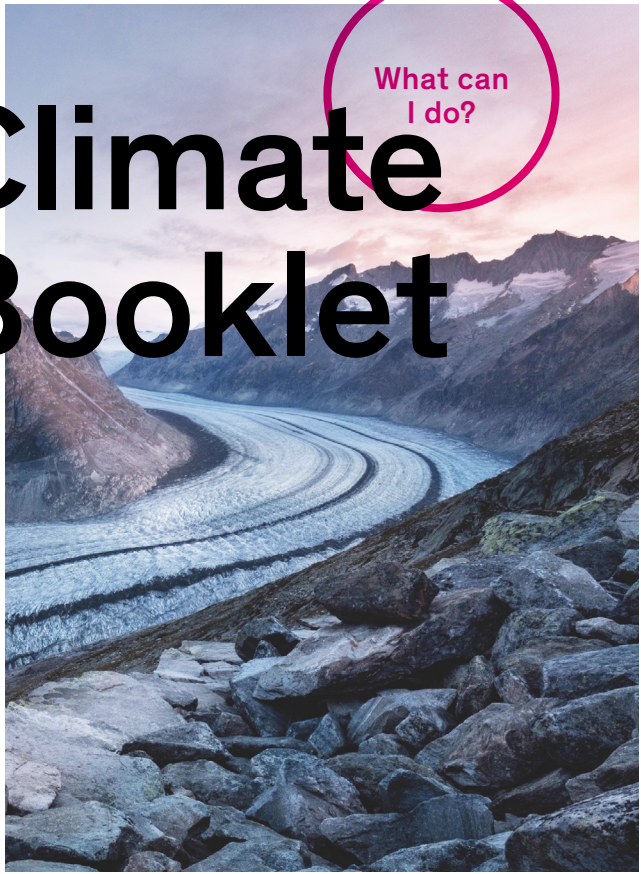
Climate Change
and Protection

myclimate
shape our future

Climate Booklet

What can I do?



“Whatever befalls the earth, befalls the sons and daughters of the earth.”

Speech by Chief Seattle, 1855

“The topic of climate change is far too serious to be left to the boffins.”

We sent the first edition of the climate booklet to be printed (climate neutrally) with this sentence in 2007. Some time has passed since then. For a long time now, climate change has been a topic concerning more than just scientists and students. The vast majority of people are aware of our collective influence on the global climate. Some of us feel it with our own bodies. But what was that about greenhouse gases? What can I do? What does energy have to do with CO_2? Is CO_2 the sole cause of climate fluctuations? How did our climate come to be? How does it work?

Do you want to refresh and extend your knowledge? This updated climate booklet is more in-depth and shows you steps you can take – for yourself and our climate.

The myclimate team wishes you happy reading.

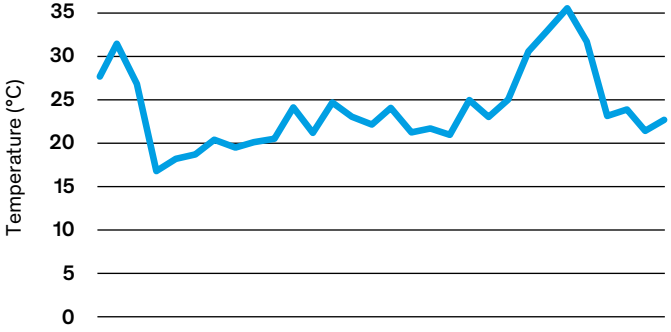
“Such a thing as the climate doesn’t exist. Everything that we experience and feel through our senses outside is weather – heat, warmth, rain or snow.”

Source: Own quote

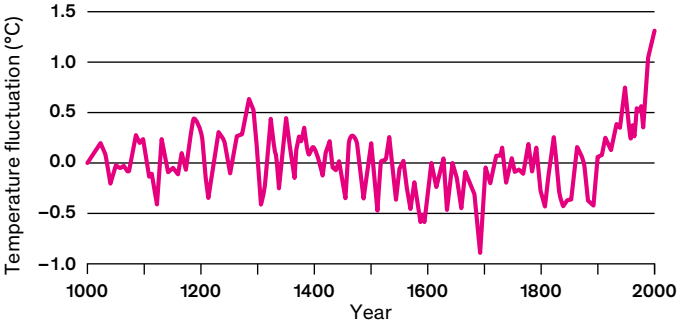
What Exactly is “the Climate”?

For scientists, the term “climate” encompasses weather patterns over a long period. Although this term is somewhat abstract, its impact is very real. In rich, developed countries, we also observe the change in the climate but will be able to deal with it for the foreseeable future. The situation in poorer countries and island nations is different. Similarly, plants and animals feel the effects of a changing climate much more profoundly. In contrast to people, particularly those in developed countries, they cannot adapt at the same speed.

The Difference Between Weather and Climate



Temperature progression, June 2019, Paris-Montsouris



Temperature progression, Central Europe, last 1000 years

Weather

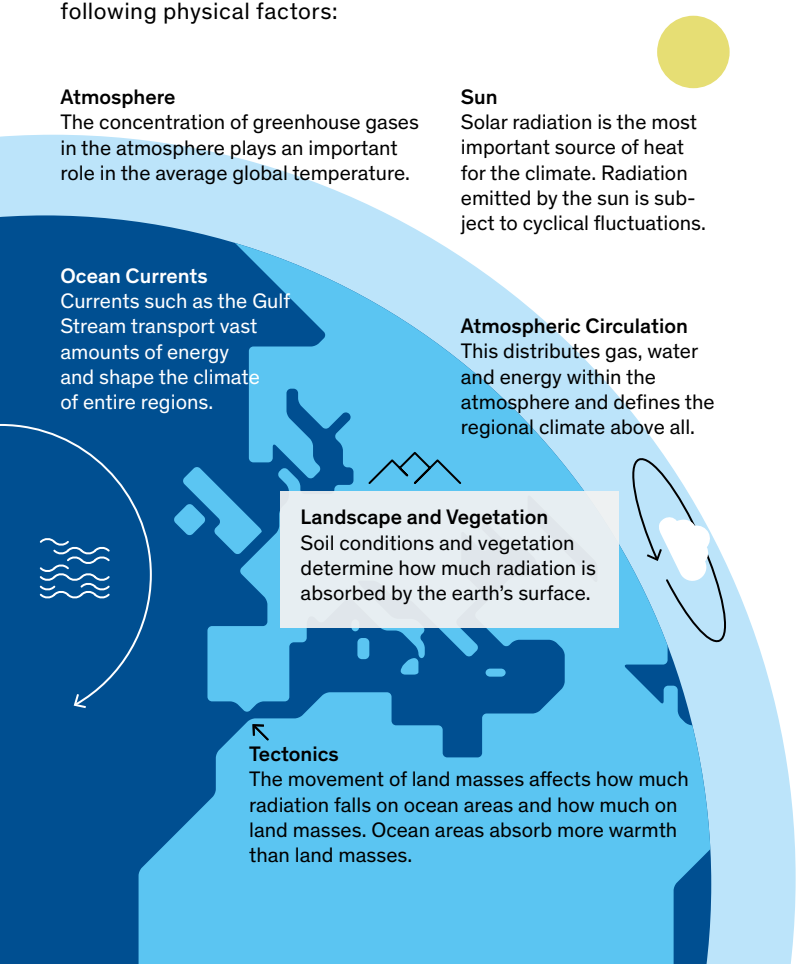
Atmospheric conditions that we can actively feel and experience come under the term weather (e. g. temperature, precipitation, humidity, wind speed and direction, etc.). These are always applicable to a comparatively short period of time (hours, days or a few weeks) and to particular locations or regions. High-speed and high-amplitude weather changes are normal, such as the day-and-night or seasonal cycles.

Climate

The term “climate” refers to the average weather phenomena in a selected place, a large region or across the entire globe over a period of at least 30 years. This time span is defined as a climate normal. Since it covers a large timescale, climate is a slow, more stable system. Changes occur, but at a slower pace, and the fluctuation range is likewise considerably narrower. The climate is determined by a variety of factors.

Climate Factors and Drivers

The prevailing climate of our planet is determined by the following physical factors:



Atmosphere
The concentration of greenhouse gases in the atmosphere plays an important role in the average global temperature.

Sun
Solar radiation is the most important source of heat for the climate. Radiation emitted by the sun is subject to cyclical fluctuations.

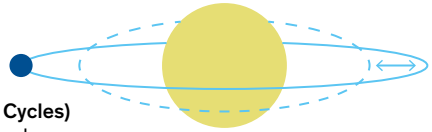
Ocean Currents
Currents such as the Gulf Stream transport vast amounts of energy and shape the climate of entire regions.

Atmospheric Circulation
This distributes gas, water and energy within the atmosphere and defines the regional climate above all.

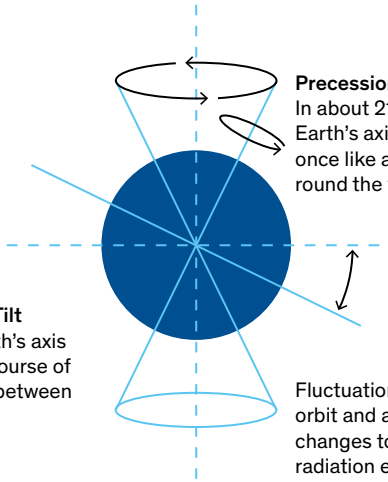
Landscape and Vegetation
Soil conditions and vegetation determine how much radiation is absorbed by the earth's surface.

Tectonics
The movement of land masses affects how much radiation falls on ocean areas and how much on land masses. Ocean areas absorb more warmth than land masses.

Earth's climate is the result of all these influences. A change in one or more factors thus brings about a change in the climate. Individual influencing factors, such as volcanic eruptions, have only a short-term effect over a few years. Whereas fluctuations in Earth's orbit change the climate very gradually over hundreds of thousands of years.



Eccentricity (Milankovitch Cycles)
Earth's orbit around the sun changes over about 100,000 years. It starts off rounder and becomes more elliptical.



Precession
In about 21,000 years, Earth's axis rotates once like a spinning top round the vertical axis.

Earth's Axial Tilt
The tilt of Earth's axis varies in the course of 41,000 years between 22.5° and 24°.

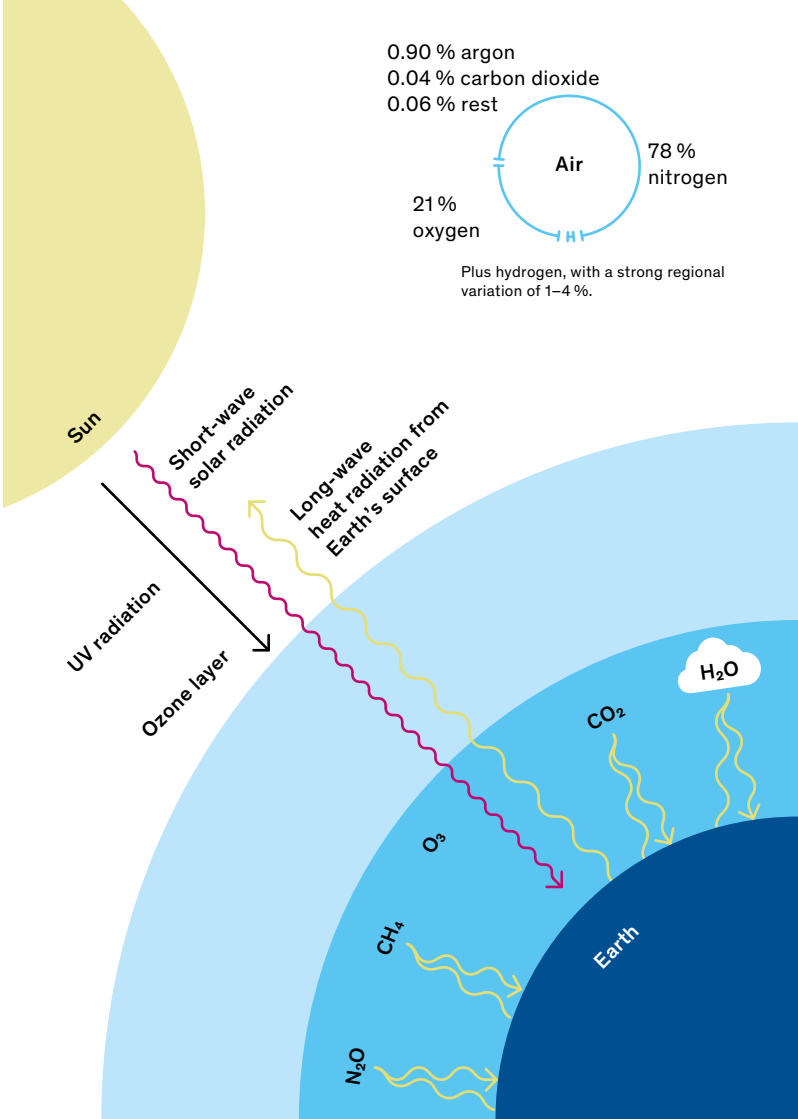
Fluctuations in Earth's orbit and axis cause changes to the solar radiation emitted onto Earth and in turn to the climate.

Earth's Climate

The atmosphere and its composition play a crucial role in determining the prevailing climate. This gas envelope is what makes life on Earth possible in the first place, sheltering us from some damaging external influences such as UV radiation. It is in its lowest layer, the "troposphere", where weather takes place. There, winds ensure heat exchange between cold and warm regions. Alongside its primary constituents oxygen and nitrogen, the atmosphere also contains the greenhouse gases water vapour (H_2O), carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). These gases are able to absorb and re-release long-wave thermal radiation emitted by Earth's surface. Part of this radiation is returned to Earth's surface, causing a higher temperature by reducing the cooling effect of heat emission.

This natural process is known as the greenhouse effect and causes an increase in the global average temperature of around 33 °C. Some two thirds of this is caused by water vapour. The remaining third is caused by CO_2 (22 per cent), ozone (7 per cent), N_2O and CH_4. Consequently, the prevailing average global temperature on Earth is a pleasant +15 °C and not –18 °C, which is what it would be were it not for the greenhouse effect.

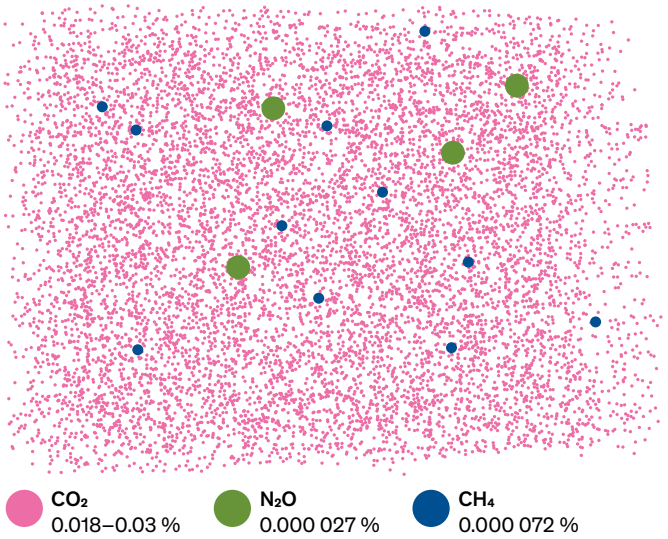
Greenhouse gas emissions caused by people strengthen this natural effect.

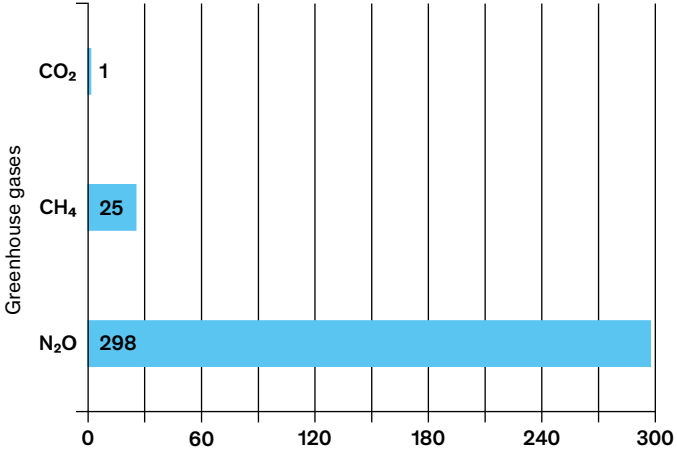


Greenhouse Gases

Not only does the concentration of greenhouse gases influence Earth's temperature but temperature fluctuations caused by natural climate factors (see page 10) in turn alter these concentrations. CO_2 concentrations of between 180 and 300 ppm (parts per million) have been ascertained for the last 800,000 years from Arctic ice and sediment core samples.

Pre-industrial Concentration





Comparison of warming potential

The respective influence of CO_2, CH_4 and N_2O on the climate varies. Thus, CH_4 and N_2O have a disproportionate impact on the greenhouse effect relative to their comparatively small atmospheric concentrations.

In order to compare the respective impact on the climate and the warming potential of the greenhouse gases, methane and nitrous oxide are measured in CO_2 equivalents (CO_2e). For this purpose, emissions are multiplied by the respective climate impact factor. The basis for this calculation is CO_2 with a warming potential of one.

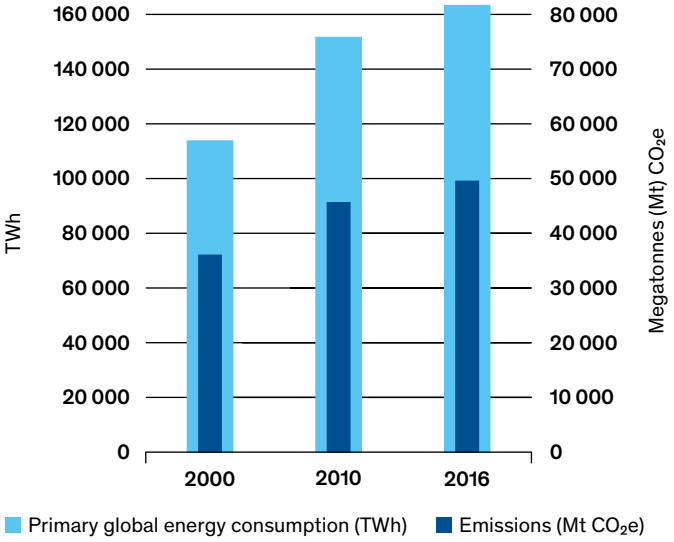
“We are rich enough to alleviate climate change, but too poor to do nothing.”

Modified quote from Sigmar Gabriel,
German Minister of the Economy and Energy, 2008

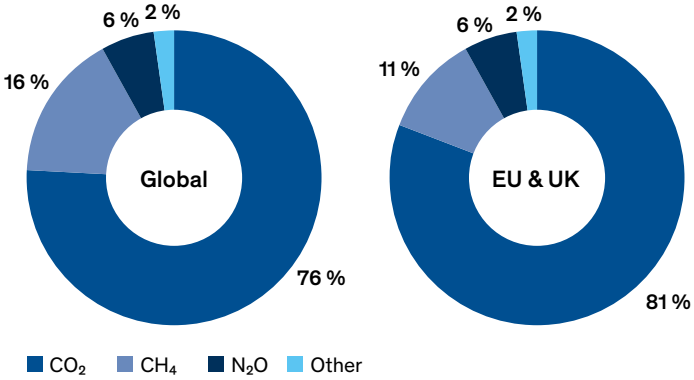
Climate Change

If we want to alleviate climate change, we must understand it! The term is now on everyone’s lips. The issue is a very complex one. What is climate change? What causes it? What dangers and opportunities does it bring? What does it have to do with all of us? Let’s take a look!

Since the industrial revolution of the 18th century, the combustion of black and brown coal, oil and natural gas has released the carbon stored inside these materials for millions of years into the atmosphere as CO_2. With a rapidly growing population and economy, annual energy demand likewise increases and is in large part covered by consumption of these “fossil fuels”. In turn, annual global CO_2 emissions are also increasing. In 2018, around 52 billion tonnes of CO_2e were released into the atmosphere by anthropogenic (human) activity. China, the USA and the EU are among the biggest emitters. They alone are responsible for more than 50 per cent of global greenhouse gas emissions.



The Human Influence



Composition of greenhouse gas emissions – global and in EU and UK

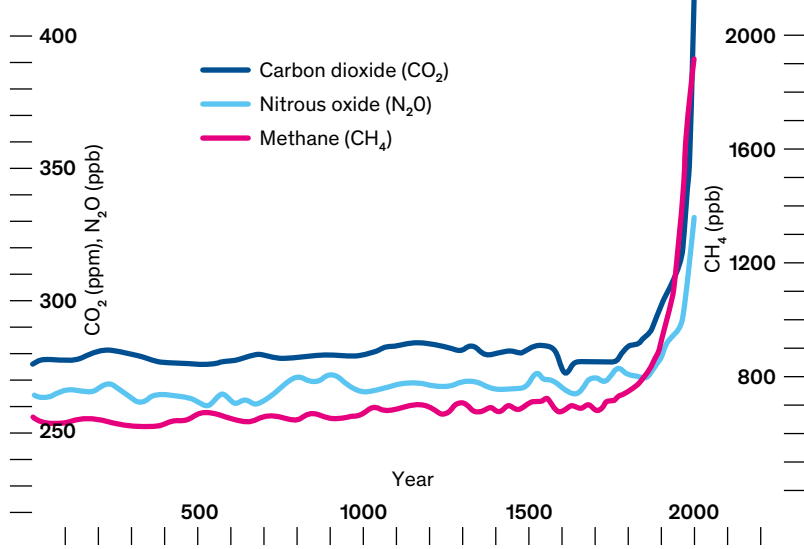
Human activity also influences atmospheric concentrations of methane and nitrous oxide. Agriculture is the dominant source of methane (CH_4) emissions. Livestock farming in particular is linked with high methane emissions, as is rice production. Nitrous oxide (N_2O) is likewise predominantly generated by agriculture, through the use of nitrogen and nitrate fertilisers. On the whole, increasing methane and nitrous oxide emissions can be attributed to the increasing world population and changes in eating habits.

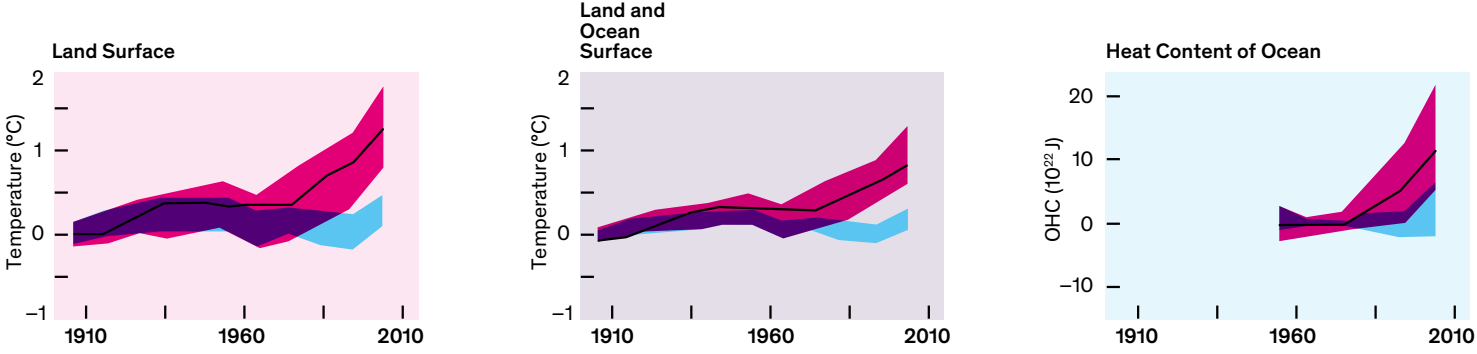
IEA/UNEP (2019), Statista

Current Changes to the Climate

Since the start of the century before last, global climate records document increasing changes. Significant increases in the concentration of the greenhouse gases CO_2, CH_4 and N_2O are apparent. Meanwhile, the speed of the increase in the global average temperature is unusual.

Natural climate fluctuations have always existed (see page 9). According to the Intergovernmental Panel on Climate Change (IPCC), the sharp increase in temperature since the mid-20th century can only be explained by human activity. The cause of this is the rapid increase in greenhouse gas concentrations and an amplified greenhouse effect.





UBA (2017), IPCC (2013c), ipcc.ch (diagram simplified)

Effects of Climate Change

The direct consequences of climate change can be ascertained by observing various climate and geological parameters. Increasing greenhouse gas concentrations in the atmosphere increase air and sea temperatures. This reduces the total global snow and ice mass (sea ice, polar ice caps and glaciers). In conjunction with the increasing volume of water and higher temperatures, sea levels are also rising. These higher temperatures are also accelerating the global water cycle. The evaporation rate, water content in the atmosphere, and the frequency and intensity of heavy rainfall are all increasing.

A faster evaporation rate and an increase in aridity are reducing freshwater reservoirs and negatively impacting agricultural productivity. Famine and water crises coupled with increasing heat reduce quality of life, increase mortality rates and cause waves of migration. Altered climatic conditions have in part dramatically reduced the typical biodiversity of local ecosystems thanks to the limited adaptive capacity of flora and fauna. Parasites and pathogens are taking hold in previously unaffected regions and doing damage. Heavier storms and rainfall lead to more frequent infrastructural issues. Power cuts, restrictions on train travel and overcrowded streets are negatively impacting daily life increasingly.

To mitigate the damage of current and future changes to the climate, corrective measures must be taken across the entire globe now, with significant costs.

Despite the already noticeable changes to the climate, with far-reaching climate protection measures we can curb climate change and safeguard the quality of life of future generations. To this end, every person must be aware of their individual influence on and responsibility for the climate and actively participate in its protection.

IPCC (2013a)/https://images.nasa.gov

“We are the last generation with the opportunity to turn the tide.”

Sofia (18)

The Problem: Emissions

The increasing demand for energy from the world’s ever-growing population and the lifestyle of a small part of it threaten the future of our planet and so the future of subsequent generations. People in developed countries see it as their right, here and now, to live a pleasant, privileged life. However, they forget their duty to ensure that other people and subsequent generations have the same opportunity.

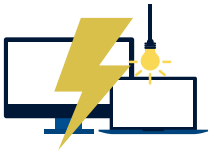
Greenhouse Gas Emissions in Europe?

Greenhouse gas emissions can be attributed to various consumer sectors: industry and commerce is the biggest contributor, at around 35 per cent, followed by transport.

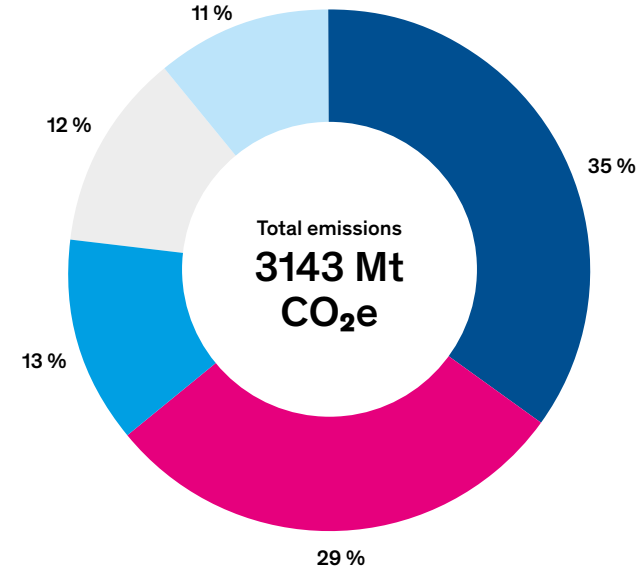
We contribute to all of these emissions directly and indirectly through our daily activities, our lifestyles and our consumer behaviour. We cannot ignore our responsibility and must recognise that we all contribute to the changes in the climate that are currently taking place. Through small adjustments leading to a more conscientious and sustainable lifestyle, each and every one of us can take part in the global climate protection project.

1 t CO_2e = production of **80 kg** of beef

1 t CO_2e = heating for a **55 m^2** energy-optimised home for **one year**



1 t CO_2e = operation of electronic devices in one household for **350 days**

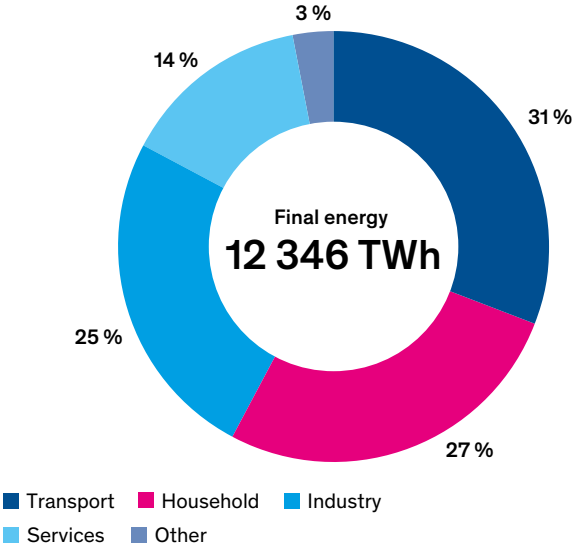


Greenhouse gas emissions by sector (2018)

IEA (2020)

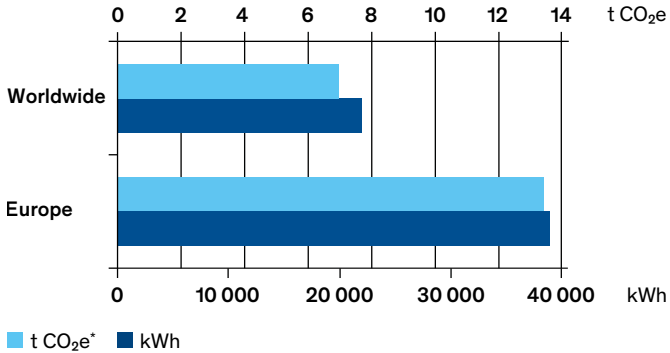
Energy Consumption in Europe

In 2018, primary energy consumption in the EU amounted to 18,049 terawatt hours (TWh), with final energy consumption of 12,346 TWh.



Energy consumption in EU & UK (2018)

Eurostat (2018)



*Incl. emissions generated abroad by imported goods

Comparison of global per capita energy use and greenhouse gas emissions with per capita data for Europe (2018)

On average, only seven out of 100 citizens of the world (6.5 per cent) live in the countries of the EU and UK. Per-person energy consumption in these countries is considerably higher than the global average, which is reflected in greenhouse gas emissions. Moreover, there are huge differences between individual countries within Europe itself (see Eurostat data). By the year 2050, the EU aims to be greenhouse gas neutral. To achieve the planned reduction in greenhouse gases, per capita emissions (also referred to as a carbon footprint) must be drastically reduced from the year 2015 onwards – by more than 80 per cent – in comparison to 1990 levels.

European Union (2019)/IEA (2018)/UNEP (2019)

International Air Traffic

4 100 000 000
Global airline passengers (2017)

That corresponds to half of the world's population. However, these flights are primarily taken by people from richer countries. They fly multiple times a year.

icao.int

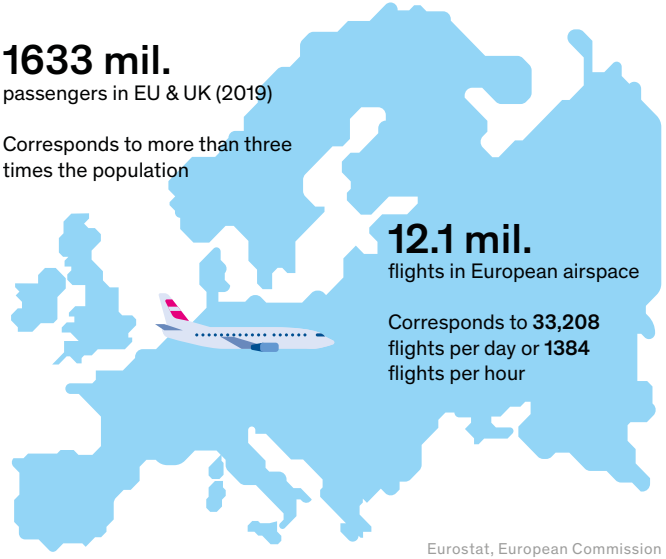
While recording greenhouse gas emissions is a national matter, international traffic crosses international borders and consequently the allocation of these emissions is difficult and mostly calculated separately. Since international air traffic volumes are consistently increasing, resulting in an increase in emissions, close examination of the numbers is important if we want to protect the climate and reduce our emissions. Globally, air traffic emissions account for 2-3 per cent of total emissions, though in Europe the percentage is slightly higher. Here too there are large differences between individual countries.

1633 mil.
passengers in EU & UK (2019)

Corresponds to more than three times the population

12.1 mil.
flights in European airspace

Corresponds to **33,208** flights per day or **1384** flights per hour



Eurostat, European Commission

“When lots of little people in lots of little places do lots of little things, the face of our Earth will change.”

African proverb

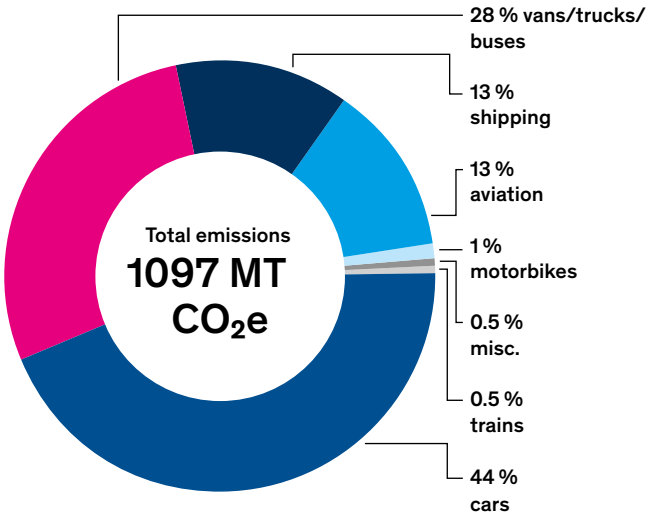
How do I Contribute to Climate Change and what can I Do?

The average European citizen generates 8.7 tonnes of CO_2e each year. To reach global climate targets and effectively curb climate change, this value must sink sharply.

Eurostat

Category “Mobility”

To reduce our personal carbon footprints, we must rethink our daily mobility attitudes and habits.



Greenhouse Gas Emissions in Europe in Transport Sector (2018)

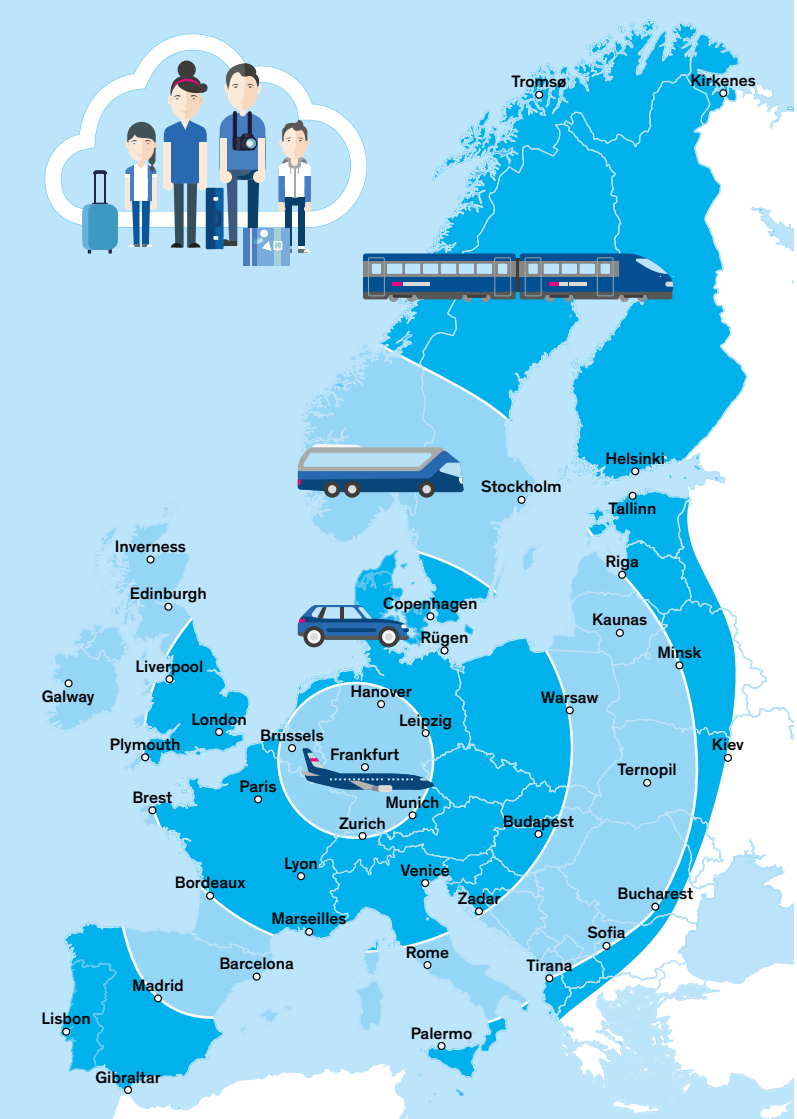
Around 30 per cent of greenhouse gas emissions in the EU in 2018 were generated by the transport sector (including international flights), amounting to some 1097 Mt CO_2e. For mobility alone, more than 2 tonnes of greenhouse gases are emitted in Europe per capita per year.

If we consider domestic personal transport within Europe, more than 80 per cent of journeys are still made with cars, while just under 20 per cent are made on public transport. Trains are used most frequently in Austria and the Netherlands and least frequently (aside from the islands of Malta and Cyprus) in Greece and Lithuania.

Tips	CO_2 savings
Use local public transport	Up to 69 % in comparison with private vehicles
Take a coach or long-distance train for holidays abroad	On average, some 77 % fewer emissions (compared with cars) and more than 660% fewer (compared with planes)
Beware of the emission value when purchasing a car	The bigger and heavier the car, the higher the fuel consumption and in turn the emissions
Adjust your way of driving and speed	Travelling at 110 km/h instead of 120 km/h on motorways could save 30 kg CO_2e per vehicle each year

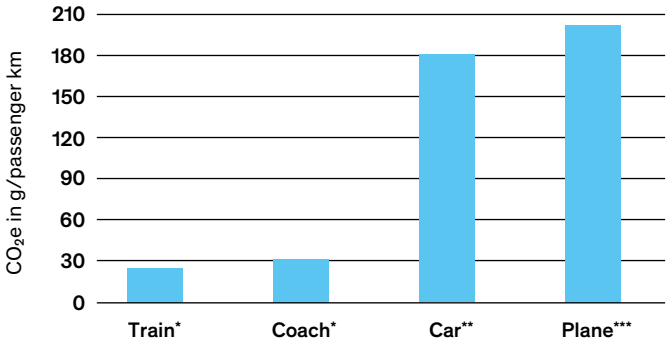
Eurostat

www.eea.europa.eu



How far can four People go with a Tonne of CO_2e?

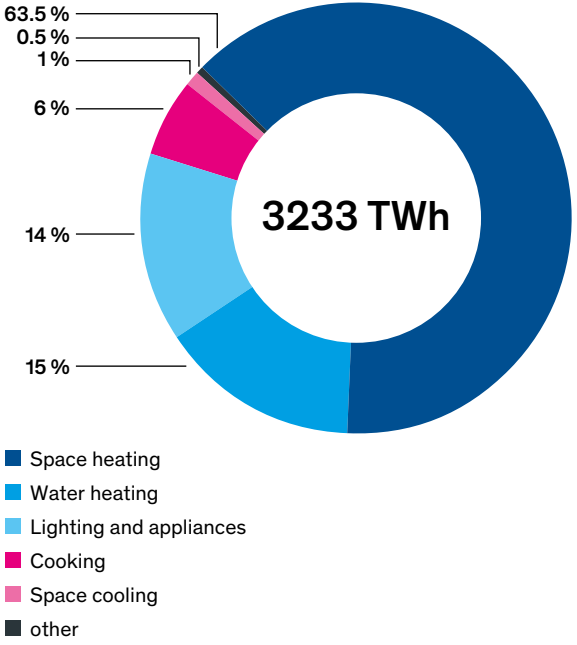
Since greenhouse gas emissions vary by mode and capacity of transport, the accompanying illustration shows how far a family of four can travel without emitting more than a tonne of CO_2e. Starting in Frankfurt, by plane it is only possible to cross the German border. Conversely, you can reach destinations in the south of Spain or north of the Arctic Circle by train. The choice of transport for holidays abroad can thus have a big impact on the emissions generated by the trip and, in turn, your personal carbon footprint.



*With average capacity and typical energy mix for country
**Data based on one person in car, more occupants decrease individual carbon footprint
***With average capacity, economy and business class averaged

Comparison of Average Emissions of Individual Transport Type per Kilometre Travelled

Category “Living”



Final Energy Consumption in Private Households (2018)

Eurostat

Around 27 per cent of the total final energy consumption in Europe can be attributed to private households. The majority of energy consumed in European households comes from natural gas. 20 per cent comes from renewable sources of energy. 3.5 per cent is still extracted from coal.

Within the EU, Sweden is the frontrunner in renewable energy, which amounts to some 60 per cent of the energy mix there. Finland and Latvia likewise have a very “green” energy mix.

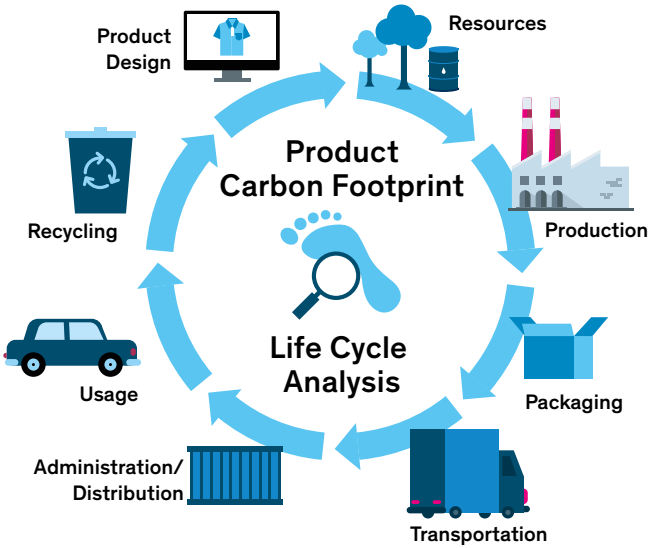
Tips	Savings
Lower your heating temperature	Each additional degree increases energy use by around 6 % ≅ 350 kg CO_2e per year per household
Air dry your washing instead of using a tumble dryer	Around 130 kg CO_2e per year and household (4 people)
Switch inefficient and outmoded filament lamps for LED lights	1 filament lamp – around 6.96 kg CO_2e per year; with 20 filament lamps per house – around 140 kg CO_2e per year

Eurostat, European Commission

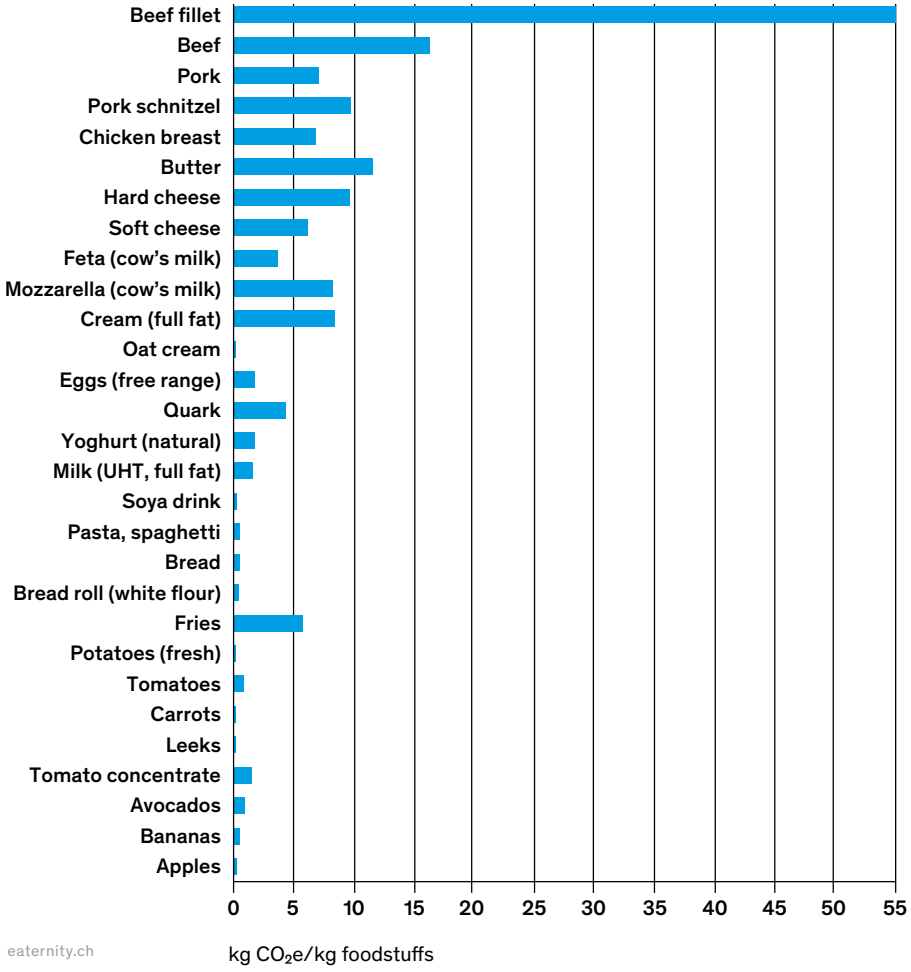
Category “Consumption”

There is always talk of sustainable consumption, in other words a conscious and resource-conserving lifestyle, as a reaction to the high consumption of a wide variety of goods in our globalised consumer society. Manufacturing every individual product requires energy and generates emissions. The energy required for manufacture, transport, storage, sale and disposal, known as embodied energy, is often easily forgotten. Generally speaking, energy use is only associated with electronic devices, which incur continuous costs for the consumer.

“Climate-friendly consumption” is a concept that can be applied to many more areas than simply the electronics sector. Fundamental, mostly unconscious household decisions regarding the size of a home and its furnishings, usage times, disposal, recycling and daily shopping habits in relation to groceries, clothes and shoes are all factors that determine an individual’s carbon footprint. Sustainable consumption is geared towards the concept of sufficiency (the right amount).



Embodied energy encompasses the energy use of various activities and the respective carbon footprint of their emissions. Imported products thus bring an invisible “rucksack” of previously emitted gases with them, which weren’t produced in Switzerland. These emissions are generated in the country of origin. It is for this reason too that China is the world’s biggest emitter, since an overwhelming proportion of its emissions are generated by the production of goods for developed countries like Switzerland.



eaternity.ch

Food

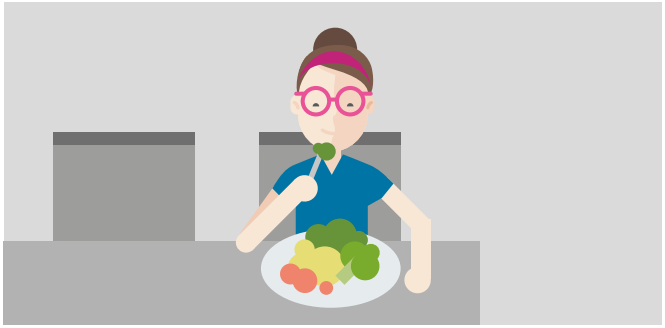
Food has a huge influence on the individual carbon footprint of every human being. The carbon footprint varies enormously from food to food. Animal products such as meat and dairy have a bad climate balance owing to methane and nitrous oxide emissions, but also because of their production processes, which are comparatively more energy intensive. If the products are then sold on the international market, the respective carbon footprint of each foodstuff is increased thanks to long transport routes.

A bacon, sausage and egg sandwich on a German breakfast table, for example, generates almost 1.5 kg of CO_2 emissions – this roughly equates to the CO_2e produced by a 19 km car journey. So, contrary to popular belief, the use of your own car is not the only decisive factor in determining your personal carbon footprint. Dietary habits also play a significant role; this is an area in which it is easy to save lots of emissions with a few simple measures.

Tip	Savings
Reduce your meat consumption by 100 g a day; for comparison: on average, a burger contains 150 g of meat	344 kg CO_2e savings per person per year are possible with 100 g less of meat each day
Choose organic products when shopping	Savings of 5–15 % CO_2e possible
Opt for fresh ingredients with minimal processing instead of frozen products	Fresh potatoes: 200 g CO_2e per kg; frozen chips: 5.7 kg CO_2e per kg ⟶ 96 % saving
Reduce your consumption of other animal products	On average a 16 % CO_2e saving is possible by switching to a vegan diet from a vegetarian one and a 26 % CO_2e saving is possible by forgoing meat and switching to vegetarian

eaternity.ch, wwf.ch, bmu.de

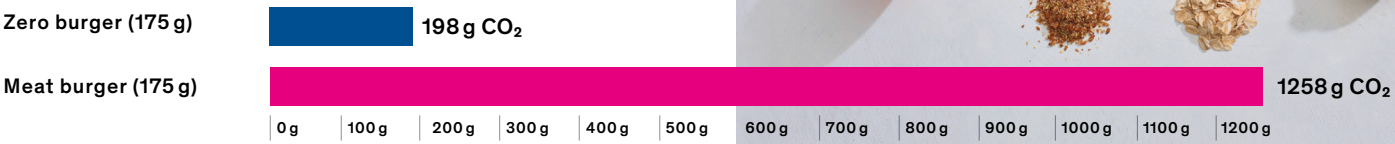
Alongside consuming mainly plant-based products, the most important aspects of climate-friendly eating habits are the origin of the food and the time of year. Choosing regionally produced food products reduces greenhouse gas emissions thanks to short transport routes. Seasonal products in Switzerland and abroad can be produced without additional effort (e.g. heating greenhouses) so the associated emissions are low. Consuming certified organic, ecologically cultivated products can significantly reduce your individual carbon footprint. As opposed to conventional farming, ecological methods forgo the use of nitrogen and nitrate fertilisers. This results in a significant decrease in the greenhouse gas N_2O, which is particularly bad for the climate.



CareElite (2018), myclimate, Scarborough et al. (2014), Lindenthal et al. (n.d.)

Vegan burger versus meat burger

Our diet has a huge impact on our personal carbon footprint. Vegetarian alternatives to meat products, such as myclimate's "Zero Burger", are tasty and significantly more climate friendly. A vegan burger causes less than a sixth of the CO_2 emissions generated by a meat burger. This comparison shows that substituting just one meat meal with a vegan alternative per week considerably reduces CO_2 emissions – all without sacrificing taste.

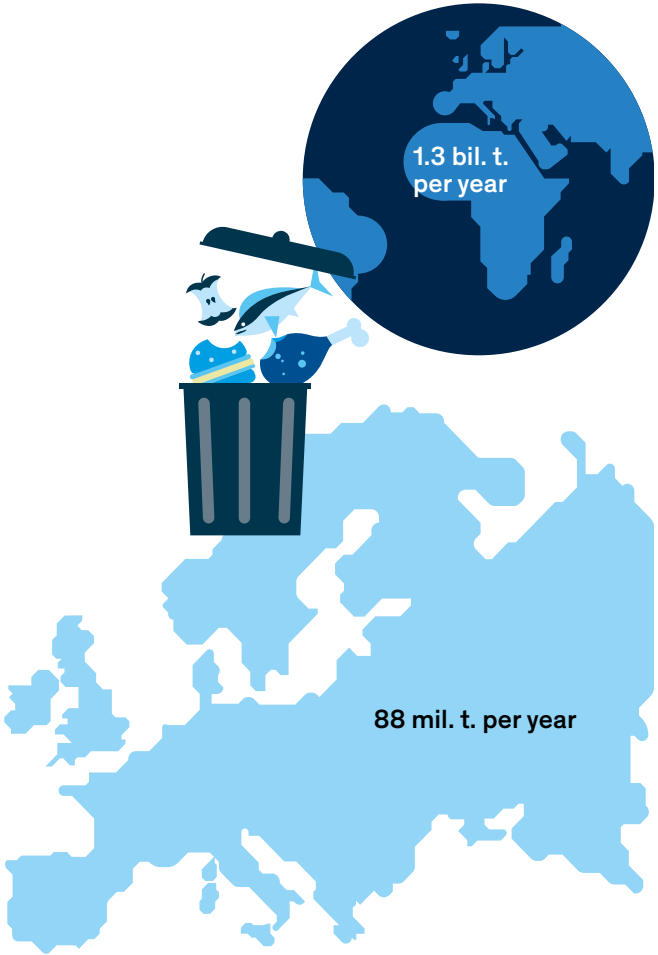


Zero burger recipe: myclimate Germany, meat recipes: swissmilk.ch, bettybossy.ch, myclimate calculations, photo: roberthoernig.com

Food Waste

In our society, appreciation of the value of everyday items is significantly diminished. In particular, a huge variety of food is available everywhere at low prices, which encourages a more thoughtless lifestyle. Each year around 1.3 billion tonnes of food are wasted worldwide. In Europe, it is estimated that 88 million tonnes are wasted, which corresponds to around 173 kg per person. With regard to total European consumption, a good 20 per cent of food that is produced is not used as intended, but is simply thrown away. Around 50 per cent of avoidable losses are attributable to us as individual end consumers. Some 170 million tonnes of CO_2 are produced from the disposal of food waste alone in the EU. This is equivalent to the entire transport sector in Germany per year.

Food waste is also an economic and social issue, costing around 143 billion euros every year at a time when 42 million Europeans still cannot afford proper meals.



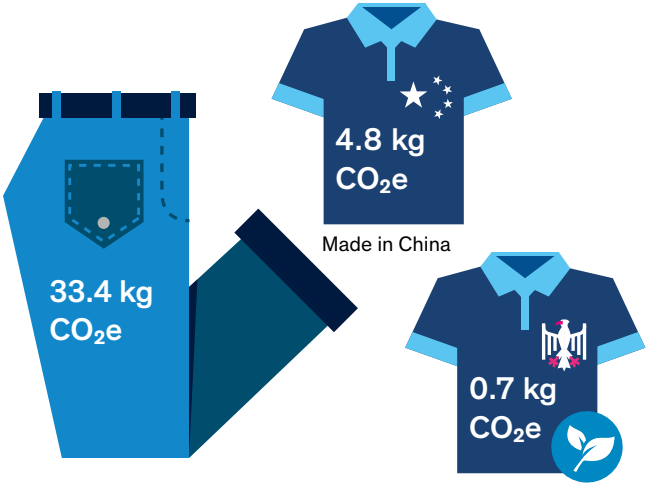
European Parliament, UBA (2017), wwf.ch

Clothing

Clothing consumption in the last decades has risen sharply; within the last 15 years global sales have almost doubled. Central Europeans purchase on average 65 to 70 new items of clothing each year, motivated by huge and frequently changing offerings and cheap prices. In the midst of such intensive consumer behaviour, little thought is given to the high water and energy consumption involved in the production of raw materials, international distribution and, finally, disposal. Statistics show that **40 per cent of all clothing purchased** is never even worn. By adjusting our behaviour and consuming more consciously, greenhouse gas emissions in the clothing sector can be drastically reduced too.

Tip	Savings
When making a purchase, be aware of the material, its origin and the place where the textiles were processed	A t-shirt made from organic cotton in Europe has around an 80 % lower carbon footprint than a comparable cotton shirt from China, which must be transported to Central Europe by air

greenpeace-magazin.ch (2015), worldwatchers



Emissions caused by production of a pair of jeans

Made in Germany (Bio)

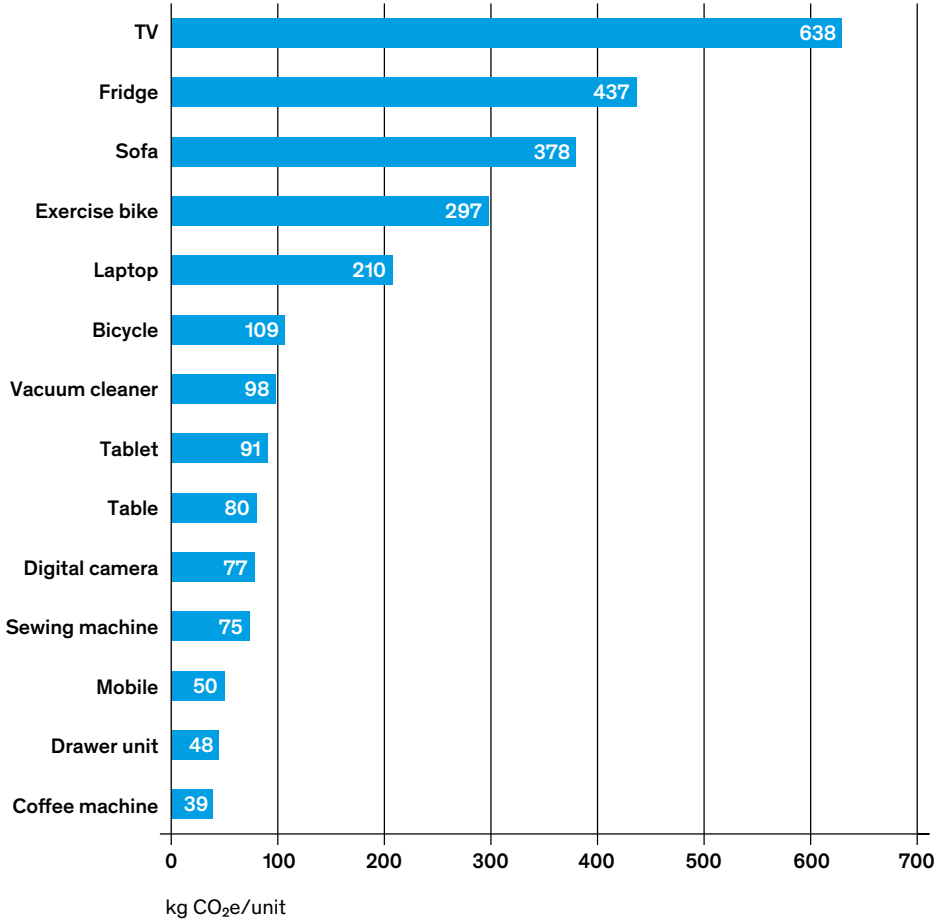
Extra tips

– Pay attention to quality and processing when shopping. The longer you wear the item, the better its carbon footprint.

– Weigh up shopping online and on the high street.

– Place group orders. If you choose to shop on the high street, it is best to combine this trip with other appointments and to use local public transport.

Paper: Elemental LCA, publication, study by myclimate and Tutti.ch, 2019



Average CO_2 emissions for new devices/objects

Study by myclimate and Tutti.ch, 2015, Schibsted 2017

Second hand

There are lots of options for reducing your personal carbon footprint. Although the main goal is to reduce your consumption of resources, a climate-friendly lifestyle doesn't necessarily mean you have to miss out. Rather, it is a question of adopting conscious and sustainable shopping habits. One example of this would be purchasing second-hand items. As a result of the high levels of consumption in Europe, many still usable products and fully functional electronic devices are thrown out. If these items were resold, often buyer and seller would be financially better off and, at the same time, enormous quantities of CO_2e could be avoided. By purchasing a used TV, the approx. 640 kg CO_2e in emissions generated by a new device can be saved. Depending on allocation, it is possible to save the entire 640 kg CO_2e. A calculation of the CO_2e savings generated through second-hand purchases on online platforms in Europe with around 60 million users per year estimates the annual emissions savings at around 16.3 million tonnes.

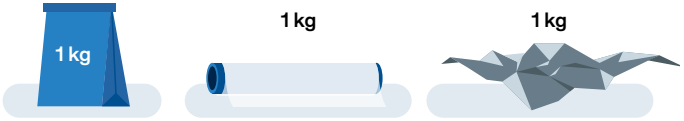
Emissions per Activity

250 ml white coffee =
0.16 kg CO_2e/contents
250 ml coffee cup =
0.015 kg CO_2e/card cup

The contents are **ten times as damaging** to the environment as the packaging!

Tumble dryer emissions (Energy class B):
542 g CO_2e/cycle

Cardboard vs plastic film vs aluminium

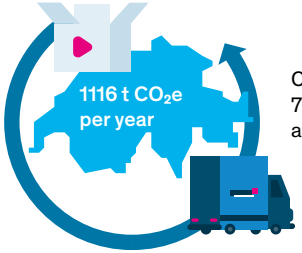


1.1 kg CO_2e | **2–3 kg CO_2e** | **19 kg CO_2e**

Vegan	Vegetarian	Flexitarian	Meat intake
1050–1125 kg CO_2e per year	**1280–1390 kg CO_2e per year**	**1500–1700 kg CO_2e per year**	**≤ 1800 kg CO_2e per year**

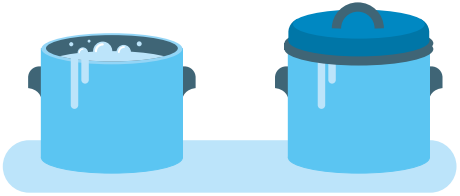
The numbers give a spectrum of the greenhouse gas emissions from various average forms of European nutrition in kg CO_2e per person per year.

European Environment Agency, ecoinvent.org, wwf.ch, fea.ch, logistik-watchblog.de, blog.carpathia.ch, mobitool.ch, web.de, myclimate calculations, Swiss Academy of Natural Sciences (numbers rounded), bafu.admin.ch, naturwissenschaften.ch, Statista 2020



Online shopping (Switzerland): approx. 7 mil. Zalando **returns** per year with an average parcel weight of 3 kg

Cooking with a lid saves **20 % CO_2e**



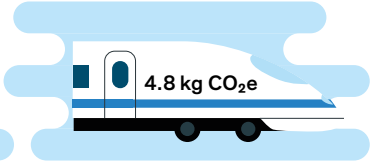
25 g CO_2e/l boiling water

20 g CO_2e/l boiling water

One Google search generates around **10 g CO_2e**; 2 billion annual searches worldwide **≈ 20 mil. t CO_2e**; 20 searches a day x 365 = **73 kg** personal **CO_2e emissions** per year

100 km per person (EU average)

100 km per person in average regional and distance traffic



“One waits for times to change, while another seizes the day and takes action.”

Dante Alighieri, Italian poet, 1265–1321

How can I take Responsibility?

A few examples of how you can reduce CO_2e have been given on the previous pages. Unfortunately, even the most careful person cannot avoid producing emissions entirely. Nevertheless, you can take responsibility for them.

Global Warming and your Carbon Footprint

In order to limit the global temperature increase to the internationally stated goal of 2 or, even better, 1.5 °C above the pre-industrial levels of 1850, within the next few years the carbon footprint of each person must be significantly reduced worldwide and there must be a general trend towards climate neutrality. According to the most recent reports from the IPCC, human activities have thus far contributed to a global temperature increase of about 1°C above pre-industrial levels. However, there is much regional fluctuation here; in northern regions, such as Canada, temperatures at the end of the 20th century were already around 3 to 4 °C above pre-industrial levels. In Switzerland the temperature increase is currently around 2 °C.

If global emissions remain at the current level, global warming could amount to 1.5 °C by 2030. In order to keep the global temperature increase below 1.5 °C, within the next few years extensive measures for reducing emissions must be introduced on an international level.

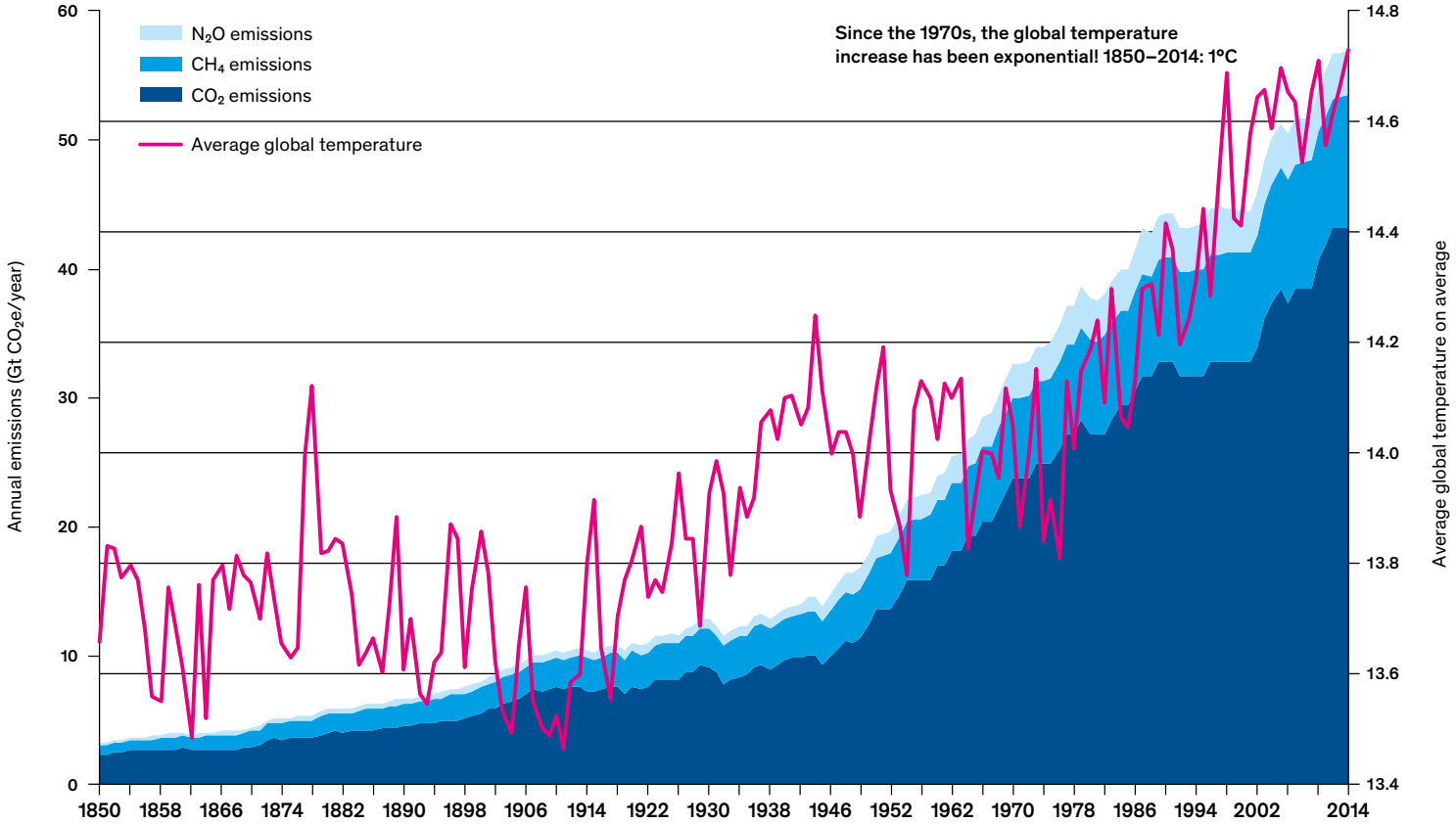
IPCC Special Report (2018). Global Warming of 1.5°C

We can and should not wait for instructions from above; every individual can do something. The options for reducing your individual carbon footprint are varied and often involve little effort or expense. For the most part, simply adopting more conscious behaviour and rethinking familiar habits can have a considerable impact.

Unavoidable Emissions

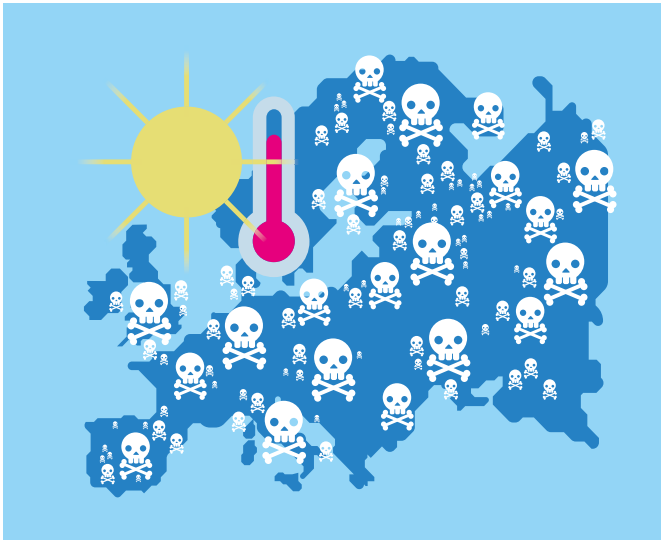
Even by living a climate-conscious lifestyle with limited consumption, we cannot completely reduce today's emissions. Day-to-day living, food, mobility and energy use all generate **unavoidable emissions.** But through carbon offset projects, such as those from myclimate, we have the opportunity to take responsibility for our own unavoidable emissions and to offset them.

Development of the last 164 Years



Climatewatch (n. d.), PIK (2017), IPCC (2013c), ACIA (2004)

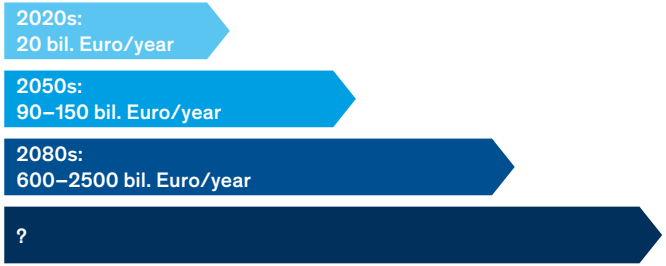
Extreme Weather, Risks and Climate Change



The heat waves of 2003 and 2015 led to excess deaths in Europe in the tens of thousands. As a result of climate change, the probability of such heatwaves in Europe had nearly doubled by the beginning of the 21st century and since then has increased tenfold.

Euromomo.eu

Extreme weather causes huge damage. An increase in the intensity and frequency of such events thanks to climate change also increases the damage they cause. The observed sharp increase in this damage cannot be entirely attributed to climate change however; the global increase of material assets (houses, streets, general infrastructure) also plays a very significant role. The extent to which climate change is responsible for this increase in damage is very difficult to determine. In some regions, an increase in the intensity or frequency of certain extreme weather events is evident; in individual cases, damage such as deaths from heatwaves can be ascertained.



Calculated Development of Costs for Climate Change Consequences in 21st century Europe

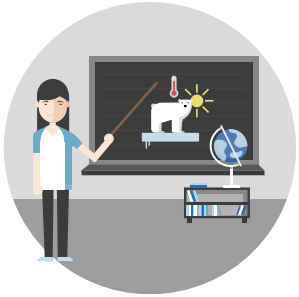
UBA (2012), BCG (2018)

The Work of myclimate

myclimate is a charitable organisation and your partner for effective climate protection, globally and locally. Together with partners from the business sector, as well as private individuals, myclimate wants to shape the future of the world through consultation and educational programmes, as well as its own projects.

myclimate
shape our future

Generally speaking, myclimate carbon offset projects are implemented in developing countries, as in such places steps can be taken at comparatively low cost to protect the climate and more: these initiatives have been proven to contribute to the fulfilment of the United Nations' Sustainable Development Goals (SDGs). These include, for example, fighting poverty, hunger, illness and unemployment, the improvement of schooling and also the improvement of gender equality. It doesn't matter to the climate where greenhouse gas emissions are reduced and saved; what's important is that a reduction takes place overall.



Training

Through our interactive and action-orientated educational programmes, we encourage everyone to make a contribution to our future.

Carbon Offset Projects

With our projects of the highest quality, we promote quantifiable climate protection and sustainable development worldwide.

Consulting and Solutions

We advise companies on integrated climate protection with tangible added value. This is done through analyses, IT solutions, awards and resource management.

Carbon Offset Project “Solar Energy for Education and Jobs”

Some 2.5 billion people, around a third of the global population, live without a reliable energy supply. Kerosene is often used as a fuel for the production of electricity, but it is expensive and produces lots of emissions. Thanks to a myclimate project, people in Tanzania can acquire subsidised solar panels, adapted to their energy demands, which include a battery, light source and a mobile phone charger. Microfinancing systems within the project framework also help to make the investment.

Light increases the sense of security. Photo: mobisol/myclimate

The people are no longer dependent on natural light, enabling children to learn for longer in the evening and adults to generate additional income. Installation is carried out by the local population, which creates additional jobs. The contribution to climate protection currently amounts to a 10,000 tonne CO_2e saving per year.

Solar energy opens up income opportunities. Photo: mobisol/myclimate

Carbon Offset Project “Clean Drinking Water for Schools and Households”

In many regions of the world, particularly south of the Sahara, there is still little or no access to clean drinking water. Without chemical or physical treatment of the water before drinking or use in cooking, there is a high risk of various diseases. In Uganda, around 40 per cent of the population boil water before it is used, primarily through burning wood. This results in an increasing rate of deforestation. In addition, since people must travel ever farther to collect the wood, this work is increasingly time consuming for the local population.

Water preparation system of Nkumba Talemwa Junior School in Entebbe. Photo: myclimate

The 900 pupils of Kawempe Mbogo School can drink water at any time. Photo: myclimate

With various simple, yet effective filter technologies, myclimate has already given many people access to clean drinking water and thus significantly improved their living conditions. For example, children who catch fewer diseases can attend school more regularly. “Previously, we had to purify the water with chemical tablets, since we were unable to boil a sufficient amount. It tasted awful, the tablets were expensive and not always available,” explains Mulindwa Muhammed Noor, Headmistress of Kawempe Mbogo School. The annual reduction of CO_2e emissions through this project is around 61,500 tonnes.

Carbon Offset Project “Efficient Boilers save Habitat for the last of the Mountain Gorillas”

Inefficient cookers using wood as fuel cause Earth huge problems in many regions. Alongside the smoke produced by combustion, local ecosystems, and rainforests in particular, are jeopardised by the ever-increasing demand for wood resulting from higher population numbers. This is having a particularly profound effect on Rwanda’s mountain gorillas, of which there are just 1000 left in the world.

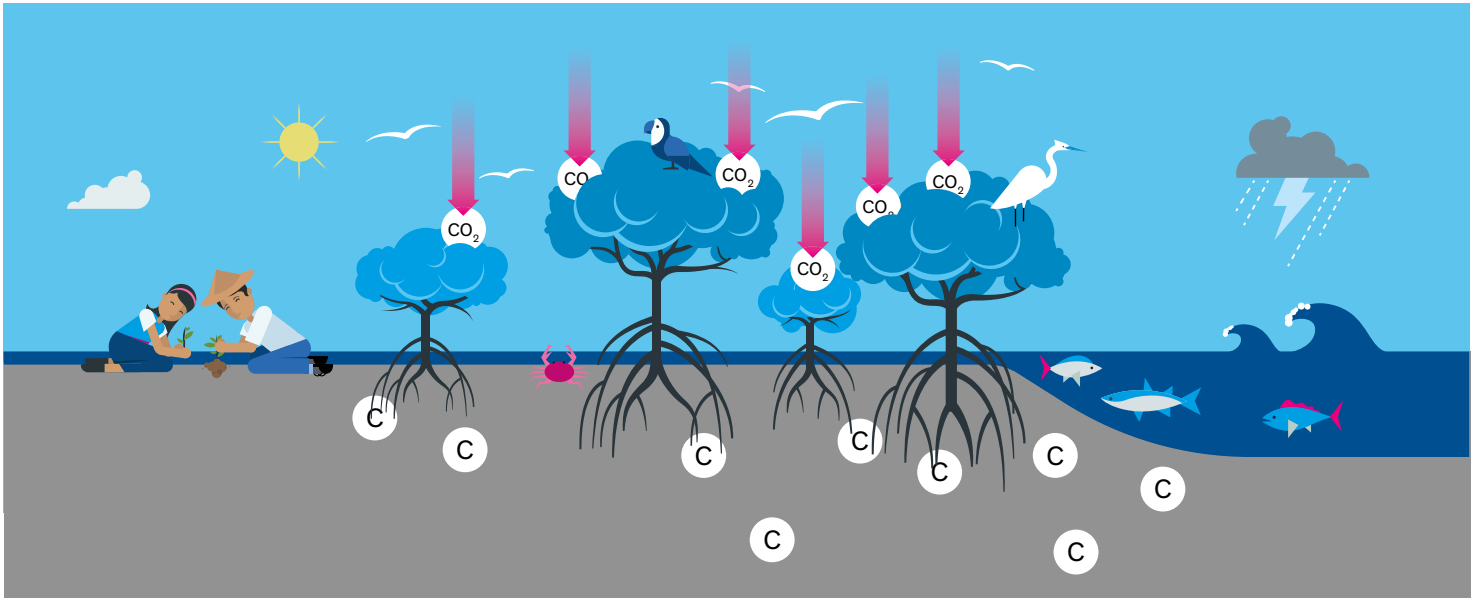
myclimate is working with local players and developing cheap, efficient cookers for the population. These reduce wood consumption by about two thirds, protecting both the rainforest and the mountain gorillas, while improving the living conditions of the local population too.

Money and time savings resulting from a decreased need for wood allow women and children to take part in other activities, promote education and create new jobs, as the cookers are produced and installed by local people. The significant decrease in smoke generated inside huts measurably improves the health and living standards of children and women above all. The project saves a total of 72,000 tonnes CO_2e per year.

Photos: Likano/myclimate

Carbon Offset Project “Mangrove Reforestation and Female Empowerment”

The goal is to create healthy mangrove forests in a coastal region of Myanmar, which absorb CO_2, protect the population from natural disasters and promote biodiversity by providing a crucial habitat for endangered species. The project connects the local population with the replenishment of the degraded mangrove ecosystems while simultaneously improving their quality of life.



Glossary

CH_4: Methane – chemical compound of carbon and hydrogen. Primary constituent of natural gas. Second most significant greenhouse gas generated by human activity.

CO_2: Carbon dioxide – chemical compound of carbon and oxygen. By far the most significant greenhouse gas generated by human activity.

CO_2e: CO_2 equivalents. For the emission of greenhouse gases other than CO_2, the equivalent amount of CO_2 is calculated on the basis of the respective greenhouse effect of the gas. These "virtual" CO_2 emissions are then added together and provide the sum total of CO_2 equivalents.

Emission: The release of gases (here greenhouse gases) or their precursors into the atmosphere above a certain region and within a certain time period.

Final energy: The form of energy that is used by consumers (e.g. heating oil, petrol, electricity, etc.).

Energy efficiency: The ratio of energy output and use. The greater the utility of the energy volume used, the greater the energy efficiency.

Renewable energy: Forms of energy that regenerate themselves such as solar, wind or geothermal energy.

Warming potential: Warming potential compares the climate impact of a unit of a given greenhouse gas to the climate impact of a unit of CO_2. We use warming potential to calculate CO_2 equivalents.

Fossil energy: Energy from combustible fuels, which were created by the bacterial decomposition of dead plants and animals. Fossil energies are not renewable. Examples are black and brown coal, natural gas and crude oil. Although an element, uranium is also included here.

Embodied energy: Energy volume used for the manufacture, transport, storage, sale, disposal, etc. of goods.

Gt: Gigatonne (factor 10^9)

kWh: Kilowatt hour (factor 10^3)

Mt: Megatonne (factor 10^6)

N_2O: Nitrous oxide

OHC: Ocean heat content

ppb/ppm: parts per billion/million. Relative indication of the concentration of gases in the air.

Primary energy: Primary energy is the inherent energy present in energy sources (e.g. the fuel value of coal). Primary energy is converted in power plants, refineries, etc. into final energy (usable energy such as electricity or heat). This conversion incurs energy losses.

kt: Kilotonne (factor 10^3)

TWh: Terawatt hour (factor 10^{12})

Bibliography

ACIA (2004). Impacts of a warming Arctic. Retrieved on 20.07.18 from https://www.amap.no/documents/download/1058.

CareElite (2018). Plastikmüll Zahlen, Fakten & Studien 2017/2018. Retrieved on 13.08.20 from https://www.careelite.de/plastik-muell-fakten/.

Climatewatch (n. d.). Global Historical Emissions. Retrieved on 13.08.20 from https://www.climatewatchdata.org/ghg-emissions?source=32&version=2.

CSI (n. d.). Natural Causes of Climate Change. Retrieved on 28.06.18 from http://www.ces.fau.edu/nasa/module-4/causes-2.php.

Eaternity (2020). Climate Score. Retrieved on 14.08.2020 from https://eaternity.org/foodprint/climate-score.

EPA (n.d.). Global Greenhouse Gas Emissions Data. Retrieved on 13.08.20 from https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data.

European Union (2019). Going climate neutral by 2050, a strategic long-term vision for a prosperous, modern, competitive and climate-neutral EU- economy, a publication of the European Commission. Retrieved on 13.11.20 from https://op.europa.eu/de/publication-detail/-/publication/92f6d5bc-76bc-11e9-9f05-01aa75ed71a1.

European Parliament (2017). Food waste: the problem in the EU in numbers. Retrieved on 13.11.20 from https://www.europarl.europa.eu/news/en/headlines/society/20170505STO73528/lebensmittelverschwendung-in-der-eu-infografik.

European Commission (2020). Reducing emissions from aviation. Retrieved on 13.11.20 from https://ec.europa.eu/clima/policies/transport/aviation_en.

European Commission (2020). In focus: Renewable energy in Europe. Retrieved on 13.11.20 from https://ec.europa.eu/info/news/focus-renewable-energy-europe-2020-mar-18_en.

European Environment Agency (2019). Greenhouse gas emissions from transport in Europe. Retrieved on 13.11.20 from https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases/transport-emissions-of-greenhouse-gases-12.

European Environment Agency (2019). Average carbon dioxide emissions from new passenger cars. Retrieved on 13.11.20 from https://www.eea.europa.eu/data-and-maps/daviz/average-emissions-for-new-cars-5#tab-chart_1.

Eurostat (2018). Energy consumption in households by type of end-use. Retrieved on 13.11.20 from https://ec.europa.eu/eurostat/de/web/products-eurostat-news/-/DDN-20200626-1.

Eurostat (2018). Greenhouse gas emission statistics – emission inventories. Retrieved on 13.11.20 from https://ec.europa.eu/eurostat/statistics-explained/index.php/Greenhouse_gas_emission_statistics_-_emission_inventories#Trends_in_greenhouse_gas_emissions.

Eurostat (2018). Eurostat news release, Energy consumption in 2018. Retrieved on 13.11.20 from https://ec.europa.eu/eurostat/documents/2995521/10341549/8-04022020-BP-DE.pdf/3e62b994-68fb-0ea8-7d29-f1769272bf5a.

Eurostat (2019). Population statistics by age and sex. Retrieved on 13.11.20 from https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjan&lang=de.

Eurostat (2020). Aircraft traffic data by reporting country. Retrieved on 13.11.20 from https://ec.europa.eu/eurostat/databrowser/view/avia_tf_acc/default/table?lang=en.

Eurostat (2020). Greenhouse gas emissions per capita. Retrieved on 13.11.20 from https://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=t2020_rd300&language=en.

Eurostat (2020). People on the move statistics on mobility in Europe 2020 edition. Retrieved on 13.11.20 from https://ec.europa.eu/eurostat/cache/digpub/eumove/index.html?lang=en

EuroMOMO (2020). Graphs and maps. Retrieved on 13.11.20 from https://www.euromomo.eu/graphs-and-maps.

GCA (2017). CO_2 Emissions. Retrieved on 28.06.18 from http://www.globalcarbonatlas.org/en/CO_2-emissions.

Greenpeace (2017). Konsumkollaps durch Fast Fashion. Retrieved on 28.06.18 from https://www.greenpeace.de/sites/www.greenpeace.de/files/publications/s01951_greenpeace_report_konsumkollaps_fast_fashion.pdf.

Greenpeace (2017). 10 Jahre Smartphone – Die globalen Umweltfolgen von 7 Milliarden Mobiltelefonen. Retrieved on 26.03.19 from https://www.greenpeace.de/sites/www.greenpeace.de/files/publications/s01981_greenpeace_report_10_jahre_smartphone.pdf.

IEA (2020). Data and statistics. Retrieved on 13.11.20 from https://www.iea.org/data-and-statistics?country=EU28&fuel=CO_2%20emissions&indicator=CO_2BySource.

IEA (2020). Key World Energy Statistics 2020. Retrieved on 13.11.20 from https://www.iea.org/reports/key-world-energy-statistics-2020.

Infoclimat.fr (2019). Temperature progression in June 2019 in Paris Retrieved on 13.11.20 from https://www.infoclimat.fr/observations-meteo/archives/1er/juin/2019/paris-montsouris/07156.html.

IPCC (2013a). Chapter 3 Observations: Ocean. Retrieved on 28.06.18 from https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter03_FINAL.pdf.

IPCC (2013b). Information from Paleoclimate Archives. Retrieved on 17.07.18 from https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter05_FINAL.pdf.

IPCC (2013c). Summary for Policymakers. Retrieved on 17.07.18 from https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf.

IPCC (2014). Chapter 5 Drivers, Trends and Mitigation. Retrieved on 28.06.18 from https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter5.pdf.

IPCC Special Report (2018). Global Warming of 1.5°C. Retrieved on 18.08.20 from https://www.ipcc.ch/sr15/.

Munich Re (2019). Retrieved on 14.08.20 from https://www.munichre.com/de/loesungen/fuer-industriekunden/natcatservice.html#1675154658.

Nature Climate Change (2014). https://www.nature.com/articles/nclimate2468.

Olivier, J.; Peters, J. (2019). Trends in Global CO_2 and Total Greenhouse Gas emissions. Summary of the 2019 Report. Retrieved on 18.08.20 from https://www.pbl.nl/en/publications/trends-in-global-co2-and-totaal-greenhouse-gas-emissions-summary-of-the-2019-report.

Perkins-Kirkpatrick, S. E.; Lewis, S. C (2020). Increasing trends in regional heatwaves. Nat Commun 11, 3357.

ProClim – Forum for Climate and Global Change. https://naturwissenschaften.ch.

Robine, J. M.; Cheung, K.; Roy, S.; Oyen, H.; Herrmann, F. (2007). Report on excess mortality in Europe during summer 2003. EU Community Action Programme for Public Health, Grant Agreement.

Scarborough, P.; Appleby, P. N.; Mizdrak, A.; Briggs, A. D. M.; Travis, R. C.; Bradbury, K. E.; Key, T. J. (2014). Dietary greenhouse gas emissions of meat-eaters, fish-eaters, vegetarians and vegans in the UK.

Schibsted (2017). The Second Hand Effect Report 2017. Retrieved on 03.07.18 from https://secondhandeffect.schibsted.com/wp-content/uploads/2017/04/PDF-Rapport_2017.pdf.

Statista (2020). Höhe der Treibhausgasemissionen in der EU-28 nach Gas im Jahresvergleich 2000 und 2018. Retrieved on 13.11.20 from https://de.statista.com/statistik/daten/studie/311892/umfrage/treibhausgasemissionen-in-der-eu-28-nach-gasen-im-jahresvergleich/.

Tagesschau (2019). Warum anderswo weniger in der Tonne landet. Retrieved on 13.11.20 from https://www.tagesschau.de/inland/containern-lebensmittel-verschwendung-101.html.

TextileExchange (2014). The Life Cycle Assessment of Organic Cotton Fiber – A Global Average. Retrieved on 11.07.18 from https://textileexchange.org/wp-content/uploads/2017/06/TE-LCA_of_Organic_Cotton-Fiber-Summary_of-Findings.pdf.

Tutti (n. d.). Klima. Retrieved on 14.08.20 from http://www.klima.tutti.ch/.

UBA (2013). Ist nicht Wasserdampf statt CO_2 das wichtigste Treibhausgas? Retrieved on 14.08.20 from https://www.umweltbundesamt.de/service/uba-fragen/ist-nicht-wasserdampf-statt-co2-das-wichtigste.

UBA (2014). Klima und Treibhauseffekt. Retrieved on 14.08.20 from https://www.umweltbundesamt.de/themen/klima-energie/klimawandel/klima-treibhauseffekt#textpart-1.

UBA (2017). Atmosphärische Treibhausgas-Konzentrationen. Retrieved on 14.08.20 from https://www.umweltbundesamt.de/daten/klima/atmosphaerische-treibhausgas-konzentrationen#textpart-1.

UBA (2017). Pressemitteilung Klimabilanz 2017. Retrieved on 13.11.20 from https://www.umweltbundesamt.de/presse/pressemitteilungen/klimabilanz-2017-emissionen-gehen-leicht-zurueck.

UNEP (2019). Emissions Gap Report 2019. https://www.unenvironment.org/resources/emissions-gap-report-2019.

Worldwatchers (2019). TRIGEMA T-Shirts mit gutem CO_2-Footprint. Retrieved on 28.06.18 from https://www.worldwatchers.org/news/trigema-t-shirts-mit-gutem-co2-footprint.

WWF (2010). Bekleidung und Umwelt. Retrieved on 28.06.18 from https://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/HG__Bekleidung_Umwelt_BB_JE_06_2010.pdf.

WWF (2015). Das grosse Wegschmeissen. Vom Acker bis zum Verbraucher: Ausmass und Umwelteffekte der Lebensmittelverschwendung in Deutschland. Retrieved on 09.07.18 from https://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/WWF_Studie_Das_grosse_Wegschmeissen.pdf.

WWF (n. d.). Fleisch und Milchprodukte. Retrieved on 18.08.20 from https://www.wwf.ch/de/unsere-ziele/fleisch-und-milchprodukte.

Zhiyenbek A.; Beretta C.; Stoessel F.; Hellweg S. (2016). Ökobilanzierung Früchte- und Gemüseproduktion. ETH Zürich. https://www.wwf.ch/sites/default/files/doc-2018-02/2017-02-Studie-Fruechte-und-Gemuese-Oekobilanz_0.pdf.

Foundation myclimate
Pfingstweidstrasse 10
8005 Zurich
T +41 44 500 43 50
info@myclimate.org
www.myclimate.org

Donations in EUR:
Swiss Post
Account number: 91-377511-5
IBAN: CH35 0900 0000 9137 7511 5
BIC/SWIFT: POFICHBE

myclimate Deutschland gGmbh
Kurrerstr. 40/3
72762 Reutlingen
T +49 7121 31 777 50
kontakt@myclimate.de
www.myclimate.de

GLS Gemeinschaftsbank eG
IBAN: DE72 4306 0967 7044 8548 00
BIC/SWIFT: GENODEM1GLS

New issue

Paper made out of 100 % recycled fibres.
Editorial support from
ProClim – Swiss Academy of Natural Sciences

myclimate neutral
Printed matter
myclimate.org/01-16-158743