Consumer Behaviour

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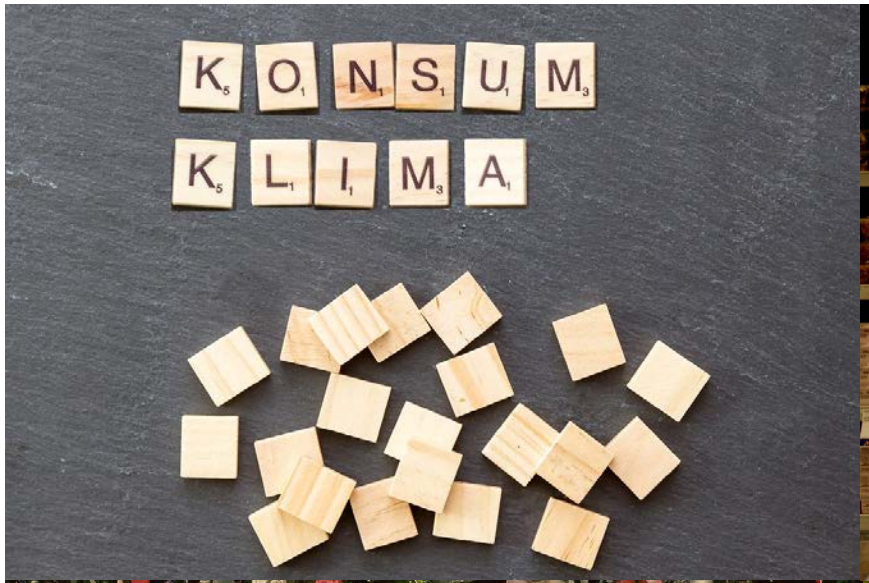
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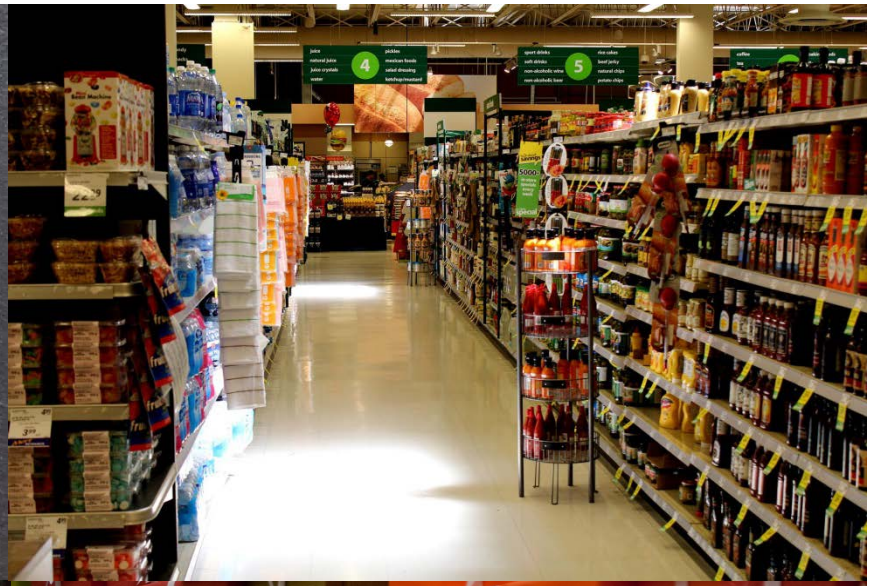

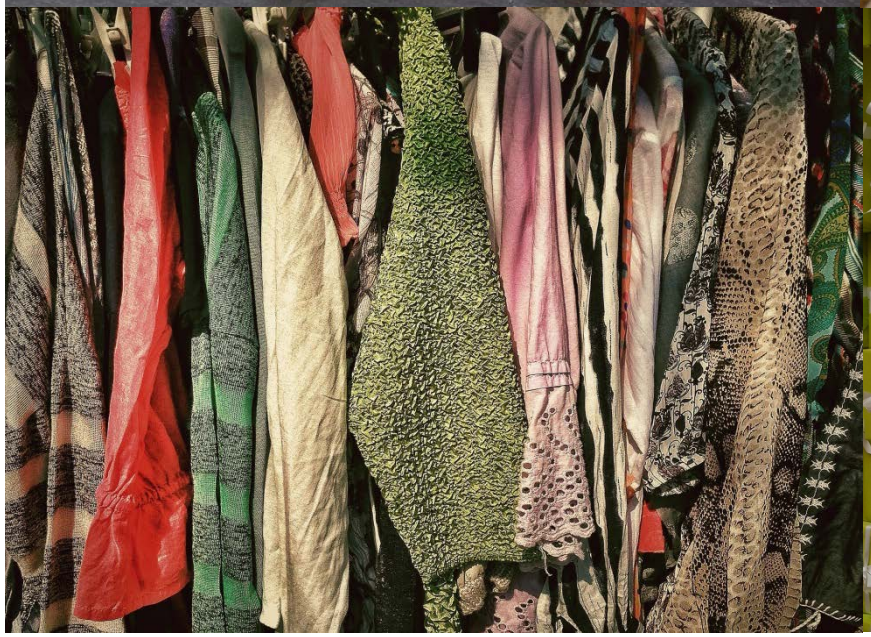

Consumption Patterns

Global

- Consumer behaviour in one country has an influence on different aspects of the environment in other parts of the world.
- Smartphones contain up to 30 different metals that are washed out of the rock with highly toxic chemicals. Extracting 1 g of the gold necessary for 50 smartphones means having to mine one ton of ore by explosives and grinding it afterwards.
- One pair of jeans uses 12,000 liters of water to produce and travels about 50,000 km during the production process until it reaches the shop.[1]
- A typical plastic wrapping for cheese or sausages used in supermarkets weighs approx. 20 g and creates 80 g of CO_2. This increases the CO_2 footprint of a packaged product by 30%.[2] Thereby the CO_2 footprint increases by 30% for the product.

Europe/Germany

- On average, every German buys five new items of clothing monthly. [3]
- Private consumption in German households creates a quarter of the total greenhouse emissions and the daily raw material consumption per capita stands at 200 kg.
- Every human being in the world can be fed on ca. 1.7 hectares of farming land, most people need more than double this area. In Germany, people use 5.1 hectares for their private consumption.[4]
- In Germany, 80 million people had 114 million mobile phone contracts in 2016.[5]
- In Germany, around 18 million tons of supermarket packaging are disposed of every year. [6]

What you can do

- Try to avoid packaged products.
- Use devices as long as they work and possibly share them with other people.
- Wear second-hand clothes and sell or give away things that you do not use anymore. [7]

[1] http://www.planet-wissen.de/gesellschaft/wirtschaft/konsum/pwiediekehrseitedeskonsums100.html
[2] http://klimaohnegrenzen.de/vermeiden/konsum
[3] Greenpeace (2015): Saubere Mode hat's schwer. Available at: www.greenpeace.de/sites/www.greenpeace.de/files/publications/mode-unter-jugendlichen-greenpeace-umfrage_zusammenfassung_1.pdf
[4] http://www.planet-wissen.de/gesellschaft/wirtschaft/konsum/pwiediekehrseitedeskonsums100.html
[5] Bundesnetzagentur (2016): Anzahl der Mobilfunkanschlüsse in Deutschland von 1992 bis 2016 (in Millionen). Available at: www.de.statista.com/statistik/daten/studie/3907/umfrage/mobilfunkanschluesse-in-deutschland/
[6] Umweltbundesamt (2017): Entwicklung des Verpackungsaufkommens in Tausend Tonnen. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/384/bilder/dateien/2_tab_entwicklung-verpackungsaufkommen_2017-10-19.pdf
[7] https://www.nachhaltiger-warenkorb.de/nachhaltiger-konsum/nachhaltig-muss-nicht-teuer-sein/


EICHER

Food Transport

Global

- Food transported by container ships emits 11 times more CO_2 than domestic produce. This means that 11 kg of produce can be transported within Germany for each kg from overseas; the comparative figure for air transport would be 90 kg (Fig. 1).[8]
- If only those food items were imported into Germany that cannot grow there due to the climatic conditions, more than 22% CO2 equivalents would be saved.

Europe/Germany

- The current dietary habits cause about 1.5 t of CO_2 per person per year.[9]
- When exporting to other European countries on average 460 g of CO_2 per kg are emitted. Imports from Europe pollute the environment between two to three times more than the consumption of local food.
- The transport of regional fruits and vegetables causes on average 230 g CO_2 per kilo.

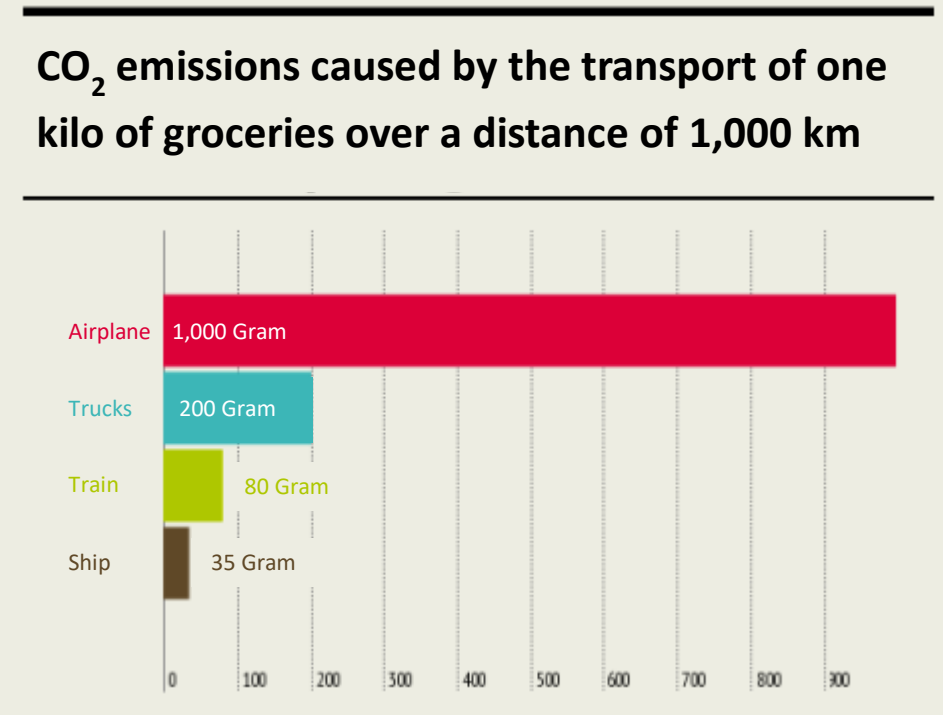

Figure 1: CO_2 emissions for one kilo of food on a 1,000 km transport route

What you can do

- If we prefer regional and seasonal fruits and vegetables, we would avoid long transport and expensive storage.
- If more vegetable and unprocessed food were eaten, we would protect our environment and improve our health.
- Fairly produced food and food which is wrapped in reusable packaging encourages fair working conditions and climate-friendly methods of packaging.

[8] https://www.ugb.de/forschung-studien/hohe-umweltbelastung-durch-lebensmitteltransporte/
[9] https://nachhaltiger-warenkorb.de/#!/topic/start/essen-und-trinken


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Bio versus
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Nutrition

Organic versus Conventionally Grown Food

- Agriculture focusing on organically grown fruits and vegetables does not use energy-intensive chemical fertilizers and toxic pesticides. Thus by eating a meal containing organically grown food you can save CO_2 emissions, which are released during production. [10]
- Apart from that, for the production of organic food no genetic engineering is needed. Adequate animal housing and the protection of groundwater also make a difference. [11]
- " Omnivores" cause as much CO_2 emissions by eating agricultural products as a 4,758 km car trip. For "organic omnivores" the car trip would be 4,377 km long. By using conventionally produced food, vegetarians could drive 2,427 km; by using organic products 1,978 km. Vegans who eat conventionally produced food emit the equivalent of 629 km, those who eat only organic food 281 km (Fig. 2). [12]
- Eating organic products reduces CO_2 emissions by up to 15% (compared to conventionally grown food). By choosing the organic option the following savings could be made: [13]
  - Dairy products → 6 - 12%
  - Bakery products → 20 - 25%
  - Meat → 7 - 17%
  - Vegetables → 10 - 25%

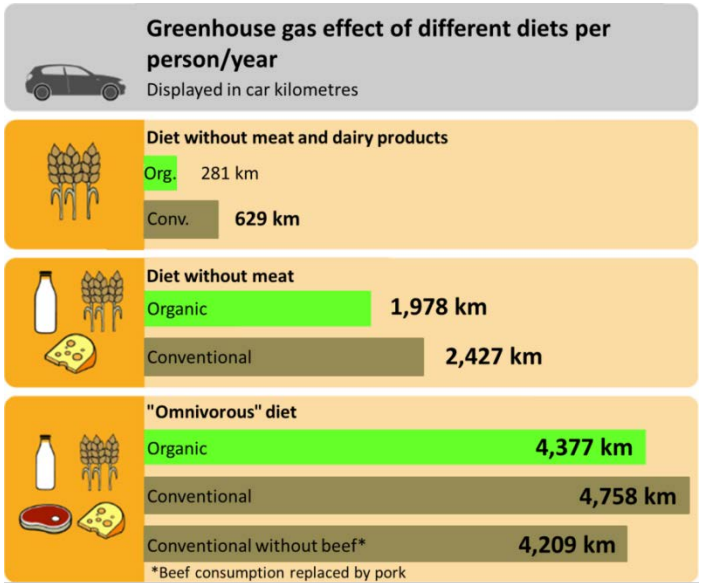

Figure 2: Greenhouse effect of different eating habits per capita and year

What you can do

- Organic, seasonal and regional – at least one of these 3 choices should apply for a sustainable consumption of food:
  - 1 kg of greenhouse tomatoes grown in the conventional way → 9.3 kg CO_2 [14]
  - 1 kg of organically raised, regional or seasonal tomatoes → 0.035 kg CO_2

[10] https://www.greenpeace.de/themen/landwirtschaft/fleischeslust-was-das-stuck-lebenskraft-tatsachlich-kostet
[11] http://www.planet-wissen.de/gesellschaft/lebensmittel/bio_lebensmittel/index.html
[12] https://www.greenpeace.de/themen/klimawandel/klimaschutz/bio-gut-fuers-klima
[13] http://klimaohnegrenzen.de/vermeiden/konsum
[14] https://www.nachhaltiger-warenkorb.de/wp-content/uploads/Broschuere_Nachhaltiger_Warenkorb_Folder_2.pdf

Meat Consumption

Global

- Livestock breeding worldwide accounts for roughly 20% of greenhouse emissions and is one of the biggest contributors to global warming.[15] These include direct emissions, such as methane released by cows as well as emissions caused by animal feed production and deforestation to create more farming land.
- The production of one kilo of beef releases 13.3 kg CO_2 into the atmosphere. The same amount of bread produces 0.75 kg CO_2, apples 0.5 kg CO_2 and tomatoes 0.2 kg CO_2. [16]
- For producing one kilo of beef you need: 6.5 kg grain, 36 kg roughage and 15,500 liters of water. 310,000 hectares of rain forest are also deforested in order to grow animal feed. [17]

Europe/Germany

- In Germany livestock breeding (animal feed included) causes 71% of the total of greenhouse gas emissions. [18]
- In 2017 the average meat consumption (including animal food) was 87.7 kg per person. Of this figure 59.7 kg was for direct human consumption[19]

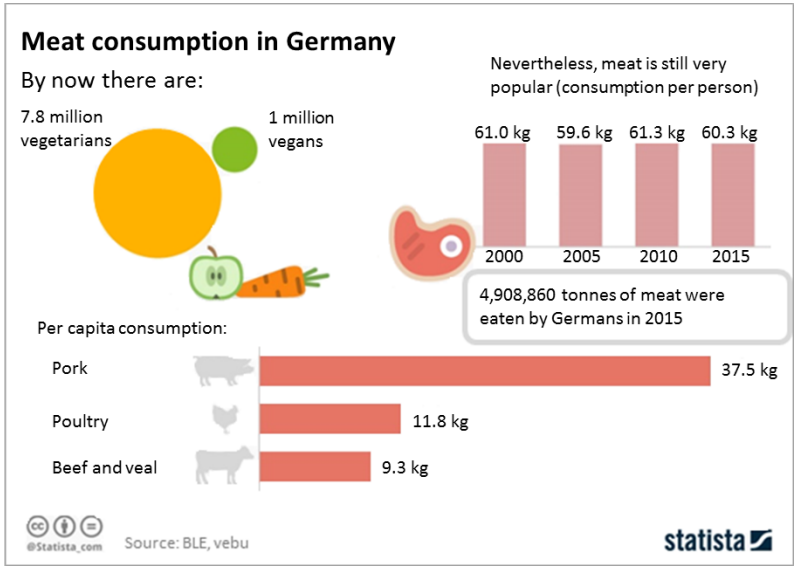

Figure 3: Greenhouse effect of different eating habits per capita and year

What you can do

- Reduce meat consumption and raise awareness for more conscious consumption. If every German had one meat-free day a week, it would save up to 9 million tonnes of greenhouse gas emissions per year. [20]
- The German Association for Nutrition recommends a meat consumption of a maximum of 300 - 600 g per week.[21] In 2015 the meet consumption per person was about 1,160 g per week and twice as much as that recommendation (Fig. 3). The consumption of 300 g weekly is roughly 16 kg per year (600 g roughly 32 kg/year).

[15] https://www.greenpeace.de/themen/landwirtschaft/fleischeslust-was-das-stuck-lebenskraft-tatsachlich-kostet
[16] https://www.greenpeace.de/themen/landwirtschaft/fleischeslust-was-das-stuck-lebenskraft-tatsachlich-kostet
[17] https://www.planet-wissen.de/gesellschaft/wirtschaft/konsum/pwiediekehrseitedeskonsums100.html
[18] https://www.greenpeace.de/themen/klimawandel/klimaschutz/bio-gut-fuers-klima
[19] https://de.statista.com/statistik/daten/studie/36573/umfrage/pro-kopf-verbrauch-von-fleisch-in-deutschland-seit-2000/
[20] https://www.wwf.de/?id=8793
[21] https://www.nachhaltiger-warenkorb.de/themen/weniger-fleisch/

Food Waste

Global

- One third of food worldwide is not consumed but needs to be disposed of. This wastes water, energy, and soil (Fig. 4).
- The amount of food thrown away wastes nearly 30% of cultivable acreage world-wide. [22]
- In total, 1.3 billion tons of edible food is dumped every year. [23]

Europe/Germany

- In Germany alone 11 million tons of food is thrown away every year. This makes up about ¼ of the total and costs almost 25 billion Euros. [24] That is the equivalent of 440,000 fully loaded articulated lorries. [25]
- Two thirds of this waste comes from private households, a fifth from retailers and the rest from large business customers. [26]
- 95 - 115 kg of groceries are thrown away per person each year. [27]
- When taking the whole production chain into account food waste in Europe and North America stands at between 280 and 300 kg per year. [28]

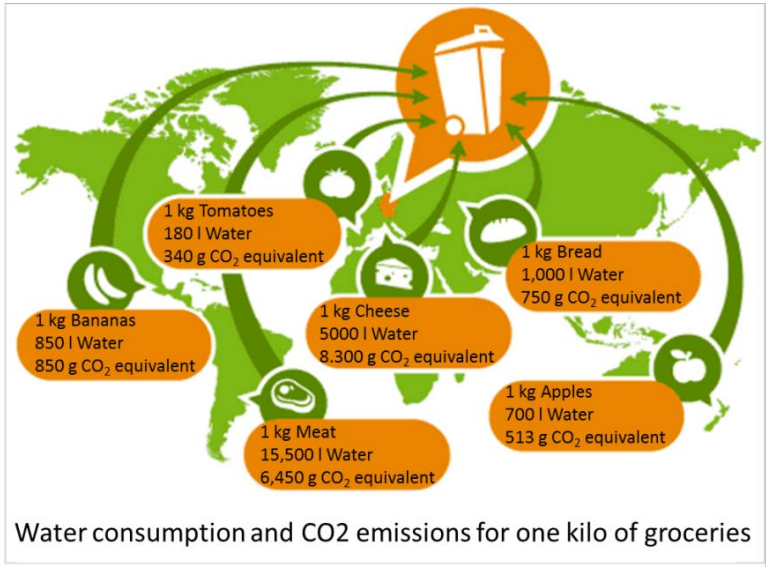

Figure 4: Water consumption and CO2 emissions per kilogram of food

What can be done

- When shopping take care that you don't buy too much and check the "best before" date.
- Many products can still be eaten even after the expiry date.
- Cook creative dishes with the leftovers.

[22] https://www.verbraucherzentrale.de/lebensmittelverschwendung
[23] https://www.pik-potsdam.de/aktuelles/pressemitteilungen/lebensmittelverschwendung-vermeiden-heisst-klimafolgen-mindern
[24] http://www.heute.de/lebensmittelverschwendung-in-deutschland-zu-viel-fuer-die-tonne-46754404.html
[25] https://www.verbraucherzentrale.de/lebensmittelverschwendung
[26] Bundesministerium für Ernährung und Landwirtschaft (2012): Ermittlung der weggeworfenen Lebensmittelmengen und Vorschläge zur Verminderung der Wegwerfrate bei Lebensmitteln in Deutschland. Available at: www.bmel.de/SharedDocs/Downloads/Ernaehrung/WvL/Studie_Lebensmittel
[27] https://www.slowfood.com/sloweurope/wp-content/uploads/TED_position_paper_foodwaste6.pdf
[28] https://www.slowfood.com/sloweurope/wp-content/uploads/TED_position_paper_foodwaste6.pdf


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Energy Consumption

Global

- The country that consumes the most power in the world is Iceland with 53,160 kWh per capita per year. At the same time Icelanders use the most climate-friendly energy sources generated from geothermic and water power processes.[29]

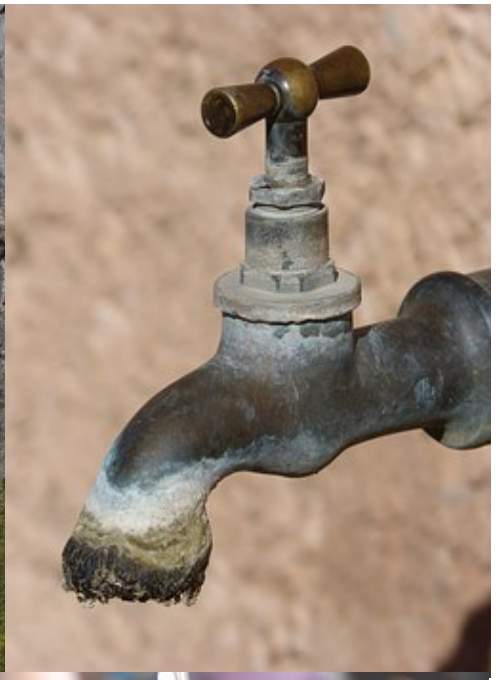
Europe/Germany

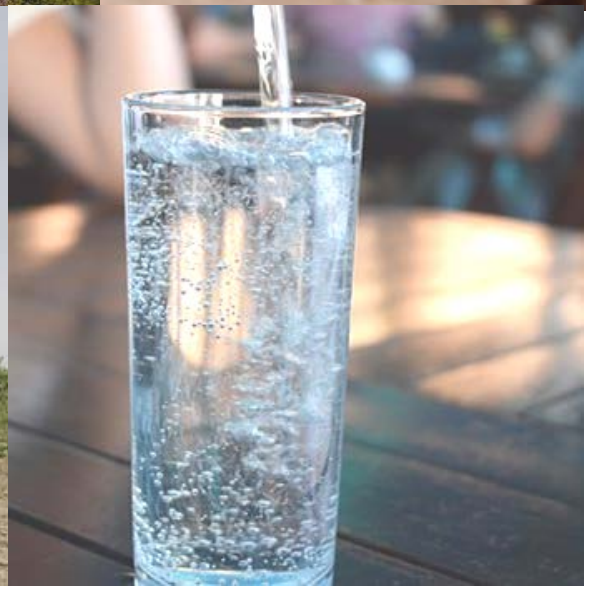
- In 2014 the average power consumption was 7,035 kWh per capita in Germany; the European average was 6,150 kWh per capita. 30
- The CO_2 emissions of the German energy industry are currently 564 g per kWh. [31]
- When surfing the internet you use as much energy for one google search as one light bulb needs to work for one hour. Both emit 2 g CO_2. [32]

What you can do

- When buying electronic devices check their energy efficiency. The device should be graded with least grade A or higher.
- Energy-saving light bulbs are more expensive, but one bulb (15 watts) works for 15,000 hours per year and results in savings of 20 Euro a year, compared to a traditional bulb (70 watts). In addition, they last up to 15 times longer.
- Avoid putting devices on standby mode. The energy consumption of a single device might be small, but over the period of one year considerable costs will be produced.
- *Example:* If one kilowatt hour costs 0.20 Euro a device with 30 watts on permanent standby would cost about 52 Euro per year. When a TV with 250 watts is operated for four hours a day it will costs about 75 Euro per year.
- Be mindful of unnecessary heating habits: Each degree more uses about 6% more energy. It is also important to bleed radiators regularly.

[29] https://www.entega.de/blog/stromverbrauch-weltweit/
[30] https://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC?locations=DE-IS
[31] http://www.umweltbundesamt.de/themen/klima-energie/energieversorgung/strom-waermeversorgung-in-zahlen
[32] https://www.cleanenergy-project.de/so-viel-strom-verbraucht-google/



Water Consumption

Global

- Globally people consume about 4,000 m³ of fresh drinking water each year. Between 1930 and 2000 the global water consumption has increased sixfold.
- Every person also uses virtual water. This is water which evaporates or is used or rendered undrinkable through manufacturing processes.

  Example (Fig. 5): [33]
  - 1 Hamburger → 2,400 liters
  - 1 cup of coffee → 140 liters
  - 1 T-Shirt → 4,100 liters

Europe/Germany

- An average person uses 121 liters of drinking water every day. The biggest part of this is used for personal hygiene, e.g. taking a bath or a shower (36%), and flushing the toilet (27%). The smallest amount of water usage is cooking related (4%).
- In 2010 Germany had a water footprint of 117.2 billion m^3. This means that each person in Germany has a water foot-print of about 1,426 m³ per year that equals 3,900 liters every day. Cotton products alone results in almost 78 m³ of water per head in 2010. [34]

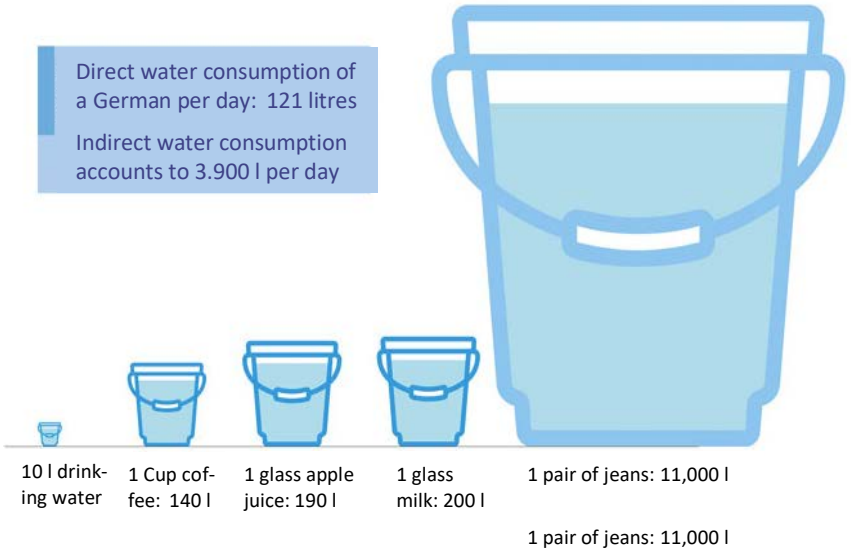


Figure 5: Water consumption throughout the production chain of certain products

What you can do

- Outdated appliances should be avoided, use water-saving pumps or rain water where possible.
- Buy regional and second-hand products and drink tap water. For 0.27 Euro one gets 121 liters of tap water, which is the best and most controlled "food" in Germany. It is not possible to buy one liter of bottled water for this price.
- If every citizen of Berlin changed to tap water, the saving of CO_2 would be almost 100,000 tons per year. [35]

[33] http://www.bpb.de/nachschlagen/zahlen-und-fakten/globalisierung/52730/wasserverbrauch
[34] http://www.umweltbundesamt.de/daten/private-haushalte-konsum/wassernutzung-privater-haushalte#textpart-1
[35] http://nachhaltig-sein.info/lebensweise/leitungswasser-mineralwasser-vergleich-nachhaltigkeit-gesundheit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DELTA

Use of Transportation

Global

- Urbanisation, population and economic growth have led to increased traffic worldwide. The consequences are an increase in pollution, over-crowded streets and cities, increased consumption of fossil fuels and an increase in CO_2 emissions. [36]

Europe/Germany

- In 2015 Germany ranked third among Europe's busiest countries. [37]
- Stuttgart, the capital of Baden-Württemberg, is the city with the highest traffic volume in Germany. Car drivers spend an average of 73 hours per year in traffic jams there. [38] Stuttgart is also the city with the highest particulate matter pollution in Germany. [39]

Car versus public transport: Greenhouse gas emissions per person at 100 kilometers distance (Fig. 6) [40]

- Airplane (77% capacity): 21.1 kg
- Car/caravan (1.5 person/car): 14.2 kg
- Train (long distance train with 50% capacity): 4.1 kg
- Bus (60% capacity): 3.2 kg

What you can do

- Walk or cycle.
- Use public transport.
- Buy an energy efficient car and check the tyre inflation pressure regularly.

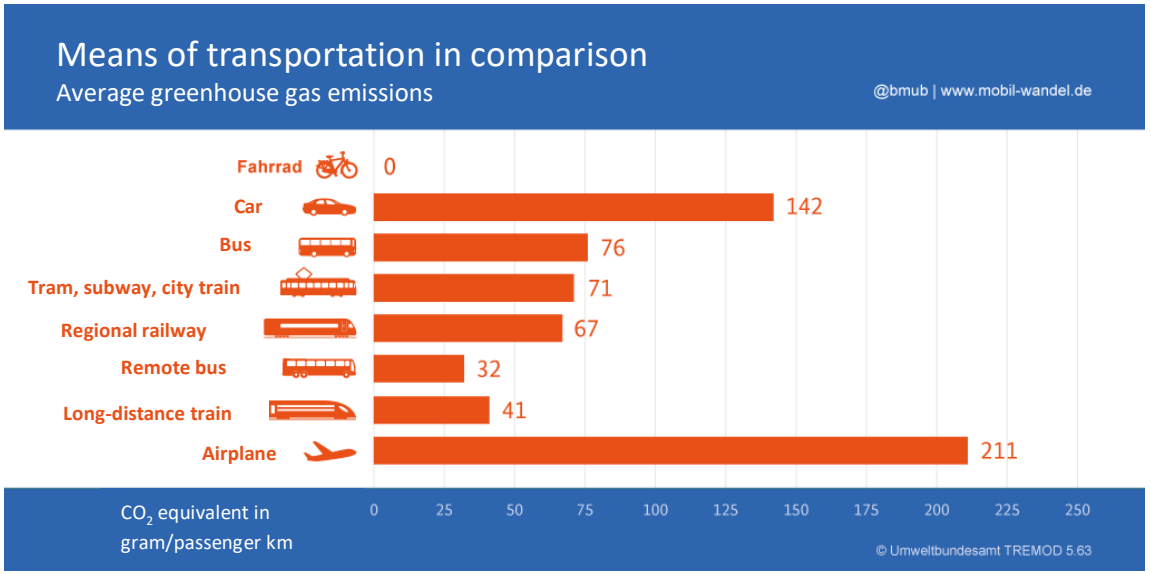

Figure 6: Comparison of modes of transportation

[36] http://www.bpb.de/mediathek/178986/globaler-verkehr
[37] INRIX (2015): Traffic Score Card. Available at: www.inrix.com/press/scorecard-de/
[38] INRIX (2015): Traffic Score Card. Available at: www.inrix.com/press/scorecard-de
[39] Umweltbundesamt (2015): Feinstaub im Jahr 2015 . Available at: www.umweltbundesamt.de/sites/default/files/medien/358/dokumente/pm2_2
[40] https://www.umweltbundesamt.de/themen/verkehr-laerm/emissionsdaten#emissionen_verkehrsmittel_personenverkehr