





Interreg Mediterranean

EUROPEAN UNION

ZeroCO2MED

CLIMATE-SMART CHOICES:
How to Reduce Your Project's Carbon Footprint

This online booklet was created as part of the **ZeroCO2MED project**.

The ZeroCO2MED consortium is formed by: University of Vic-Central University of Catalonia (UVIC, Spain), WWF Mediterranean (WWF Med, Italy), Institute for Health and Environment (IHE, Slovenia), and the Centre for Energy, Environment and Resources (CENER21, Bosnia and Herzegovina). Global Footprint Network has joined as an external consultant.

Editor: Tadeja Pretnar

Authors: Debora Barioni, Amina Begić, Alessandro Galli, Tim Gregorčič, Harisa Muratović, Tadeja Pretnar

Editor of List of references: Dagmar Nared

Language review: Catherine Roberts, Nuša Vezonik

Proofreading: Nuša Vezonik, Tadeja Pretnar

Graphic design: Jana Kučej, ADO, Agencija za družbeno odgovornost

Photographs: Freepik, Canva Pro

June 2022

Interreg Mediterranean EUROPEAN UNION ZeroCO2MED

Project co-financed by the European Regional Development Fund

Table of CONTENTS

INTRODUCTION

The Earth's climate system is changing rapidly. Rising global average temperatures are not only having an impact on ecosystems and biodiversity but on people as well. Climate change is caused by the excessive production of greenhouse gas (GHG) emissions for which full responsibility lies with humanity from the beginning of the industrial age.[1] *When speaking about GHG emissions, the term carbon Footprint*[A] *cannot be avoided. The carbon Footprint of a person, company, organization, country, and so on tells us the amount of CO_2 emissions generated by the studied object due to fossil fuel use. The vast proportion of the global carbon Footprint is caused by the energy sector, which includes energy consumption for industry, buildings, and transport (76%). Agriculture, forestry, and land use are responsible for another 15% of global carbon Footprint, followed by industrial processes (6%) and waste (3%).*[2]

This brochure goes hand in hand with the tool ZeroCO_2MED as an in-depth carbon Footprint mitigation manual covering all main project working fields. It equips readers with science-based mitigation guidelines for reducing their organization's carbon Footprint, especially for project-leading organizations. Being as sustainable as possible—in the office, at events—an organization not only reduces its carbon Footprint but also sets an example to everyone involved—employees, partners, attendees—and gains credibility ("You practice what you preach!").

People, however, are the "core" of the organization, so a lot of recommendations target individuals as well. Hopefully, these recommendations will not only help employees and volunteers to reduce the carbon Footprint of projects or other work-related activities, but also help people to reduce their carbon Footprint in everyday life. Taking small steps towards sustainable living is important, especially when these small steps become habits and are multiplied by an increasing number of people.

[A] According to Global Footprint Network's Glossary, the term Footprint is a proper noun and thus should always be capitalized.

ABOUT THE PROJECT

This booklet is one of the results of the project Transition Towards Climate-Neutral Interreg MED Projects (ZeroCO_2MED) to develop a carbon Footprint methodology and a tool that could be easily applied to Interreg MED projects.[3] The project working group is made up of a highly qualified and transdisciplinary partnership: Fundació Universitària Balmes (Spain), WWF Mediterranean (Italy), Centre for Energy, Environment and Resources (Bosnia and Herzegovina), and Institute for Health and Environment (Slovenia), with an external expert on the Ecological Footprint, Global Footprint Network. A growing need to evaluate the performance of publicly funded projects was identified, not only in terms of scientific outputs, but also from the perspective of sustainability. Therefore, the working group developed a user-friendly software that includes the accounting methodology and tools to facilitate the decision-making process for the implementation of cost-effective carbon Footprint mitigation strategies and high-quality options to offset any remaining emissions.

For more information on the project, please visit the project's website.

ZeroCO_2MED is co-financed by the European Regional Development Fund.

1. LABOR AND THE CARBON FOOTPRINT

Human labor is needed in all phases of every project (project management, research, writing reports, communication). To operate efficiently, human resources require a proper environment (in the office or at home), daily commuting to the office, the use of materials, and operational services, such as the Internet. All these elements, discussed in this chapter, have an associated carbon Footprint.

1.1 Commuting

Commuting accounts for 98% of an employee's carbon Footprint.[4] Since a car powered by gasoline produces 1.7 kg of CO_2 every 10 km, and because commuters are frequently stuck in traffic jams as a result of the rigidity of traditional working hours, there are millions of tonnes of produced greenhouse gas emissions (GHG).[5] Numerous studies have lauded work from home, also called e-working, for its environmental benefits, while reducing the overall carbon Footprint of work-related activity: from lowering carbon emissions caused by traveling to minimizing significant office waste.[6] According to research conducted by New Zealand's Energy Efficiency and Conservation Agency (EECA), if 20% of people who normally commute to work by car shifted to e-working at least once per week, approximately 84,000 tonnes of carbon emissions would be avoided each year.[7] In addition to lowering carbon Footprint, e-working is becoming popular due to possible cost savings, flexibility, productivity, and efficiency.[4,6] However, it is

more complicated than it appears at first sight. **Remote work does not cancel out carbon emissions, but it merely shifts carbon emissions away from the office and into the homes of the employees.** Heating, ventilation, and air conditioning (HVAC) accounts for 40% of all carbon emissions linked with a residence.[8] That is why, in addition to their offices, businesses should measure and reduce the carbon Footprint of remote working as well.

Commuting is an unavoidable part of work when working from home is not an option. There are, however, ways of effectively reducing the carbon emissions caused by daily commuting.

How to reduce the carbon Footprint of commuting

Active mobility! Walking, cycling, running, skateboarding … are not only good for human physical and mental health but are also beneficial for the environment.[9,10] Active mobility is a way of commuting without burning additional fuel and polluting the air and is best for the planet. Employers could encourage active transport by providing employees with e-bikes and matching corporate culture with the cycling dress code. However, some research, focusing on the Ecological Footprint[B] of an average bike and its use (including data on the average European diet), estimates that all in all, cycling produces 21 g of CO_2 per km.[11]

Using public transport = using sustainable mobility.

If active mobility is not possible, using local public transport (bus, train, underground, tram) is the best option. A completely occupied bus can replace 57 single-occupant cars; a fully occupied train can replace up to 1,500 cars. It is also generally less expensive than driving and travelers can use their time for either pleasure or work during the ride.[12] However, one should bear in mind that taking a cab or a taxi is not environmentally friendly and is better to be avoided.[13]

[B] According to Global Footprint Network's Glossary, the term Ecological Footprint is a proper noun and is thus capitalized.

How to reduce your carbon Footprint when driving is unavoidable

Favor electric vehicles over fossil-fueled ones. Electric vehicles have a lower carbon Footprint regardless of how the electricity for their functioning is produced (with renewable sources or fossil fuels).[14] In addition to a lower carbon Footprint, electric vehicles have a lower impact on local air quality.[12]

Practice car-sharing. When commuting by car is the sole viable option, sharing a car with other passengers should be a priority. This not only reduces the carbon Footprint but also reduces costs related to owning and driving a car.[12]

Consider commuting needs in advance. When on a business trip, booking accommodation within walking distance or as near as possible to a venue is recommended, practicing active mobility (walking or cycling) or using public transport to prevent unnecessary travel by taxis.

Practice multimodal mobility. Sometimes, it is hard to choose only sustainable or active mobility for daily commuting and the use of a personal car is necessary. Insufficient, extensively time-consuming public transport, or even the absence of public transport especially in rural areas, are often reasons for daily commuting by car. In this case, one can still lower the carbon Footprint of commuting by applying a multimodal mobility approach, using two or more means of transport in one trip.[15] For example: driving a car until reaching a suburban area, parking in a park and ride (P+R) area, and taking public transport to the destination.

1.2 Energy consumption

No matter where people work—from their offices or their homes—they always consume energy: for heating and cooling, lighting, electronic and electric devices. Moreover, energy is used for water distribution, collection, and treatment as well.[16]

Heating accounts for 20–40% of energy costs in a typical office environment. However, ventilation (e.g., using fans) and the use of cooling, including air conditioning, is increasingly becoming commonplace due to an increase in heat gains from lighting, staff, and office equipment. The more heat is generated, the harder the ventilation and cooling systems must work to maintain the desired temperature.[17]

Similarly, CO_2 emissions associated with water consumption occur due to the background operations for providing this service, as well as energy consumption for heating the water used. On average, in office buildings, most water (63%) is used for toilets, while tap water consumption from bathrooms and kitchens is around 17%.[8]

The use of materials in the office can be a significant source of CO_2 emissions due to their disposal, starting with paper consumption and document management. According to various studies, 75% of the waste produced in a typical office is paper waste. Office paper comprises 45% of this waste stream, while the remaining 30% of paper waste consists of cardboard, newspapers, and hygiene paper (paper towels, napkins).[8]

Finally, most work during office hours is done online. The recently established digital lifestyle has significant environmental benefits, such as lower CO_2 emissions from travel or paper waste. However, increasing Internet use does have an impact that cannot be overlooked and must be addressed.[18] The electricity consumed by data centers represents 1% of world energy demand and is greater than the national energy consumption of many countries. [19] Internet traffic in different ways contributes to negative environmental impacts and climate change depending on the energy source mix and efficiency use. Several studies have been conducted to estimate the carbon Footprint of data storage, transmission, and consumption.[20] Globally, the carbon Footprint of Internet use ranges from 28 to 63 g of CO_2e per gigabyte (GB)[c], equivalent to driving about half a kilometer by car.[18]

Energy costs, however, are one of the overheads most easily managed in a working space and often have the greatest potential for reduction. Low- or no-cost improvements can reduce energy use by around 20%.[22] Best performance is usually achieved where companies have comprehensive energy monitoring systems in place.[23] Employers can also encourage employees to lower their energy consumption at home, especially if they are working from home, by conducting an energy audit to be aware of their energy consumption and help identify ways to be more energy-efficient.[17]

DID YOU KNOW?

A regular videoconferencing service consumes around 2.5 GB/hour and emits 157 g of CO_2e/hour. 15 one-hour meetings every week or 60 one-hour meetings per month would emit 9.4 kg CO_2e which would be about the same as the amount released when burning 4 liters of fuel.[16]

[c] According to the United States Environmental Protection Agency, CO_2e or CO_2 equivalent is the combination of the pollutants that contribute to climate change adjusted using their global warming potential.

How to begin?

Irrespective of the sector, the primary way of achieving significant reductions is through improvements in the building. The elements to consider are:[24]

- wall/roof/façade/floor,
- windows and glazing,
- internal and external solar shading,
- air tightness.

As the first step to reduce energy consumption, the following activities should be considered:[24]

- **Learn about the current heating system**—identifying the heated area (e.g., in m^2).
- **Quantify energy consumption and costs for heating**—approximately 9.5 m^3 = 1 kWh).
- **Identify losses and evaluate possibilities for improving efficiency**—comparing the consumption of an office building through benchmarking.

The overall reduction in CO_2 emissions depends on several factors, including the current baseline energy characteristics of the building and the potential for onsite renewables and building fabric change (e.g., retrofitting).[24]

DID YOU KNOW?

Reducing the heating by just 1°C can reduce energy consumption by 6%.[6]

How to reduce CO_2 emissions

Replace old windows and doors with new double-glazed types. This can save 40% of total energy consumption. If this is not possible, then a renovation of the façade could be an alternative. Other insulation options such as curtains and insulating wallpapers can increase the efficiency of the overall insulation system. This recommendation works both in the office and at home and ensures a workspace that retains heat during the winter and stays cool in summer, using less energy while reducing carbon Footprint and costs.[8]

Install a thermostat or intelligent building operation system. These devices are relatively inexpensive and help avoid overheating and overcooling. Some of them can be programmed and can be used to switch off heating/cooling systems during weekends and at night (saving up to 30% of the total energy consumption of the office). For most parts of Europe, it is ideal to maintain indoor temperatures at 19–21°C in winter and 23–26°C in summer, although this will depend on the average temperature of a location.[8]

Switch off heating in rooms which are never used. Spaces such as storage areas, entrances, or corridors where employees only pass through, do not need to be kept at the same temperature as permanently occupied rooms. However, for hygienic reasons (e.g., to prevent mildew), it is necessary to keep rooms well ventilated.[8]

Invest in renewable energy technologies to reduce primary energy use. Installing renewable energy sources (e.g., solar or wind energy) to produce all or a portion of the energy used can considerably reduce the carbon Footprint. If installing a renewable energy system on site is not possible, one can opt for buying electricity from a certified renewable energy provider.[17]

Install a green roof or vertical garden. This involves planting different species of grasses and flowers on the roof to reduce the heat of the roof, increase evaporation, and cool the building from the top. The same can be done by installing green walls (or vertical gardens): vegetated walls that can be used indoors or outdoors to increase energy efficiency, reduce temperatures (indoor and outdoor), and improve air quality.[24]

Reduce the temperature of water coming from the hot tap. In some boilers, the temperature is automatically set at 60–65°C, while 25–35°C is considered enough for comfort and health. It is recommended to turn water temperature to 48°C as this not only saves energy but also slows mineral buildup and corrosion of water heater and pipes.[25]

Turn off lights and unplug electronic devices when not in use. According to a study by the Energy Saving Trust, devices plugged in on standby account for 1.3 million tonnes of CO_2e of UK household energy use.[26]

Adjust blinds according to sun exposure. When blinds are open in the winter, less energy is needed to warm up the office, and closed blinds during the summer stop overheating, so there is no need for additional, energy-consuming means of reducing the room temperature.[8]

Switch from incandescent light bulbs to light-emitting diodes (LEDs). The best way to reduce energy loss and thus reduce the carbon Footprint is to switch to LEDs. LEDs are the most energy-efficient since they use less electrical power (watts) to produce the same brightness as other bulbs. Although they are more expensive at first, they last longer—on average for 25,000 hours; if one light were left turned on 24/7, it would last for 15 years.[27] Classic incandescent light bulbs are the least efficient bulbs as they use the most watts and lose approximately 90% of their energy as heat, lasting around 750 hours.[17,28]

Create a jungle in the office! Plants in the office not only have a positive impact on air quality, as they use CO_2 for photosynthesis and lower the concentration of pollutants, but they also help to maintain the temperature.[28] Plants that are recommended for indoors and absorb toxins include spider plants, snake plants, dracaena, and aloe vera.[29]

Best practice example

The Hungarian University of Szeged made 250 MWh/year of energy savings by installing automatic lighting. Their installation cost €2,500 but saved them more than €38,000 per year (250 MWh/year, 40 tonnes/year CO_2). Due to this saving, 123 tonnes of CO_2 emissions are avoided every year.[8]

DID YOU KNOW?

Processing, delivering, and heating water in buildings requires energy and resources. Using less water is not only good for saving water as a resource, but also reduces a building's carbon Footprint. As well as reducing CO_2 emissions, reducing water translates into considerable cost savings.

By taking a few simple steps, water consumption can be reduced:[30,31]

- **Install flow regulators (aerators and low-flow faucets) to reduce water consumption by up to 30%.**
- **Regularly clean taps** as sediments may accumulate and reduce the flow.
- **Use self-closing or sensor taps.** As well as reducing water and the energy used for heating it, these offer other benefits, such as improved hygiene and cleanliness in your washrooms. There are many kinds of sensor taps available, depending on your requirements. Some of them offer water savings of up to 70–90% compared to traditional taps.

- **Remind people to turn off taps.** Encourage employees to reduce their water consumption by placing friendly reminders to turn off the tap.
- **Install toilet trim with lower water consumption per flush.** This transition can reduce water use by 35%.
- **Ensure regular maintenance.** When looking to reduce resources and the related carbon Footprint, regular maintenance is necessary. For toilets, applying dye tests for "silent leaks" every 6 months is a good way to start.
- **Use a dishwasher instead of handwashing.** A fully loaded dishwasher uses less water than washing the same number of dishes by hand. Even more water is saved when the dishwasher is set to eco- or water-saving modes.

1.3 Use of office materials

The use of materials at work can be a significant source of CO_2 emissions, but also an area with great potential for improvement—from sustainability to cost-effectiveness. Paper is the most intensively used—and disposed of —resource in an office. An average office worker in the USA is estimated to consume 10,000 sheets of paper in a year and about 45% of all office waste is paper waste.[32,8] Going paperless helps to reduce CO_2 emissions. Turning a single tree into 17 reams of paper results in around 49.9 tonnes of CO_2 being released into the atmosphere.[33] Trees are also "carbon sinks" and every tree that is not cut down for paper is able to absorb CO_2.[34] By minimizing paper use in an office, we not only contribute to reducing the carbon Footprint but also help reduce water pollution and landfill waste.[35]

How to begin?

Audit/review use of office materials. An audit or an initial review is the first step to reduce consumption as it determines what and how much is being used, as well as the cost to the organization. An audit should also provide criteria for measuring the success of reducing office materials.[8]

An audit of office materials should cover the following:[8]

- Identify all types of office materials that are used.
- Identify the origin of each type of material.
- Identify any hazardous waste and consider how it can be separated from the main waste stream or replaced with a non-hazardous substitute.
- Establish methods of measuring the consumption of each type of office material for monitoring.
- Identify the cost of the office materials.
- Set targets for reducing the consumption of office materials.

GOOD IDEA!

Indicators that can be used for an audit:[8]

The total amount of office paper used (total kg in a year), including:

- **amount/number of reams/A4 sheets used per employee (kg/reams/sheets per employee in a year),**
- **share of eco-labeled office paper (% of all office paper used),**
- **share of eco-labeled other paper, e.g., toilet paper and paper towels (% of all office paper used),**
- **share of eco-labeled procured printed paper materials, e.g., leaflets, brochures, reports (% of all procured printed paper materials),**
- **CO_2 emissions from paper use (kg/tonnes per year per employee).**

Once it has been determined what materials—and in what quantity—are being used in the office, it is important to develop (and include in the work routine) office rules for minimizing consumption of resources, at least those which are most widely used.

What to do when paper is the biggest issue

It is important to develop office rules or guidance for reducing paper consumption and waste. Reducing the quantity of paper used, reusing paper, and using environmentally friendly paper products should be a priority for all employees!

The following steps can help employees reduce paper consumption:[8,36]

Create eye-catching signs with examples of good paper use on walls or next to computers, printers, and copiers.

Reuse paper within the office: install appropriate bins for separate waste collection and further recycling including for paper already used on both sides, and a designated place for paper already used on one side, which can be reused.

Create systems for personal measurement of paper consumption and encourage employees to keep track of their paper consumption. Make it fun, with a competition or paper-saving campaign. Most people are shocked to find out how much paper they are using.

Encourage a "think before you print" attitude. Avoid printing whenever possible, view documents on the computer, edit on-screen, share already printed documents with coworkers, and replace faxes and letters with e-mail. However, using e-mail and electronic devices also creates CO_2 emissions (for more information, please refer to Chapter 1.4).

Ensure regular maintenance of copiers and printers. Well-maintained machines work best, avoiding paper jams and unnecessary paper consumption.

Purchase the lightest possible weight paper and products in bulk to minimize packaging.

GOOD IDEA!

Using environmentally friendly paper products can lower carbon footprint in the office! Certificates to look for:[8,21]

FSC: certification provides a credible link between responsible production and consumption of forest products (including paper products). FSC enables consumers and businesses to make purchasing decisions that benefit people and the environment, as well as providing ongoing business value. The intent of the FSC system is to shift the market to eliminate habitat destruction, water pollution, displacement of indigenous peoples, and the violence against wildlife that often accompanies logging.

TCF and PCF: Processes or products that are manufactured without chlorine are identified with the TCF (Totally Chlorine-Free) or PCF (Processed Chlorine-Free) labels.

PEFC: The product comes from a PEFC-certified forest. A PEFC-certified forest is a forest that is managed in line with environmental, social, and economic requirements.

GOOD IDEA!

Tips for environmentally friendlier printing:[8]

- Reduce blank space as much as possible: minimal spacing, narrower margins, smaller characters, using efficient fonts, e.g., Times New Roman.
- Proofread and preview documents before printing to spot and avoid errors.
- Set the “print on both sides” option as a default.
- Set the black and white option as a default.
- Select only the pages that are needed, do not print whole documents.
- When printing presentations, choose the “handout” option.
- Choose unbleached and uncolored paper (or pastel colors) and avoid glossy paper.

1.4 The Internet

Although using technology can lower our carbon Footprint, we need to be aware that using digital technology (including the Internet) also has an impact. Why? Energy is needed for telecommunications networks (Wi-Fi, mobile data), data centers, terminals (computers, (smart)phones, televisions), and the Internet of Things (IoT).[37] However, the estimated direct energy demand for digital technology varies widely due to lack of consistent global data, power consumption characteristics, usage patterns, and so on. Recent estimates suggest that digital technology accounts for between 6% to 12% of global electricity use.[38] That is why large-scale adoption of environmentally responsible online conduct is critical to help prevent climate change and support sustainability. The first step toward promoting sustainable digital behavior is to make internet users aware of the costs of online actions and the benefits of making small changes in their habits. Small actions such as turning off the video during a virtual meeting, lowering the quality of streaming services, limiting time spent on social media, deleting emails and unnecessary content from cloud-based storage services, and unsubscribing from email lists can have a significant impact on the environment when put together and carried out by a lot of people. It should not be forgotten that the digital technology industry plays a significant role in GHG emission production as well, and their transition to renewable energy sources is of the first importance.[39]

How to reduce your internet-related carbon Footprint

Delete old digital files that are not in use.

Unsubscribe from newsletters that are no longer interesting.

Use Wi-Fi instead of a mobile data (e.g., 4G) internet connection, which consumes at least 50% more energy.[37,40]

Use an ecological search engine, which donates profit to conservation or humanitarian projects as a way of offsetting carbon emissions caused by data transmission and research.[41]

Use USB sticks to transfer documents rather than online cloud systems whenever possible.[41]

Avoid unnecessary emails. A single email emits 4 g of CO_2. It is best to speak with your coworker in person, if possible!

Reduce video resolution from HD to normal. A typical streaming service has a carbon Footprint of 441 g of CO_2e/hr (global median). Streaming videos at high resolution (HD) for four hours per day would result in a monthly carbon Footprint of 53 kg of CO_2e. However, decreasing the video quality from HD to standard would reduce the monthly Footprint to 2.5 kg of CO_2e, saving the emissions of a 150 km car ride.[18]

Turn off videos during videoconferencing. One-hour online audio-only call emits 0.08 kg of CO_2 while a standard video call emits 0.6 kg of CO_2.[43]

DID YOU KNOW?

If 70 million streaming subscribers reduced the quality of their video streaming services, it would result in a monthly reduction of 3.5 million tonnes of CO_2e—the equivalent of eliminating 1.7 million tonnes of coal, or around 13% of total monthly coal consumption in Europe.[44]

Similarly, if 1 million video conference users turned off the video, they would collectively reduce emissions by 9,023 tonnes of CO_2e per month, the equivalent of coal-powering a town of 36,000 people for one month.[44]

DID YOU KNOW?

The carbon Footprint of an email varies: spam emails emit 0.3 g of CO_2, regular emails emit 4 g of CO_2, and emails with photos or large attachments emit 50 g of CO_2.[42]

A typical business user emits 135 kg of CO_2e with emails each year—nearly as much as an 800 km journey by a gasoline car.[5,42]

If each adult in the UK sent one less 'thank you' email a day, it would save over 16,433 tonnes of CO_2e a year.[45]

2. FOOD AND DRINKS

2.1 Food and the carbon Footprint

Food systems worldwide play an important role in current and future sustainable development strategies, and their impact on the environment cannot be underestimated. The food industry contributes to deforestation, mineral depletion, desertification, eutrophication, acidification, biodiversity loss, and genetic erosion, and accounts for up to 37% of global greenhouse emissions and 70% of water extraction.[46] This impact is further aggravated by the 1.3 billion tonnes of food wasted every year—which represents about one-third of the total amount of food produced in the world for human consumption.[47] It is shocking to learn how much GHG is produced to grow food, raise animals, transform raw materials into refined products, and package and transport food from one side of the globe to the other. Less than 30% of the global population can fulfill a demand for crops from within a 100 km radius.[48]

The environmental impacts of these processes vary significantly depending on the **type of food** and **the mode of production**.[D]

The carbon Footprint of food indicates the greenhouse gas emissions responsible for climate change connected with the whole food system from the production of primary sources to processing and refining, packaging, transport, the wholesale and retail distribution of the food we eat, and its disposal. It is measured in CO_2e.

To understand the food system and its carbon Footprint, the whole food industry life cycle—from the field to the table and disposal—should be considered (see Figure 1).

[D]To fully understand the full impact of the food system on the environment, it is important to consider the other resources it consumes, such as land and water. However, this is beyond the scope of the ZeroCO_2MED project and is not included in this booklet.

FOOD JOURNEY

Figure 1: The food journey from the field to the plate.[49]

1. Crop production
2. Meat production
3. Seafood production
4. Food chain workers
5. Climate change
6. Agroecology
7. Food distribution
8. Food safety
9. Food processing
10. Food labeling
11. Food marketing
12. Food environments
13. Food waste
14. Hunger & food security
15. Food policy

Interreg Mediterranean ZeroCO2MED

Type of food

Each food product has its own life cycle, which is strictly related to the food type and its manufacturing process. Both our **dietary choices and the ways in which food is produced** (organic/conventional) can have a major influence on the carbon Footprint of food.

Meat (especially red meat) and **dairy products have a greater impact on the planet's ecosystems than vegetables, fruit, and cereals** as their production requires more land and releases more CO_2.[50] The production of 1 kg of red meat (beef, pork, or lamb), for example, produces 32 kg of CO_2e, while the production of 1 kg of white meat (chicken or turkey) requires 4.24 kg of CO_2e.[47,51]

Similarly, consuming high trophic-level fish (carnivorous fish higher in the food web, e.g., tuna and swordfish) has a greater impact on the planet's ecosystems than consuming low trophic-level fish (fish lower in the food web, e.g., sardines, anchovies).[52] For instance, fishing crustaceans, particularly tiger prawns, shrimps, and lobsters, as well as large pelagic species (e.g., tuna) requires greater energy use (e.g., fuels) and thus causes the highest carbon emissions, whereas anchovies, mackerel, sardines, and herrings—especially when caught via purse seine gear or other surrounding nets—are the most energy- and carbon-efficient fish. Similarly, lower trophic-level fish species like cuttlefish, sardines, and prawns have the smallest embedded Footprint per kilogram of product; choosing these species instead of high trophic fish and seafood species like tuna and cod can help consumers reduce their food Footprint.[53]

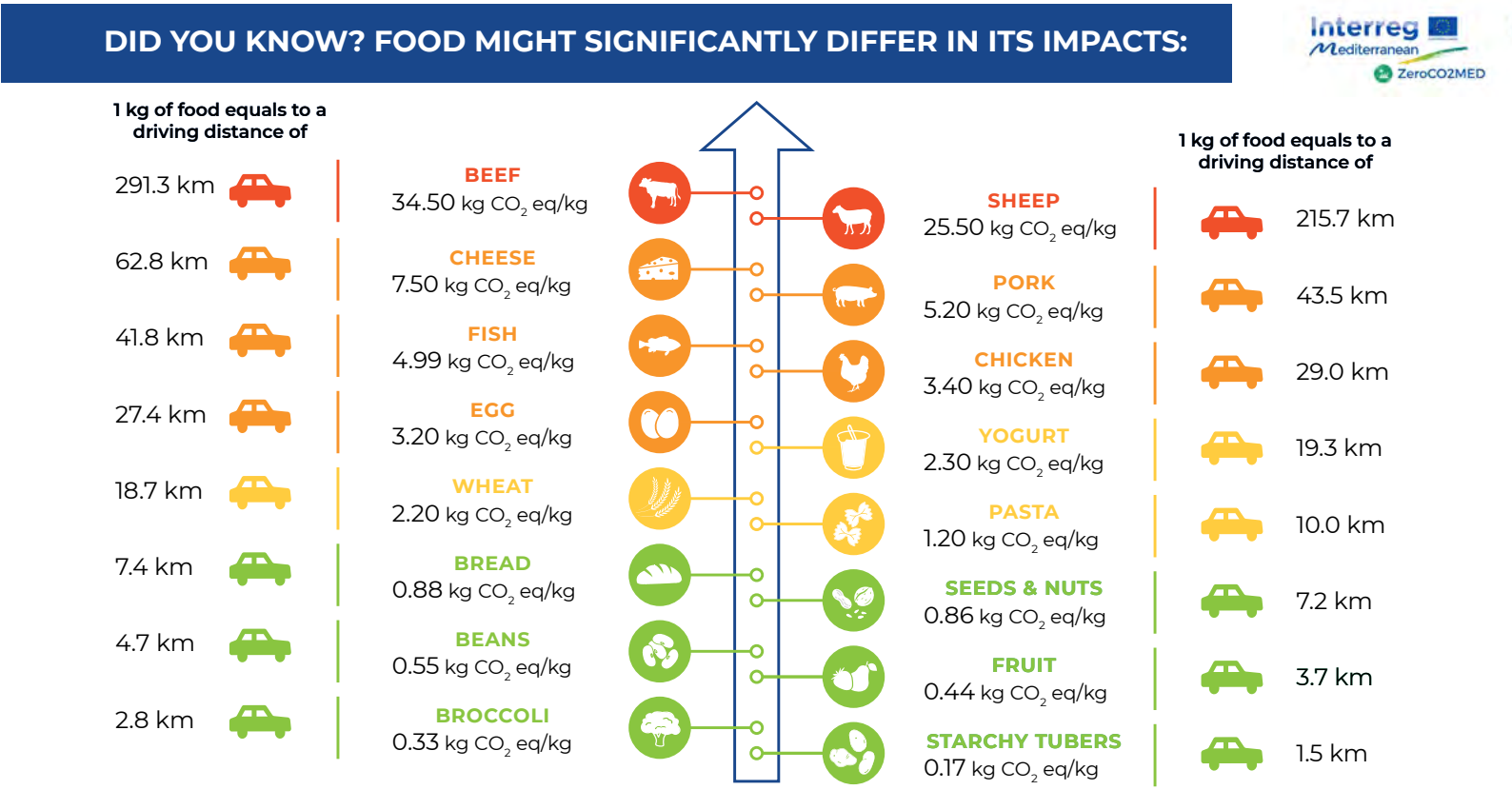

Figure 2: Some examples of carbon emission release by food type.[53]

The food industry cycle

The impact of primary food resources (wheat, for instance) varies throughout the year, according to location and type of food resource, with those farmed out of season having a higher carbon Footprint as well as using more energy for their production (e.g., in greenhouses).[54] Food that requires little processing, such as vegetables and fruit, usually has a lower impact than food that is highly processed before reaching the consumer.[55]

Another impact on the food-related carbon Footprint is waste—both as food waste and as food packaging. Food packaging accounts for 25% of all plastic waste that ends up in landfills and pollutes the environment, not forgetting the impact of manufacturing the packaging as well.[55]

The extent of the food's journey from the field to the plate must also be considered—the further it travels, the more CO_2 emissions are produced. And the food life cycle does not end at the grocery store—about a third of food produced for human consumption is wasted each year. In the European Union alone, about 88 million tonnes (Mt) of food or about 186 Mt of CO_2e are being unnecessarily produced.[48]

Along with food type, the mode of production (organic or conventional) also affects the carbon Footprint of food consumption, as each food product is characterized by a variety of process inputs, which influence its environmental impact.[52]

Organic farming favors natural methods and processes, such as crop rotation, natural fertilizers, compost, and non-invasive pesticides, while **conventional (i.e. industrial) agriculture** relies primarily on synthetic inputs and invasive processes to maximize production, including high degrees of mechanization and fuel-hungry equipment, monoculture, and dependence on chemical inputs (fertilizers and pesticides).[56] Similarly, intensively farmed meat has a far higher carbon Footprint than meat produced from cattle raised through practices that help diversify the landscape and preserve forest land.[57]

The difference between organic farming and conventional agriculture also concerns the fertility of soil and the maintenance of soil biodiversity in the long term.

Table 1: Effects of conventional and organic farming methods on the environment.[58,59]

Conventional agriculture	Organic farming
• reduces biodiversity, • pollutes waterways, • increases marine dead zones with agrochemical outflow, • releases excess carbon dioxide in the atmosphere through intensive processing.	• preserves soil health, • restores natural ecosystems to regenerate water and air, • avoids toxic pesticide residues.

For example, the production of vegetables is characterized by inputs (e.g., pesticides, fertilizers, etc.) and outputs (e.g., nitrogen released from fertilized soils and emissions released from plants and fields) which adds up to the overall carbon Footprint of food production.[52]

DID YOU KNOW?

The production of 1 kg of meat requires the same land and time as the production of 160 kg of potatoes.[52] To produce 1 kg of beef, the amount of water a person would use to shower daily for six months is required. In terms of global warming, 1 kg of beef produces roughly 80 times more greenhouse gases than 1 kg of wheat, which is equivalent to driving 60 km.[8]

DID YOU KNOW?

Lowering the carbon Footprint of the mode of production also means favoring seasonal vs. out-of-season products. For instance, vegetables from heated greenhouses have a carbon Footprint of 2.13 kg of CO_2e/kg while field-grown vegetables have a carbon Footprint of 0.37 kg of CO_2e/kg.[52]

DID YOU KNOW?

Food products in Europe can only be legally labeled "organic" if they are produced in line with the European Council Regulation (EEC) No 2092/91 of June 24, 1991, on organic production of agricultural products and indications relating to agricultural products and foodstuffs. This legislation specifies how food must be grown, processed, and packed in order to be labeled as organic, making it much easier to determine whether or not food items were produced organically.[8,60]

2.2 Reducing the carbon Footprint of food and drinks

The commitment of organizations and institutions to ensuring environmentally friendly meals can widely support the reduction of carbon Footprint and GHG. At the same time, individuals (i.e., project staff) also play an important role, beginning with their daily actions, by consciously choosing products with a low carbon Footprint and opting for dietary habits that are good for both their health and the planet. The principles of a sustainable diet are in fact consistent with the principles of a healthy diet.[61,62]

During the implementation of project activities, project partners are often responsible for meals and catering (at events, project meetings, social dinners, and meals on business trips). It should be clear that by organizing sustainable meals and catering, they are setting an example on how to mitigate GHG during project activities.

Catering can sometimes involve large numbers of people, so that partner(s) organizing events and meetings (paid for from the project budget) can play a key role—for instance, with their procurement decisions—in ensuring climate-friendly meals, from the organizational phase to the selection of service providers.

How to reduce the carbon Footprint of food in general[E]

Choose fruit and vegetables, as well as legumes and whole grains. Eating a diet rich in fruit and vegetables, whole grains, nuts, and legumes is an excellent approach to ensure a healthy and environmentally friendly diet.

Favor protein from plants. It is important for us to consume an adequate quantity of protein, preferably plant-based. Some examples include beans, lentils, peas, and legumes such as chickpeas. They are high in fiber and nutrients, low in fat, salt, and sugar, as well as being adaptable in the kitchen and environmentally friendly.

Reduce consumption of meat, especially red and processed meat. Beef, lamb, pork, and processed meat have a significant impact both on human health and the environment, especially when consumed too often. The industrial production of red meat increases GHG drastically, so limiting consumption to one portion per week is recommended.

Eat a wide variety of foods. Plan weekly meals based on a well-balanced and varied diet. Poultry and fish are high in proteins, vitamins, and minerals while having a smaller environmental impact than red meat, allowing consumers to eat them up to three times a week while still helping the environment. Eggs and cheese should be limited to up to twice a week, with a handful of veggies on the side.

Avoid food waste by considering portion sizes. To reduce food waste, buy only what is necessary, store it properly, check expiry dates, and prepare food in appropriate quantities (communicating with guests/colleagues, so all cancellations are properly addressed) to eliminate the negative impact of uneaten food that would otherwise go to waste.

[E]Recommendations are based on the findings of Chapter 2.1.

Reduce packaging and disposables. Resource and material consumption, as well as food waste, can be limited by choosing what to buy, where to buy it, and how to prepare it. Always carry your own shopping bags and choose to buy at farmers' markets or directly from the farmer or at a plastic-free grocery store. When buying in supermarkets, choosing foods with minimal or no packaging is advised to reduce the amount of plastic, paper, cardboard, tin cans, and glass (waste).

Reuse and recycle. If packaging cannot be avoided, choose glass or (recycled) paper packaging instead of plastic packaging or tin cans; it can be recycled more efficiently and is also better for human health. Cooking habits can also help conserve resources, for example by reducing the amount of water, covering the pot with a lid to reduce energy use and cooking time. When eating in a restaurant, leftovers can be taken home using your own food containers to avoid additional plastic packaging, as can take-away food.

Choose seasonal ingredients, and local or traditional varieties. Seasonal and local food has the smallest carbon Footprint.

Choose fresh and minimally processed food, preferably organic. For the majority of food items, choosing organic products helps reduce the carbon Footprint related to the production process.

Opt for food with a "fair trade" certificate. Not only are working conditions in the food industry better, but the impact on the whole food chain is also lower, including the carbon Footprint.[63]

Avoid products containing palm oil. Palm oil can be found in the majority of the products that we use daily: food, cosmetics, biofuel, etc. The biggest issue with palm oil production is the deforestation of rainforests, which not only impacts biodiversity but also decreases carbon storage which affects the carbon Footprint as well.[64]

What to do when organizing catering

Events and meetings are an excellent way of raising awareness regarding sustainability and encouraging proactive change. They provide an excellent opportunity to motivate employees, staff, clients, and members of the local community. Within an event, meeting, or social dinner, catering plays a key role. The following recommendations could be directly followed by the project partner organizing the catering or agreed/coordinated with the service provider responsible for it.

There are three main recommendations to bear in mind to limit the carbon Footprint of the food served at an event or a meeting:

1. Adopt a long-term catering strategy. When and if possible, choosing sustainable catering that strives to reduce environmental impact at all stages of the manufacturing process and purchases basic ingredients for environmentally responsible products.

2. Adopt a sustainable procurement policy. When necessary, it is recommended to work with the management of the organization to ensure that criteria such as the implementation of sustainable practices (e.g., avoiding single-use plastic plates and cutlery) and the use of local, organic food are included in the procurement process.

3. Choose suppliers with an environmental management system (EMS) for catering services (such as EMAS, ISO 14001), or equivalent.[65]

What you can do to reduce food waste at events

- Ensure online registration to predict attendance and cater for accurate final numbers.
- Plan smaller portions.
- Plan to donate surplus food to local charity organizations.

What you can do to reduce carbon Footprint of other waste at events

- Provide **reusable** crockery and cutlery, reusable tablecloths, napkins, glasses; for large events, implement a reusable cup system, where attendees pay a deposit for their cups, and obtain a refund when they return the cup after the event; reusable tableware necessitates a more elaborate collection process, but allows for efficient disposal of the various wastes by participants prior to returning the dirty tableware.
- When reusable is not feasible, 100% **certified compostable** tableware should be provided (cups, plates, cutlery, etc.). However, avoid biodegradable items, as they are generally not compostable. For larger events, consider making it a policy to only allow compostable tableware; this keeps things simple for onsite organics collection.
- Inform caterers and suppliers that using **single-use plastic** items **is not an option** at your event (e.g., plastic stirrers, straws) because they are not recyclable or compostable. Condiments could be served in reusable dishes or bulk containers at self-serve stations.
- Provide bins for **waste sorting**, including organic waste. The collection of food scraps and compostable tableware should be clearly signed at the event.
- Products should be delivered in returnable crates to **reduce packaging**.
- **Avoid single unit products** (e.g., sugar, butter).
- **Reusable** coffee filters should be used rather than disposable ones.
- If linen napkins cannot be used, paper towels made from **100% post-consumer recycled fiber** are best. Give one to each person.
- **Drinkable tap water** should be provided: at smaller events in glass jugs, at larger events a water bottle refill station can be hired.

What you can do to reduce the carbon Footprint related to food when organizing meals at events

Always remember that choosing legumes, vegetables, and fruit over meat and dairy food is the way to go:

- Provide **vegetarian** and **vegan** options.
- Provide **local** and **seasonal fruit** as an alternative snack in meetings.
- Serve more fruit, vegetables, and legumes—preferable regional or domestic—with **stable importers** (building up long-term relationships with food providers).
- When offering a meat menu, choose **poultry** and **do not offer red meat** at all.
- When organizing catering, selecting a **vegan menu as a default** could encourage people to eat plant-based food (at least) during the event. However, **offer a choice** for people to select vegetarian, pescatarian, or a meat (poultry) option as well.

Choose seasonal and locally grown ingredients or traditional varieties.

Choose fresh and minimally processed food, organic and fair trade when possible.

Set an example—the best way to educate and raise awareness about environmentally-friendly practices is to provide such food and minimize waste consumption.

3. ACCOMMODATION

3.1 Accommodation and the carbon Footprint

Participation in events/meetings is a significant aspect of most projects. As mentioned in previous chapters, events usually require traveling, and to limit the carbon Footprint of the organization and the project, it should be done in a sustainable and environmentally responsible way.

Although the main source of carbon emissions during a business trip is air or road travel, accommodation follows right after. The global average estimate is that each guest's night generates 14 kg of CO_2, although it can vary from between 0.1 kg of CO_2 to 260 kg of CO_2, depending on the type of accommodation. The carbon Footprint per occupied room per night varies according to country and star rating, but also other factors such as electricity source and water consumption. Hotels usually consume high amounts of energy and produce unnecessary waste as part of their operations. The highest share of total energy in accommodation establishments is used for heating and hot water. The energy consumption of hotels depends on their star rating, the services they offer, as well as heating/cooling needs. It also correlates with occupancy rates. Data indicates that 5-star hotels use the most energy in absolute terms, though energy consumption is a cost factor specifically for accommodation without a star rating, or with 1-star or 2-star ratings. This is because energy accounts for a larger share of the operational cost in these establishments.[66] The carbon Footprint also varies by country (as shown in Table 2).

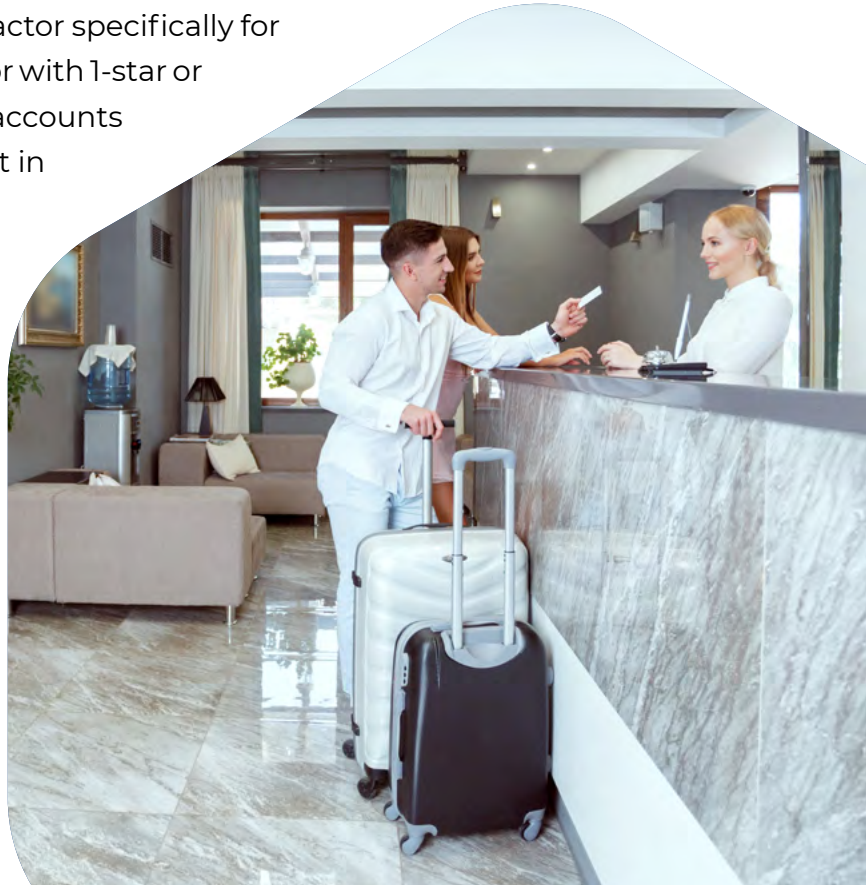

Table 2: Carbon Footprint of the use of a hotel room in different Interreg MED countries by star rating.[67]

COUNTRY	AVERAGE CARBON FOOTPRINT PER ROOM ($KG\ OF\ CO_2e$)		
	1–2-star ★	3–4-star ★★★	5-star ★★★★★
Spain	5	9	15
Portugal	6	10	16
Belgium	5	9	13
Italy	6	11	17
France	3	6	10
Malta	8	13	21
Slovenia	6	10	16
Croatia	5	9	14
Bosnia and Herzegovina	13	22	35
Montenegro	9	15	24
Greece	9	16	26
Albania	7	12	19
Cyprus	11	20	31

The data clearly show that hotels with a lower star rating emit less CO_2, as expected. However, it is especially important to pay attention to the difference in CO_2 emissions per room depending on the country in which the hotel is located. For example, a 4-star hotel in Italy will be a more climate-friendly choice than a 3-star hotel in Bosnia and Herzegovina.

3.2 How to reduce the carbon Footprint when choosing accommodation

Choose environmentally-friendly accommodation

It is best to check whether the chosen accommodation has a valid and widely known “eco-friendly” certificate. One should be aware of potential scams, as greenwashing is a common practice. Not all certification is authentic, and many certificates can be ordered online without any audits.

Two types of certification are relevant to hotels:[68]

- **Environmental certification of the building itself**, with different versions for new buildings versus existing buildings. Examples include LEED and BREEAM.
- **Environmental certification of how a hotel is operated**, examples include Green Key, Green Globe, and EU Ecolabel.

Table 3: Some of the most popular certification schemes for hotels are shown in this section.[68]

Building certifications	
	LEED assesses areas such as energy and water efficiency, materials used, indoor air quality, and awareness and education.
	BREEAM has nine criteria including energy, health and wellbeing, ecology, and waste.
	EDGE certifies buildings based on their on-site energy savings and includes certification for zero carbon.
Operational certifications	
	Global Sustainable Tourism Council (GSTC) Criteria. Designed to take sustainable tourism guidelines and standards from around the world into account, the GSTC criteria focus on sustainable management, socioeconomic impacts, cultural impacts, and environmental impacts. They also recognize various hotel certification schemes around the world which are equivalent to GSTC certification.
	EarthCheck uses internationally recognized criteria to report on management performance covering a wide range of areas including environment, risk, and quality management.
	Green Globe includes 44 core criteria focused on areas such as sustainable management, social/economic, cultural heritage, and the environment.
	Green Key represents a commitment by businesses that their premises adhere to the environmental responsibility and sustainable operation criteria set by the Foundation for Environmental Education (FEE).
	Travelife Accommodation Sustainability criteria cover environmental, social, and economic business impacts.
	EU Ecolabel or **EU Flower** is awarded to products and services that have a lower environmental impact than comparable products and services.

GOOD IDEA!

Environmentally friendly accommodation with trusted certificates can be searched on, for example, the following web pages:

- Global Sustainable Tourism Council (available at: gstcouncil.org/membership/member-search)—searching the Global Sustainable Tourism Council by use of filters for hotels/accommodation within the search section.
- Earthcheck (available at: earthcheck.org/search-members/interactive-map)—searching the Map of all Earthcheck hotels in the world.
- Green Globe (available at: greenglobe.com/green-globe-members)—searching the Green Globe hotels with the click on the continent and then search Map of all the Green Globe hotels on the chosen continent.
- Green Key (available at: greenkey.global/green-key-sites)—searching the Map of all the Green Key hotels in the world.
- Travelife (available at: staybetterplaces.com)—searching the Map of all the Travelife hotels in the world.
- Ecolabel (available at: ec.europa.eu/ecat/hotels-campsites/en)—searching the Ecolabel hotels with the click on the country tab.

Consider the star rating of the accommodation

Choose countries with a lower carbon Footprint. If it is possible to choose the country in which project meetings, seminars, training courses, workshops, and conferences take place, **countries with a lower carbon Footprint for accommodation** are recommended (see Table 2). However, the traveling distance for the majority of the participants must also be taken into account, as travel also has a high carbon Footprint.

Distance between the accommodation and the venue. If possible, accommodation should be within the venue where project events are taking place. Otherwise, the closer the better. If events are in a venue with no accommodation, choose the accommodation which is the shortest possible distance away, ideally within walking distance. Accommodation with easy access to public bicycles or public transport is the next best option.

4. EVENTS

Events—conferences, roundtables, workshops—are a central aspect of projects. They are crucial for sharing knowledge, new ideas, and identifying solutions. Although they are necessary, they generally contribute massively to the carbon emissions of projects. A one-day event with 1,000 people can generate up to 500 kg of waste and can consume up to 200 kWh of energy (the equivalent of 3 years of light with a 15-watt ecological bulb), 30,000 liters of water, and 100 kg of paper.[69]

The following aspects are considered the most relevant for making events more sustainable:[70]

- mobility,
- venue,
- accommodation,
- energy consumption,
- procurement of services and products,
- catering,
- waste management,
- water management,
- gifts for guests.

Many of these aspects are addressed in other chapters, where detailed recommendations on lowering the carbon Footprint can be found. It is important, however, to consider the financial advantages of making events more sustainable along with the opportunity for creating a positive model for event planners and service providers, and for raising awareness in the wider community.[71,72]

4.1 How to reduce the carbon Footprint of events

Select the best location for the venue. Travel is the main source of emissions generated during an event. Therefore, choosing a venue that is as close as possible to the participant's accommodation and is easily reachable by public transport is important. Standard sustainability measures and sustainable choice of destination for the event of 4,000 participants can reduce CO_2 emissions by 669 tonnes which equals to taking 134 cars off the road for a year.[73]

Carbon offsetting. Provide participants with instructions for using a carbon Footprint calculator and encourage them to offset their GHG emissions by presenting them with possibilities of how to do that.[71]

Waste reduction.[67,71,72]

- Using **single-use products should not** be considered at all.
- Avoid printed material (letters, brochures, invitations, etc.) and **use e-versions** instead. Encourage attendees not to print these materials themselves (for more information, please refer to Chapter 1.3).
- If printing is unavoidable, print only the necessary materials and do it in the most **sustainable** way: recycled paper, double-sided, and black and white (for more tips related to printing, please refer to Chapter 1.3).
- **Collect reusable objects** for the next event. This is especially relevant for non-personalized objects—badges, pens, USB keys containing information, etc.—which can be used again. These items can be collected at the end of the event.
- **Avoid or minimize gifts and freebies**. If these gifts are provided by sponsors, negotiate alternative sponsoring options (e.g., financing sustainable catering, providing their visibility as well).
- **Sort** as much **waste** as possible. However, it should not be expected that everyone knows how to sort the garbage (especially in foreign countries), so detailed labeling on trash bins is advised.
- If portable toilets are needed for the event, **dry** ones are best. If this service is not available, using **gray water** for flushing is the second-best option.

Sustainable materials. All materials produced or bought for the event should be as sustainable as possible. When sustainable materials cannot be used, borrowing, renting, or buying second-hand is best.[72]

Cooperation with sustainable businesses. Choosing to work with sustainable businesses for the event (e.g., sustainable local catering) raises awareness and pushes the idea of sustainability forward.[70]

Presenters. It is best to invite speakers who will not fly to the event but rather take a train or a bus. If flying is unavoidable, flying distance and the possibility of online participation, especially for short presentations at the event, should be considered.[70]

The venue itself:[71]

- Choose a venue that has **environmental** or **sustainability policies** incorporated in its services. Policies should cover at least some of the following: sustainable procurement, energy-saving, catering, transport, and waste management.
- It is also advisable to book venues that are **certified** by a sustainability or environmental management system (e.g., ISO 14001, EMAS, BREEAM, etc. For further information, please refer to Chapter 3).
- The building should be well **insulated** and equipped with **efficient heating** and **cooling systems**.
- It is important that the **temperature** within the building can be **regulated**. The venue should not be heated more than 20°C above or cooled more than 6°C below the outside temperature.
- The venue should ideally maximize **daylight** usage. Besides that, **energy-efficient lightning** should be installed.
- It is advisable to book the venue supplied by or with **green electricity sources** installed (solar panels, etc.).

Cleaning. Although cleaning services are often forgotten, they represent a considerable share of the carbon Footprint of events. It is best if environmentally-friendly cleaning supplies are used—from the point of view of both the carbon Footprint and human health.[74]

5. TRAVEL

Globalization means that people are connected worldwide, including within project-based initiatives. However, transport is one of the most important contributors to CO_2 emissions, also in the service sector, which includes project-based services. The carbon Footprint of transport is based on several factors: mode of transport, type of vehicle, type of fuel, frequency of travel, etc.

Increasing international collaboration leads to growth in passenger and freight activity that could outweigh all mitigation measures. Greenhouse gas emissions from the transport sector have more than doubled since 1970 and have increased at a faster rate than any other energy end-use sector. In 2019, before the COVID-19 pandemic, GHG emissions from passenger transport accounted for 23% of all GHG (8.7 Gt of CO_2e)—up from 5.0 Gt of CO_2e in 1990).[38] There are several obstacles to successful mitigation: financial, institutional, cultural, and legal.[75]

Before deciding on traveling, including shorter and inland trips, one should always consider whether is it **really necessary** to travel. The COVID-19 crisis has taught us that a lot of meetings and other social engagements can be successfully carried out online.

A nice example is switching to online conferencing. A renowned international food and agriculture conference, the Agriculture, Nutrition and Health Academy Week, held annually and alternating between Asia and Africa, was forced to move online due to the pandemic. This resulted in a travel-related carbon Footprint of zero. In comparison, in 2019, they emitted 1.2 tonnes of CO_2 (aviation carbon Footprint), which is more than 60% of the average annual carbon Footprint of an adult in India.[76] In addition to lowering the carbon Footprint, online events are more widely accessible, especially for people from low and middle-income countries.[77]

Flying is the most harmful means of transport for the climate, although its relative speed makes it very appealing.[78] Traveling by train or bus is always the best option regarding the carbon Footprint. On average, train travel produces 20 times less CO_2 than flying (14 g of CO_2 per passenger/km vs. 285 g of CO_2 per passenger/km).[79] In addition, taking a long-haul flight can result in a carbon Footprint that is greater than the annual carbon Footprint of an average person in some countries. For example, a return flight from London (STN) to New York (JFK) generates more CO_2 than the average adult in any of 54 countries generates in a whole year (most African countries, Myanmar, and Papua New Guinea to name a few). Even a shorter trip, such as a return flight from Paris (CDG) to London (STN), produces more CO_2 than some people do in a whole year (Mali, Chad, Somalia, and five other African countries).[80] Nevertheless, there are effective mitigation measures that can drastically lower the carbon Footprint of transport.

5.1 How to reduce the carbon Footprint of traveling

Is traveling really necessary? Could that meeting or project activity also be successfully held online? This does not only save people's time but can also lower the carbon Footprint (for more information, please refer to Chapter 1.4).

Sustainable mobility. The best way to travel internationally in a climate-friendly way is to take a train or a long-distance bus.[79] A plane emits 285 g of CO_2e per passenger/km while a train emits around 14 g of CO_2e per passenger/km. Taking a bus on average produces 68 g of CO_2e per passenger/km, which is still better than driving a car or even taking a plane.[80]

Car sharing. When taking a car, a car sharing option should always be considered as a priority. Having more than one person in a car lowers the per capita carbon Footprint and helps to improve local air quality and reduce risks to public health. An average diesel-fueled car produces 171 g of CO_2e per passenger/km, which is cut by 75% to 43 g of CO_2e per passenger/km when there are 4 passengers in the car.[79]

Choose electric vehicles. Electric vehicles always have a lower carbon Footprint regardless of how the energy they use is produced (with renewable sources or fossil fuels). On average, an electric car in Europe will emit 65% less CO_2e than a petrol- or diesel-fueled car over its lifetime: 20 tonnes of CO_2 vs. 57 tonnes of CO_2 for 225,000 km.[81] Since every country has its own mix of energy sources, it is hard to predict the degree to which a specific electric vehicle is more climate-friendly than a standard petrol or diesel car. However, the bigger the share of renewable energy, the bigger the discrepancy between the carbon Footprint of petrol/diesel and electric vehicles. In the UK, the average electric vehicle produces 53 g of CO_2e per passenger/km while the average diesel-fueled car produces 171 g of CO_2e per passenger/km.[79]

Reduce speed and drive with care to benefit the climate. Careful driving techniques can minimize carbon emissions. This includes lowering fuel waste by soft acceleration and braking, avoiding idling, using overdrive and cruise control, properly maintaining vehicles, and so on.[82] Lowering your speed on the motorway from 120 to 110 km/h can save fuel and reduce emissions at the same time.[83]

Do not travel by plane. One should always prioritize ground-based transport (train, bus) over flying. When this is not possible, and for distances of less than 1,000 km, choose driving over flying, but only for more than one passenger.[78] For a person traveling alone for more than 1,000 km, the carbon Footprint is higher when driving a car than when taking a direct flight. Only in this case is flying a slightly better option despite the fact that less fuel-efficient planes are often chosen by airlines for shorter flights, which increases the carbon Footprint of flying as well.[84]

How to reduce your carbon Footprint when flying is unavoidable

Minimize luggage. Luggage contributes to a large portion of an aircraft's weight, so lighter luggage means a lower carbon Footprint.

Choose economy class over business or first class.
A first-class passenger on a long-haul flight produces 599 g of CO_2e per passenger/km while a passenger in economy class produces 240 g of CO_2e per passenger/km.[79] The main reason for this is that economy class maximizes the number of passengers a flight can carry, so that each passenger occupies a much smaller area than those in first or business class. As there are more people in the economy class, the share of CO_2 production per person is much smaller.

Take direct flights. Avoid connections with (multiple) plane changes when traveling by plane, as take-off and landing are the most fuel-intensive parts of a flight. The more plane changes there are in a journey, the higher the carbon Footprint will be.[84]

6. PROJECT MATERIALS

Dissemination and communication activities are important parts of any project. At the same time, they are a source of CO_2 emissions and can significantly affect a project's carbon Footprint.

The carbon Footprint of printed materials includes emissions caused by the electricity and heat production required for making the product as well as greenhouse gas emissions resulting from transport. In addition, methane is produced as a result of the decomposition of these materials deposited in landfill sites (1 kg of methane corresponds to 25 kg of CO_2e).[85]

Considering the above, **project publications should be printed only when strictly necessary** and only by following a specific dissemination plan.[87] If possible, **always opt for electronic promotion and distribution of project materials and results**.
However, in cases where printing is unavoidable, follow the recommendations on printing already mentioned in chapter 1.3).

There are other issues to consider in addition to recommendations regarding printing:[89]

- Distribution: **print publications close to where they will be distributed** to minimize transport distances.
- Design: if possible, **design and produce materials in a generic way** (e.g., when printing materials for conferences/workshops) so that they can be reused for other events.

Other materials should be produced only if necessary. When organizing events, participants' bags/packs should be made from recycled material, and they should be **reusable**. Refillable pens made of a high content of recycled material should be provided only **upon request**.

CARBON FOOTPRINT CALCULATIONS TAKE INTO ACCOUNT THE ENTIRE LIFE CYCLE OF ADVERTISEMENT LEAFLETS

Figure 3: Phases of a leaflet's life cycle.[86]

LIST OF REFERENCES

[1] Gasparini B, Dütsch M, Gorenc T, Jósa V, Peloza J. ***WTF is Climate Change***. Ljubljana: Institute for Health and Environment; 2021. 80 p.

[2] World Resources Institute [Internet]. Washington: WRI; 2022 February 6. ***4 Charts Explain Greenhouse Gas Emissions*** by Countries and Sectors; 2022 February 6 [cited 2022 June 10]; [about 6 screens]. Available from: https://www.wri.org/insights/4-charts-explain-greenhouse-gas-emissions-countries-and-sectors

[3] Interreg Mediterranean, ZeroCO2MED [Internet]. Marseille: Interreg MED; 2022. ***About the Project***; 2022 [cited 2022 April 14]; [about 2 screens]. Available from: https://zeroco2med.interreg-med.eu/our-story/about-the-project/

[4] Beňo M. The Advantages and Disadvantages of E-Working: ***An Examination Using an ALDINE Analysis***. Emerging Science Journal [Internet]. 2021 [cited 2022 April 19];5:11–20 Available from: https://ijournalse.org/index.php/ESJ/article/view/458 doi: 10.28991/esj-2021-SPER-02

[5] UK Government, Department for Business, Energy & Industrial Strategy [Internet]. London: The UK Government; 2021. ***Greenhouse gas reporting: conversion factors 2021***; 2022 January 24 [cited 2022 April 14]; [about 1 screen]. Available from: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021

[6] Raišienė AG, Rapuano V, Varkulevičiūtė K, Stachová K. ***Working from Home—Who Is Happy?*** A Survey of Lithuania's Employees during the COVID-19 Quarantine Period. Sustainability [Internet]. 2020 July [cited 2022 May 26];12(13): 5332. Available from: https://www.mdpi.com/2071-1050/12/13/5332 doi: 10.3390/su12135332

[7] Energy Efficiency and Conservation Agency [Internet]. Wellington: EACA; 2020. ***Gen Less Ways of Working and Travelling Can Cut Climate Emissions Dramatically – Immediately and at No Cost***; 2020 July 6 [cited 2022 May 26]; [about 1 screen]. Available from: https://www.eeca.govt.nz/about/news-and-corporate/news/gen-less-ways-of-working-and-travelling-can-cut-climate-emissions-dramatically-immediately-and-at-no-cost/

[8] Povodör A, Bodroghelyi C, Mouazan E, Moora H, Katalin J, Chipev K, Kilk K, Lesage K, Meesche M, Judith M, Emőke P, Kern S, Ogarelec V. ***European Green Office: Handbook*** [Internet]. Hungary: KÖVET Association for Sustainable Economies; 2013 [cited 2022 May 26]. 117 p. Report No: 510859-LLP-1-2010-1-HU-LEONARDO-LNW. Available from: https://cdn.sei.org/wp-content/uploads/2013/10/european-green-office-handbook.pdf

[9] Mueller N, Rojas-Rueda D, Basagaña X, Cirach M, Cole-Hunter T, Dadvand P, Donaire-Gonzalez D, Foraster M, Gascon M, Martinez D, Tonne C, Triguero-Mas M, Valentín A, Nieuwenhuijsen M. ***Urban and transport planning related exposures and mortality: a health impact assessment for cities***. Environ Health Perspectives [Internet]. 2017 [cited 2022 May 26];125:89–96. Available from: https://ehp.niehs.nih.gov/doi/10.1289/EHP220 doi: 10.1289/EHP220

[10] Chen ST, Stevinson C, Yang CH, Sun WY, Chen LJ, Ku PW. ***Cross-sectional and longitudinal associations of outdoor walking with overall mental health in later life***. Experimental Gerontology [Internet]. 2021 [cited 2022 Apr 20];151:111428. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0531556521002102?via%3Dihub doi: 10.1016/j.exger.2021.111428

[11] European Cyclist's Federation [Internet]. Brussels: ECF; 2013. ***How much CO2 does Cycling really Save?***; 2013 Jul 11 [cited 2022 Apr 14]; [about 4 screens]. Available from: https://ecf.com/news-and-events/news/how-much-co2-does-cycling-really-save

[12] World Wildlife Fund [Internet]. Washington: WWF; 2017. ***Reducing the impact of commuting; 2017*** [cited 2022 Mar 3]; [about 1 screen]. Available from: https://www.worldwildlife.org/magazine/issues/summer-2017/articles/reducing-the-impact-of-commuting

[13] Ghahramani M, Pilla F. ***Analysis of Carbon Dioxide Emissions From Road Transport Using Taxi Trips***. IEEE [Internet]. 2021 July [cited 2022 Jun 1];9:98573-98580. Available from: https://ieeexplore.ieee.org/abstract/document/9481118 doi: 10.1109/ACCESS.2021.3096279

[14] Transport & Environment [Internet]. Brussels: TE; 2022. ***How clean are electric cars?***; 2022 May 30 [cited 202 Jun 9]; [about 3 screens]. Available from https://www.transportenvironment.org/discover/how-clean-are-electric-cars/

[15] Li H, Su L. ***Multimodal transport path optimization model and algorithm considering carbon emission multitask***. J Supercomput [Internet]. 2020 Feb [cited 2022 Jun 09];76:9355-9373. Available from https://link.springer.com/article/10.1007/s11227-019-03103-1 doi: 10.1007/s11227-019-03103-1

[16] Matsumoto S. ***How Much Difference Does Household Energy Source Selection Make in Winter CO_2 Emissions?*** Frontiers in Climate [Internet]. 2022 May [cited 2022 June 24]; 4:847851.. Available from: https://www.frontiersin.org/articles/10.3389/fclim.2022.847851/full doi: https://doi.org/10.3389/fclim.2022.847851

[17] The Carbon Trust. ***Office based companies: Maximising energy savings in an office environment*** [Internet]. London: The Carbon Trust; 2018 April [cited 2022 Apr 20]; 23 p. Available from: https://www.carbontrust.com/resources/office-energy-efficiency-guides

[18] Obringer R, Rachunok B, Maria-Silva D, Arbabzadeh M, Nateghi R. ***The Overlooked Environmental Footprint of Increasing Internet Use***. Resources, Conservation and Recycling [Internet]. 2021 April [cited 2022 May 26];167(2021):105389. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0921344920307072?via%3Dihub doi: https://doi.org/10.1016/j.resconrec.2020.105389

[19] Masanet E, Shehabi A, Lei N, Smith S, Koomey J. ***Recalibrating Global Data Center Energy-Use Estimates***. Science [Internet]. 2022 Feb [cited 2022 May 26];367(6481):984–86. Available from: https://www.science.org/doi/10.1126/science.aba3758 doi: https://doi.org/10.1126/science.aba3758

[20] State of the Planet [Internet]. New York: Columbia Climate School; 2018 Dec. ***The 35 Easiest Ways to Reduce Your Carbon Footprint***; 2018 27 Dec [cited 2022 May 26]. Available from: https://news.climate.columbia.edu/2018/12/27/35-ways-reduce-carbon-footprint/

[21] PEFC. ***Look for the PEFC label*** [Internet]. PEFC; 2022 [cited 2022 Jun 23]; [about 5 screens]. Available from: https://pefc.org/what-you-can-do/look-for-the-pefc-label

[22] Resource Efficient Scotland [Internet]. UK: EAUC; 2016. ***The Green Office Guide***; 2016 [cited 2022 Apr 17]. Available from: https://www.sustainabilityexchange.ac.uk/resource_efficient_scotlands_green_office_guide1

[23] Galvez-Martos JL, Styles D, Schoenberger H. I***dentified best environmental management practices to improve the energy performance of the retail trade sector in Europe***. Energy Policy [Internet]. 2013 Dec [cited 2022 may 26];63:982-994. Available from: https://abdn.pure.elsevier.com/en/publications/identified-best-environmental-management-practices-to-improve-the doi: 10.1016/j.enpol.2013.08.061

[24] Pulselli RM, Paolinelli G, Bastianoni S. ***Il giardino rampante***. Firenze: Edifir; 2014. 74 p.

[25] Energy Saver [Internet]. Washington: U.S. Department of Energy; 2022. ***Do-It-Yourself Savings Project: Lower Water Heating Temperature***; 2022 [cited 2022 Apr 24]; [about 5 screens]. Available from: https://www.energy.gov/energysaver/do-it-yourself-savings-project-lower-water-heating-temperature

[26] Energy Saving Trust [Internet]. Cardiff: EST; 2020. ***Over a third of British households miss out on bill savings by not changing home energy use***; 2020 Jan 20 [cited 2022 Jun 11]; [about 8 screens]. Available from: https://energysavingtrust.org.uk/over-third-british-households-miss-out-bill-savings-not-changing-home-energy-use/

[27] NOPEC [Internet]. Ohio: NOPEC; 2019. ***Comparing LED vs. CFL vs. Incandescent Light Bulbs***; 2019 [Cited 2022 Jun 09]; [about 3 screens]. Available from: https://www.nopec.org/blognewsroom/blog/comparing-led-vs-cfl-vs-incandescent-light-bulbs/

[28] Han KT, Ruan LW. ***Effects of indoor plants on air quality: a systematic review***. Environ Sci Pollut Res Int [Internet]. 2020 May [cited 2022 Jun 06];27(14):16019-16051. Available from: https://pubmed.ncbi.nlm.nih.gov/32170619/ doi: 10.1007/s11356-020-08174-9

[29] Gardenine [Internet]. Georgia: Gardenine; 2021. ***11 Best Air Purifying Plants for Indoors (Low Light Bedroom, Bathroom)***; 2021 Aug 10 [cited 2022 June 06]; [about 6 screens]. Available from: https://gardenine.com/best-air-purifying-plants/

[30] Ecoprod [Internet]. Surrey: Ecoprod; 2019. ***The ecoprod guide to water saving your business***; 2019 [cited 2022 May 26]; [about 1 screen]. Available from: https://www.ecoprod.co.uk/download-our-free-guide-to-saving-water-in-your-business/

[31] Chebaane M, Hoffman B. ***Office Buildings: Watter Efficiency Guide*** [Internet]. USAID: Ministry of Water and Irrigation; 2011 [cited 2022 Jun 13]. 31 p. Available from: https://jordankmportal.com/resources/office-buildings-water-efficiency-guide-english

[32] United States Environmental Protection Agency [Internet]. Fec: Federal Electronics Challenge; 2013. ***Benefits of Automatic Duplexing Fact Sheet***; 2013 [cited 2022 Jun 3]. 3 p. Available from: https://www.epa.gov/fec/benefits-automatic-duplexing-fact-sheet

[33] Paperless Productivity [Internet]. Seattle: PP; 2022. ***Eco-impact: Economical and Ecological Benefit with Paperless Productivity***; 2022 [cited 2022 May 10]; [about one screen]. Available from: https://paperlessproductivity.com/eco-impact/

[34] World Economic Forum [Internet]. Geneva: WEF; 2021. ***Climate change: Are forests carbon sinks or carbon sources?***; 2021 Feb [cited 2022 Jun 03]; [about 5 screens]. Available from: https://www.weforum.org/agenda/2021/02/forests-climate-change-carbon-absorb-environment-earth-trees/

[35] World Wildlife Fund [Internet]. Washington: WWF; 2011. ***WWF launches database of eco-rated paper products***; 2011 Jan 31 [cited 2022 Jun 11]; [about 4 screens]. Available from: https://wwf.panda.org/wwf_news/?199223/WWF-launches-database-of-eco-rated-paper-products

[36] Environmental Paper Network. ***Paper Saving Opportunities, Benefits, and Leaders*** [Internet]. EPN North America; 2018 Jul 23 [cited 2022 Jun 1]. 7 p. Available from: https://environmentalpaper.org/wp-content/uploads/2019/04/EPN_FactSheet_Updated-April-2019.pdf

[37] Zou L, Muntean GM. ***Smart Mobile Device Power Consumption Measurement for Video Streaming in Wireless Environments: WiFi vs. LTE. IEEE International Symposium on Broadband Multimedia Systems and Broadcasting (BMSB)*** [Internet]. 2017 [cited 2022 Jun 11];6 p. Available from: https://www.researchgate.net/publication/318574812_Smart_mobile_device_power_consumption_measurement_for_video_streaming_in_wireless_environments_WiFi_vs_LTE doi: 10.1109/BMSB.2017.7986151

[38] Skea J, Shukla PR, Reisinger A, Slade R, Pathak M, Khourdajie AA. ***Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change: Summary for Policymakers*** [Internet]. Geneva: IPCC; 2022 [cited 2022 Jun 12]; 2913 p. Available from: https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_SPM.pdf

[39] Greenpeace [Internet]. Amsterdam: Greenpeace; 2015. ***Clicking Clean: Which Companies Are Building Us a Green Internet?***; 2015 May 12 [cited 2022 Jun 11]; [about 7 screens]. Available from: https://www.greenpeace.org/usa/clicking-clean-report/

[40] Vereecken W, Van Heddeghem W, Deruyck M, Puype B, Lannoo B, Joseph W, Colle D, Martens L, Demeester P. ***Power Consumption in Telecommunication Networks: Overview and Reduction Strategies***. IEEE Comm. Mag. [Internet]. 2011 Jun [cited 2022 Jun 24];49(6). Available from: https://www.researchgate.net/publication/228774201_Power_Consumption_in_Telecommunication_Networks_Overview_and_Reduction_Strategies doi: 10.1109/MCOM.2011.5783986

[41] Welcome to the Jungle [Internet]. Paris: WTTJ; 2019. ***Going Green: How to Reduce Digital Pollution***; 2019 Nov [cited 2022 May 26]; [about 3 screens]. Available from: https://www.welcometothejungle.com/en/articles/how-to-reduce-digital-pollution

[42] BBC [Internet]. London: BBC; 2020. ***Why your internet habits are not as clean as you think***; 2020 Mar 2 [cited 2022 Jun 11]; [about 12 screens]. Available from: https://www.bbc.com/future/article/20200305-why-your-internet-habits-are-not-as-clean-as-you-think

[43] CIBO Technologies [Internet]. Cambridge, MA: CIBO; 2021. ***Calculating the Carbon Footprint of Zoom Meetings***; 2021 Mar 15 [cited 2022 Apr 24]; [about 2 screens]. Available from: https://www.cibotechnologies.com/blog/calculating-the-carbon-footprint-of-zoom-meetings/

[44] Eurostat [Internet]. Luxemburg: EC; 2022. ***Coal production and consumption statistics***; 2022 May 2 [cited 2022 May 10]; [about 2 screens]. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Coal_production_and_consumption_statistics

[45] OVO Energy [Internet]. Bristol: OVO Energy; 2019. ***'Think Before You Thank': If every Brit sent one less thank you email a day, we would save 16,433 tonnes of carbon a year - the same as 81,152 flights to Madrid***; 2019 Nov 26 [cited 2022 Jun 11]; [about 4 screens]. Available from: https://www.ovoenergy.com/ovo-newsroom/press-releases/2019/november/think-before-you-thank-if-every-brit-sent-one-less-thank-you-email-a-day-we-would-save-16433-tonnes-of-carbon-a-year-the-same-as-81152-flights-to-madrid

FOOD AND DRINKS

[46] Petersson T, Secondi L, Magnani A, Antonelli M, Dembska K, Valentini R, Varotto A, Castaldi S. ***A multilevel carbon and water footprint dataset of food commodities***. Scientific Data [Internet]. 2021 May [cited 2022 May 26];8(127):1-12. Available from: https://www.nature.com/articles/s41597-021-00909-8

[47] Galli A, Moreno Pires S, Iha K, Alves AA, Lin D, Mancini MS, Teles F. ***Sustainable food transition in Portugal: assessing the Footprint of dietary choices and gaps in national and local food policies.*** Science of the Total Environment [Internet]. 2020 Dec [cited 2022 May 26];749(2020):141307. Available from: https://www.sciencedirect.com/science/article/pii/S0048969720348361 doi: https://doi.org/10.1016/j.scitotenv.2020.141307

[48] National Geographic [Internet]. Washington, DC: NG. ***A whopping 91% of plastic isn't recycled***; 2018 Dec 20 [cited 2022 May 22]; [about 8 screens]. Available from: https://www.nationalgeographic.com/science/article/plastic-produced-recycling-waste-ocean-trash-debris-environment

[49] Johns Hopkins Center for a Livable Future. ***Food's journey***. [Image on Internet]. 2022 [cited 2022 May 26]. Available from: https://www.foodsystemprimer.org/sebin/d/w/CLF_Infographic-800.jpg

[50] Caro D, Davis SJ, Bastianoni S, Caldeira K. ***Global and regional trends in greenhouse gas emissions from livestock***. Climatic Change [Internet]. 2014 Jul 9 [cited 2022 May 26];126(2014):203-216. Available from: https://link.springer.com/article/10.1007/s10584-014-1197-x

[51] Clune S, Crossin E, Verghese K. ***Systematic review of greenhouse gas emissions for different fresh food categories***. J Clean Prod [Internet]. 2017 Jan [cited 2022 May 26];140(2014):766–783. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0959652616303584

[52] Selen A, Adeline M, Katsunori I, Galli A. ***Reducing Mediterranean Seafood Footprints: The role of consumer attitudes***. Ocean and Coastal Management [Internet]. 2021 Nov [cited 2022 May 26];214(105915): 1-16. Available from: https://www.sciencedirect.com/science/article/pii/S0964569121003987 doi: https://doi.org/10.1016/j.ocecoaman.2021.105915

[53] SU-EATABLELIFE [Internet]. Fondazione Barilla; 2022. ***Choose what to eat to save the Planet***; 2022 [cited 2022 May 20]; [about 2 screens]. Available from: https://www.sueatablelife.eu/en/the-earth-recommends/choose-what-to-eat-to-save-the-planet/

[54] SU-EATABLELIFE [Internet]. Fondazione Barilla; 2022. ***At the table, make your choice. Start today to make a difference for a better future***; 2022 [cited 2022 May 26]; [about 2 screens]. Available from: https://www.sueatablelife.eu/en/the-earth-recommends/

[55] Scherhaufer S, Moates G, Hartikainen H, Waldron K, Obersteiner G. ***Environmental impacts of food waste in Europe***. Waste management [Internet]. 2018 [cited 2022 May 26];77:98-113. Available from: https://quadram.ac.uk/publications/environmental-impacts-of-food-waste-in-europe/

[56] Muller A, Schader C, Scialabba N EH, Brüggemann J, Isensee A, Erb KH, Smith P, Klocke P, Leiber F, Stolze M, Niggli U. ***Strategies for feeding the world more sustainably with organic agriculture***. Nature Communications [Internet]. 2017 Nov [cited 2022 May 26];8(1290):1-13. Available from: https://www.nature.com/articles/s41467-017-01410-w

[57] Earth Overshoot Day [Internet]. Oakland: Global Footprint Network; c2003-2022. ***Land Stewardship for Low Impact Beef Production***; 2022 [cited 2022 May 26]. Available from: https://www.overshootday.org/portfolio/low-impact-beef-production-foodnected/

[58] Godfray HC, Beddington JR, Crute IR, Haddad L, Lawrence D, Muir JF, Pretty J, Robinson S, Thomas SM, Toulmin C. ***Food security: the challenge of feeding 9 billion people***. Science [Internet]. 2010 Jan 28 [cited 2022 May 26];327(5967):812–8. Available from: https://pubmed.ncbi.nlm.nih.gov/20110467/ doi:10.1126/science.1185383

[59] Foley J, Ramankutty N, Brauman KA, Cassidy ES, Gerber JS, Johnston M, Mueller ND, O'Connell C, Ray DR, West PC, Halzer C, Bennett EM, Carpenter SR, Hill J, Monfreda C, Polasky S, Rockström J, Sheehan J, Seibert S, Tilman D, Zaks DPM. ***Solutions for a cultivated planet***. Nature [Internet]. 2011 Oct [cited 2022 May 26];478(2011):337–342. Available from: https://www.nature.com/articles/nature10452

[60] European Commission [Internet]. Brussels: EC. ***The Organic Logo***; 2022 [cited 2022 Jun 12]; [about 3 screens]. Available from: https://ec.europa.eu/info/food-farming-fisheries/farming/organic-farming/organic-logo_en

[61] Crippa M, Solazzo E, Guizzardi D, Monforti-Ferrario F, Tubiello F, Leip A. ***Food systems are responsible for a third of global anthropogenic GHG emissions***. Nat Food [Internet]. 2021 March [cited 2022 May 26];2:198–209. Available from: https://www.semanticscholar.org/paper/Food-systems-are-responsible-for-a-third-of-global-Crippa-Solazzo/cd1db6d29b6d0ab35e45575ff06749ed590af44f doi: 10.1038/s43016-021-00225-9

[62] Kinnunen P, Guillaume JHA, Taka M, D'Odorico P, Siebert S, Puma MJ, Jalava M, Kummu M. ***Local food crop production can fulfil demand for less than one third of the population***. Nature Food [Internet]. 2020 April [cited 2022 May 26];1: 229–237. Available from: https://www.semanticscholar.org/paper/Local-food-crop-production-can-fulfil-demand-for-of-Kinnunen-Guillaume/a22e60e41d818d65104af9b9579fcf7888be8a53 doi: 10.1038/s43016-020-0060-7

[63] Randoni A, Grasso S. ***Consumers behaviour towards carbon footprint labels on food: A review of the literature and discussion of industry implications***. Journal of Cleaner Production [Internet]. 2021 [cited 2022 May 25];310(127031):1-11. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0959652621012506 doi: 10.1016/j.jclepro.2021.127031

[64] Vijay V, Pimm SL, Jenkins CN, Smith SJ. ***The Impacts of Oil Palm on Recent Deforestation and Biodiversity Loss***. PloS ONE [Internet]. 2016 [cited 2022 May 26];11(7):1-19. Available from: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0159668&xid=17259,15700022,15700186,15700190,15700256,15700259,15700262,15700265,15700271 doi: 10.1371/journal.pone.0159668

[65] European Commission [Internet]. Brussels: EC; 2022. ***Eco-Management and Audit Scheme: European Commission***; 2022 [cited 2022 Jun 12]; [about 3 screens]. Available from: https://ec.europa.eu/environment/emas/join_emas/emas_iso_14001_regional_labels_en.htm

ACCOMMODATION

[66] Gössling S, Lund-Durlacherb D. ***Tourist accommodation, climate change and mitigation: An assessment for Austria***. Journal of Outdoor Recreation and Tourism [Internet]. 2021 [cited 2022 Jun 12];34(100367):1-9. Available from: https://www.sciencedirect.com/science/article/pii/S2213078021000037 doi: 10.1016/j.jort.2021.100367

[67] Barioni D, Galli A, Mancini MS. ***ZeroCO$_2$MED - Carbon Footprint Methodology***. Technical project report. 2022 [cited 2022 Jun 1]. Draft, internal document.

[68] Sustainable Hospitality Alliance [Internet]. England and Wales: SHA; 2022. ***Sustainability certifications factsheet***; 2022 [cited 2022 May 9]; 4 p. Available from: https://sustainablehospitalityalliance.org/resource/hotel-sustainability-certifications-factsheet/

[69] ADEME. ***Guide pour des manifestations responsables*** [Internet]. France: Association Meduli Nature; 2009 [cited 2022 Apr 20]; 99 p. Available from: https://communication-responsable.ademe.fr/sites/default/files/guide-manifestations-responsables-gironde.pdf

[70] Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection. ***Guidelines on Sustainable Event Organisation*** [Internet]. Berlin: BMU; 2020 August [cited 2022 May 3]; 100 p. Available from: https://www.bmuv.de/en/publication/guidelines-on-sustainable-event-organisation

[71] Greenpeace [Internet]. Amsterdam: Greenpeace, 2015. T***oolkit for a Plastic-free Future: Organize a Zero Waste Event***; 2022 [cited 2022 Apr 20]; [about 3 screens]. Available from: https://www.greenpeace.org/international/campaign/toolkit-plastic-free-future/organise-a-zero-waste-event/

[72] Zero Waste Europe. ***My Zero Waste Event Guide*** [Internet]. Paris: Zero Waste France; 2017 May 26 [cited 2022 Jun 12]; 20 p. Available from: https://zerowasteeurope.eu/wp-content/uploads/2019/11/zero_waste_europe_guide_my_zero_waste_event_en.pdf

[73] One Planet Network. ***Sustainable Events Guide: Give Your Large Event a Small Footprint*** [Internet]. Vienna: UNEP; UNEP Resources: UNEP; 2018 Feb 13 [cited Apr 19]; 104 p. Available from: https://www.oneplanetnetwork.org/knowledge-centre/resources/sustainable-events-guide-give-your-large-event-small-footprint

[74] Martínez-Rocamora A, Solís-Guzmán J, Marrero M. ***Toward the Ecological Footprint of the use and maintenance phase of buildings: Utility consumption and cleaning tasks.*** Ecological Indicators [Internet]. 2016 [cited 2022 Apr 19];69(2016):66-77. Available from: https://www.sciencedirect.com/science/article/abs/pii/S1470160X16301777?via%3Dihub doi: 10.1016/j.ecolind.2016.04.007

TRAVEL

[75] IPCC: The Working Group III. ***AR5 Climate Change 2014: Mitigation of Climate Change*** [Internet]. Cambridge, UK and New York. US: Cambridge University Press; 2014 [cited 2022 Mar 5]. Available from: https://www.ipcc.ch/report/ar5/wg3/

[76] Phys.org [Internet]. Douglas: Omicron Limited; 2022. ***'Going virtual' sees international conference cut carbon emissions by 425 tons and bost LMIC attendance***; 2022 [cited 2022 Apr 24]; [about 5 screens]. Available from: https://phys.org/news/2022-02-virtual-international-conference-carbon-emissions.html

[77] Yates J, Kadiyala S, Li Y, Levy S, Endashaw A, Perlick H, Wilde P. ***Can virtual events achieve co-benefits for climate, participation, and satisfaction? Comparative evidence from five international Agriculture, Nutrition and Health Academy Week conferences.*** Planetary Earth [Internet]. 2022 [cited 2022 Apr 24];6(2):164-170. Available from: https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00355-7/fulltext doi: https://doi.org/10.1016/S2542-5196(21)00355-7

[78] Our World in Data [Internet]. England: OWD; 2020. ***Which form of transport has the smallest carbon footprint?***; 2020 Oct 13 [cited 2022 Apr 26]; [about 5 screens]. Available from: https://ourworldindata.org/travel-carbon-footprint

[79] European Environment Agency [Internet]. Copenhagen: EEA; 2019. ***CO_2 emissions from passenger transport***; 2019 Jun 25 [cited 2022 Mar 23], [about 2 screens]. Available from: https://www.eea.europa.eu/media/infographics/co2-emissions-from-passenger-transport/view

[80] The Guardian [Internet]. London: The Guardian; 2019. ***How your flight emits as much CO_2 as many people do in a year***; 2019 Jul 19 [cited 2022 Mar 4]; [about 8 screens]. Available from: https://www.theguardian.com/environment/ng-interactive/2019/jul/19/carbon-calculator-how-taking-one-flight-emits-as-much-as-many-people-do-in-a-year

[81] Transport & Environment [Internet]. Brussels: TE; 2019. ***How clean are electric cars?***; 2020 Apr 20 [cited 2022 Apr 26]; [about 3 screens]. Available from: https://www.transportenvironment.org/discover/how-clean-are-electric-cars/

[82] Center for Climate and Energy Solutions [Internet]. Arlington: C2ES; 2022. ***Reducing Your Transportation Footprint***; 2022 [cited 2022 Apr 28]; [about 4 screens]. Available from: https://www.c2es.org/content/reducing-your-transportation-footprint/

[83] European Environment Agency [Internet]. Copenhaged: EEA; 2019. ***Do lower speed limits on motorways reduce fuel consumption and pollutant emissions?***; 2020 Nov 23 [cited 2022 Apr 28]; [about 6 screens]. Available from: https://www.eea.europa.eu/themes/transport/speed-limits-fuel-consumption-and

[84] Graver B, Zhang K, Rutherford D. ***CO_2 emissions from commercial aviation*** [Internet]. Washington: The ICCT; 2019 Sep 19 [cited 2022 Apr 16]; 6 p. Available from: https://theicct.org/publication/co2-emissions-from-commercial-aviation-2018/

[85] IPCC: The Working Group I. ***AR4 Climate Change 2007*** [Internet]. Cambridge, UK and New York. US: Cambridge University Press; 2007. Chapter 2, Direct Global Warming Potentials; [cited 2022 Jun 8]; [about 3 screens]. Available from: https://archive.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html

[86] VTT. ***Carbon footprint of an advertisement leaflet*** [Internet]. Finland: VTT; 2010 [cited 2022 Jun 8]. 4 p. Available from: https://projectsites.vtt.fi/sites/leader/www.vtt.fi/sites/leader/en/adv_leaflet_cf_2010.pdf

[87] InterregMED [Internet]. Marseille: InterregMED; 2017. ***Greening and Social Inclusion***; 2017 [cited 2022 May 20]; 4 p. Available from: https://eufunds.gov.mt/en/EU%20Funds%20Programmes/EU%20Territorial%20Programmes/Documents/Interreg%20Med/MED%20Manual/Key%20principles%20and%20standards/22.%20Greening%20and%20Social%20inclusion.pdf