

## Annotation

This thesis is a comprehensive study describing and quantifying material flows of waste electric and electronic equipment (WEEE) in the Czech Republic; specifically the material flow of small waste electric and electronic equipment (s-WEEE) as well as representative substances. The studied material flows were estimated regarding aspects of the environmental impact. The End-of-Life mobile phone is seen as a typical representative of s-WEEE ; therefore material flows of mobile phones are described in this thesis as well.

To put it in concrete figures, approximately 124 thousand tons of WEEE from households originated in the Czech Republic in 2010, where each inhabitant got rid off 4 pieces of WEEE in average. Further, total production calculating also consumer-like WEEE from companies and institutions was around 141 thousand tons in 2010. S-WEEE present around 15% from the total amount of WEEE originating in 2010; however it is more than 80% as regards the number of pieces. Despite of that fact the recycling potential of Au for instance is slightly higher by s-WEEE than by large WEEE (63kg/year compared to the 59kg/year respectively).

As regards estimation of the total production of EoL mobile phones, around 45 thousand pieces originated in the Czech Republic between the years 1990-2000 and 6,5 million pieces in years 2000-2010. The estimation for years 2010-2020 is 26,3 million pieces. Taking into account estimation of EoL mobile phones for the Czech Republic as an average number within the EU, number of pieces of EoL mobile phones shall exceed 1,3 billion pieces between years 2010-2020. Interestingly, these EoL mobile phones shall contain approximately 31 tons of Au and 325 tons of Ag.

It is discussed that the major impact on the environment under conditions of the current WEEE management has the presence of cooling and freezing WEEE in the bulky waste, which means more than 200 thousand tons CO<sub>2</sub> equiv. emitted in the air annually. On the contrary, environmental relevance of collection and recycling of s-WEEE was confirmed in this thesis. In order to improve the protection of environment connected to the management of WEEE, it is necessary to remove system failures such as dumping of cooling and freezing WEEE contained in the bulky waste, as well as the improper treatment of EoL mobile phones, such as shredding of entire mobile phones without prior removal of printed circuit boards.

In this thesis it is recommended that complementary recycling shall be included into the official evidence of collection and recycling of WEEE in the Czech Republic in order to meet the collection target of 40% in the coming years. At the same time it is necessary to sort the bulky waste and to hand over the sorted out WEEE further for recycling. It is equally important to substantially decrease the amount of s-WEEE in the unsorted municipal solid waste stream in the coming years and to identify unknown flows of WEEE. As the s-WEEE presents the major part of the WEEE flow in the unsorted municipal solid waste stream, it is advisable to redirect the flow of the s-WEEE from the unsorted municipal solid waste to the sorted collection stream in order to meet the future collection targets.