Climate Change and Protection

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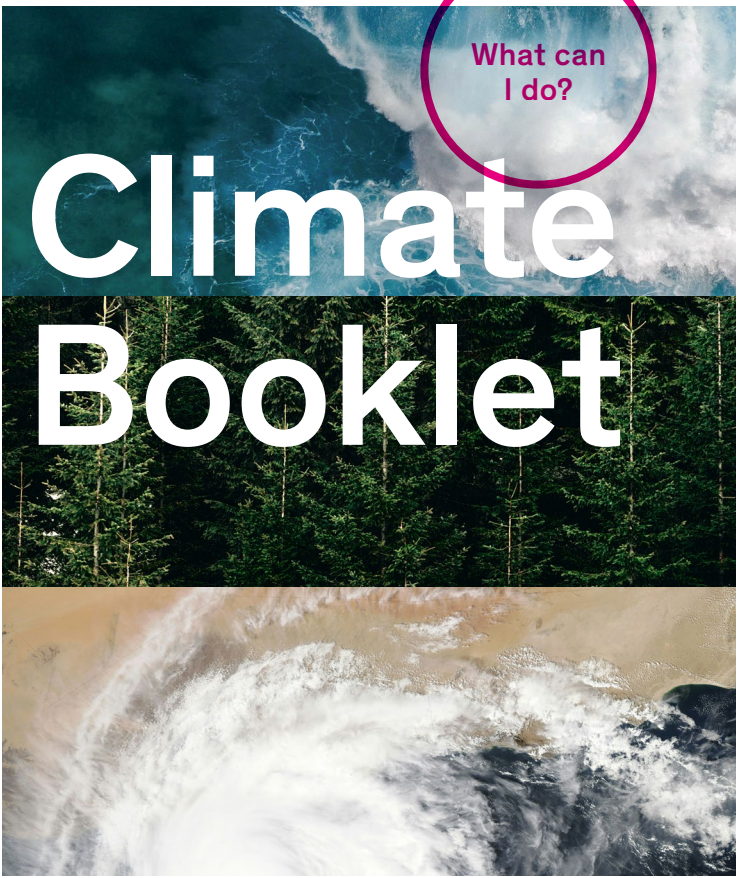


What can I do?

Climate Booklet

“We’re living in yesterday’s future scenarios”

Professor Sonia I. Seneviratne, Professor of Land-Climate Dynamics at ETH Zurich, IPCC Author 2023

The climate crisis is undoubtedly one of the most pressing problems of our time. It is not a natural phenomenon but is largely caused by human activity. We are now experiencing the far-reaching effects of long-term climate change on our environment, society and economy right on our own doorstep. Would you like to understand what climate change really means? What exactly are greenhouse gases? What does electricity have to do with carbon dioxide? What does global warming have to do with your own CO_2 footprint? Find out in the new edition of our Climate Booklet how you too can contribute to climate protection, use resources efficiently and make environmentally conscious decisions. Concrete tips for action will help you to make the topic tangible – for you and our climate.

The myclimate team wishes you an enjoyable read.

Table of Contents

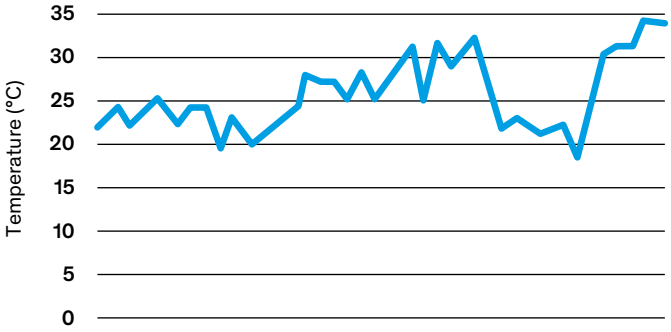
“Such a thing as the climate doesn’t exist. Everything that we experience and feel through our senses outside is weather – heat, warmth, rain or snow.”

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 high-income countries, we also observe the change in the climate but will be able to deal with it for the foreseeable future. The situation in low-income 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 high-income countries, they cannot adapt at the same speed.

The Difference Between Weather and Climate

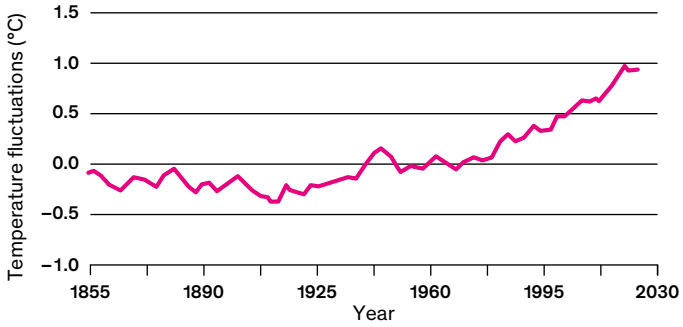


Temperature progression, August 2023, Paris

Weather

The atmospheric conditions that we actively feel and experience are encompassed by 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.

Weatherspark[1]



Global temperature progression, since industrialisation

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.

National Centers for Environmental Information[2]

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.

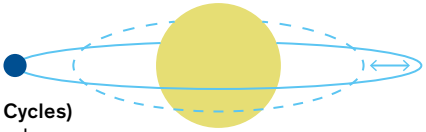
Ocean Currents
Currents such as the Gulf Stream transport vast amounts of energy and shape the climate of entire regions.

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

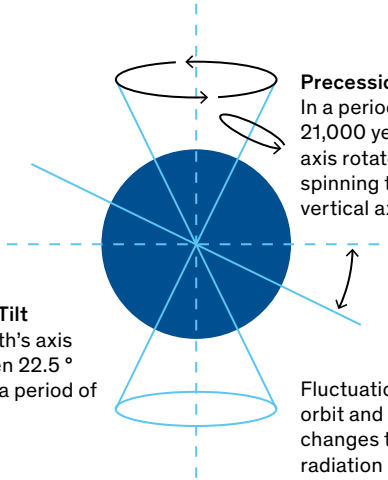
Landscape and Vegetation
Soil conditions and vegetation determine how much radiation is absorbed by the Earth's surface.

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 a period of 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 between 22.5 ° and 24 ° over a period of 41,000 years.

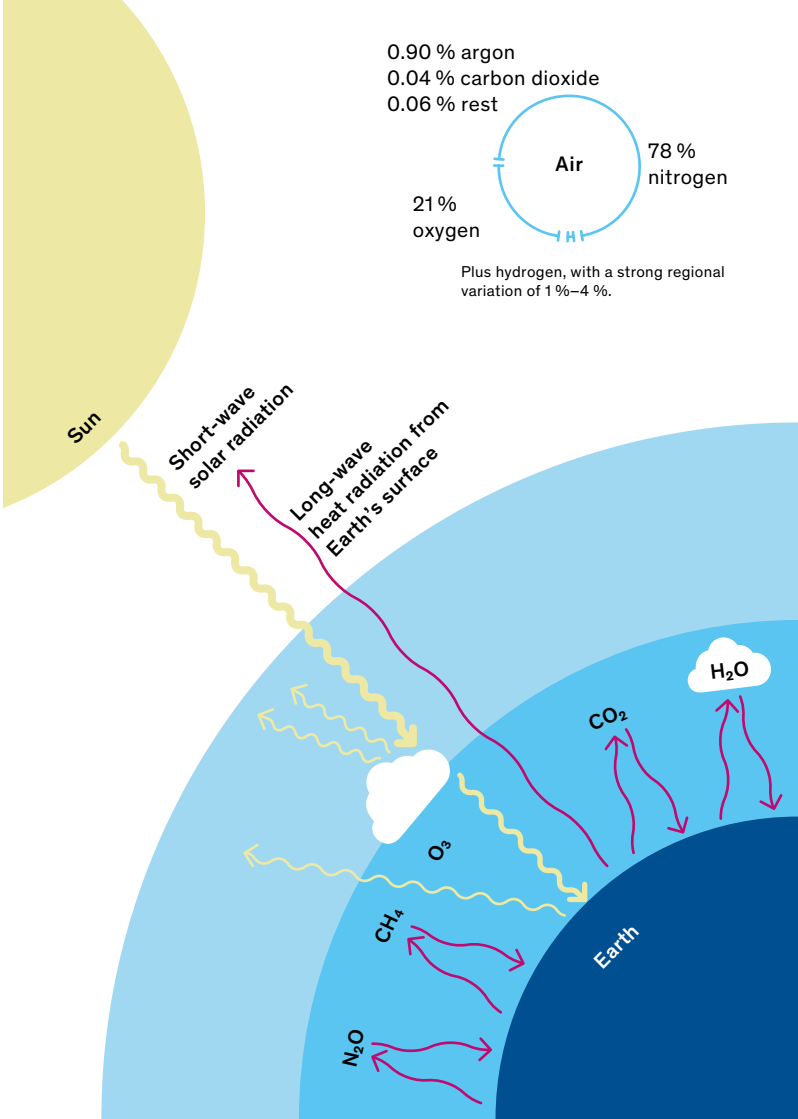
Fluctuations in Earth's orbit and axis cause changes to the solar radiation emitted onto Earth and in turn to the climate.

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 the Earth's surface. Part of this radiation is returned to the 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 it 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.

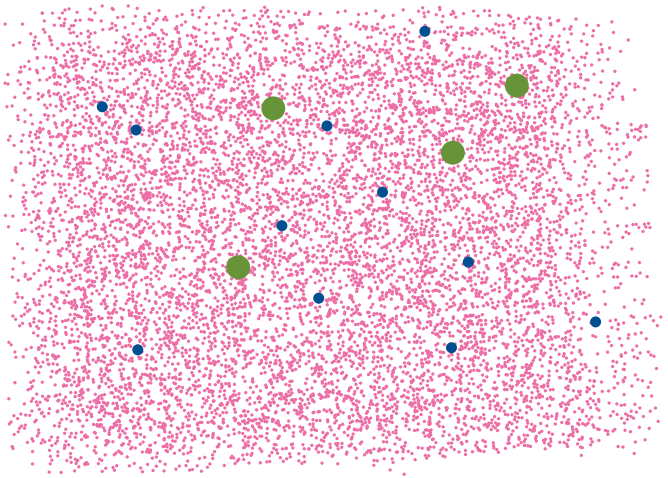
Greenhouse gas emissions caused by people strengthen this natural effect.

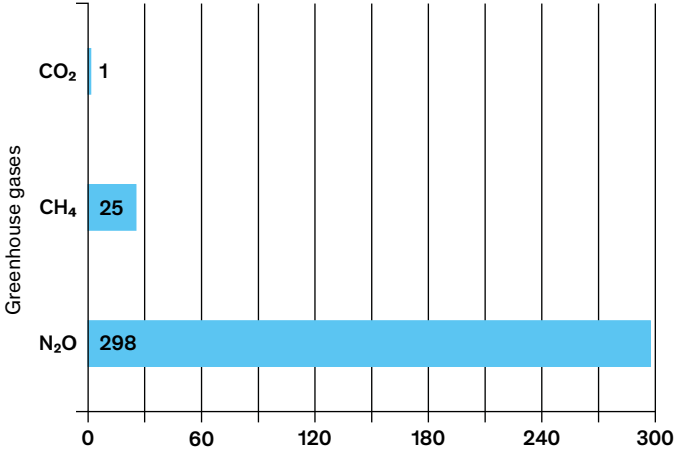


Greenhouse Gases

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 global 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 be able to compare the respective impacts 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.

IPPC (2018)[3]

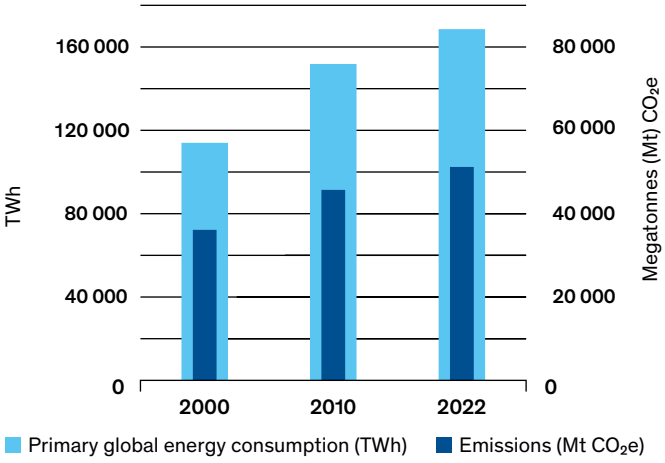
“We have passed significant multiple tipping points already. The cascade is not far away.”

Dr Mamphela Ramphele
Co-President Club of Rome

Climate Change

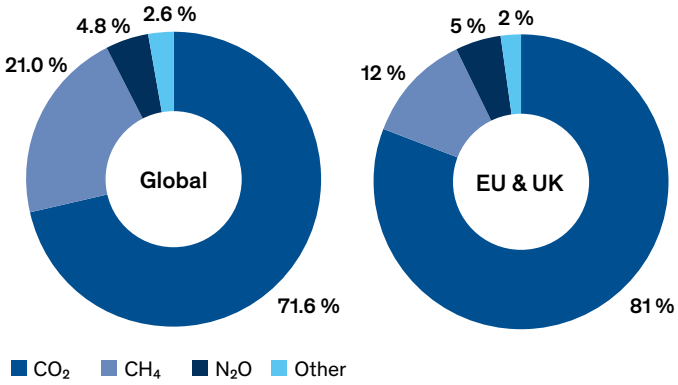
If we want to alleviate climate change, we must understand it! The term is now on everyone’s lips. The issue is a very complex one. What is climate change? What causes it? What dangers and opportunities does it bring? What does it have to do with all of us? Let’s take a look!

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, the 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 2022, annual global emissions reached a new high of more than 53.8 billion tonnes of CO_2e released into the atmosphere by anthropogenic (human) activity. China, the USA and the EU are among the biggest emitters. They alone are responsible for 47 per cent of global greenhouse gas emissions.



Global primary energy demand and the resulting CO_2e emissions

The Human Influence

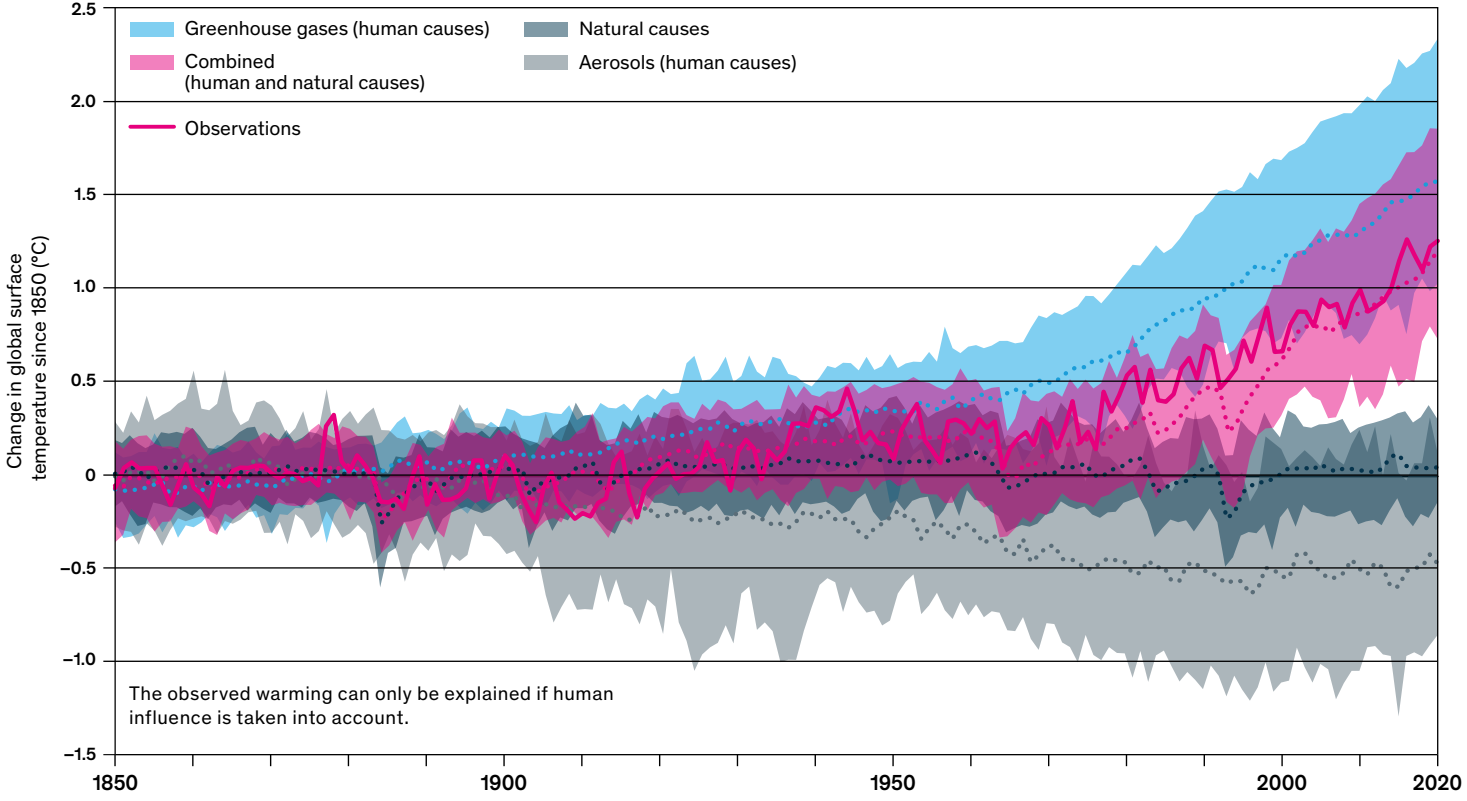


Composition of greenhouse gas emissions in Mt CO_2e – globally and in the EU and the UK 2021

Human activity also influences atmospheric concentrations of methane and nitrous oxide. Agriculture is the predominant 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.

United Nations[4], European Commission[5]

How do we know that Humans are Causing Climate Change?



IPCC (2021)[6]

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, can lead to death and cause waves of migration. Altered climatic conditions have in part dramatically reduced the typical biodiversity of local ecosystems due 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 more and more.

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

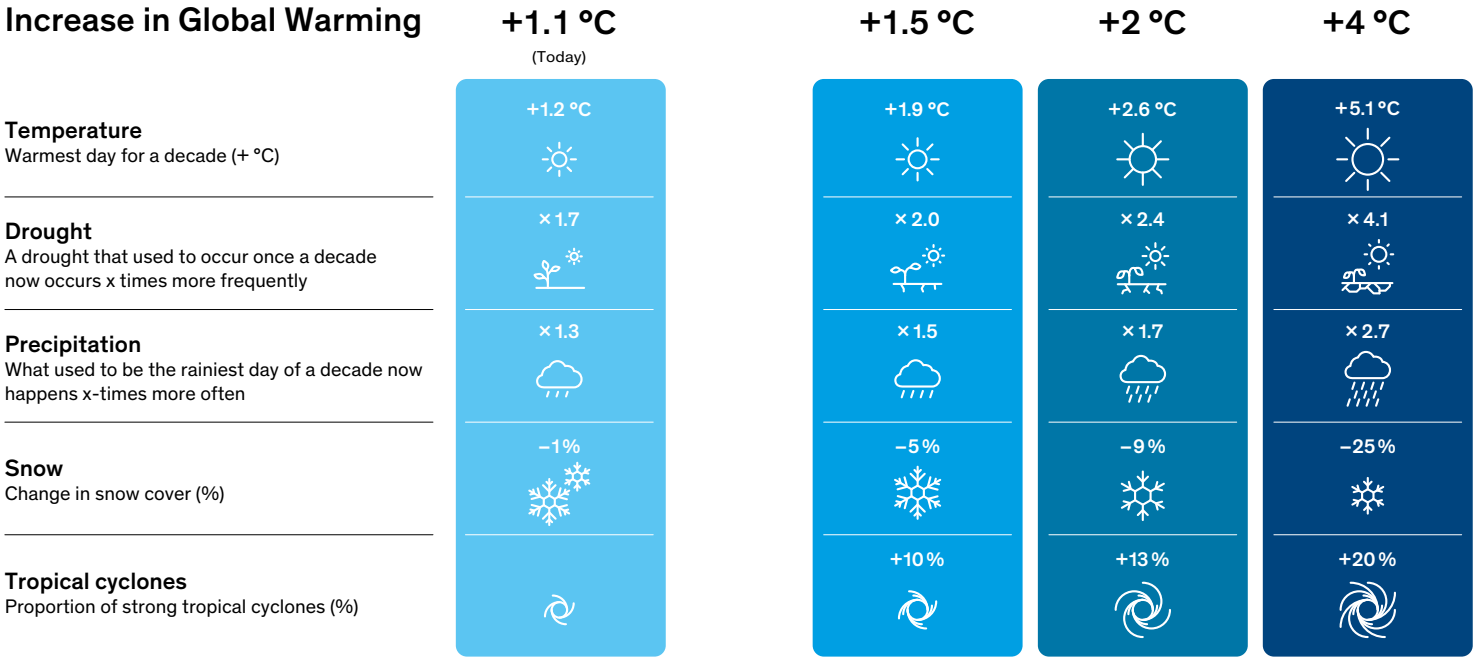
Despite the already noticeable changes to the climate, with far-reaching climate protection measures, we can curb climate change and safeguard the quality of life of future genera-tions. To this end, every person must be aware of their individual influence on and responsibility for the climate and actively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

images.nasa.gov

Current Climate Change

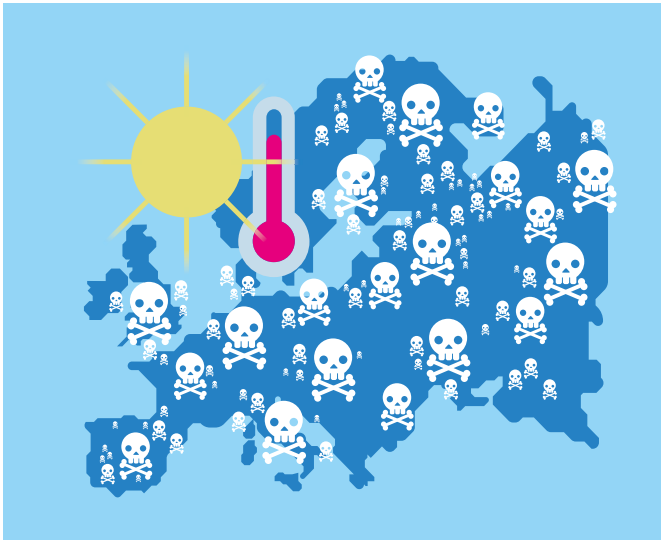
The records of the global climate have documented increasing changes since the beginning of the century before last. Significant increases in the concentration of the greenhouse gases CO_2, CH_4 and N_2O can be observed. At the same time, the average global temperature is rising at an unusually fast rate.

There have always been natural climate fluctuations (page 9). According to the Intergovernmental Panel on Climate Change (IPCC), the sharp rise in temperature since the middle of the 20th century can only be explained by human activity. The causes are the rapid increase in greenhouse gas concentrations and the resulting increase in the greenhouse effect.



IPCC (2021)[6]

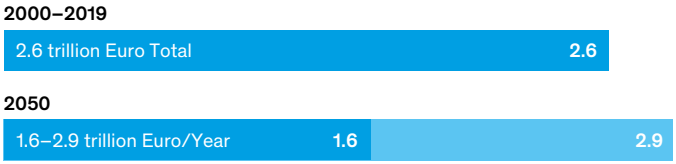
Extreme Weather, Risks and Climate Change



The increasing heatwaves over the last two decades have 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.

Nature Climate Change (2014)[7]

Extreme weather causes huge damage. An increase in the intensity and frequency of such events due 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. Extreme weather events therefore also lead to high socioeconomic costs. Studies show that there is a link between human-related greenhouse gas emissions and changes in extreme weather events.



Estimates of costs for climate change consequences in the 21st century globally

Weforum[8], Newman[9]

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

Sofia (18)

The Problem: Emissions

The increasing energy demand of the steadily growing world population, as well as the lifestyle of more and more people, threaten the future of our planet – not only the future of the generations to come, but also of those who are already particularly threatened by climate change. People in high-income 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.

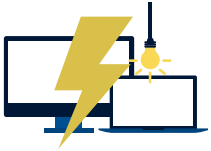
Greenhouse Gas Emissions in Europe?

Greenhouse gas emissions can be attributed to various consumer sectors: manufacturing is the biggest contributor, at around 22 per cent, followed by electricity and gas supply.

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.

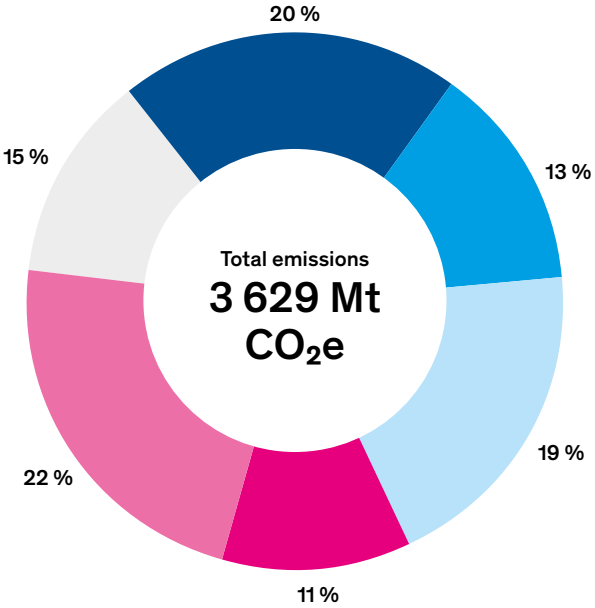
1 t CO_2e = production of **22.65 kg** of beef

1 t CO_2e = heating for an **86.8 m^2** energy-optimised home for **one year**



1 t CO_2e = operation of electronic devices in one household for **145 days**

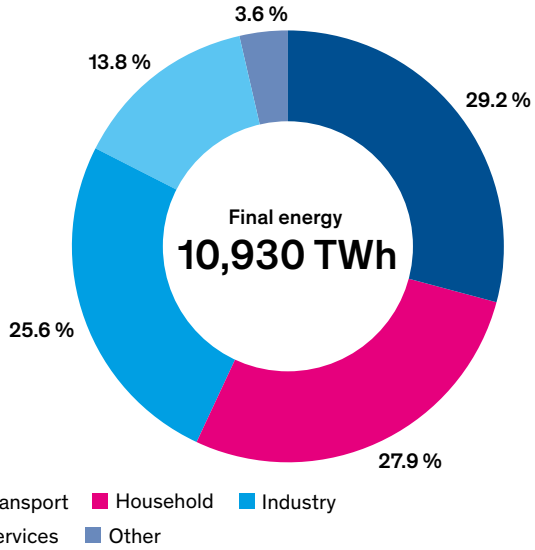
Calculations myclimate, UZH[10], Learn Metrics[11], Princeton University[12]



Eurostat[13], Eurostat[14]

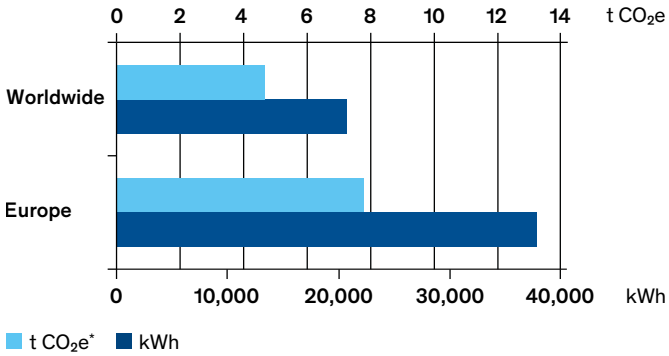
Energy Consumption in Europe

In 2021, primary energy consumption in the EU amounted to 17,008 terawatt-hours (TWh), with final energy consumption of 12,346 TWh.



Energy Consumption in Europe – EU 27 (2021)

Eurostat[15]



*adjusted for emissions generated abroad by imported goods

Comparison of global per capita energy use (2022) and greenhouse gas emissions with per capita data for Europe (2021)

On average, only seven out of every 100 citizens of the world (5.6 per cent in 2022) live in the countries of the EU and the 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. 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.

Ourworldindata[16], Ourworldindata[17], Statista[18], European Union[19]

International Air Traffic

3.2 billion*

Global airline passengers (2022)

The number of air passengers worldwide corresponds to almost half of the world's population. However, these flights are mainly taken by people from the richer countries. They fly several times a year.

* The figures for 2021 are unfortunately an exception. The decline is primarily due to the COVID-19 pandemic.

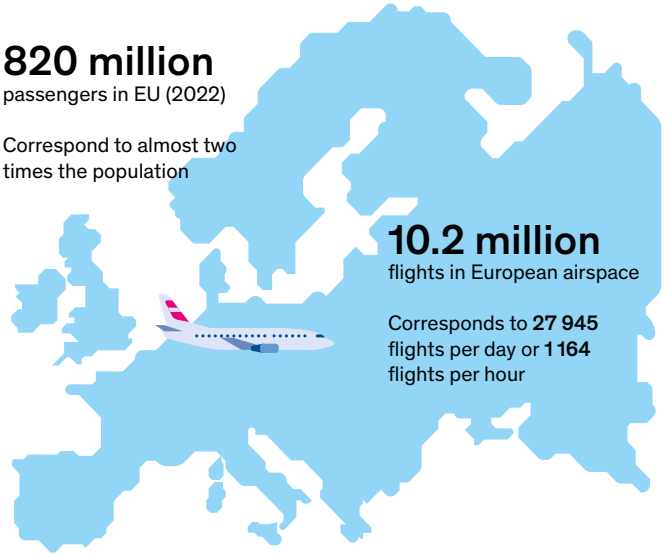
Credit Suisse[20]

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. Worldwide, aviation emissions account for 5.9 per cent of total emissions, with a rising trend observed after the coronavirus pandemic. There are large differences between individual countries.

820 million

passengers in EU (2022)

Correspond to almost two times the population



10.2 million

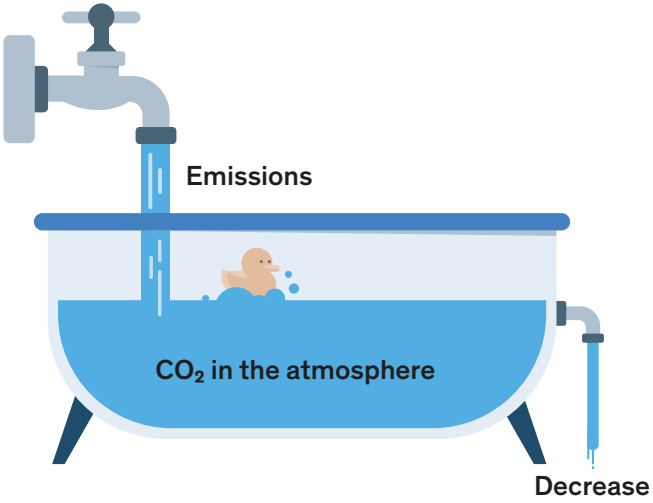
flights in European airspace

Corresponds to **27 945** flights per day or **1 164** flights per hour

stay-groundet.org[21], Eurostat[22], Eurocontrol[23]

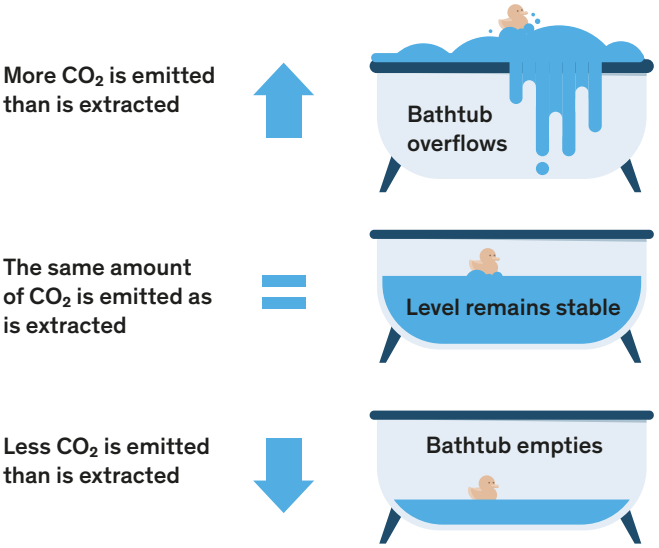
How many Emissions are too many?

Our atmosphere can be metaphorically represented as a bathtub. Greenhouse gas emissions flow out of the figurative tap. The outflow represents the artificial (e.g. through new CO_2 binding and storage technologies) and biological (such as soils, forests and peatlands) sinks. Currently, much more flows into this bathtub than flows out. As a result, the concentration of greenhouse gases (GHG) in the atmosphere (represented by the water level) is rising continuously. So far, the average global temperature has risen roughly in line with the GHG concentration.



Own representation according to climateinteractive.org/Dr. John Sterman[24]

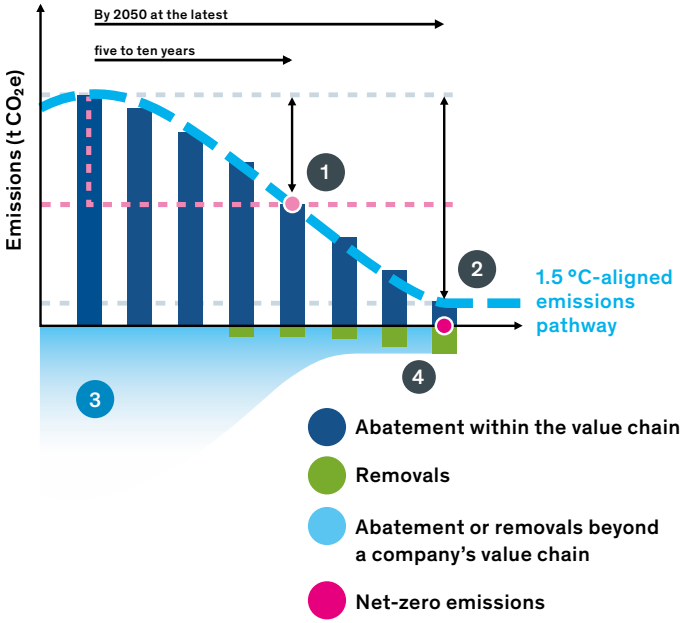
However, there is still the bathtub edge, which in our climate system represents so-called “tipping points”, where changes can become drastic and irreversible. This includes, for example, the thawing of permafrost soils, which could release large amounts of the greenhouse gas methane. Or the melting of the poles, which leads to the warming of the polar seas by solar radiation instead of being reflected into space by the white ice. According to reports from the Intergovernmental Panel on Climate Change (IPCC), these tipping points can begin at a global average temperature increase of 1.5 °C.



Own representation based on University of Hamburg[25], IPCC (2021)[6]

What does this mean for the Tap?

To ensure that the net greenhouse gas balance of human activities is zero and – metaphorically speaking – the bathtub does not overflow, the tap must be turned off continuously. In other words, this means that instead of drastic, sudden reduction measures (as during the pandemic), we want to achieve a low-CO_2 economy (decarbonisation) through many different measures.



Own illustration according to sciencebasedtargets.org (2023)[26]

We cannot 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.

1. **To set near-term science-based targets:**
   five-to-ten year emission reduction targets in line with 1.5 °C pathways.

2. **To set long-term science-based targets:**
   target to reduce emissions to a residual level in line with 1.5 °C scenarios by no later than 2050.

3. **Beyond value chain mitigation:**
   in the transition to net-zero, companies should take immediate and consistent action to mitigate emissions beyond their value chains.

4. **Neutralisation of residual emissions:**
   unavoidable GHGs released into the atmosphere when the company has achieved their long-term, science-based targets must be counterbalanced through the permanent removal

Required

Highly recommended

Global Warming and your Carbon Footprint

In order to limit the global temperature increase to the internationally stated goal of 2 °C 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 1.1 °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 °C to 4 °C above preindustrial levels. In Switzerland the temperature increase is currently around 2.5 °C.

Limiting global warming to well below 2 °C is only possible with a rapid acceleration of efforts to reduce emissions. It is particularly important to implement comprehensive climate protection measures at the international level in the years leading up to 2030. In its March 2023 report, the IPCC warns that CO_2 emissions must fall by 48 per cent by 2030, measured against 2019 emissions, in order to have a chance of still achieving the 1.5 °C target.

Meteoschweiz[27], IPCC[28], IPCC[29]

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.

“What you do makes a difference, and you have to decide what kind of difference you want to make.”

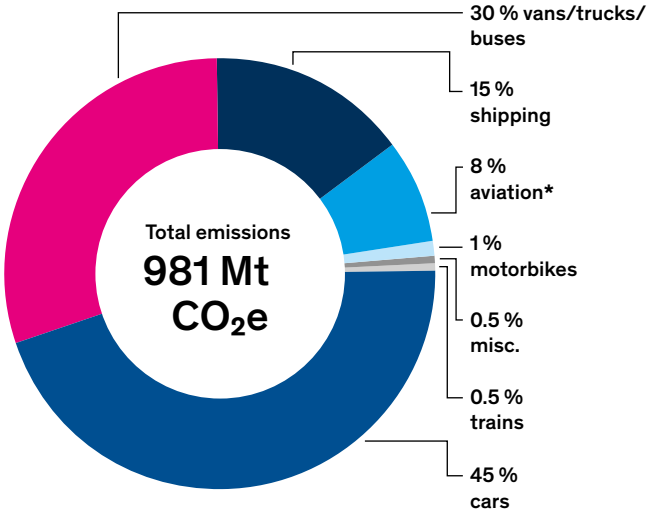
Dr Jane Goodall,
Scientist and Activist

How do I Contribute to Climate Change and What can I do?

The previous pages have shown why a long-term reduction in CO_2e is essential, and we must not and do not have to wait for instructions from above. It is not only within large companies that we can take action; every individual can also do something. There are many ways to reduce your individual carbon footprint, and they often require little effort. In most cases, acting more consciously in everyday life and rethinking various habits can have a big impact.

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 (2021)
Seven per cent out of the eight per cent of emissions from aviation are emitted by international aviation.

* The numbers from 2021 are unfortunately an exception. The decline is largely due to the COVID-19 pandemic.

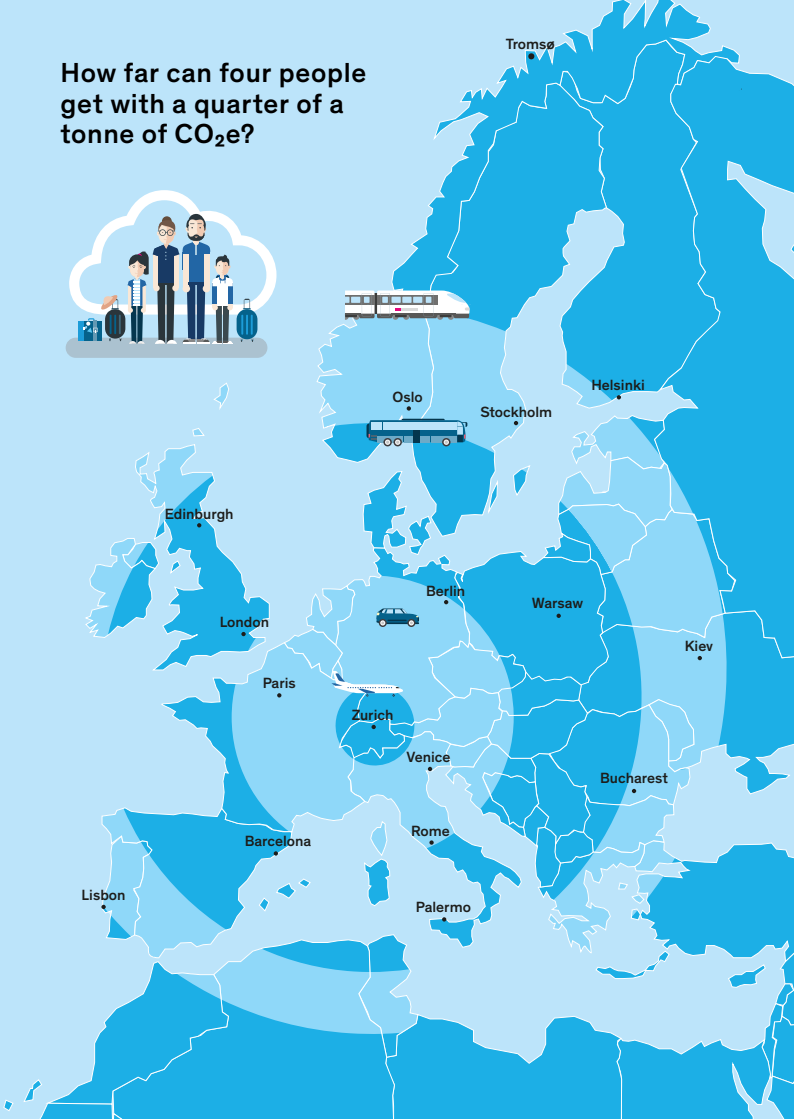
Europa.eu[30]

Around 11 per cent of greenhouse gas emissions in the EU in 2021 were generated by the transport sector (including international flights), amounting to some 981 Mt CO_2e. For mobility alone, more than two tonnes of greenhouse gases are emitted in Europe per capita per year.

If we consider domestic personal transport within Europe, more than 87.2 per cent of journeys are still made with cars, while just under 12.8 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.

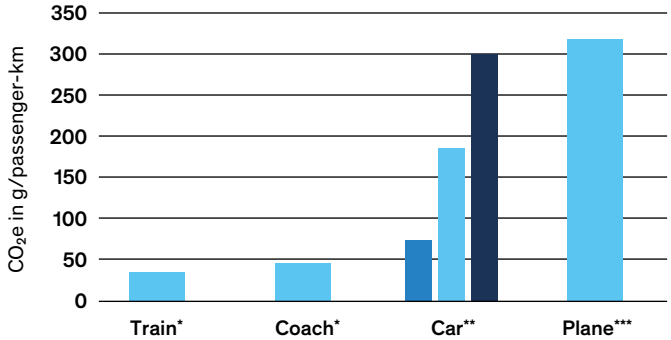
Tips	CO_2 savings
Use local public transport	Up to 93 % in comparison with private vehicles
Take a coach or long-distance train for holidays abroad	On average, some 77.7 % fewer emissions (compared with cars) and more than 87 % fewer (compared with planes)
Beware of the emission value when purchasing 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[31], Mobitool[32]



Travel Emissions

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 Zurich, by plane it is only possible to cross the German border. Conversely, you can reach destinations in the south of Spain or Scandinavia 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.

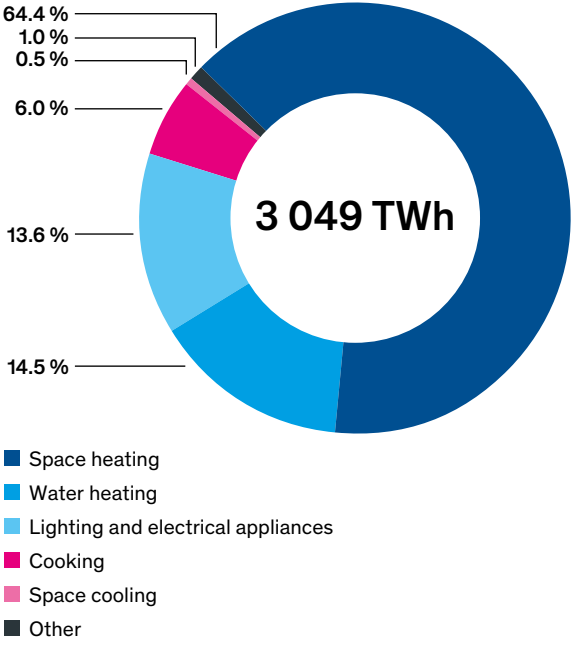


*Economy and Business Class averaged

Comparison of Average Emissions of Individual Transport Type per Kilometre Travelled

Mobitool[32]

Category “Living”



Final Energy Consumption in Private Households (2021)

Eurostat[33]

Around 28 per cent of the total final energy consumption in Europe can be attributed to private households (2021). The majority of energy consumed in European households comes from natural gas, while 21.2 per cent comes from renewable sources of energy. 2.5 per cent is still extracted from coal.

Within the EU, Sweden is the frontrunner in renewable energy, which amounts to some 66 per cent of the energy mix there. Finland and Latvia likewise have a very “green” energy mix.

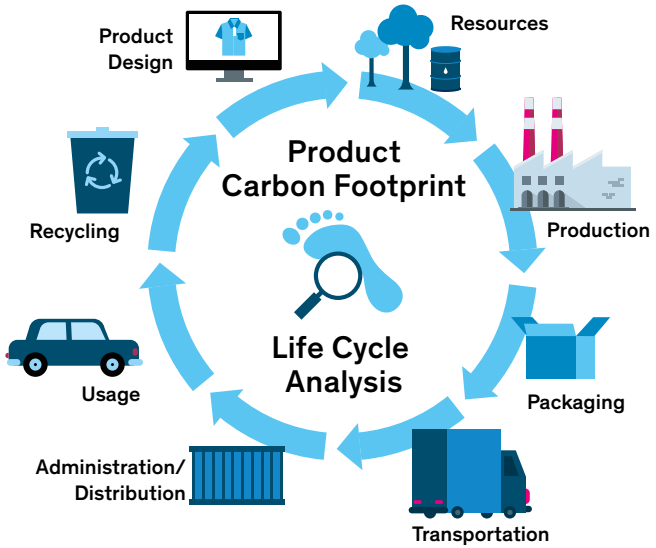
Tips	Savings
Lower your heating temperature	Reducing the heating temperature from 20 to 19 degrees, with an outside temperature of 2 degrees, reduces energy consumption and CO_2e emissions by around 6 %
Air-dry your washing instead of using a tumble dryer	With each laundry cycle where the laundry is air-dried instead of using a tumble dryer, 1.15 kg of CO_2e is saved
Switch inefficient and outmoded filament lamps for LED lights	By opting for LED light bulbs over incandescent ones, you can reduce emissions during usage by approximately 80 %

European Commission (2020)[34], Eurostat[35], oekotest.de[36]
calculations myclimate, Uddin, S. (2011)[37], Eurostat[38]

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).

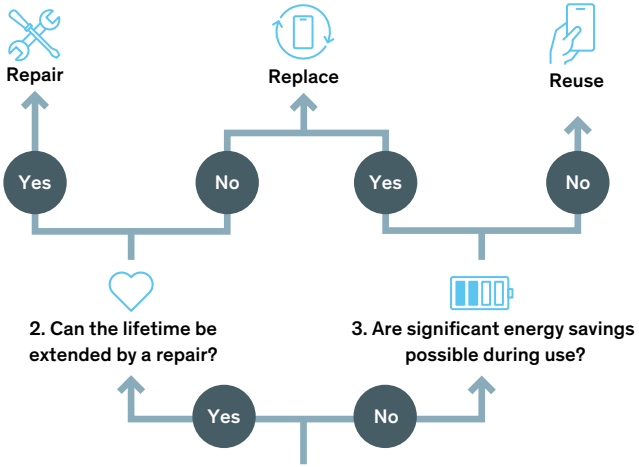


Embodied energy encompasses the energy use of various activities and the respective carbon footprint of their emissions. Imported products thus bring an invisible “rucksack” of previously emitted gases with them that weren’t produced in Switzerland. These emissions are generated in the country of origin.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

Climate-Friendly Decisions

In our globalised society, we are consuming more and more. Sustainable, conscious consumption, which includes a resource-conserving lifestyle and is based on the concept of sufficiency, is therefore essential. The production, transportation, storage, sale and disposal of every product require resources and have an impact on nature through the emissions they generate. The extraction and processing of raw materials should not be underestimated. These usually account for the largest share of emissions and exceed energy consumption in the use phase and in the running costs for consumers.

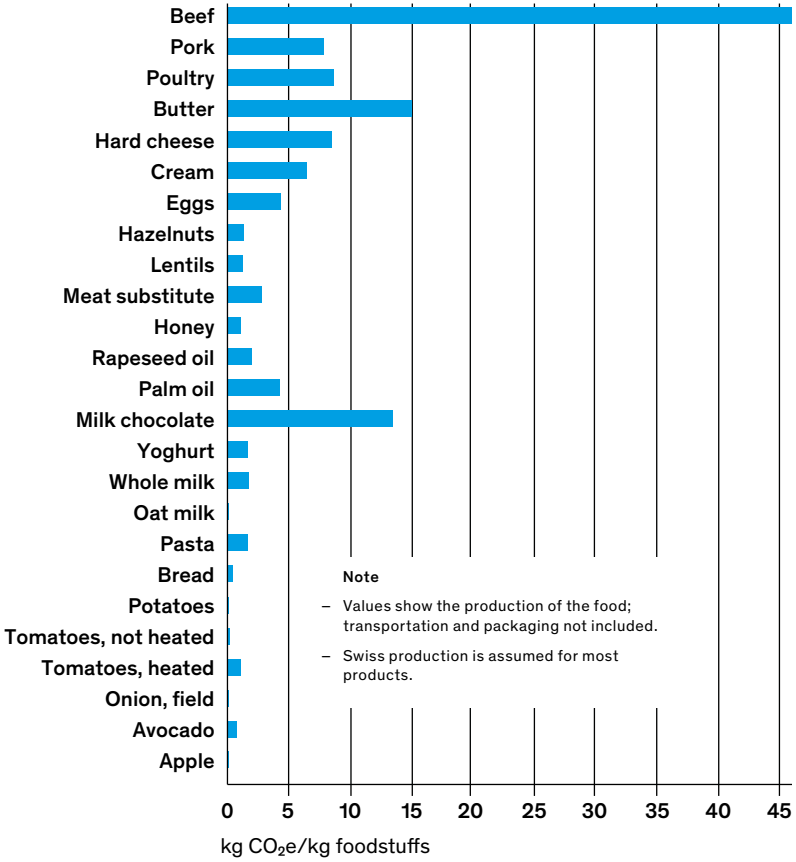
“Climate-friendly consumption” encompasses many more areas. Fundamental, usually unconscious decisions in purchasing behavior as well as the lifespan and disposal method of products often have a much greater impact on the environment than the energy efficiency of the products themselves. In general, before making a new purchase, it should always be carefully considered whether what is available is sufficient (sufficiency), whether an existing product can be shared or borrowed (sharing economy) or whether a second-hand product will do the job (second-hand). Furthermore, personal footprints can be significantly reduced by giving preference to products made from recycled materials or those of high quality and therefore with a longer lifespan.



1. Is the central function for which the product/device is used limited by gradual wear and tear? A distinction should be made as to whether only a less important function is slightly restricted or whether it is a complete functional failure that would justify a replacement.

2. Is it possible to restore the central functionality of the product by repairing or replacing worn or defective individual parts? Depending on the cost of the restoration and the extension of the service life, a replacement should be carefully considered.

3. Can a replacement product save energy that exceeds the total production, procurement and disposal costs of the old and new product in a foreseeable time frame? Replacing outdated appliances such as oil-fired heating systems, refrigerators or old diesel vehicles with new technologies is often more resource-efficient in the long term.



Average climate footprint of foods compared

Internal calculation based on WFLDB database

Food

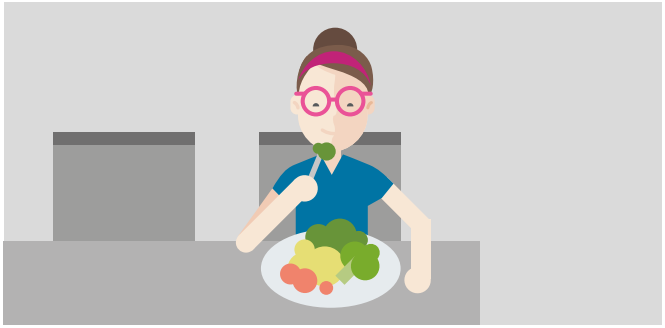
Food has a huge influence on the individual carbon footprint of every human being. The carbon footprint varies enormously from food to food. Animal products such as meat and dairy have a significant climate impact owing to methane and nitrous oxide emissions, but also because of their production processes, 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.

For a 250-gram beef steak, emissions amount to approximately 11.5 kilograms of CO_2e – this corresponds to the CO_2e emissions of a car travelling a distance of around 61.7 kilometres. 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 meat each day
Choose organic products when shopping	Savings of 5 % to 15 % CO_2e are 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, meaning 96 % savings
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 foregoing meat and switching to vegetarian

Eaternity[39], WWF[40]

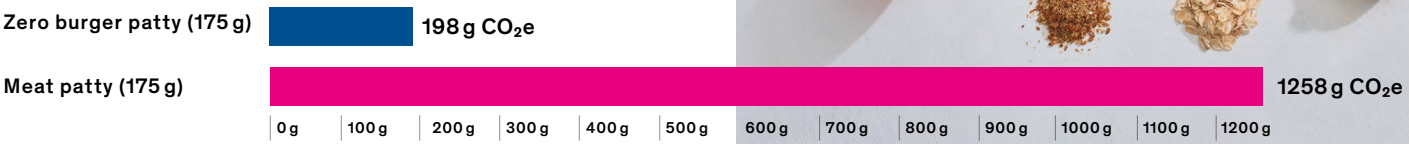
Alongside consuming mainly plant-based products, the most important aspects of climate-friendly eating habits are the origin of the food and the time of year. Choosing regionally produced food products reduces greenhouse gas emissions thanks to short transport routes. Seasonal products in Switzerland 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 forego 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 (2020)[41], myclimate, Scarborough et al. (2014)[42], Lindenthal et al. (n.d.)[43]

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.



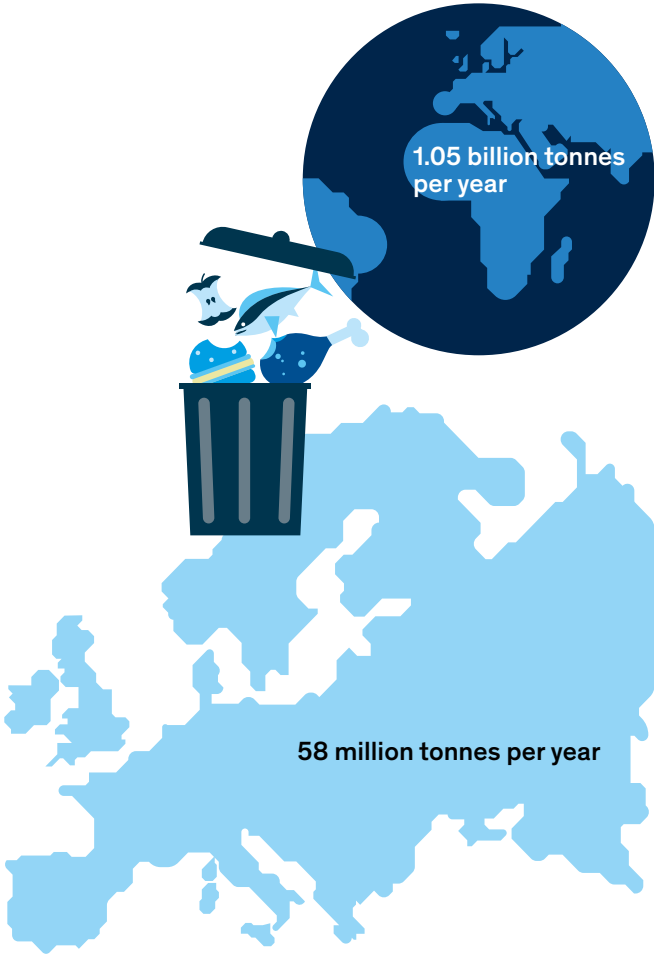
myclimate calculations, photo: roberthoernig.com

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 1,052 million tonnes of food are wasted worldwide. In Europe, it is estimated that more than 58 million tonnes are wasted, which corresponds to around 131 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 252 million tonnes of CO_2e are produced from the disposal of food waste alone in the EU. This is around 100 million tonnes more than the entire transport sector in Germany emits per year.

Food waste is also an economic and social issue, costing around 132 billion euros every year at a time when more than 37 million Europeans still cannot afford proper meals.

European Commission[44], pubaffairsbruxelles.eu[45], UNEP[46], Statista[47]

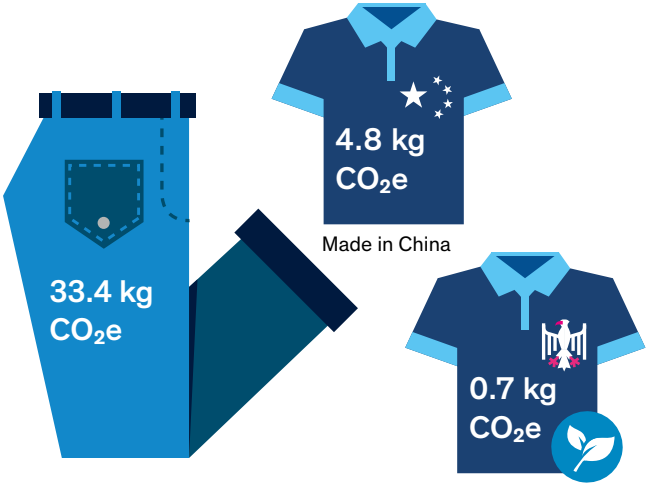


Clothing

Clothing consumption has risen sharply in recent decades, with global sales doubling between 2000 and 2015. The trend towards mass production of clothing and mass consumption continues to grow and is forecast to double again by 2030. Central Europeans purchase on average 60 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 a 79 % lower carbon footprint than a comparable cotton shirt from China

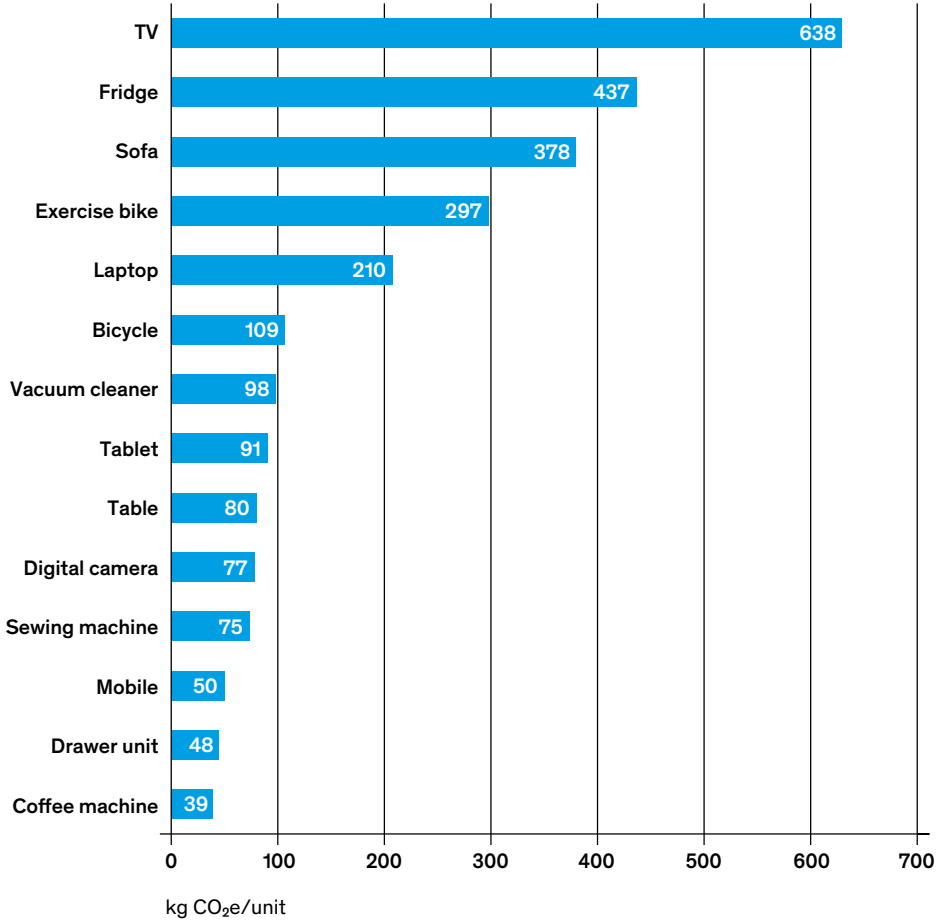
Greenpeace (2017)[48], Greenpeace (2023)[49], SmartPCF calculation



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.

calculation myclimate



Average CO_2 emissions for new devices/objects

calculation myclimate, Schibsted (2017)[50]

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, buyer and seller would often 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. 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 of CO_2e.

Climate-Friendly Decisions

40 ml coffee
0.08 kg CO_2e

100 ml cow milk
0.185 kg CO_2e

100 ml oat drink
0.025 kg CO_2e

Cow milk is **7.4 times** more damaging to the environment than oat drink

Tumble dryer emissions:
1.15 kg CO_2e/cycle

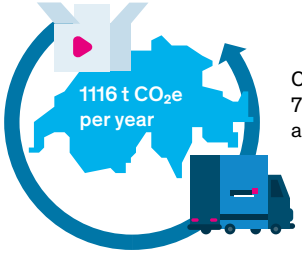
Cardboard vs plastic film vs aluminium

1.1 kg CO_2e | **3.1 kg CO_2e** | **6 kg CO_2e**

Vegan	Vegetarian	Flexitarian	Meat intake
1124 kg CO_2e per year	**1380 kg CO_2e per year**	**1495 kg CO_2e per year**	**2350 kg CO_2e per year**

The figures show the average greenhouse gas emissions from various average forms of European nutrition in kg CO_2e per person per year.

myclimate calculations, WWF[40]

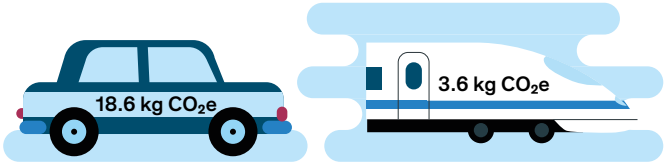


Online shopping (Switzerland): approx. 7 million Zalando **returns** per year with an average parcel weight of 3 kg

Cooking with a kettle instead of an electric stove saves **27.7 % CO_2e.**

100 km per person (EU average)*

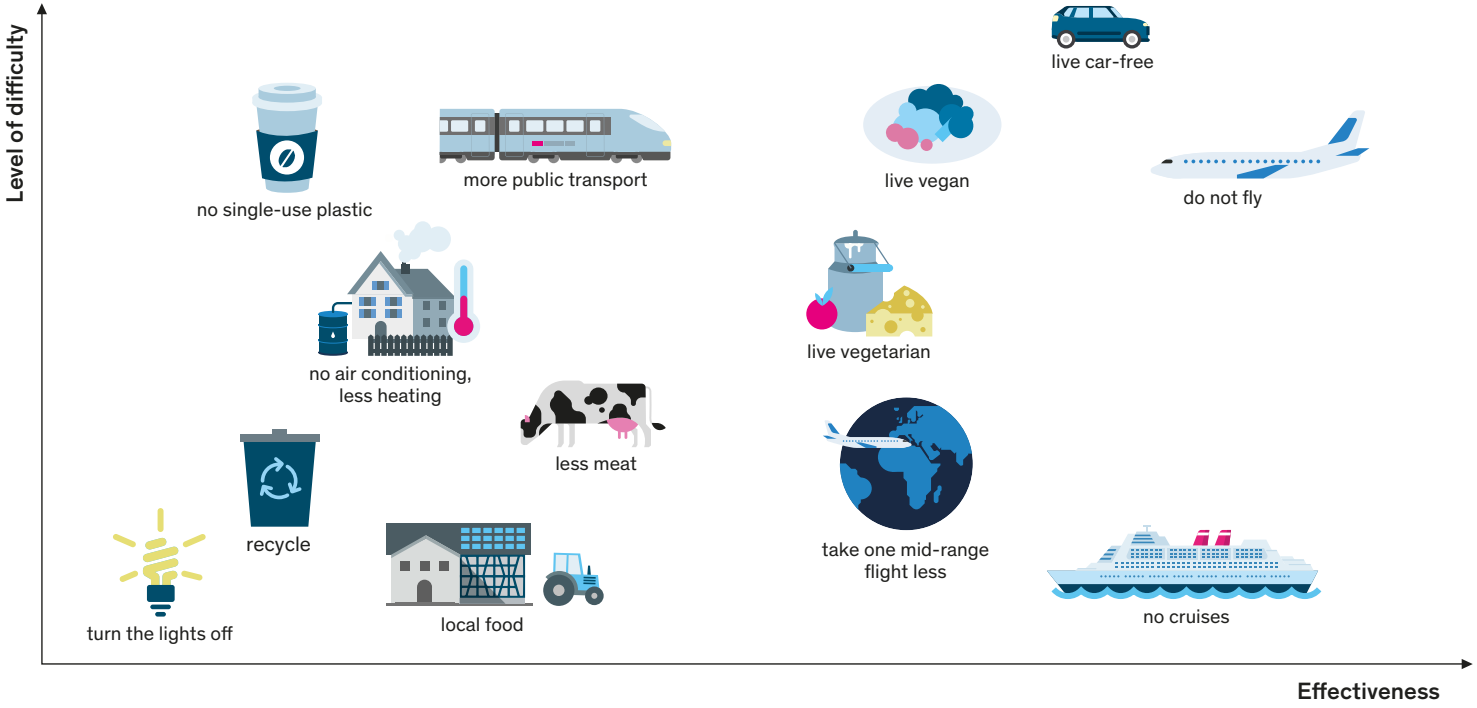
100 km per person in average regional and long-distance traffic*



*With an average occupancy rate of 1.6 people in the car and 45 % occupancy in the train

logistik-watchblog.de[51], blog.carpathia.ch[52], Princeton University (2022)[12]
theenergyprofessor.com[53], safehomeadvice.com[54], myclimate calculations, Mobitool[32]

The effectiveness of decisions, represented on the horizontal axis, was calculated for typical emission profiles. The difficulty of decisions, indicated on the vertical axis, varies individually. Effective climate protection means avoiding as many CO_2 emissions as possible, as quickly as possible. Therefore, we should focus more on effective measures (to the right in the diagram). Consistently implementing these measures requires efforts at various levels. Often, effective measures are more challenging for us than simple ones. Therefore, it helps us to exchange experiences with others.



Climate-friendly decisions and their effectiveness

Own illustration according to klimapsychologie.com[55]

The Work of myclimate

myclimate is an international climate protection organisation with Swiss roots and a partner for effective, holistic climate protection, globally and locally. Together with partners from industry and private individuals, myclimate aims to shape the future of the world through consulting and educational services as well as its own projects. The guiding principle of myclimate is “avoid, reduce, support”.

Training

We empower, inspire and support people at school and at work with impact- and solution-oriented educational offers in order to promote effective climate protection through enhanced skills. myclimate education offers positive encouragement, picking up on everyone’s individual prior knowledge and scope for action, and motivating them to actively exploit this.

Consulting and Solutions

We offer companies of all sizes advice on integrated climate protection with tangible added value. myclimate supports companies in CO_2 and resource management with advice, analyses, IT tools and labels. Our services range from simple carbon footprints (emissions calculations) at the company level to detailed life cycle assessments of products and the development of an overarching climate strategy.

Climate Protection Projects

The climate protection projects that myclimate develops and supports are of high quality and promote measurable climate protection and sustainable development worldwide. Supporting these projects financially means taking responsibility for your own emissions, putting a price on them according to the “polluter pays” principle (money per tonne) and thus reducing greenhouse gas emissions outside your own value chain (beyond value chain mitigation). The projects are demonstrably effective, they have an immediate impact and are fair, but they are not a panacea for climate change.

Alice Nabwire (32) has been a cook stove artisan in the project since 2010.
Photo: Josemarie Nyagah/myclimate/Fairpicture

Glossary

Beyond Value Chain Mitigation (BVCM): a key concept for minimizing climate impacts outside the value chain. It complements the reduction plans for emissions within the company and in its own supply chain.

CH_4: methane – chemical compound consisting 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.

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

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

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

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

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.

kt: kilotonne (factor of 10^3)

kWh: kilowatt hour (factor of 10^3)

Mt: megatonne (factor of 10^6)

Net-zero emissions: all anthropogenic greenhouse gas emissions that need to be removed from the atmosphere through reduction measures, thus achieving a net-zero balance in the Earth's climate.

N_2O: nitrous oxide

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.

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

Sinks: a carbon sink refers to a system that absorbs more carbon than it emits. This is also referred to as negative emissions. The primary natural carbon sinks include soils, forests and oceans.

Sufficiency: is understood as the conscious reduction of our consumption of resources, particularly non-renewable natural resources.

TWh: terawatt hour (factor of 10^{12})

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.

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