

# **Beyond energy - Material stock in German data centers: Taking resource efficiency into account in Green IT strategies for data centers**

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## **Abstract**

The study, which will be presented, ascertains the equipment and material resources of German data centres for the reference year 2008 and predicts its development until the year 2015 in two scenarios ("business as usual" and "Green IT"). It is the first study worldwide that analyses material stocks and material efficiency issues in data centers. The study, which was commissioned by the German Federal Agency for the Environment, develops a methodology, which allows to calculate the number of data centres in different size classes and their average equipment with IT components and infrastructure elements such as air conditioning systems and power supplies. Reference products are defined and on this basis a detailed determination of the material composition of data centre components is made. This allows to make detailed statements on the material equipment of approximately 53,000 data centres in Germany.

In the year 2008 in German Data centres approx.12.000 tonnes of electronics, 17,000 tonnes of copper, 7,000 tonnes of aluminium, 11,000 tonnes of plastics and 58 000 tonnes of iron were used. The electronic material contains 1.8 tonnes of gold, 7.5 tonnes of silver and 0.8 tonnes of palladium. Nearly 30% of the materials are bound in almost 50 major data centres.

In the scenario "business as usual" the amount of electronics in the German data centres increases from 2008 to 2015 by 60% up to 20,000 tonnes. This includes almost 3 tonnes of gold, 21 tonnes of silver and 1.8 tonnes of palladium. The amounts of copper, aluminium and iron will increase by over 50%. Even in the scenario "Green IT" when the energy needs of data centres in Germany decreases by 40%, the material stock in the data centres would not reduce, especially the electronic material will increase significantly by more than 20%.

The study points to significant further research. In particular there is a need to ascertain detailed data on the material composition of IT products (servers, etc.). The study stresses that in the future in addition to the issues of energy efficiency the questions of material efficiency of data centres should be regarded. Additionally the development of appropriate product design and recycling strategies for servers, storage and other data centre components should be enforced.

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