

Towards a global recycling society

Feature Initiative: Materials Flow Analysis of PGMs

Summary: European legislation such as the End-of-Life Vehicle Directive (2000) and the Waste Electrical and Electronic Equipment Directive (2003) aim at saving natural resources through improved reuse and material recovery. At first sight, these legislative measures appear to be on the right track. In reality however, we are far from achieving high recycling rates for important trace elements such as platinum group metals. New ideas, new partnerships and a global perspective will be required to close the loop and truly become a recycling society.

In theory, European legislation such as the End-of-Life Vehicle Directive (2000) and the Waste Electrical and Electronic Equipment Directive (2003) should lead to high recycling rates of the metals used in vehicles and electric and electronic equipment. However, in reality this is, so far, not the case.

For all these products, real recycling rates are well below 50% – even for valuable platinum group metals (PGMs). These low rates persist despite supportive legislation, consumer awareness, advanced recycling technologies, first-rate collection and recycling infrastructure, and attractive economic incentives.

In 2001, Umicore and Germany's Öko-Institut engaged in a research project to gain a better understanding of why actual recycling rates of PGMs in Europe were so much lower than predicted. Entitled "Materials Flow Analysis of PGMs," the study revealed that the life cycle structure of consumer products have a direct impact on their low recycling rates, especially when compared to the life cycle structure of industrial products. Characteristics include the following:

- Most participants in the lifecycle of consumer products are not aware of the contained valuable resources.
- Multiple changes of ownership occur, and usually no connections remain between the final owner and the product manufacturer.
- The mobility of consumer goods is one of their in-built characteristics. With transfer of ownership the location of use can be spread across the globe. Developing and transition countries are often the final destination.
- Often informal operators participate in the early steps of the recycling chain.
- Often no sharp distinction exists between an end-of-life and a second hand product. Many traders take advantage of this lack of clarity and illegally declare exports of "waste" as "reuse".
- Recycling in most developing and transition countries is mainly informal.
- Material flows are not well documented.



European legislation such as the End-of-Life Vehicle Directive should lead to high recycling rates of the metals used in vehicles. In reality however, this is not the case.

Summing up, the study showed that old consumer products such as cars and electronics are traded on a global scale, widely bypassing national legislation and recycling efforts. Legislative measures such as the WEEE directive and the ELV directive are therefore only first steps. To achieve a true “recycling society,” further action will be necessary. Some key recommendations from the study include the following:

- **Consider value-based targets.** Solely weight-based recycling rates ignore the significance of trace elements and can lead to counteractive solutions in some cases (e.g. accepting losses of precious metals into side streams in order to recover more plastics and iron).
- **Redefine recycling rates.** If a large portion of scrap escapes domestic recycling through exports, the calculation of recycling rates based only for the part that has been domestically collected gives a false impression.
- **Control illegal exports.** More monitoring, control and enforcement is needed to prevent illegal exports and non-compliant recycling processes.
- **Reconsider system boundaries.** Assumptions that make sense within a defined system can be wrong once system boundaries are crossed (e.g. car or computer exports to developing countries that do not have recycling infrastructure).
- **Consider a service business model.** If cars or computers would be leased out instead of sold to the consumer, traceability and management of end-of-life products could be much better controlled than today.

In the long run, a “global recycling society” will need to be envisioned. Clearly, the metals industry cannot solve this problem alone but needs support from regulators, product manufacturers, and customers alike. Achieving the vision will require a better understanding of the global flows and fate of old consumer products. It will also require international co-operation efforts to establish effective recycling infrastructure in the countries where European products end up at end-of-life.



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