

# **Design for a Circular Economy – Some Comments about implementing a successful Concept**

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## **ABSTRACT**

Circular economy is on everyone's lips and thus a top social issue. It is divided into the target areas Reduce, Reuse and Recycling (so-called 3R Approach). This presentation addresses the recycling aspect.

The recycling rates published by official agencies are hopeful. Especially in economically strong EU countries these values are respectably high. But appearance is deceptive, because the real reuse rates are - of course different from waste stream to waste stream - rather low. The main cause of this discrepancy is the (EU-compliant) official method of calculating recycling rates. It is also noticeable that the recycling regime contains no qualitative differentiations. It dominates a purely quantitative input consideration in the recycling regime. Poorly developed secondary commodity markets characterize the status quo. Inferior reuse areas of secondary raw materials dominate; it is also possible to prove illegal waste management practices.

In addition, the limited availability of certain resources is often unilaterally assessed. Innovative-dynamic processes as well as economic adjustment procedures are not included in the analysis. The current system is not sustainable.

**Keywords:** recycling-rate, secondary raw materials, business model, scarcity of resources

## **INTRODUCTION**

Contrary to all the numerous initiatives, campaigns and expressions of will remains to state as a status quo: The circular economy is (still) in its infancy. The market forces have only very rarely led to the development and establishment of commercially self-sustaining recycling markets with sufficient supply and attractively priced demand (Ueta K. et al., 2000). This circumstance combined with the social goal of replacing the linear disposable society with a more cycle-based economy has led to regulatory requirements in many countries.

Prominent example are material flow specific binding recycling quotas, e.g. for packaging. Contrary to the officially announced actual recycling rates, the real re-use amounts are more or less modest. In addition, so far no broad and attractive range of reuse areas has been developed. It is striking that the recycling-based control system so far contains no qualitative elements (Reh K. et al., 2013).

This raises the question of whether the established recycling system with mandatory input-based recycling rates is effective and efficient. This also includes the question of whether the current scarcity statements on non-renewable raw materials in a dynamic, innovative world lead to the right assessments.

## **MATERIAL AND METHODS**

The quantitative findings are based on officially accessible statistics and own empirically based research projects. The quantitative statements have either been generated using the methods of descriptive statistics or derived using methods of inductive (= closing) statistics.

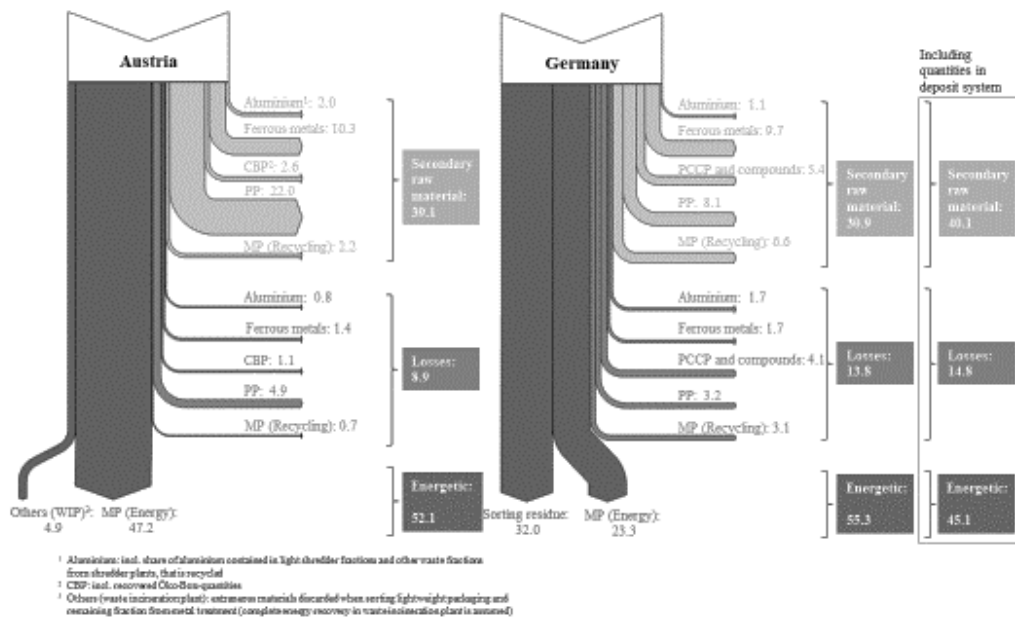
## **RESULTS AND DISCUSSION**

The circular economy is justified by the indications of limited availability of non-renewable raw materials, climate protection and the necessary emission limitation, as well as the safeguarding of an economic raw material base (so-called: urban mining). Nevertheless, one should resist the temptation to draw one-sided apodictic conclusions from this factual situation. After all, the earth is neither a static nor a closed system.

It is necessary to adapt the stable past findings, according to which scarcity creates a strong pressure to innovate and ongoing innovations lead to permanent "creative destruction". The re-allocation of "Property Rights" is based on the principle "The better is the enemy of the good". The extent to which the scarcity of certain resources has the potential to be threatened (for example in the form of a "political weapon") must be left to individual consideration. However, it should be noted in this context that the use of scarcely scarce resources (such as coal) also carries a significant threat potential (in this case climate damage).

Since the implementation of the "circular economy" mission statement can not be equated with increased recycling efforts in unison, a maximization strategy of recycling is ruled out. Such a suggestion fails because of the fact that every recycling loop leads to emissions and pollutant enrichments / concentrations. It must always be left to an individual evaluation whether the reprocessing or the final allocation to a sink is ecologically more advantageous. Circular economy can not be thought one-dimensionally. Alternatives to recycling include longevity of products, reuse or cascade use and - very radically thought - the reduction of waste (reduce) (Bunge, R., 2017).

Regardless of this, we have found in the example of "dual disposal of packaging waste" in Germany and Austria that the real re-use rate is rather modest. In addition, it could be demonstrated that predominantly inferior reuse areas dominate the recycling regime. The flow rates in detail can be found in the Sankey diagram below.



**Figure 1 Comparison of the flow rates (recycling routes and recovery losses)**

At the root of the status quo of the dual disposal of packaging waste, the currently practiced business models are the so-called system providers on the basis of the currently applicable framework conditions. The focus is on cost-effective fulfillment of the legally assigned task. The packaging companies in the economic circulation largely finance the disposal task.

Realization proceeds play a very subordinate role in the current regime. On the contrary, co-payments are often called in the market for the return into the economic cycle (Bosewitz S., 2013).

The existing system must be modified or significantly changed. The amount of the exploitation proceeds - and thus the quality of the secondary revenues generated - must be included as an incentive premium in the financing and recovery system. In an empirical project we were able to identify the main reservations about secondary raw materials. These reservations need to be addressed and market-driven solutions developed.

## CONCLUSION

The conclusions derived from the scarcity of non-renewable raw materials are often apodictically one-sided and insufficiently account for dynamic components.

Recycling is not a royal road to the circular economy, but it is an important tool. In each individual case, the best option is to be determined from a number of alternatives. However, despite the mission statement "circular economy" the real re-use rate is still too low. The causative control mechanisms of the current framework conditions are the cause of this empirical finding. These lead to business models of the companies active in this industry, which

do not sufficiently consider the aspects "quality of secondary raw materials" and "marketable exploitation opportunities".

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