Investigation of regulatory barriers hampering the transition towards a circular economy in the EU

Tamara Fischer, Summary

THE COMPANY: *short information*

I conducted my study project at the thinkstep company, a worldwide leading expert in the field of sustainability consulting. One of the main tasks of the company is the performance of Life-Cycle-Assessments (LCA), used to calculate specific environmental key indicators in order to evaluate a product's environmental impact along its value chain. The information are used by companies for various reasons, for example for required certificates or marketing. The company was founded by students of the University of Hohenheim in 1991 in Stuttgart (Leinfelden-Echterdingen), where I have been working for 3 months. thinkstep is represented by 300 employees in 19 different countries and has more than 2.000 costumers, among them 40 % of the Fortune 500 (the highest-revenue companies).

INTRODUCTION: *circular economy*

Circular economy is a concept describing an economy, which produces no wastes and no emissions through its design, considering all the phases of the life cycle of products. It is opposed to the currently widely distributed linear model of make-take-dispose, where generated waste is dominantly incinerated or landfilled and materials as well as the energy embedded into them get lost. In the circular economy concept, the first priority is given to waste prevention. However, waste which cannot be prevented, is kept within a circle of re-use, remanufacturing, refurbishment and recycling, so that materials are circling in a closed-loop system. Incineration and landfill of materials represent material leakages (linear concept) and are to be minimized in such a system. The circular economy therefore represents a model which intends to maintain the value and energy of products, materials and resources within the economy as long as possible, and therefore saving material, energy and resources.

CONTEXT: *circular economy in the EU*

The circular economy model has gained worldwide importance, but especially in the European Union, where the European Commission sees high benefits in the transition towards a circular economy as it allows to maintain materials within the EU by using them in many cycles. This makes the EU independent from material imports, increases its global competitiveness and protects European business against the scarcity of resources and volatile prices. Further benefits represent the increased sustainable economic growth, the creation of new, innovative and more efficient business models, the high level of protection for humans in terms of working and safety standards within the EU for the increased amount of employees in the growing European secondary market and last but not least the reduction of environmental impacts. In order to implement a successful transition towards circular economy, the European Commission published the Circular Economy Package in December 2015, which is consisting of a concrete program of actions. However, increasing circular economy is challenging due to existing legislative barriers in some industry fields, which are hampering this transition.

THE CIRCULAR ECONOMY PROJECT: *purpose, steps and methodology*

Against this background, the Commission initiated a research project, which aimed to identify the main regulatory barriers for circular economy in the EU for the 10 most relevant cases. In the first step of the project, information were gained by literature study and public consultation. The second step involved the interrogation of industry associations active in the specific industry fields and the last step (that is where I participated) consisted of interviews with expert companies. The findings were included in a final report for the European Commission. I was responsible for two case studies, which are described below. My main tasks involved writing (estimated 55 %) and reading (estimated 44 %). The remaining 1 % was the interrogation of two expert companies for both case studies.

CASE STUDIES AND OUTCOMES: *recycling of palladium in autocatalytic converters*

Palladium is a precious metal and of high scarcity. Therefore, its economic value and price is high (around 17.000 Euro per kg). 50 % of its supply is used in the automotive sector, where palladium acts as catalytic converter, enabling the conversion of pollutants from fuel combustion into less harmful substances. In the EU, palladium can technically be recycled up to 100 %, but the actual recycling rate is with 60-70 % much lower.

Table 1: Barriers identified for the palladium case

Barrier identified	Effect of the barrier	Possible solution
Exports of end-of-life cars outside the EU	Cars reaching their EoL are often declared as used and can thus be exported outside the EU (lacking definition in the legislation). This leads to palladium losses for European disassemblers and recyclers.	Definition of EoL vehicles in the legislation; Reversed burden of proof procedure: exporter has to prove usability of the vehicle
Non-transparent value chains	Treatment of converters depends on actors and countries. Improper treatment and handling can cause losses of materials	Creation of international standards for treatment of autocatalytic converters; Allow only certified actors in the treatment and value chain
Classification of converters in Basel Convention as hazardous waste	Basel Convention hampers transport of hazardous waste over country borders by complex and time-consuming procedures. This is hampering the access to EoL converters for recyclers. Different country specific interpretations of Basel Convention make it difficult to implement procedures	Exclude catalytic converters from Basel Convention or classify them as „valuable substance to recycle“; Harmonize different interpretations and classifications of Basel Convention at national level

CASE STUDIES AND OUTCOMES: *recycling of packaging plastics for food and drinks*

Plastics are valuable materials used in a wide range of applications in everyday life. Since 1950, global as well as European plastic production has been continuously growing. In 2014, Europe was the second biggest plastics producer behind China. Packaging plastics for food and beverages were considered to be of special interest to the project as they represent the biggest market share of plastics packaging, which again represents the biggest share of plastics demand. With increasing plastics production, also the amount of plastics waste has increased. Regarding this, recycling is the preferred end-of-life option for plastics waste as they are nearly fully recyclable. However, in Europe only 30 % of the plastics waste is collected for recycling, 30 % for deposition and 40 % for energy recovery. This leads to an actual post-consumer plastics waste recycling quote of only 15 % in Europe. This rate is far away from a resource efficient “circular economy” scenario and is not compliant with the existing European waste hierarchy, which favors recycling over incineration and is legally stated in the European Waste Framework Directive. Barriers identified are shown in Table 2 on the next page.

INTERESTING FACTS: *about plastics packaging*

(1) Plastics packaging, which is in direct contact with food or drinks, is not allowed to consist of recycled material, as it is qualitatively downgraded after the recycling process and slightly contaminated with other plastic sorts and substances. This means, all packaging plastics you see in the supermarket have to be from primary plastics.

(2) Flexible, but non-recyclable plastic packaging could help to prevent waste and save primary material more effectively than recyclable ’normal’ plastic, even if it has to be incinerated at its end-of-life. For the production of flexible plastics, significantly less material is needed, therefore, also the mass of generated waste is lower.

Table 2: Barriers identified for the packaging plastics case

Barrier identified	Effect of the barrier	Possible solution
Lacking implementation of the waste hierarchy	Waste hierarchy favors recycling of waste over incineration and deposition. However, in the EU, only 30 % of plastics waste is recycled, the rest is incinerated (40 %) and landfilled (30 %). These rates are composed of country specific rates dependent on the policy background of the member states	Band landfilling of plastics in all member states; Identify main sources of insufficiencies in collection systems in the EU; Establish clear requirements and standards for collection systems in the EU
Missing guidance for eco-design	Products are often not designed for recycling or eco-design performance but for marketing reasons. The design of plastics makes their recycling often difficult (e.g. multi-layer plastics)	Promote eco-performance of products by giving guidance on design, but before identify the best option by considering the whole life-cycle of a product (e.g. flexible packaging)
Insufficient recycling targets and lacking description of action in legislation	In the current legislation, there is no valid recycling target for packaging plastics. The recycling target of 50 % in the legislation is related to all sorts of waste and leaves room for interpretation (50 % each material or together?)	Reformulate legislation and include general collection and recycling targets specified according to material types

APPENDIX: *figures for better understanding the circular economy*

The figures below shall help to visualize the circular economy concept as described by the Ellen MacArthur Foundation and the benefits it is supposed to bring according to the statements of the European Commission. However, the model of circular economy as presented in Figure 1 is simplified, as circular economy does not only consist of waste management (circular end-of-life options), but it also includes renewable energies, business models, the business culture of companies, consumer behavior, legislation and innovation in design and technologies and is therefore a highly complex topic with various actors.

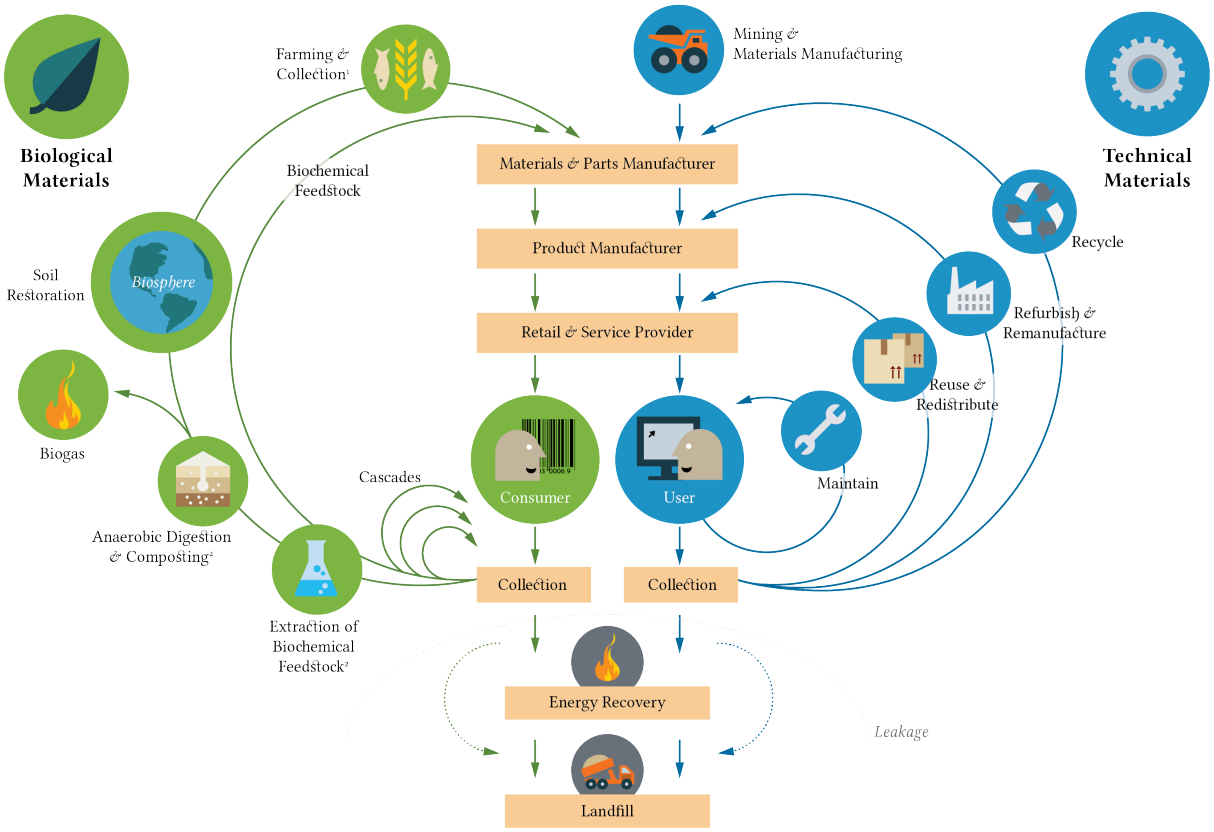

Figure 1: The circular economy model (Ellen MacArthur Foundation)

Figure 2: Benefits of a transition towards circular economy