Economy should be embraced by all if it can solve our societal challenges and create new wealth and jobs. Projected socio-economic and environmental benefits for Europe are impressive. But these benefits will be truly felt if the bioeconomy - the renewable part of the circular economy concept - is made to play its important and growing role.

Circular economy: just a new buzzword?

The EU is set to make legislative proposals that would break away from the traditional European linear economic model of make-use-dispose, in favour of a circular and regenerative model that uses resources in a smart and efficient way, turns waste into a new resource, and considers sustainability and circularity in the design of products and processes. No doubt that the entire Brussels stakeholder community is on alert.

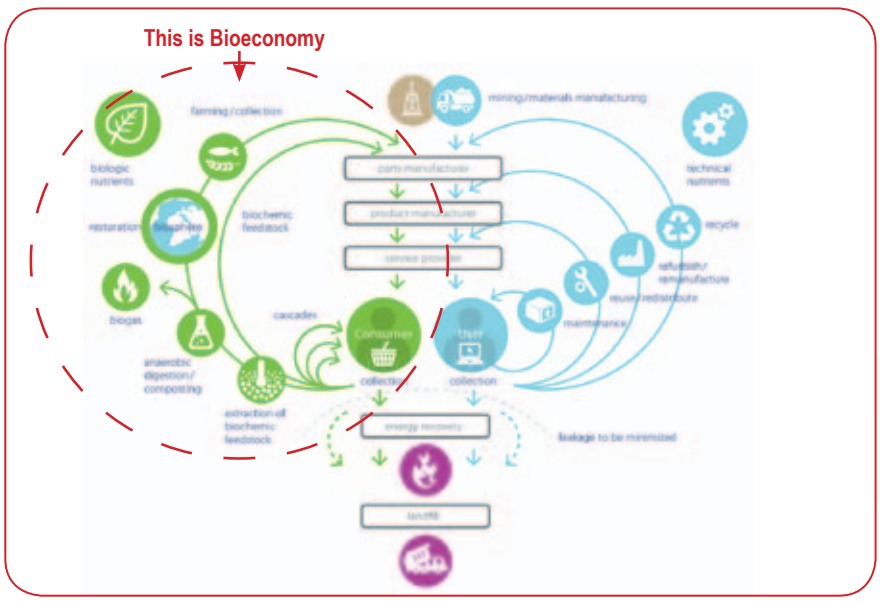
The circular economy will mean different things to different sectors. It might be good news for some, but for others it might mean having to battle for survival. It should therefore be a surprise to no one if each sector seeks to shape legislation in their favour.

The political context cannot be clearer. Europe's economic woes, high unemployment, energy vulnerability, and catastrophic climate change certainly justify the need for innovative and ambitious initiatives. As the European Commission puts it in its Circular economy roadmap, this initiative is meant as a new boost for Jobs, Growth and Investment and placed within the wider context of the Commission's commitment towards sustainable development. Moreover, eco-industries and eco-innovation currently supply a third of the global market for green technologies, worth a trillion euro and expected to double by 2020. This initiative aims to reinforce this trend, thus contributing to green growth and to other EU priorities such as the work towards developing a Resilient Energy Union with a Forward-Looking Climate Change Policy.If the circular economy can effectively solve these major societal challenges while being profitable, then we should all probably embrace it.

Leadership will be needed

EU governments and Members of the European Parliament (MEPs) will have to decide on how to go about legislating on this one: as a team deploying a vision for Europe, or as the sum of national interests? The circular economy is an opportunity to lead Europe and its citizens into the economic model of the 21st century. If done coherently, the Ellen MacArthur Foundation's *Growth Within: A Circular economy vision for a competitive Europe* project the following key benefits for Europe:

- *Overall benefits of €1.8 trillion by 2030, or twice the benefits seen on the current development path (€0.9 trillion);*
- *Europe can take advantage of the technology revolution and increase average disposable income for EU households by €3,000, or 11% higher than the current development path;*
- *An 11% GDP increase by 2030 versus today, compared with 4% in the current development path;*
- *48% CO_2 emissions reduction by 2030, across the three basic needs studied, or 84% by 2050;*



Source: Ellen MacArthur Foundation

- *Primary material consumption measured by car and construction materials, real estate land, synthetic fertiliser, pesticides, agricultural water use, fuels, and non-renewable electricity could drop 32% by 2030 and 53% by 2050, compared with today;*
- *Positive employment effects occurring if the circular economy is implemented.*

Political leadership more than mere interest representation will be needed to convert this potential into reality.

Bioeconomy: circular by nature

To date, the role of the bioeconomy in spurring the circularity of the economy is hardly recognised in related conversations. Yet, the EU has a Bioeconomy Strategy in place since 2012, and since July 2014, it has a Public-Private Partnership on Bio-based Industries (BBI) that invests €3.7 billion in innovative technologies and biorefineries that already convert biomass and wastes into greener everyday products such as food, feed, fibers, chemicals, materials, fuels and energy.

The bioeconomy is circular by nature because carbon is sequestered from the atmosphere by plants. After uses and reuses of products made from those plants, the carbon is cycled back as soil carbon or as atmospheric carbon once again.

Bioeconomy: enabling and complementing the circular economy

The circular economy focuses mainly on the efficient use of finite resources and ensures that those are reused or recycled as long as possible. The bioeconomy integrates the production of renewable resources, in particular renewable carbon. The principle of the circular economy is thus complementary to the renewable character of the bioeconomy and must facilitate the recycling of carbon after efficient uses. The bioeconomy is thus a perfect illustration of circularity in that it regenerates CO_2 and uses renewable raw materials to make greener everyday products.

A waste management system that fully considers the potential of agricultural, forestry and municipal (biogenic) wastes will be essential to enable the circular economy.

Growth of bioeconomy = growth of the *renewable* circular economy

- The bioeconomy uses renewable resources instead of fossil resources. Biorefineries play the central role of intelligently converting biomass and wastes through efficient and innovative technologies into a plethora of bio-based products.
- The bioeconomy is not new. It is already worth €2 trillion and is responsible for over 22 million jobs in Europe. It has recently become an EU strategic priority for its recognised potential in stimulating sustainable growth and jobs; using renewable resources in a smart and efficient way; making Europe more self-sufficient; and in reducing global GHG emissions.
- The EU and the Bio-based Industries Consortium joined forces to kick-start a 10-year investment of €3.7 billion through the BBI. It focuses on 1) securing sustainable supply of biomass, 2) optimising/building new value chains and biorefineries, and 3) creating new markets for bio-based products. The BBI is needed to de-risk an emerging sector and to create the framework conditions needed to leverage Europe's renewable resources, innovative technologies and industrial know-how. This is important if the EU wishes to establish itself as a competitive force in the global bioeconomy race, especially with the US, Brazil and China.
- Bio-based products and materials have the benefit of achieving a more balanced carbon cycle in comparison to fossil alternatives. The rate at which CO_2 is emitted from bio-based products matches the rate at which it's been sequestered in the biomass. The rate at which CO_2 is released from fossil based products (1-10 years) is significantly higher than the millions of years it took for CO_2 (organic matter) to be fossilised and sequestered into petroleum, natural gas or coal.

In other words, the bioeconomy and the BBI are instrumental in demonstrating and commercialising sustainable bio-based ingredients, products and materials that can feed the EU's circular economy. Indeed, the circular economy is not just about waste management. Upcoming policy will have to factor in criteria beyond conventional approaches, and reflect on the cross sector nature of bio-based industries, markets, products and processes to maximise the EU's circular economy potential.

"How to close the circular economy loop and the role of NGOs"

Stéphane ARDITI
Products & Waste Policy Manager, EEB

The EU has a vision of turning Europe into a circular economy. That vision now needs to become a reality.

If it happens, there are many benefits on offer. Apart from boosting our economy, it will help balance our needs with the carrying capacity of the planet. We could reduce our dependence on costly imported materials by making the most of every unit of energy or material that enters our market.

What's more, a circular economy can deliver on job creation where traditional business models, based on throw-away-and-replace consumption patterns, have failed. As Europe struggles to recover from a lasting economic downturn characterized by massive youth unemployment, this new circular economy model can deliver millions of jobs. In essence, it could offer Europe a unique competitive advantage over other large economies if we are serious about it and act swiftly enough.

The basic principles of a circular economy are well known, but they need to be put into practice now:

1. Help the emergence and development of new business models based on products and services offered, including leasing, sharing, repairing, and contracts between economic actors based on performances achievement rather than quantity of units sold.
2. Design products and services so as to extend the product's life compared to today, make it possible to upgrade and repair things, and make it easier to disassemble and recycle products. The design stage is where most of the environmental impacts of a product are set. This is also where the future potentials for circularity and opportunity for cost effective operations along the value chain are determined.
3. De-toxify products and materials to prevent toxic substances from staying on the market.
4. Encourage citizens and communities to adopt new, more sustainable consumption patterns.
5. Support the demand side for greener products, recycled materials and services.

Actions are needed at EU, national and local levels to accompany business initiatives, and leverage points should be combined to make a real difference. For example, the EU is responsible for product design rules and overall product policy because of the single market, while nNational authorities set fiscal incentives and ensure the proper implementation and enforcement of policies, and local authorities have real influence through their public procurement ruless. In the meantime, businesses need to do what they are good at: innovation, which is only possible if it is underpinned by long-term investments helped by clear legal drivers and economic incentives.

Now to the role of NGOs. They have to ensure that the framework regulatory and economic conditions are properly defined and concrete actions are put in place by public authorities. They also need to be active when more conservative types of business hijack the legislative process and stall the pace of change. NGOs must reject short-term vested interests in favour of the long-term view where the benefits of action usually outweigh the costs.

But there is more: NGOs and the not-for-profit social economy sector can help contribute to innovation and bring about new ways for people and products to interact with one another. Many of the initiatives that today are highlighted as good circular economy practices have come from NGOs and not-for-profit organisations: car sharing, repair shops, goods exchanging or food waste prevention schemes. Although these activities often become part of the mainstream, the not-for-profit sector will play a key role in any progress towards a circular economy.

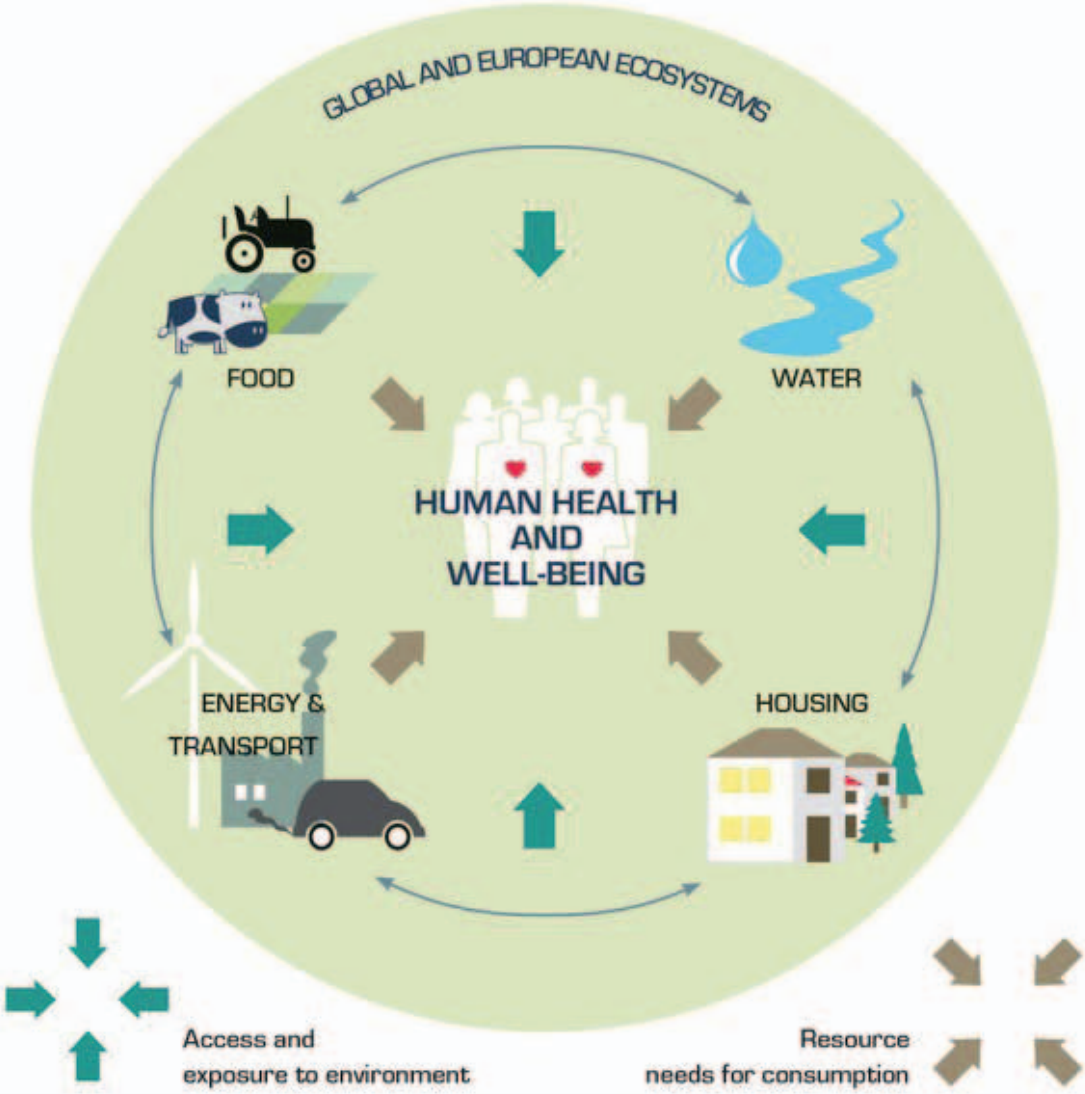
NGOs also have a recognised role in educating and promoting sustainable consumption patterns, developing awareness raising tools, and promoting fair and comparative information tools for products in an age where marketing sometimes includes greenwashing.

This awareness-raising role could be complemented by a broader collaboration with public authorities on policy implementation and the enforcement of existing laws. Non-compliance with these laws is a clear obstacle to the delivery of expected results when it comes to resource conservation. The future direction of a market is then about racing to the bottom instead of improving social and economic standards.

Finally any drive towards a circular economy must be inclusive or it will fail. It should include those along the supply and reverse logistics chain to make sure the resources embedded in products are handled properly. It should bring around the table the stakeholders who have a real desire to shape the economy and society of the future. And it should allow those who are most vulnerable to take part and not to feel left by the wayside.

How are the environment and our well-being and health connected?

Natural resources fuel our production and consumption, and create wealth and jobs, contributing to our quality of life and well-being. But our level of resource consumption is undermining our ecosystems' capacity to provide for us in the future.



Between 2009 and 2011, up to

96 %

of EU city dwellers were exposed to fine particulate matter ($PM_{2.5}$) concentrations above WHO guidelines.

In Europe, at least

110 million

people are adversely affected by noise from road traffic alone.

In southern Europe, up to

80 %

of the extracted freshwater goes to agriculture, reducing the amount available to other uses.

Source: EEA

Circular Economy, an asset for European Industry

Françoise GROSSETÊTE
MEP, (Vice-Chair of the EPP Group) Member of the ENVI Committe

Our European society is a throwaway society. Each year about 3 billion tons of waste are produced in the European Union, which amounts to about 6 tons of waste for every European citizen. We need to understand that this high level of waste is dangerous for our society and our environment. Our raw materials are not endless and in the near future, we will have problems supplying enough resources for a growing population. Therefore, it is crucial to find a way to reduce waste in Europe.

Within this objective, the European Union aims at creating a more circular economy based on a recycling society in the context of the Europe 2020 Strategy for smart, sustainable and inclusive growth.

A circular economy, through recycling, keeps the added value of a product for as long as possible and consequently drastically reduces waste. This system is the key for achieving a sustainable growth in a future-oriented European Union. In the end the best waste is the waste which is not produced.

We need to understand is that throwing waste does not only pollute, it is also costly as it means a loss of valuable materials. For example, out of each tonne of electronic waste, about 350g of gold could be produced. The treating and the valorisation of waste should therefore be a crucial element of a new more sustainable economic model which stimulates economic growth making the European Union and its economy even more competitive and modern.

However, we are not only throwing valuable materials but also food. Each year, one billion tons of food are wasted worldwide in times where about one billion people are starving. This needs to be changed urgently.

The move to a circular economy requires a full systemic change and innovation. It is not only about introducing new technology, but also the organisation, finance methods and policies need to be reviewed. Value chains, product designs, business and market models need to be adapted so that businesses and consumers benefit from a recycling society.

The concept of Ecodesign precisely aims at enhancing the environmental performance of energy related products. It is about improving the quality of the product and making sure it does not pollute the environment. We need to promote and develop this idea of Ecodesign and encourage European businesses to apply it.

Despite all the efforts, a European circular economy is a real asset for the European industry as it brings new perspectives on growth and employment and benefits the environment and businesses.

Indeed, as the European Commission esteems, the change to a circular economy could bring net savings of 600 billion euros, representing 8% of the annual turnover, for businesses in Europe. Furthermore, annual greenhouse gas emission could be reduced by 2 - 4% benefitting the sustainability of our fragile environment.

In 2011, the European Commission published a "Roadmap to a Resource Efficient Europe" underlining the "need for an integrated approach across many policy levels and areas". Indeed it is first of all necessary to find common definitions and measures of waste in order to be able to find a common European waste reduction strategy.

In July 2014, the Commission proposed a package in order to complete a European circular economy. However, in December 2014, these propositions have been withdrawn in favour of an even more ambitious package. At the moment, the ENVI Committee of the European Parliament is reviewing this new package.

The content of this communication portrays the benefits of a more efficient use of resources and the measures to take in order to create a European circular economy.

Investment and innovation are the keys to create the necessary change. This is why the Commission wants to support innovation projects for a more circular economy under its EU Research and Innovation Programme. Innovation needs to target especially the cooperation between and within the value chains in order to create an efficient overall system.

Furthermore, the Commission promotes the unlocking of investment in circular economy solutions and makes circular economy projects a priority in its funding programme. The aim is to encourage Member States and their businesses and consumers to realize and participate in circular economy projects like in Ecodesign. In the end, a circular economy only works, when businesses and consumers actively support and engage in recycling projects by using recycled materials for their production process and by consuming sustainable products. Within the logic, one of the EU's priorities is to focus on the support of SMEs.

The targets set by the EU are ambitious but necessary to reach a true change. By 2030, at least 70% of the municipal waste should be reused and recycled. This objective is ambitious but it would be even more efficient if this objective was extended to commercial and harmless industrial waste as municipal waste makes up only one third of the total waste.

Furthermore, the recycling rate for packaging should increase to 80% by 2030. The Commission also sets interim targets of 60% by 2020 and 70% by 2025. Another crucial aim is to strive for the elimination of landfilling by 2030. By 2025 already, the EU wants to prohibit the landfilling of recyclable plastics, glass, metal, cardboard, paper and biodegradable waste.

On top of those targets, the EU seeks to increase, by 2030, the resource productivity by minimum 15%, or even better, by 30%. The development for high quality secondary raw materials should support this trend.

This ambitious initiative to create a European circular economy is a crucial step to positively change European industry. Governments, businesses and consumers need to understand that changing our industry by recycling more is necessary in order to create more sustainable economic growth. It is proven that businesses, consumers and the environment benefit from a recycling society. Therefore, let us not wait and start recycling from now on.

Innovation in the chemical industry for a circular economy

Daniele FERRARI
Chief Executive Office of Versalis

For some time now we have been hearing about circular economy, a theoretical and inspirational model Europe is moving towards to establish a more resource-efficient community: now it is definitely turning into action. The time is right, since the circular economy is meant to make the most of sustainability patterns, stimulating innovation and competitiveness of the European industry and enabling resilient growth.

The chemical industry is paving the way to this virtuous approach because it has proved to be able to transform itself developing new business models that have big impact on the whole production chain down to end markets. It is an enabler of innovative solutions for energy-efficient applications, durability and recycling that can be maximized through a collaborative approach within the value chain. Worth mentioning that the chemical industry, as one of the most energy-intensive, has already done extraordinary efforts to continuously become more efficient: it has reduced its energy intensity by 50% in the last 20 years, more than every other industrial sector in Europe. In particular, plastics supply all sectors of the economy both in traditional and technologically advanced industries, meeting consumers' needs with a life cycle environmental impact far lower than other materials in terms of energy consumption and CO_2 emissions.

In the challenging EU scenario in terms of feedstocks, energy and environmental concerns, Versalis (Eni) is carrying on an ambitious turnaround plan to stay competitive, banking on wide industrial and commercial know-how, and technology leadership. **Circular economy is positively seen as an opportunity to spur competitiveness along with sustainability.**

With a comprehensive product portfolio, Versalis addresses to businesses where sustainability is a key market driver. Polymers have some unique characteristics of lightweight, versatility and durability that contribute to energy and resource savings, in sectors such as building&construction, packaging, automotive and tyre. Market megatrends indicate that these sectors, on which we concentrate our efforts, are those that have the greatest growth and demand for innovative solutions.

In the **building&construction sector**, Versalis has recently launched an innovative range of products for thermal insulation of buildings to promote integrated energy efficiency solutions. The final application is based on expandable polystyrene (EPS), an extremely light material consisting of 98% air and only 2% of plastic material which limits the impact on the environment - by significantly reducing energy consumption and consequently CO_2 - and allows a tangible saving on energy bills.

Versalis is also in **food packaging** - one of the most significant application for plastics - which allows to protect food against spoilage, meeting EU stringent standards of shelf life and temperature conditions, and above all safety. Versalis R&D has a strong commitment in smart packaging to develop nanofillers and new additives, also based on renewable sources, having specific antimicrobial or moisture regulators action, and thus improving the film barrier properties.

In the **automotive sector**, Versalis is committed to green tyre manufacturing with new generation elastomers products capable of minimizing energy and fuel consumption in high performance tyres, without compromising safety. A new range of bio-based extender oils and fillers to be used as additives in the rubber compound will then complement the green tyre portfolio. Versalis has recently been awarded the "Tire Industry Supplier of the Year" as recognition of our commitment to an all-round sustainability of the tyre industry, going beyond compliance to unlock the potential of innovation.

Green chemistry is one of the most ambitious ventures we have undertaken as an opportunity to develop circularity and walk the path of the responsible use of resources and raw materials. A strong R&D focus and strategic partnerships allow to integrate all the competences needed to consolidate a leading role in the new bio-based chemical industry. The main market drivers are the performance-based demand growth and the environmental sustainability of the whole supply chain, along with an increasing consumers awareness on the products impact. Turning uncompetitive productions into bio-run plants has been a starting point of Versalis "green experience": this is the case of Matrìca project, in Sardinia, that produces specialties based on renewable sources for applications in bio-lubricants, oilfield chemicals, bio-additives for rubbers and polymers. Other projects are developing an innovative guayule-based natural rubber, specialty bio-chemical from vegetable oils, and bio-butadiene from biomass - representing opportunities to synergize with traditional production cycles.

Versalis' experience goes in the same direction of other players of the European chemical business, which is definitely contributing in the implementation of the principles of "circularity" creating value for all its stakeholders. Our industry is pivotal in setting the right balance based on its **capability of generating the innovation grade necessary to reconcile the industry needs with environmental requirements**. As our prime duty, we are keeping a constructive dialogue with institutions and regulators in order to create the right conditions to reach environmental and societal objectives without compromising competitiveness. Sharing the same vision and defining common objectives can bring opportunities and value to both the civil community and the industry.

The construction sector's commitment to circular economy

Emmanuel FOREST

President of ECTP (European Construction Technology Platform),
CEO, BOUYGUES Europe

In most debates on circular economy, it is often expected that the construction sector will be mentioned very rapidly in the discussions. Aware of representing the largest single contributing sector to waste generation as well as the major energy consumer, the construction actors have also taken the lead in tackling these issues, not only by carefully applying legislation, but also by showing exceptional dynamism and creativity in developing innovative solutions.

A MULTI-FACETED CHALLENGE

The variety of themes that connect the circular economy concept to construction is the simple proof of this multi-faceted challenge.

A first theme which deserves priority attention is the **construction materials:** these will never be considered anymore in the same way. Right now a joint expert group from the Commission and stakeholders of the sector is working at the definition of new indicators: on top of more traditional quality criteria, a strong focus will be put on energy, water and primary elements used to produce a given material. Their recyclability will be of course at the core of the group's work. This will lead to new "Key Performance Indicators" (KPI) that will totally reshape the market of construction materials.

One of the most exciting dimensions to explore is the **digital revolution in the construction sector:** it shows breakthrough applications of innovative solutions, delivering high impact responses to the circular economy challenges. The **Building Information Modeling (BIM)** creating 3D virtual buildings with all their systems, completed by the big data management, is allowing the optimization of performances, starting from the conception stage of the building. In particular, even the deconstruction phase can be planned from conception of the building into details.

Thanks to dedicated **new software**, the **smart district approach** is allowing to develop the **sharing of facilities** between neighbouring buildings, optimizing usage and sometimes even avoiding duplications at construction stage: not only parking spaces or recharging points for electric vehicles, but also meeting rooms, auditoriums, sports facilities can now be managed in a more efficient way.

New technologies like **3D printing** are also revolutionizing the construction process by giving a new life to **prefabrication** with its **modularity** potential and by allowing an ever more efficient **industrialization** of the construction process. This technique also shows a very strong potential for improving **efficient use of resources** by a very high control of quality and quantity of materials used.

CIRCULAR CONSTRUCTION IN ACTION

If the situation "in the field" had to be summarized, it would probably be appropriate to distinguish two different realities: the buildings on one side, and the network infrastructures on

© Kengo Kuma and Associates

The HIKARI district in Lyon designed by Japanese architect Kengo Kuma is a pioneering positive energy ensemble of buildings that combines offices, apartments and commercial areas. This allows to mutualize resources by taking advantage of the complementary activity of buildings, the residential part being more active around the night while others around the day. Photovoltaïc energy, geothermy and cogeneration fueled by local rapeseed oil, combined with a battery storage system and connected through a local smart energy grid, allow HIKARI's energy consumption to be 50% lower than the legal requirements.

Better roads for the legendary Mont Ventoux, one of the Tour de France's top classics, also welcoming over 1,500 amateur cyclists each day! An environmentally- friendly "on location retreatment process" is applied that consists in milling a layer of the existing pavement, adding a cold emulsion, then mixing the ingredients to make a new base. This allows to avoid sending waste materials to the landfill, saves energy, uses less aggregates and allows to reopen the road very rapidly. (Courtesy COLAS SA)

© COLAS SA

the other, with a focus on transport as a good example.

In the buildings sector, the circular economy approach is of course already present but still appears to be more on a **project by project** approach rather than a full-fledged strategy. It is indeed important to realize that it is not the construction companies alone that are responsible. In fact, everything will be enacted during the **close dialogue** between contracting authorities, accompanied by their technicians in charge of defining the specifications, together with the building consortium of companies. Moreover, inside this same consortium, discussions between partners, builders and materials providers for instance, may also be more or less oriented towards innovative solutions that will facilitate this circular economy approach.

A very interesting approach that is taking more and more importance regards the **usage of buildings**: when taking into account that for instance offices and shops are used more during the day and homes during evenings and nights, demand for energy, parking spaces or other services can be managed in complementarity. This will allow considerable savings just by bringing closer together usages that so far had a tendency to be kept apart. It is nothing less than a total rethinking of the **urban design** which will also have a positive impact on citizens in terms of quality of life. The more they will believe in it, the more they will also contribute to it by adapting their behaviors.

In the infrastructures sector, if we may take transport as an example, the reality appears to be more advanced. The high pressure linked to the large amounts of construction materials used led to the development of a complete economic model for the management of waste with very efficient solutions on reuse and recycling. Maturity and performance have led to a competitiveness that allows some of the companies involved to offer their solutions to other industrial sectors for their waste management. The circular economy is somehow embedded in the system already, and can of course be reinforced and generalized through EU legislation (waste regulation, toxicity and trace elements, increased harmonization between Member States…)

BOOSTING THE BUSINESS CASES

But can the circular economy approach be really considered **"economic"**? Of course the investments needed as well as return on investment issues cannot be ignored. The two situations described above show that in fact some of its applications are already economically viable, while in other cases, it cannot be the only criteria to choose that circular path yet. The combination of political will, together with increasing costs of commodities for which demand exceeds the offer, or the urgency to reduce environmental impact, will definitely push the system towards the circular solutions. Managing the products of deconstruction in that context will probably also shift the waste disposal issue towards a secondary materials storage issue. Who will deal with this? In which case are the actors working from conception to exploitation going to extend their business towards deconstruction and secondary materials management? Are the waste management specialists going to evolve into secondary materials managers and marketers (some do already)? This shows the importance of developing as rapidly as possible an efficient market for all these products.

The role of **innovation** in that context is paramount. The **ECTP (European Construction Technology Platform)** has been working in close collaboration with the European Commission since 2005 already. The opportunities of collaborative and open innovation platform supported by the **HORIZON 2020** programme are a fundamental European tool to develop new solutions. Together with the **Smart Specialisation Strategies** launched at regional level throughout Europe, the bridges for innovation towards new markets are ready to be crossed.

To complete the scene, it is also important to consider how much this circular economy approach can be seen as an excellent **catalyst** to bring together a number of European policies, covered by specific **soft or hard law**: waste of course, but also energy efficiency, ecodesign, water, resource efficiency, digital economy…

CONCLUSIONS: "GREAT EXPECTATIONS"

As a conclusion, we may consider that circular economy is an approach essential for the sustainability not only of our economy but also of our model of modern society. If we are going to share the benefits of it with an ever larger number of people, we need to take advantage of all the innovative solutions in our hands. We need to succeed in combining sobriety with maintaining a high level of quality of life. Building partnerships before all, the construction sector is ready to play its role in this very ambitious challenge.

Industrial symbiosis in France: from research to spatial development and planning policies

Grégory GIAVARINNA

Secretary general, Institute for circular economy

Laurent GEORGEAULT

Chief executive officer, Institute for circular economy

Circular economy aims to deal locally with the issues of territorial resilience, especially with multi-stakeholders participation. Thus, the European countries are mainly turning towards energy transitions, a better management of building materials and the establishment of industrial symbiosis.

In France, industrial symbiosis appeared during the early 2000s through academic subjects. Numerous action-research projects led to the constitution of a strong and effective methodology for industrial ecology's approaches. The stabilization of this methodology, dedicated to the small scale of industrial parcs, generated confidence for policy makers and local planners. This trust has been translated in public procurements in order, not only to experiment, but to deploy real industrial policies on territories. Thus, industrial symbiosis became a practical brick for local development.

In spite of this elementary brick, the main lack of industrial symbiosis was about the management of the scale and the enlargement to a regional policy of spatial planning (the main difficulty for industrial symbiosis is to upscaled into a regional policy of spatial planning). Considering the national industrial symbiosis program (NISP) in United Kingdom and its results, a new french program was designed by the Institute for circular economy. Between 2005 - 2013, NISP was actively engaged with 15,000 companies in the UK. Opportunities identified by NISP generated £1 billion in sales and cost reductions of £1.1 billion for the companies. It reduced carbon emissions by 39 million tonnes, diverted 45 million tonnes of material from landfill, and saved or created more than 10,000 jobs. In France, such a program is now deployed in 4 voluntary regions (Aquitaine, Bretagne, Haute-Normandie, Rhône-Alpes), for two years. The objective is to integrate around 150/200 SME by region on the issue of local exchanges and opportunities. Additionally, the program is supposed to build an inter-regional hub, in order to exchange good practices, and compare the different strategies implemented by regions. Step by step, the elements of a real spatial planning policy based on industrial symbiosis appear.

This translation from research to policy does not freeze the creativity, on the contrary, these domains feed at each other and establish a constructive dialog. More and more management schools teach circular economy and industrial symbiosis in France, sometimes for few years, both development projects and demonstrators appear and strengthen the domain. The recent french law about energetic transition identifies circular economy and industrial symbiosis as progress vectors applied to territories for the industrial sector. With product service systems it seems to be the next accelerator for a transition towards a circular economy.

Obviously, some barriers still have to be suppressed. We agree with our british colleagues of NISP, Peter Laybourn about what we can improve :

- Skills and training, particularly in product design
- Recognition of the value of materials, the composition of products and where they are able to be re-used.
- Fiscal incentives to encourage businesses to engage beyond their normal supply chain.
- Knowledge of elements likely to be in short supply in the future.
- Investment into innovation and new technologies.
- Policy coherence and stability.
- Improved data and resource flow mapping.
- Support for facilitated services to encourage innovation and engagement beyond traditional business boundaries.

The competitiveness of industries can benefit by adding value to all the resources. An efficient resources management protects the environment, reduce the impacts of climate change and create jobs. Industrial symbiosis provides methods and solutions that lead to eco-innovation, investment and development.

Industrial symbiosis contributes now to spatial development and planning policies at a large scale in France.

Institut de l'économie circulaire

Circular economy: the EP took a step in the right direction. Will the European Commission follow?

Gilles PARGNEAUX
MEP, (S&D), Vice-Chair of the ENVI Committee

The era of unbridled consumerism must now come to an end

There is an urgent need for Europe to shift toward new patterns of production and consumption. The current linear economy, based on high levels of consumption, waste and pollution, simply ignores the limited carrying capacity of the earth: we have only one planet. The more we consume, the more raw materials are extracted and the more amount waste are produced, without concern for devastating pics of pollution and alarming rates of resources depletion.

On average, each European citizen consumes fourteen tons of raw material and five tons of waste a year. Yet they could be recycled, repaired or re-used. In a circular economy, products' life-cycles are extended, the amount of raw material used is reduced and waste is limited through reuse and recycling. In other words, waste from one industry becomes raw material for another.

In the European Parliament, Socialists and Democrats are fully engaged for a rapid transition to a circular economy. As a S&D representative and Vice-President of the Environment Committee, sustainable development appears to me as the only viable framework for present and future societies; in my opinion, moving to a circular economy is not a matter of "if", but "when". Last but not least, the EU needs to fight planned obsolescence, which consists in designing products with artificially limited useful life in order to encourage consumption: unbridled consumerism should belong to the past.

Resolution voted in Strasbourg: towards a life-cycle approach to product policy and *ecodesign*

On July 8, an important step has been taken by the European Parliament with the adoption of a strategic report on circular economy, asking the European Commission to be ambitious when presenting its new legislative proposals later this year.

What does the resolution, fully supported by Socialists and Democrats, concretely say about the transition to a circular economy? First, we need to introduce binding targets in resource efficiency, waste reduction and recycling. Then, we need to improve labelling, notably for measuring resource use impacts and carbon footprint. Finally, we should follow the exact opposite direction of planned obsolescence: *ecodesign*, namely the promotion of reusable, repairable and long-life products.

A call to the European Commission: "Better regulation" should not mean "no regulation"

Despite the difficulties of facing some political groups repeatedly trying to weaken the report, the European parliament agreed on a concrete, ambitious and realistic set of propositions. It is now up to the European Commission to make them come true.

The new approach of the European Commission in terms of "Better Regulation" tends too often to end with no regulation. Recently, under the pressure of industrials, the Commission abandoned its legislative project about waste, despite the oppositions of the European Parliament and many Member States.

The European Commission promised that an ambitious circular economy strategy would be presented by the end of 2015. With the adoption of the Strategic report on circular economy by the European Parliament on July 8, there now is a concrete basis for legislation at disposal of the European Commission. Transition toward sustainable societies will not happen without innovative legislations: it is now time for the Commission to prefer "better regulation" over "no regulation".

Waste to Energy: A Sustainable Energy Strategy

Dr Ella STENGLER
Managing Director, CEWEP

In February 2015 the European Commission presented the highly anticipated Energy Union Package and by the end of 2015 a "more ambitious" Circular Economy proposal is to be introduced. The Circular Economy *"addresses climate change and contributes to a reduction in the use of energy in line with our Energy Union Strategy"*, it was pointed out in the recent article by Frans Timmermans, Jyrki Katainen, Elżbieta Bieńkowska and Karmenu Vella[1] – the commissioner team that is currently working on the new proposal. Both proposals address the fact that Europe could benefit environmentally and economically if it made better use of its resources. In this context Waste-to-Energy (waste incineration with energy recovery) can be seen as a vital part of the solution to this complicated puzzle.

Waste-to-Energy plants act as a pollutant sink - they burn household and similar waste that remains after waste prevention and recycling, in this way preventing polluted materials from entering the recycling chain. The sophisticated flue-gas cleaning system is one of the most important parts of any modern Waste-to-Energy plant, and therefore enables the plants to guarantee the very low emissions that are achieved today. Waste-to-Energy is a hygienic method to treat residual waste and turn it into energy in the form of steam, electricity or hot water. The electricity is fed into the grid and distributed to the end-users, the hot water, depending on local infrastructure can be sent to a nearby district heating (or cooling) network to heat (or cool) homes, hospitals, offices etc., and the steam can be used by the nearby industry in their production processes. Ferrous and non-ferrous metals are extracted from the bottom ash and recycled while the mineral fraction of the bottom ash is used as a secondary construction material. This way residual waste is used as a sustainable and local energy source as well as secondary resource contributing to the environmental and energy security goals.

About 31% of Municipal Waste in Europe is still landfilled[2], even though landfill gas (methane) contributes significantly to global warming (25 times more significant in mass than CO_2). Landfills also take up land that could be better used for other purposes, and bury waste that is a potential source of precious energy. Waste-to-Energy helps to divert residual waste from landfills. Furthermore, the energy produced in Waste-to-Energy plants contributes to climate protection by replacing fossil fuels that would have been used to produce this energy in conventional power plants.

A significant part of the waste treated in Waste-to-Energy plants is biogenic – biomass – which means that about half of the energy produced by Waste-to-Energy plants is renewable energy. This is also the case when bio-waste is separated at source, as there is still a significant amount of biomass fraction in the remaining waste which is too polluted for quality compost and mixed material that is not easy to separate, e.g. used pizza boxes.

In 2012 76.8 % or more than three quarters of the EU-28's imports of natural gas came from just three countries - Russia, Norway or Algeria[3]. According to the Communication of the Energy Union package, recent political challenges have exposed just how important diversification of energy sources is for Europe while *"[d]omestically*

1 "Closing the circle and opening conversation on circular economy" by Frans Timmermans, Jyrki Katainen, Elżbieta Bieńkowska and Karmenu Vella http://ec.europa.eu/unitedkingdom/commissioners_corner/commissioners_articles/15_01_en.htm

2 Eurostat, 2013 data: http://ec.europa.eu/eurostat/statistics-explained/index.php/Municipal_waste_statistics

3 Eurostat 2014: http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_production_and_imports

produced energy also contributes to decreasing Europe's energy import dependence"[4].

Depending on the type of fuel – gas, oil, hard coal or lignite – between 8 – 44 million tonnes of fossil fuels (emitting 22 – 43 million tonnes of CO_2), would need to be used by conventional power plants to produce the amount of energy generated in 2012 by Waste-to-Energy Plants in Europe. Energy content of waste incinerated in European WtE plants in 2012 equals to 19% of natural gas imported from Russia.

The majority of the gas imported by the EU is used for District Heating and Cooling (DHC) – "the largest single source of energy demand"[5]. In 2012 Waste-to-Energy supplied around 10% of the total heat delivered through DHC networks in the European Union, representing 50 TWh (Terawatt hour) per year. The potential for using heat from waste is estimated at 200 TWh per year by 2050. In order to develop Waste-to-Energy's full potential for providing district energy better infrastructure for DHC is needed. United Nations Environment Programme report concludes that *"[w]aste incinerators produce very low-cost heat and often initiate development of a city's district heating network."*[6] Furthermore, connecting more households to the local DHC network rather than heating homes with individual boilers means lower emissions and better air quality in urban areas. In fact, cities like Gothenburg in Sweden have significantly reduced their emissions from heat production due to the expansion of the DH network[7].

Energy produced in Waste-to-Energy plants is also used to reduce emissions from industrial activities. Since 2007 the Rotterdam Climate Initiative has aimed to reduce the city's CO_2 emissions by 50% of 1990 levels by 2025. In order to help the city reach this goal, AVR, Stedin, and Emerald Kalama Chemical developed together a 2 km steam pipeline. For this project, called "Greener steam", AVR provides steam from waste incineration which Emerald Kalama Chemical uses for its toluene-based production process. "Greener steam" has helped Rotterdam reduce its CO_2 emissions by 25,000 tonnes each year since 2012, and has saved 15 million cubic metres of natural gas usage annually.

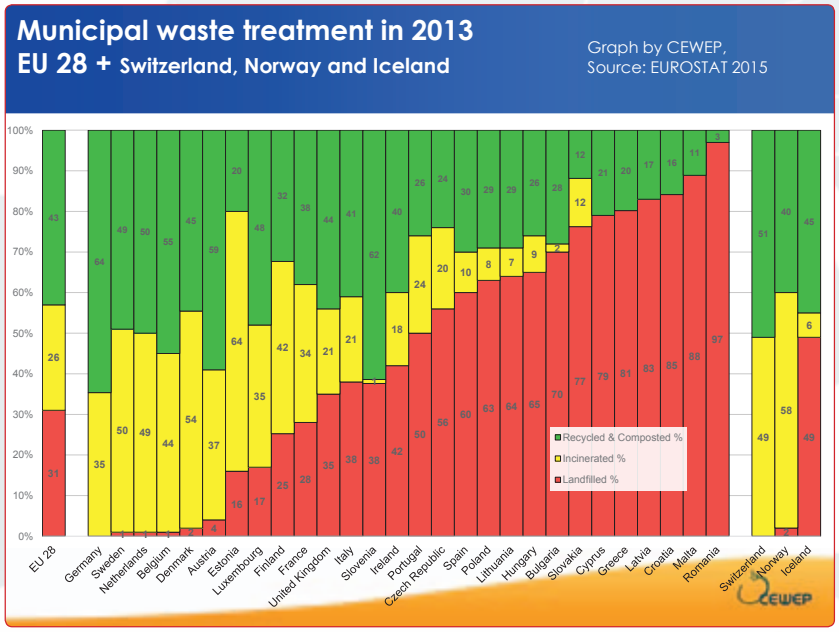
Waste-to-Energy is an important link between the Energy Union and the Circular Economy, two policies currently high on the European agenda. By providing local and sustainable energy from residual waste that would otherwise be sent to landfills, it reduces Europe's dependence on imports of fossil fuels while contributing to climate goals and air quality.

4 http://ec.europa.eu/priorities/energy-union/docs/energy-union_en.pdf , p.4-5

5 CORDIS Express: Energy efficient Europe, http://cordis.europa.eu/news/rcn/122442_en.html

6 P. 25, District Energy in Cities: Unlocking the Potential of Energy Efficiency and Renewable Energy, UNEP Report, 26th February 2015 http://unep.org/energy/portals/50177/DES_District_Energy_Report_full_02_d.pdf

7 http://cewep.eu/media/cewep.eu/org/med_454/1435_2015_06_18_summary_heat_and_steam_from_waste.pdf



Life cycle assessment and circular economy in practical application

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Nestlé, the world's largest nutrition, health and wellness company is a leading player in transforming the food sector to become more sustainable, as demonstrated by various external rankings and assessments[1]. Creating Shared Value (CSV) is the way Nestlé does business: to prosper over the long term and create value for shareholders, it must create value for society at the same time. This is demonstrated by many Nestlé initiatives, such as Alliance for YOUth[2], the Nestlé Cocoa Plan[3], the Nescafé Plan[4], or the Nespresso AAA Sustainable Quality Program[5].

Nestlé has implemented the Sustainability-by-Design concept to assess and optimize the environmental performance of its products based on a robust and scientific methodology. Life cycle assessment (LCA) is the most credible and broadly accepted methodology to evaluate the environmental performance of products[6]. Nestlé has implemented this approach into a simplified ecodesign tool (*EcodEX*) to systematically assess the environmental performance of design alternatives in the development process of new food products. Until today, 700 users of these tools have assessed more than 17'000 packaging and product design alternatives over the past years. These assessments help to understand and optimize the environmental performance of the Nestlé product range. Tivall, a Nestlé brand for meat-free, nutritious meals, has recently published an assessment[7] of a vegetarian burger compared to a conventional meat burger.

To meet our commitment to environmentally sustainable business practices, Nestlé applies a product life cycle approach involving our partners from farm to consumer and beyond. Internal assessments have demonstrated that the environmental performance (greenhouse gas emissions, freshwater consumption, impacts on biodiversity, and resource consumption) of Nestlé products is most strongly impacted by the production of ingredients (30-65%, mainly from use of machinery, fertilizers, plant protection). Consumer use is the second highest contributor (20-30%, mostly from energy consumption during cooking and refrigeration, as well as from food waste). Packaging usually represents 10-20% of typical Nestlé food & beverage products.

Packaging plays an important role in protecting the product during the numerous stages between field and fork, and through this it contributes to reduce food waste in the upstream supply chain as well as during the consumption phase. A recent study from FAO on food waste[8] indicates that there is a need for more and better packaging to comprehensively address food waste: in emerging economies food waste is primarily occurring in the upstream supply chain due to inadequate logistics and packaging. In the developed world packaging can help to reduce food waste through an adaptation of portion size to demographics and changing consumption patterns.

Measures taken to improve the circularity (a measure of how "restorative" the material flows of a product are[9]) must take into account the entire life cycle of that product. For example, a LCA performed on recyclable baby food glass jars and non-recyclable plastic jars concluded that the non-recyclable plastic jars had better environmental performance due to the light weight of the plastics system[10]. This demonstrates that circularity needs to embed a life cycle approach to ensure environmental improvements are achieved. A similar reasoning lies behind the Waste Framework Directive (Directive 2008/98/EC) which encourages a flexible approach to end of life options, justified by technical feasibility, economic viability and environmental protection.

Nestlé welcomes the European Commission's initiative to strengthen the circularity of the European economy. The Circular Economy is a powerful vision to align more efforts behind resource management and job creation. It is equally important that circular economy measures taken within the EU are developed based on the guiding principles of Life Cycle Thinking to ensure that the measures taken also contribute to actual environmental improvement, including in critical environmental areas such as water scarcity, biodiversity and climate change.

1 e.g. CDP (http://www.cdp.net), Dow Jones Sustainability Index (http://www.sustainability-indices.com), Oxfam Behind the Brands (http://www.behindthebrands.org/)

2 https://www.facebook.com/pages/All4YOUth/352140378327151

3 http://www.nestlecocoaplan.com/

4 https://www.nescafe.com/sustainability_en_com.axcms

5 http://www.nestle-nespresso.com/sustainability/the-positive-cup/coffee

6 See for instance ISO standards on life cycle assessment or the Singe Market for Green Products Initiative of the European Commission

7 2014 Nestlé in Society Report, page 157

8 N. M. Manalili, M. A. Dorado, R. van Otterdijk, Appropriate Food packaging solutions for developing countries, Food and Agriculture Organization of the United Nations, Rome, 2011

9 as described by the Ellen MacArthur Foundation http://www.ellenmacarthurfoundation.org/circular-economy/metrics

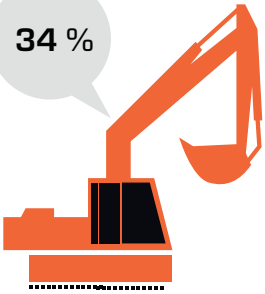
10 S. Humbert et al., Life cycle assessment of two baby food packaging alternatives : glass jars vs. plastic pots, Int. J. Life Cycle Assess, March 2009, Volume 14, Issue 2, pp 95-106. http://rd.springer.com/article/10.1007/s11367-008-0052-6

Europe's waste streams

In total, about 2500 million tonnes of waste was generated in the EU-28 and Norway in 2010. Here is an overview of where the waste came from and what it was composed of.

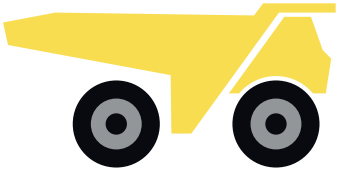
Waste streams by source

34 %



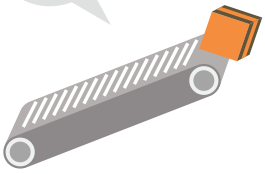
Construction

27 %



Mining and quarrying

11 %



Manufacturing

9 %

Households

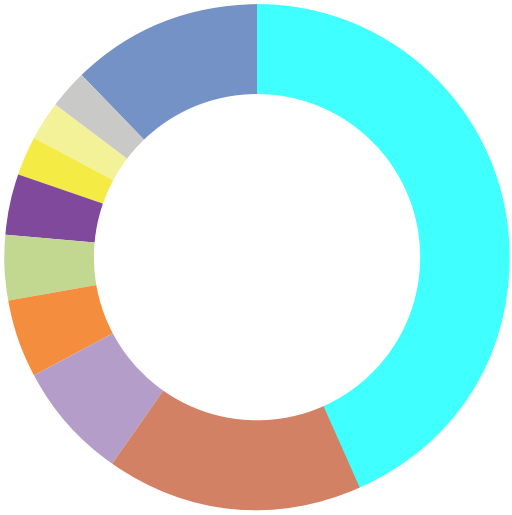
3 %

Energy supply

16 %

Other sources

Waste streams by type of waste

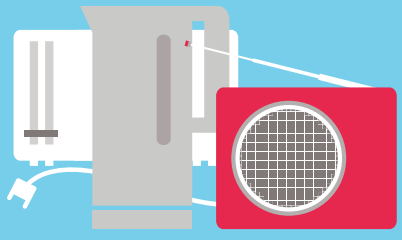


43.5 %	Mineral waste
16.4 %	Soils
7.4 %	Household and similar waste
5.0 %	Combustion waste
4.4 %	Animal and vegetal waste
3.9 %	Metal waste
2.5 %	Chemical and medical waste
2.5 %	Wood waste
2.3 %	Paper and cardboard waste
12.2 %	Other waste

Source: Eurostat 2010 data on EU-28 and Norway

On average, we generate 157 kg of packaging waste per capita in the EU.

Every year, the generation of some 74 million tonnes of hazardous waste is reported in the EU.



Electrical and electronic equipment is the fastest growing waste stream in the EU, estimated to reach 12 million tonnes a year by 2020.

Sources: EEA, Eurostat, European Commission

Read more: www.eea.europa.eu/waste

EuRIC

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