

# LCA of the Mobile Communication System UMTS

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## Introduction

Telecommunication providers and telecommunication manufacturers are preparing the implementation of the third generation (3G) mobile telecommunication system known as UMTS (Universal Mobile Telecommunication System) in Europe. In a joint effort Motorola, Swisscom, Deutsche Telekom together with ESU-services evaluated the environmental sustainability of the UMTS mobile communication system in Switzerland by means of a Systems Life Cycle Assessment (SLCA).

## Inventory data

For the modelling of the manufacturing step of PWBs and ICs, we distinguished inner and outer layers of PWBs and used specific inventory data for both. PWBs in electronic devices were then modelled based on their surface and number of layers. For ICs, three different classes were distinguished and inventoried. Whenever possible, rare and precious metals mining was also included. Inventory data for gold and silver mining and refining were compiled and weighted in a mix for gold and silver corresponding to the shares of mining countries in the world production.

## Results

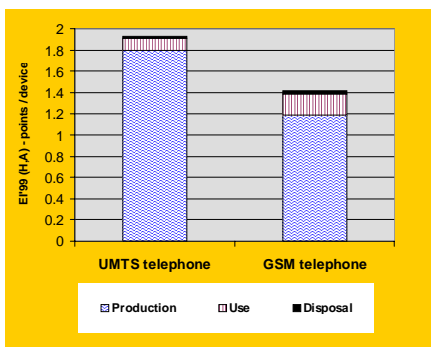


Fig. 1: The production phase has the greatest importance in the life cycle of a mobile phone (production in Germany, 1 year use and disposal in Switzerland).

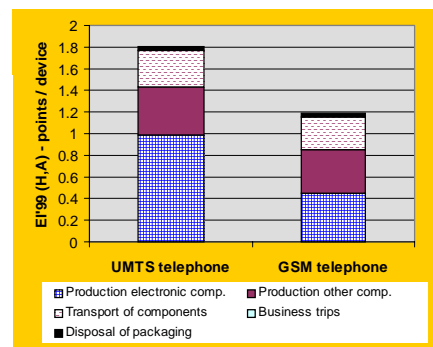


Fig. 2: The production of electronic components (PWB, IC) is predominant (40-50%) within the assessment of the manufacturing phase of the mobile telephone.

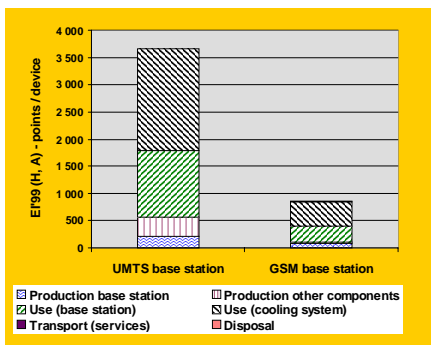


Fig. 3: The use phase is the most important parameter of the base station's life cycle, making up approximately 85% of its environmental impacts.

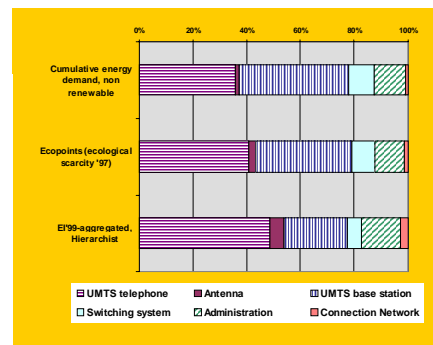


Fig. 4: The mobile phone is the most important element of the mobile communication system (data transfer of 1 Gbit, mobile phone UMTS to mobile phone UMTS). The base station is the second significant element of the network.

## Conclusions

- From an environmental point of view, the mobile phone is the most important element of the mobile communication system. The base station is the second significant element of the network.
- With respect to information and communication technology in general, the results of the study imply that special attention is recommended for the cradle to gate system of electronic components although their share in weight is low in most products.
- Another important aspect is the energy consumption of the infrastructure, i.e., of the cooling equipment of base stations.
- Major challenges on the way towards improved assessments of electronic components are constantly changing supply chains, short innovation cycles and data availability in the electronics and precious metals sector.

## References

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