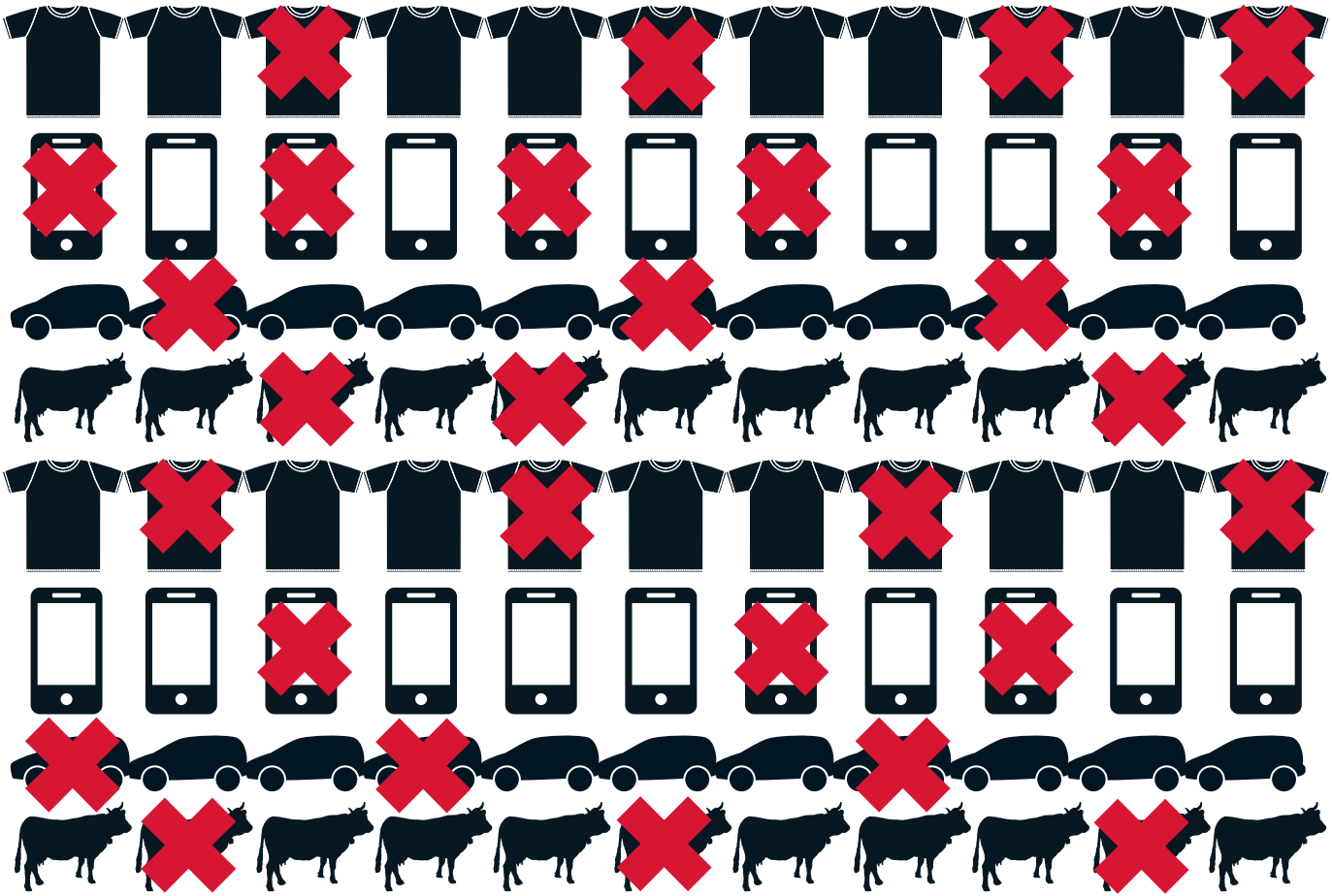
Bund für
Umwelt und
Naturschutz
Deutschland

BUND
FRIENDS OF THE EARTH GERMANY

Protecting resources and using them respectfully

Land – water – materials – atmosphere



www.bund.net

We only have one Earth!

Everything we do in our daily lives, for example buying a mobile phone or a T-shirt, eating a steak, or driving a car, involves using land, water, and materials and emitting greenhouse gases such as carbon dioxide (CO_2).

These natural resources form the foundation for all life on Earth. We use them both for making products and services and for absorbing greenhouse gases such as CO_2 and methane, for example.

The total amount of natural resources is limited. Non-renewable raw materials such as metals and oil are being used up. Other resources such as soils, water, or the atmosphere are overused. The amount of resource consumption due to our consumption of goods and services is enormous, and even today, it is far greater than what the Earth can sustain on a permanent basis. At present, humanity is using up the amount of resources that should actually last for a whole year within eight months.

The organization Global Footprint Network proclaimed 20 August 2013 to be 'Earth Overshoot Day'. On this day, the amount of natural, renewable resources available for the year 2013 (calculated on the basis of the Ecological Footprint) had already been used up. The people living in the rich countries in Europe, North America, Australia, and Japan – roughly twenty percent of the global population – consume about eighty percent of global resources.

It's up to us!

Our wasteful use of resources is the reason why minerals and metals, water and soils have become scarce. And it is the main cause of climate change and the loss of biodiversity. Much larger amounts of resources and CO_2 emissions are embedded in most products than are apparent at first glance.

This brochure uses the examples of mobile phones, beef, T-shirts, and private transport to show how much land, water, materials, and atmosphere are used, and how resource consumption can be reduced.

We need a turnaround in resource use!

In a limited world, there can be no unlimited use of natural resources. Actually, everyone should be aware of this. For example, there has already been a certain change in thinking about energy consumption and climate protection. Climate protection and the transformation of the energy system are key political topics in Germany.

We need goals that make long-term use of the resources land, water, and materials possible as well. We need a 'turnaround in resource use'! Important first steps include the EU Commission's 2011 'Roadmap to a Resource Efficient Europe' and the German resource efficiency programme PROGRESS, passed in 2012, which both provided the necessary impulses for initiating increases in resource efficiency.
Our wasteful consumption of resources must be stopped.

Friends of the Earth Germany calls for the following:

- From an ecological point of view, it would be logical to cut global resource consumption in half by 2050, compared with 2000.

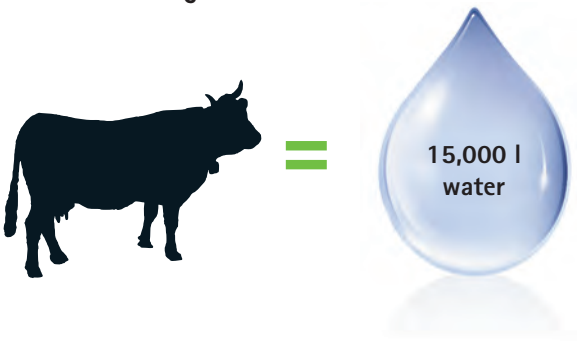
- The amount of materials (such as metals) used directly and indirectly for production would have to be reduced to at most three metric tons per person per year by 2050 – as measured by the indicator 'raw material consumption' (RMC).

- If materials are included that simply remain unused when other materials are extracted, for example mining waste, each person would be permitted to consume a maximum of six metric tons per year in 2050 – as measured by the indicator 'total material consumption' (TMC).

- The use of land and water and emissions of greenhouse gases such as carbon dioxide must also be reduced significantly. That is why these relevant resources should be measured and limited using the land footprint, water footprint, and carbon footprint as indicators.

Spotlight on beef

Resources for 1 kg of beef



Photos: istockphoto.com/Artem Egorov /christiangrass

Beef consumption in Germany

Every German consumes more than 13 kilograms of beef per year. Total meat consumption per capita in Germany is about 90 kilograms per year.

Producing one kilogram of beef requires:

- 15,000 litres of water
- 27-49 square metres of land area
- up to 27 kilograms of carbon dioxide emissions.

Consequences

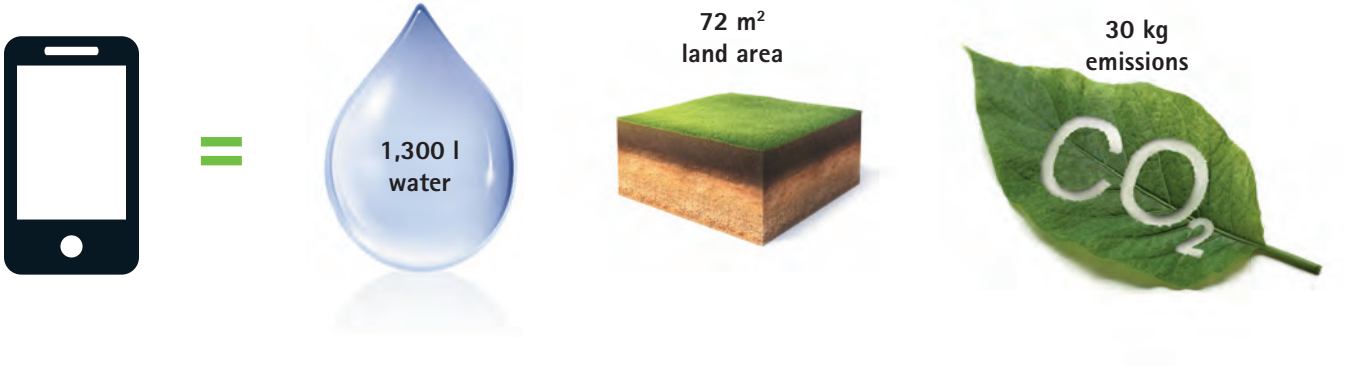
- Worsening the scarcity of water resources in other countries such as Brazil
- Deforestation of rainforests for cultivating more soybeans for feed
- Contribution to climate change – meat production causes 26 percent of greenhouse gases

Alternativen

- Eating less meat
- Buying meat produced regionally by Bioland, Demeter, Naturland, and Neuland
- Trying out vegetarian alternatives to meat such as seitan (wheat protein/gluten) or tofu (soya)
- Encouraging changes in your personal environment, for example vegetarian options in canteens

Spotlight on mobile phones

Resources for 1 mobile phone



Mobile phone consumption in Germany

63 million people in Germany own one or more mobile phones. There are roughly 140 million mobile phones in Germany, 27 million new ones were purchased in 2012, and an estimated 85 million are lying around unused.

Producing one mobile phone requires:

- 1,300 litres of water
- 72 square metres of land area
- 60 different materials, including 30 metals such as copper, gold, silver, and lithium, as well as ceramics and various plastics
- 14–30 kilograms of carbon dioxide emissions

Consequences

- Consumption of large amounts of energy, water, and land for extracting the raw materials
- Consumption of large amounts of non-renewable materials, such as copper and other metals
- Contribution to human rights violations in many countries where raw materials are extracted
- Health risks due to electromagnetic fields
  Further information is available at (www.bund.net/elektrosmog)

Alternatives

- Using your own mobile phone for a longer period of time
- Giving away or donating old mobile phones that are still in working order
- Recycling devices that are beyond repair

Delicious! Or: How to turn land into steak.

Land consumption and its consequences

Germany's land area is not large enough to meet domestic needs for agricultural and forest products and also make enough space available for houses, industry, and transport. For this reason, Germany needs additional areas for agriculture and forestry abroad to satisfy the needs for raw materials and products.

The Ecological Footprint can show how much land is required to extract energy and raw materials and to absorb carbon dioxide and waste generated by our consumption. For example, a person in India uses a total of just 0.9 hectares of land, a person in Germany 5.1 hectares, and a person in the USA as much as 8,0 hectares. Even today, 30 percent more land is used than the Earth can sustain long-term. **If our Earth's productive areas were distributed equally, every person could use at most 1.8 hectares of land today.** And the global population is growing. The area available per person is shrinking.

In addition, agricultural land is being lost in many regions of the world because of overuse, erosion, and salinisation. The cultivation of products for export in countries of the South often competes with food production for local markets and endangers the local population's land rights as well as biodiversity. Agricultural land is generally expanded at the expense of ecosystems rich in biodiversity, such as the Amazon rain forests. But land consumption in Germany also often devastates valuable land.

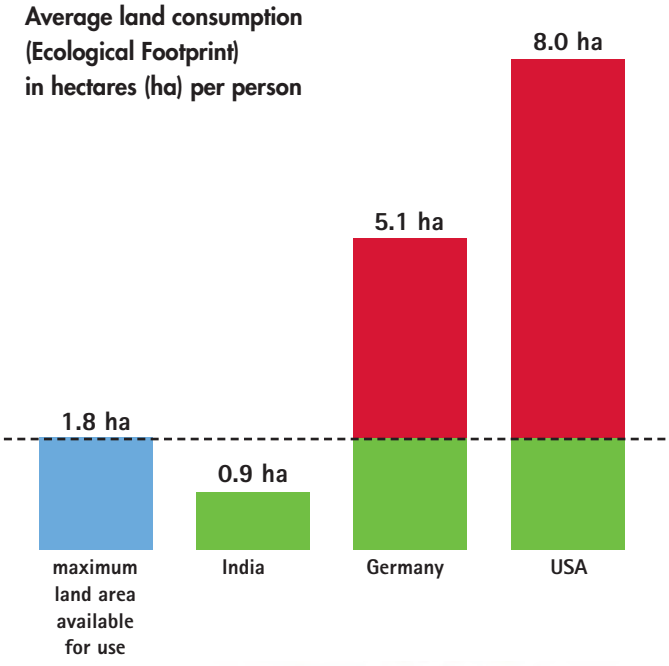


Photo: Shutterstock.com/Sasimoto

Therefore, the International Resource Panel of the United Nations Environment Programme (UNEP) recommends lowering global use of agricultural land to 0.2 hectares per person and year (with a view to the growing global population). In Europe, the current figure is an average of 0.3 hectares per person and year.

Example: Beef

38 percent of the Earth's land area is used for agriculture. Demand for agricultural products is increasing further, because of the growing global population and rising meat consumption, among other things. Feed is grown on just under one-third of all cultivated land. If byproducts from agricultural production that are also used for feed are taken into account, the figures are even more drastic: including straw as well as oil cake from soya beans and rapeseed, no less than three-quarters of cropland serves to feed animals.

In Germany, people eat a lot of meat, even though they know about possible effects on their health: on average about 90 kg per person and year, more 13 kg of which are beef. There is no sign of these figures dropping. In many other regions such as Asia, meat consumption is also increasing as the middle class is growing. In the poorest countries of the world, in contrast, many people do not eat meat at all – not only for religious reasons, but also because they cannot afford it.

Even though almost half of agricultural land in Germany serves to grow feed, this is still much too little to meet demand. Large amounts of feed such as soya are imported, mostly from Brazil or Argentina. Germany requires land area in South America alone that is larger than Lower Saxony (4.4 million hectares).

What can I change?

Eating less meat

Reducing meat consumption in the European Union by 50 percent would free up 44 million hectares of agricultural land, which corresponds to an area 1.5 times the size of Germany. A balanced diet with less meat is also better for you.

Buying organic meat

As a matter of principle, organic farming associations such as Bioland, Demeter, Naturland, and Neuland do not use imported soya as supplementary feed. Farmers whose products are awarded these labels produce their own feed or source it from their own regions. The European organic logo does not guarantee this, but limits the amount of imported soya to 10 percent of the annual amount of feed.

Looks great! Or: How to make a T-shirt out of water.

Water consumption and its consequences

More and more water is being used worldwide. This is closely linked to the rise of industrial production and the growth of international trade. The more products are manufactured, the more water is used.

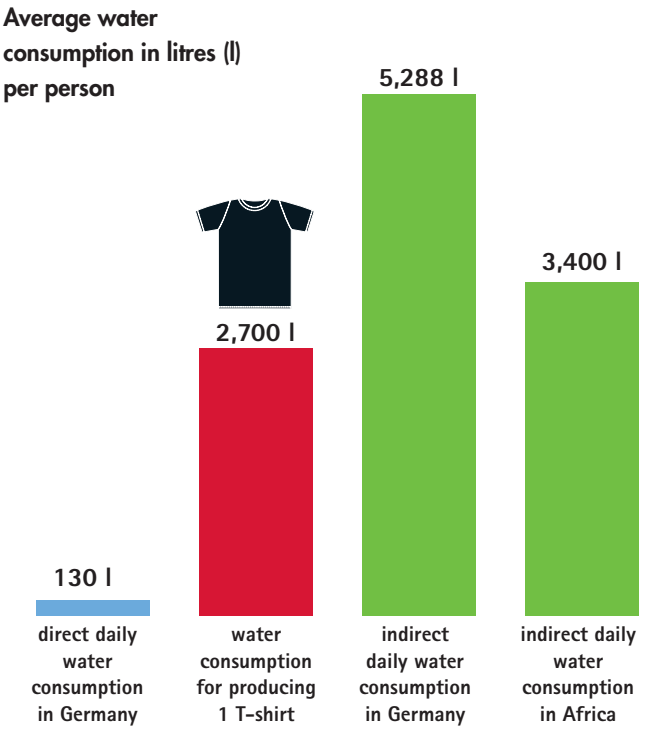
A person in Germany uses 130 litres of water per day, e.g., for cooking, showering, or washing, which corresponds to roughly one bathtub full of water. But that is only the smallest fraction of water used daily. **Overall, per capita water use in Germany amounts to 5,288 litres per day, in Africa just 3,400 liters**. Large amounts of this water are used outside of Germany and the European Union, as many raw materials, semi-finished goods, and products are imported. Agriculture is responsible for 92 percent of the world's water consumption and is by far the largest consumer of water.

Example: T-shirt

Cotton has been used to make clothing for thousands of years, and it is still the most important natural fibre for producing textiles today.

Cotton needs a lot of water. It takes 2,700 litres of water to produce an average cotton T-shirt.

The water is used mostly for cultivating the cotton and manufacturing the T-shirt. **Producing a kilogram of cotton material requires 11,000 litres of water on average.** Cotton consumption is responsible for 2.6 percent of global water consumption. Therefore, cotton crops are dependent on irrigation in low-precipitation regions. 73 percent of cotton worldwide is grown on irrigated fields.



Our cotton consumption makes seas go dry

The Aral Sea used to be the world's fourth-largest inland water body. In the last 30 years, however, irrigation has used up 75 percent of the Aral Sea's previous amount of water. The countries of the European Union are indirectly responsible for 20 percent of its drying up.

The price of a T-shirt does not cover the ecological consequences. The direct effects are borne mostly by the people in the countries where cotton is grown.

In addition, the textile industry is characterized by very high electricity consumption and very low social standards.

What can I change?

Going shopping less often

Perhaps you could do with one T-shirt less and wear the ones you have a little bit longer. Buy better quality rather than mass-produced goods that are ecologically and socially problematic.

Handing clothing down for further use

Many articles of clothing can be handed down when you no longer want to wear them. The quality is usually very good at clothing swaps or second-hand stores. Moreover, clothing should be mended if possible.

Buying organic cotton clothing

A study comparing the resource consumption of organic and conventional cotton shows that only half as much water is needed to produce a kilogram of organic cotton than the same amount of conventional cotton.

Mobility. Or: How natural CO_2 is turned into a climate killer.

CO_2 emissions and their consequences

CO_2 is a gas naturally occurring in the atmosphere. The concentration of carbon dioxide (CO_2) in the atmosphere has been increasing since the mid-18th century.

The consequence is climate change. The temperature has already risen by about 0.74 degrees Celsius since the mid-19th century. Climate change has very different effects in various parts of the world: some regions are becoming hotter, some drier, some wetter. The rising temperature of the oceans will cause more extreme weather conditions, contribute to glaciers melting, and make sea levels rise.

Globally, emissions of CO_2 and other greenhouse gases are continuing to increase after rising by 39 percent over the last 20 years. Although it is true that CO_2 emissions in Germany dropped by 25.5 percent from 1990 to 2012, this was a result of the closure of the old East German brown coal power stations. In 2012, German greenhouse gas emissions even increased by 1.6 percent, compared with the previous year. The reason for this is increased electricity generation from brown coal and hard coal.

In addition, the CO_2 emissions of rich countries such as Germany are being shifted to poorer countries. The reason for this is the increasing consumption of goods produced in developing countries.

Globally, greenhouse gas emissions must be reduced significantly in order to limit global warming to the goal of 2 degrees Celsius, which has been agreed in international conventions.

The politically declared goal is to reduce German CO_2 emissions by 80 to 95 percent by 2050. This will require massive efforts.

Global warming is caused mostly by our high consumption of fossil fuels such as oil, gas, and coal and the CO_2 emissions they involve.

50 %

Efficient cars could cut CO_2 emissions by half.

Example: Mobility and private transport

The transport sector is responsible for about 20 percent of greenhouse gas emissions in Germany today. **Every year, automobile traffic alone produces 130 million metric tons of CO_2; this figure has remained practically constant for 20 years.** Using the most fuel-efficient vehicles could cut CO_2 emissions by half even today.

If transport is to contribute to climate protection and lowering CO_2 long-term, it is also essential to prioritize low-carbon mobility strategies.

Photo: wikipedia/JFCAR

Misguided product design:
Audi Q7 4.2 FSI

Weight:	2.24 metric tons
Fuel consumption:	12.7 – 13.6 l super
CO_2 emissions:	305 – 326 g/km

What can I change?

Avoiding transport – the best way to cut CO_2.

- Good planning: Combining errands so that less driving is necessary
- Occasionally doing errands on foot or by bicycle
- Sharing rides
- Driving cars only when fully occupied
- Going on holiday nearby, and not flying

Switching to low-emission or zero-emission means of transport

- Taking the bus or the train, cycling or walking instead of driving for everyday needs
- Using the bus or the train instead of flying or driving for longer distances as well

More helpful suggestions

- Car-sharing; people don't all need cars of their own
- Fuel-saving driving habits (driving more slowly and anticipating problems, using low rolling resistance tyres and low-friction oil)
- Taking fuel efficiency and low CO_2 emissions into account when you buy a car (new or used)

Connected. Or: How to make a mobile phone out of 60 materials.

Material consumption and its consequences

for products and services per year. That corresponds to 22 kilograms per day.

Raw material consumption is distributed very unevenly: it is four times as high in Europe as in Africa.

And consumption is continuing to increase. Today, roughly 60 billion metric tons of raw materials are used per year – that is about 50 percent more than 30 years ago. If current growth trends continue, this figure could reach 100 billion metric tons in 2030.

Large amounts of energy, water, and land are used to extract raw materials such as metals or ores. Arable land is lost in this way. Water, too, is becoming even scarcer and is polluted by the use of toxic materials. Human rights violations, poor working conditions, and low wages are also a daily reality in many regions where materials are extracted. In addition, violent conflicts over the distribution of resources are fought out at the expense of the local population in many areas. The extraction of coltan (tantalum) in the Democratic Republic of the Congo remains a current example of the extreme exploitation of human beings and nature. Coltan is a raw material in high demand and is used for making mobile phones and games consoles.

Mobile phones contain valuable raw materials

In Germany alone, there are 130 to 140 million mobile phones; 27 million were purchased new in 2012. Globally the figure was roughly 1.9 billion new mobile phones in 2013. About 85 million mobile phones are currently lying around unused in Germany.

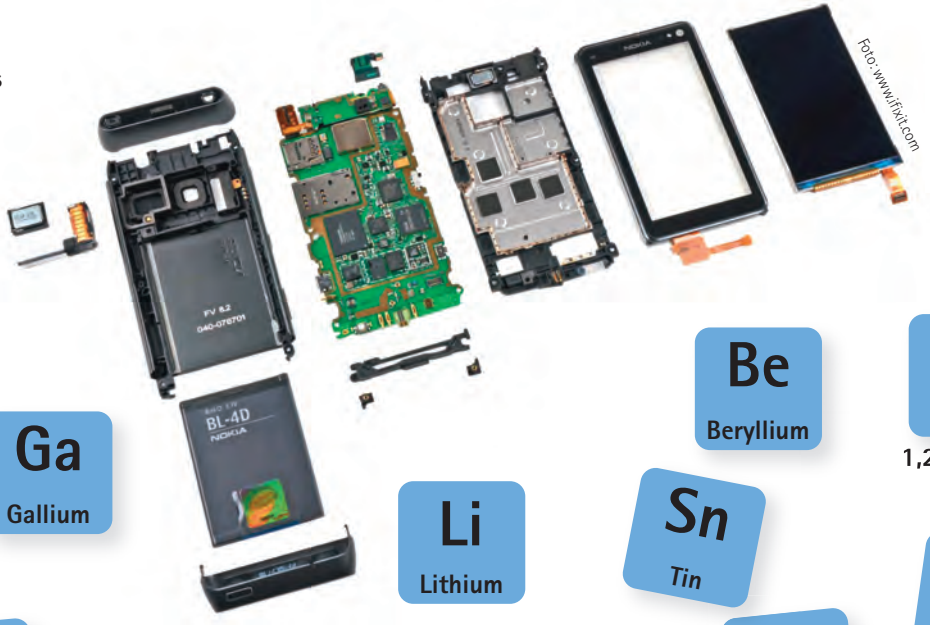
A mobile phone is made of more than 60 different materials, including a good 30 metals as well as ceramics and various plastics. One mobile phone contains 250 mg of silver, 24 mg of gold, 9 mg of palladium, 9 grams of copper, and 4 grams of cobalt, among other materials.

That may not be much per individual mobile phone, but extrapolated to 140 million mobile phones in Germany, it adds up to: 35,000 kg of silver, 3,360 kg of gold, 1,260 kg of palladium, 1,260,000 kg of copper, as well as 560,000 kg of cobalt. There are 21,250 kg of silver, 2,040 kg of gold, 765 kg of palladium, 765,000 kg of copper, and 340,000 kg of cobalt are in the 85 million unused mobile phones in Germany.

The materials come from many different parts of the world. Some require considerable effort to extract and are mined in just a few countries. For example, some rare earths used in mobile phone displays are currently produced almost exclusively in China.

A substantial amount of resources is required to extract all these materials and manufacture the mobile phone. Using the mobile phone itself is responsible for only just under a quarter of its resource consumption – for energy or for provision of the ne*twork*.

140 million mobile phones in Germany contain:



In Indium

Pd Palladium
1,260 kg

Ga Gallium

Ag Silver
35,000 kg

Au Gold
3,360 kg

Pt Platinum
42 kg

Li Lithium

As Arsenic

Be Beryllium

Sn Tin

Ta Tantalum

Co Cobalt
560.000 kg

Cu Copper
1,260,000 kg

Pb Lead

What can I change?

Using mobile phones for a longer period of time

Today, a mobile phone is used for an average of just 2.5 years before ending up being discarded or put aside. The longer a mobile phone is in use, the more resources are saved since resource-intensive material extraction and manufacturing of a new mobile phone are unnecessary. Purchasing a used mobile phone also saves resources that would otherwise be used to manufacture a new one.

Recycling old devices

Recycling mobile phones alone would avoid roughly 5,000 metric tons of electronic waste in Germany and thus enable the reclamation of many important raw materials.

Modernizing your mobile phone instead of replacing it

A new device promises many new functions – but modernizing the software is often a way to upgrade an old mobile phone. Sometimes, a new battery or a new cover can help extend your enjoyment of your mobile phone.

This is what we can change! Helpful hints for protecting resources

Being happy with less

Studies have shown that from a certain level of prosperity on, people's life satisfaction does not continue to rise, even if the amount of products they consume increases. In Germany, subjective satisfaction has not changed over the last 30 years, even though gross domestic product has tripled.

Selecting better products

- Wear organic cotton clothing
- Choose organic foods
- Choose products with the FSC (Forest Stewardship Council), MSC (Marine Stewardship Council), and Blue Angel labels

Consuming less

- Use mobile phones for a longer period of time
- Have defective devices repaired
- Wear clothing for a longer time and hand them down
- Mend clothing
- Buy used devices, furniture, clothing, etc.
- Buy food judiciously so that none is wasted
- Stop using tinfoil
- Use durable bags instead of plastic bags
- Reuse plastic and paper bags

Better ways to dispose of things

- Give away or sell devices
- Recycle old devices
- Collect waste paper and waste metal separately

Photos: Shutterstock.com/SASIM0T0, Filip Kristic

Better ways to use energy

- Save electricity
- Use green electricity
- Improve thermal insulation, for example of windows

Eating better

- Eat less meat
- Choose regional products
- Choose organic meat with the Bioland, Demeter, Naturland, or Neuland labels

Better mobility

- Reduce traffic by sharing rides, using cars only when fully occupied, or car-sharing
- Switch from driving to walking or using buses, trains, or bicycles
- Use a car for a longer time before buying a new one
- Save fuel whilst driving (drive more slowly, cut down on using air conditioning, use low rolling resistance tyres and low-friction oil)
- Take fuel-efficiency and low CO_2 emissions into account when you buy a car (new or used)

SUV = Sport Utility Vehicle

☐ yes
☐ no

☐ yes
☐ no

Photos: Shutterstock.com/Kozini, fotolia.com/deusexlupus, vege

The Earth needs friends

BUND
FRIENDS OF THE EARTH GERMANY

For many years, the Bund für Umwelt und Naturschutz Deutschland (Friends of the Earth Germany) has been dedicating its work to environmentally-aware ways of using our planet's resources. In previous years, the focus was on separating and recycling wastes. Today, our everyday consumption behaviour and our lifestyle have the greatest effects on global resource consumption.

The purpose of brochures such as this one, countless conversations with policy-makers, studies, publications for consumers, and campaigns for all age groups is to point out alternatives and create the awareness that it is possible to take a different path.

Support our work for sustainable transformation of the way we deal with the Earth's resources and join Friends of the Earth Germany

simply by going to www.bund.net/mitgliedwerden.

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Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit

Umwelt Bundesamt

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In Cooperation with:

Friends of the Earth Europe

Sources: The figures used in this publication were taken from publications by the following organizations, among others: Bitkom, Deutsche Umwelthilfe (DUH), Environmental Working Group, Global 2000 (REdUSE), Global Footprint Network, Greenpeace, Oeko-Institut, Potsdam Institute for Climate Impact Research, Sustainable European Research Institute (SERI), Water Footprint Network, World Wildlife Fund (WWF), and Wuppertal Institute.

Impressum Bund für Umwelt und Naturschutz Deutschland e.V. · Friends of the Earth Germany · Am Köllnischen Park 1 · 10179 Berlin · Phone (0 30) 27 58 64-0 · Fax -40 · E-Mail: info@bund.net · www.bund.net · Concept and text: Katja Vaupel, Dr. Rolf Buschmann · Editor: Dr. Norbert Franck (ViSdP) Design and layout: Natur & Umwelt GmbH · Berlin, 2/2014