Climate Crisis Plan

EMISSIONS REDUCTION WORKBOOK

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CLIMATE ACTION
Climate-Action.org

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Introduction

Welcome to the workbook, for the book, Climate Crisis Plan, by Philip Kent-Hughes. There is enough information included, so that you can use this guide, even without the book. This workbook has been created to help you plan and implement emissions reductions in your own life. This is where you can set an objective, make plans, enter information, and track your progress. This is an editable PDF document, so for each section that has an action to complete you can type in the answers, then tick the box on the right as seen in the examples below. If the action does not apply to your situation, you can put "not applicable" and tick the box.

Personal action	Create a new identity

Who do you want to be?

Consider your objective and write out your own belief statement about who you want to be in the following text box. For example, it could be "I live a sustainable one-planet lifestyle," or "I lead a net-zero emissions lifestyle."

I have a zero-net carbon emissions lifestyle	☑

Personal action

Description of the Action	What An action summary	Who will do it	When to do it	Status completed
Check freshness Once or twice a week, go through the fridge and check meat, dairy, fruit, and vegetables for dates and freshness. Then prioritize eating food that could soon go bad. Use mature fruit and vegetables in smoothies or juices.	Check Fridge Check cupboards Check Freezer	Person A	Every time before shopping Saturday morning	☑
Planning saves money Taking a few minutes to plan what you are going to eat for the week can make the process easier. Deciding what recipes to use will help to work out the ingredients. Check what you have on hand, then make a shopping list. Also, avoid impulse buys.	Decide on main meals and review recipes Check what you have and what you need to buy and make a list	Person B	Every time before shopping Saturday morning	☑

The section *Tips to Help You Be Successful* might be useful, especially if you find some of the actions difficult at first. This can be found at the beginning of Part 2 in the book. I wish you good luck and success.

Philip Kent-Hughes

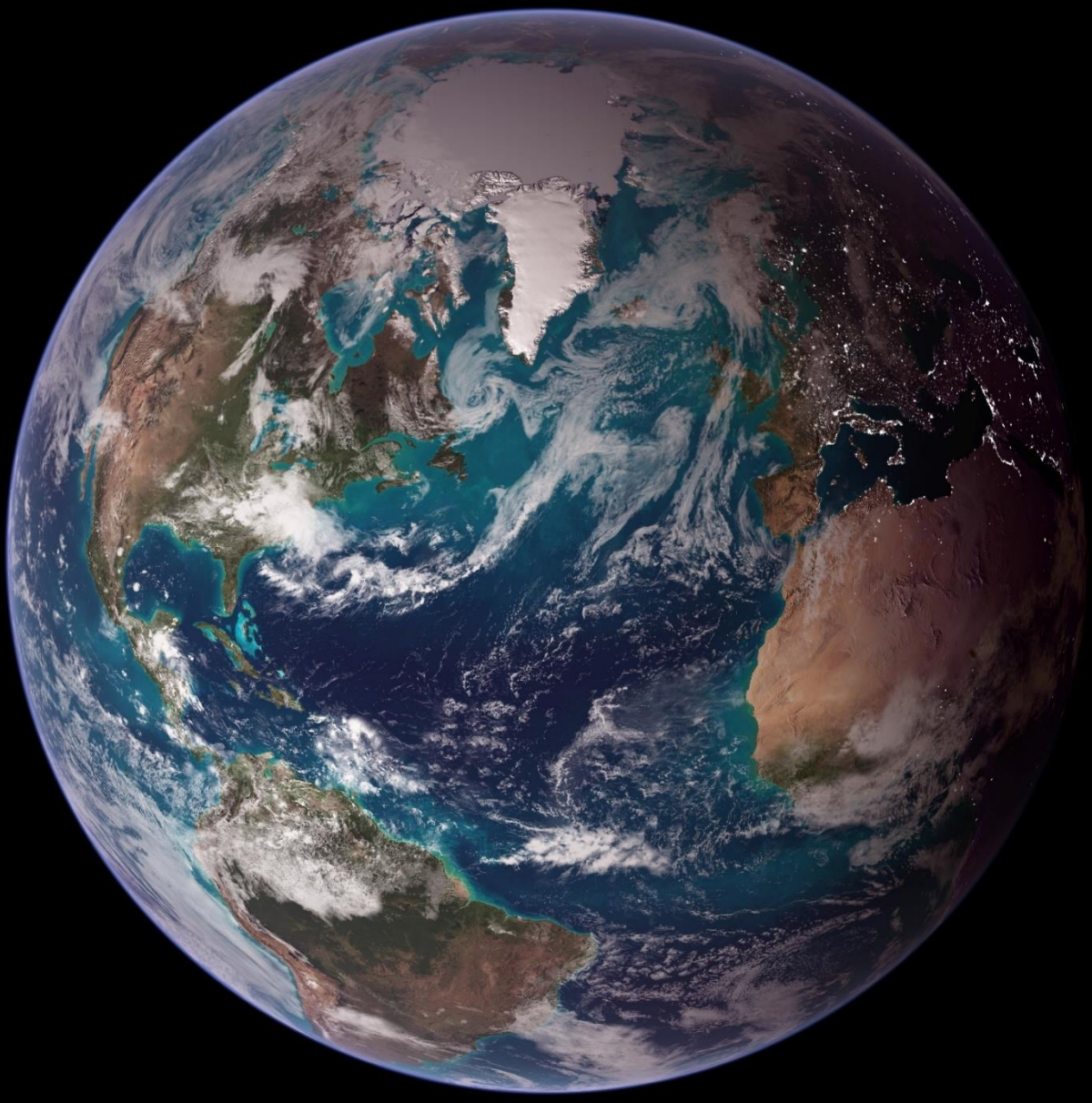
PLEASE NOTE: Any website links are correct at the time of publication. Please take care with your internet security when accessing third-party websites. I do I benefit from any of these organizations.

PART 1

The Initial Response and Planning

"Without a sharp decline in greenhouse gas emissions by 2030, global warming will surpass 1.5°C in the following decades, leading to irreversible loss of the most fragile ecosystems, and crisis after crisis for the most vulnerable people and societies."

Intergovernmental Panel on Climate Change (IPCC)
Special Report: Global Warming of 1.5°C



Mobilization

Mobilizing Your Team

You can discuss with your household or create a small group of friends or family to work together on reducing emissions. It's important to include these people at the beginning of the process. When discussing climate change, I believe that we should respect other people and their points of view. Consider explaining that you are concerned about the impact of climate change and that you are interested in finding out about your emissions and ways to make a positive difference. You could go through the information and concepts covered in the Introduction and Part One of the book to create a discussion and develop their support.

	Personal action	Mobilize your team

Here are steps you could take to help you mobilize your team:

One-by-one Consider talking with people individually to see how each views climate action and find out if they are likely to support reducing emissions. Listen to what they have to say and look for areas of agreement and for shared values. You could discuss the benefits of reducing emissions and find out what they think about these issues, for example: • Protecting natural ecosystems upon which we and the next generations depend. • Reducing the amount of energy used, thereby lowering costs, and saving money. • Looking after the Earth, as instructed by nearly every religious faith. • Some solutions can be easy and even fun, like growing a small vegetable garden together.	☐
Together If you can get a reasonable amount of support, consider having a group discussion to go through some of the personal actions in the Implementation sections for Food, Energy, Transport, Production and Consumption.	☐
Review options Then look at the first steps, such as setting an objective. You could also go through some of the *Tips to Help You Be Successful*.	☐

The Crisis Action Plan

Setting an Objective

The overall objective

To have the best chance of keeping the temperature no higher than 1.5°C, carbon dioxide emissions need to be reduced by 45% by 2030, as recommended by the IPCC (from 2010 levels).[2]

Personal or household objective

The next thing to decide on is a personal emissions reduction objective. This could be an individual objective or an objective for a household or other group. Using the SMART criteria is a helpful way to write an objective. I've described these criteria in the following table. To begin with, this can be as simple as going through the actions in this book and completing as many as you can. Alternatively, if you want to measure your emissions and then set an objective to reduce your emissions by a specific amount, then go through the carbon footprinting process covered on page 30.

Specific	Write a defined end goal, with no general statements.
Measurable	Can the outcome be measured?
Assignable	Who will do it? You can collaborate and get an agreement with others.
Realistic	Is it achievable, given available resources, and is it relevant?
Time frame	When will it be started and completed?

What I did

Below is an example of the emissions reduction objective we wrote for our household:

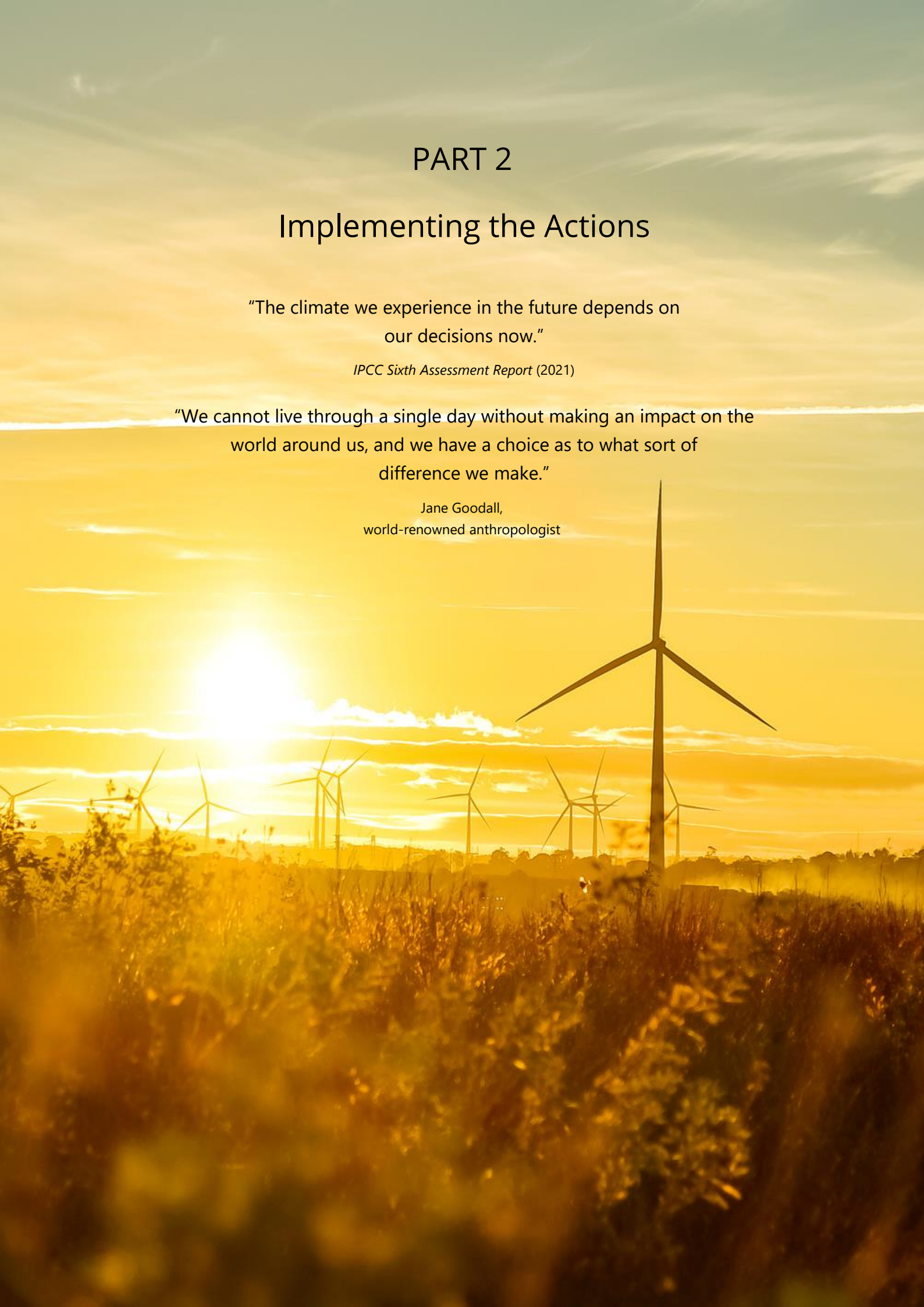
Specific	Reduce our emissions by 45% and offset the remaining emissions to achieve net-zero and then review.
Measurable	Calculate our emissions at the beginning and end of each year.
Assignable	I will work on reducing emissions together with my father.
Realistic	The objective and timeframe are both feasible and relevant.
Timeframe	The beginning and end of each year

Personal emissions reduction objective

Write an overall emissions reduction objective which reflects your capacity, your responsibilities, and how much you want to be part of creating a positive future. Consider including all the people in your household in this process. If you live with other people, you could have a group meeting and create an emissions reduction objective together.

Personal action | Decide on an emissions reduction objective

Specific		
Measurable		
Assignable		☐
Realistic		
Timeframe		



PART 2

Implementing the Actions

"The climate we experience in the future depends on our decisions now."

IPCC Sixth Assessment Report (2021)

"We cannot live through a single day without making an impact on the world around us, and we have a choice as to what sort of difference we make."

Jane Goodall,
world-renowned anthropologist

Implementation

Tips to Help You Be Successful

Who I am

In the book, *Atomic Habits,* James Clear suggests that instead of focusing only on the outcome, a good starting point is to change your belief about who you are. Don't worry—it's not too drastic. I decided that part of my new identity would be the statement "I live a sustainable, net-zero lifestyle." This statement is written as a future state, which prompts my brain to unconsciously work towards it. I read it often and I find it helps to reinforce my thinking and motivation.

	Personal action	Create a new identity

Who do you want to be?

Consider your objective and write out your own belief statement about who you want to be in the following text box. For example, it could be "I lead a net-zero emissions lifestyle." You can also write it down and put it on the fridge or other places you might see it often.

	☐

Accountability buddy

I've found it's very helpful to have someone (or a group) that you can check in with regularly, to track the progress of your plan. This can be a partner or friend or family member you are in regular contact with. You can help each other with feedback, advice, and encouragement. In Part 1, we talked about how we can create significant momentum by communicating and encouraging other people. If we each encourage 1 person to take action and they also encourage 1 person, then after 10 steps there will be 10 people taking action. If we tell 2 people and they each encourage 2 people to take action, then after 10 steps there will be 512 people taking part. If we encourage 3 people to act, then the number increases to 19,683! You could start a small emissions reduction group and meet regularly.

	Connect	Encourage 3 people

Think of three people to connect with and to encourage. They could be family, or friends outside of your household. Write the names of three people in the following table and make plan to talk with them:

Person 1		☐
Person 2		☐
Person 3		☐

Food

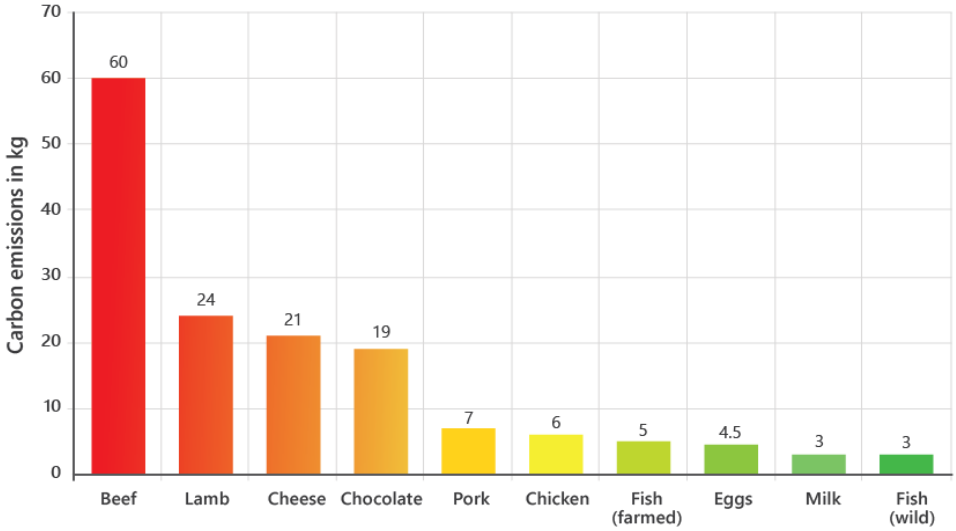
Actions – Food

Eating Food with a Lower Carbon Footprint

Not all food creates the same emissions

The graph below shows the greenhouse gas emissions created to produce 1 kilogram (2.2 lbs.) of several animal-based foods.[3] To produce 1 kg of beef, emissions equal to 60 kg of CO2 are made. Emissions are higher for beef, lamb, and dairy because large amounts of methane are created by the animals' digestive processes.[4]

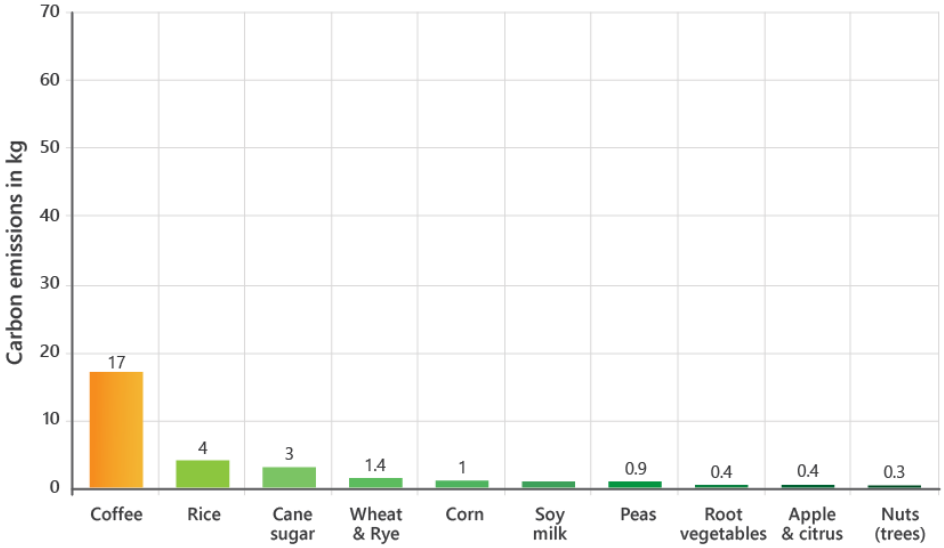
Animal-based Food Emissions Impact of 1 kg (2.2 lbs.) of Each Food Type



Source: Joseph Poore and Thomas Nemecek in *Science*, (AAAS), via Our World in Data

In 2021, the average annual beef consumption in the United States was 26 kg (58 lbs.) per person.[5] If you multiply that by 60 kg of carbon, the result is approximately 1.5 metric tons of carbon emissions for each person in the United States for beef alone. While beef, lamb, and cheese have the highest emissions, plants mostly have the lowest impact.[6]

Fruit and Vegetable Emissions Impact of 1 kg (2.2 lbs.) of Each Food Type



Source: Joseph Poore and Thomas Nemecek in *Science* (AAAS) via Our World in Data

What are the different food options to reduce emissions?

Depending on the people you ask, you'll get a wide variety of answers. Note that before you change your food lifestyle, you might consider discussing it with a doctor or dietician. (Speaking of which, I am not a doctor or a dietician, and this data is intended as information and not as medical advice.) In its *Special Report on Climate Change and Land Demand Side Mitigation*, the IPCC stated with high confidence that changing food lifestyles presents "major opportunities for reducing greenhouse gas emissions from food systems and improving health outcomes."[7] The report reviewed several food lifestyles and how they compared with emissions reductions. Four of the main options are vegan, vegetarian, healthy diet, and Mediterranean.[8] The IPCC compared what the annual reduction in global emissions could be if all people on the planet switched to these food lifestyles (see the table below).[9] You can choose one of these to model or inform your food lifestyle, or something else altogether.

Four Food Lifestyles and Potential Annual Emissions Reductions by 2050

Food Lifestyle	Emissions Reduction	Description
Vegan	7.8 billion metric tons	Completely plant-based
Vegetarian	4.6–7.2 billion metric tons	Vegetables, fruits, grains, sugars, oils, eggs, and dairy
Healthy Diet	4.3–6.4 billion metric tons	Based on global dietary guidelines for consumption of fruits and vegetables, with reduced to low meat consumption
Mediterranean	1.2–2.3 billion metric tons	Vegetables, fruits, grains, sugars, oils, eggs, dairy, seafood, with moderate amounts of poultry, pork, lamb, and beef

Source: IPCC, *Special Report on Climate Change and Land Demand Side Mitigation*

We can save up to six billion metric tons of greenhouse gases each year by following Healthy Diet guidelines. Lists of the national guidelines for many countries are available at www.fao.org/nutrition/nutrition-education/food-dietary-guidelines/en/. The dietary guidelines for the United States can be found at www.MyPlate.gov. This site presents information, resources, recipes, and can tailor a personalized food plan based on age, gender, height, weight, and physical activity level: www.myplate.gov/myplate-plan. Everyone is different, so consider your own circumstances and consult with a doctor, if necessary, before making changes.

What I did

I made small adjustments, changing one meal in a week. I gradually swapped red meat for alternatives such as chicken or fish. I also started having more vegetarian meals. Over six months I reduced my red meat intake by half. I put the money I saved on less meat towards buying more fruit and vegetables. I will continue to adjust my food lifestyle to reduce my emissions even more. To make changing habits easier, review the "Tips to Help You Be Successful" section. One way to make a change is to pick the most enjoyable option. For example, I made sure new recipes were tasty and easy to make. Some farmers and farming associations are already making important progress toward low- or zero-emissions produce, and these growers should be supported by consumers and governments.

Eating Food with a Lower Carbon Footprint

You can delete or type over the examples in the table below.

Personal action				
Description of the Action	**What** Action summary	**Who** will do it	**When** to do it	**Status** Completed
Talk with people If you share meals with other people, involve them in the meal choices, what recipes to use, the changes to make, and when they will take place.	eg. Get everyone in the household to discuss new food options and recipes	eg. Person 1 will invite all	e.g Sunday at 2pm	☑
Substitute from high- to low-carbon foods Little adjustments, such as eating less beef, can quickly and significantly reduce your food footprint. As seen on the graph on page twelve, there are alternatives like fish, chicken, pork, or even lamb. There also are many other alternatives made from vegetable protein and other products that look and taste like meat.	eg. Get the household to choose some red meat alternatives	eg. All at the household meeting	e.g Sunday at 2pm	☐
Reducing portion size Reducing the amount of high-emissions food in a meal is also a step in the right direction.	sdsad the quick brown fox	Mary	Monday at 2pm	☐
Half the plate When planning meals, consider having half your plate with fruit or vegetables.				☐
Planning saves time and money With a meal plan agreed on, you can plan what you are going to eat for the week. Deciding what recipes to use will inform the ingredients you need to purchase. Making meals tasty can support change acceptance. The MyPlate website presents more meal planning resources: www.myplate.gov/resources/print-materials.				☐
No Meat Monday – No Meat May One way to create a new food habit is to pick one day a week and aim for low emissions. If Monday is the first day of the working week for you, then starting change might be better on a different day, like Wednesday, for example. There is also No Meat May, a challenge from a group in Australia. They have a website with lots of resources, such as recipes, meal plans, blogs, and more: www.nomeatmay.net.				☐

Transporting Our Food

Food can be produced locally, driven by truck over long distances, canned and shipped by sea, or picked fresh and air freighted. Each of these modes of transportation has a different amount of carbon emissions. Fresh food transported by air freight will likely have the highest emissions, in some cases 50 times higher than sea freight.[10]

Personal action				
Description of the Action	What Action summary	Who will do it	When to do it	Status Completed
Buy in season One of the simplest choices around reducing our emissions is buying fresh fruit and vegetables in season.				☐
Buy local If there is a tag or label, find out where the fruit and vegetables come from. By buying local or regional produce, you support farmers and businesses in your community. You also help fight emissions and pollution by reducing delivery distances.				☐

What I did

We buy fruits and vegetables in season and those grown locally or from the nearby region. We also check labels of fruits and vegetables to make sure they haven't been air freighted across long distances.

Reducing Our Individual Food Waste

Personal action	
Create a food waste objective One of the Sustainable Development Goals set by the United Nations Programme is to halve per capita global food waste at the consumer level.[11] Consider setting an objective of reducing your food waste by 50% within the next three to six months or another suitable time frame that matches your circumstances.	
	☐

What I did

We started with creating the statement "We value food and don't let it go to waste" and used the following steps to gradually reduce our food waste by 80%. There are times when life is difficult and the good progress has gone backwards. That happens, when you're ready, refocus and move back into the right direction again.

Personal action				
Description of the Action	What Action summary	Who will do it	When to do it	Status Completed
Check freshness Once or twice a week, go through the fridge and check meat, dairy, fruit, and vegetables for dates and freshness. Then prioritize eating food that could soon go bad. Use mature fruit and vegetables in smoothies or juices.				☐
Planning saves money Taking a few minutes to plan what you are going to eat for the week can make the process easier. Deciding what recipes to use will help to work out the ingredients. Check what you have on hand, then make a shopping list. Also, avoid impulse buys when shopping.				☐
Not typical is beautiful We can help retailers reduce food waste by buying oddly shaped fruit and vegetables.				☐
Make a date The date you need to know is the "use-by" date, which is the last date recommended for the use of the product.[12] Use this to check freshness.				☐
Store wisely Put new food to the rear of the shelf and push older items to the front. This applies to the refrigerator, freezer, and cupboard. Use airtight containers to keep opened food fresh in the fridge and close packets.				☐
Love your leftovers Leftovers can be kept for about three days in the refrigerator.[13] If you don't think you'll be able to eat them soon, freeze them. Leftovers can be eaten for lunch or as ingredients to make pasta sauce or stew.				☐
Odd ingredients? At some point you might have a few vegetables you are not sure what to do with. Ask family or friends for recipe suggestions, look online for "What can I cook with [ingredient 1] and [ingredient 2]?", or use a recipe app.				☐

Production and Consumption

Actions – Production and Consumption

Product marketing often tells us we must have more, and that the newest shiny product is the key to becoming noticed and popular. The thing about a lie is that when we stop believing it, the fog lifts, and we can clearly see the real world around us. The head of sustainability at IKEA noted, "In the west, we have probably hit peak stuff. We talk about peak oil. I'd say we've hit peak red meat, peak sugar, peak stuff."[14]

Support a sustainable circular economy

Personal action				
Description of the Action	What Action summary	Who will do it	When to do it	Status Completed
Reduce The first step is to reject unnecessary consumerism. Consider what you purchase and consume what you need. To find the ecological footprint of your country, open the following link. If the number of Earths required for your country is more than 1, consider reducing your consumption unless you already purchase at a low level: www.overshootday.org/how-many-earths-or-countries-do-we-need/				☐
Refuse Take your own reusable shopping bag and refuse plastic bags. Stop using single use plastics such as straws, plates, containers, and cutlery. Demand renewable options from shops and take-out food outlets. See alternatives in the "What I did" section.				☐
Reuse Buying products second-hand gives them a new life. Sell or give away your unwanted items to family, friends, or charity instead of throwing them out.				☐
Repair and refurbish Many electrical items can be repaired, clothes can be mended, and furniture can be reupholstered. If you are not sure, ask your family or a friend, or search online.				☐
Recycle Buy products which have a recycle symbol on their packaging. Ensure that you recycle every item you can. Ask your local government or recycling center about which items they will take.				☐

Plastic problems

Global emissions from the plastic lifecycle in 2015 were 1.7 billion metric tons of CO2 equivalent. This is expected to grow to 6.5 billion metric tons annually by 2050 under business as usual.[15]

What I did

I take my own bags shopping and have stopped using plastic bags. I have a reusable coffee cup and use my own water bottle. I say "no" to plastic utensils. I traded my plastic toothbrush for bamboo (you need to wipe them dry after use). And I have cut out many other single-use plastics. If we choose to use less plastic, then we can significantly reduce emissions and pollution. Below are some common products that use plastic along with their alternatives.

Common Plastic Products, Decomposition Times, and Alternatives

Item	Description	Decomposition	Alternatives
	Plastic bag	10–20 years	Take your own bags shopping
	Polyester wet wipes	50–100 years	Cotton or hemp wet wipes
	Styrofoam	50–100 years	Use a reusable coffee cup
	Plastic straw	50–450 years	Take your own metal straw, or don't use one
	Plastic bottles	50–450 years	Try carrying a reusable bottle
	Plastic toothbrush	450–500 years	Bamboo toothbrush
	Plastic diaper	450–600 years	Consider compostable diapers
	Plastic utensils	1,000 years	Use your own utensils or ask for renewable options

Source: US National Park Service, National Oceanic and Atmospheric Administration (NOAA) and National Geographic

From the Author

I hope that you have been getting some use from the book and this workbook. It took a lot of time to put it together, mostly evenings after work, or the weekends and holidays. I organized the editing, proofreading, book design, publication and promotion. I hope that if you see some value in this book then would you please let some people know about it, post about it on social media, leave a review if you bought it online, or a book review site such as Goodreads.

Thank you,

Philip

How to reduce emissions from consumption

Personal action				
Description of the Action	What Action summary	Who will do it	When to do it	Status Completed
Demand renewable options to replace plastic Buy and demand products with sustainable non-plastic packaging. Several types of renewable packaging are being made. One option is packaging made from waste sugar cane pulp, and bamboo.[16]				☐
Switch away from high emissions and unsustainable products Find out if the paper and wood you use are sustainably sourced. Or do they contribute to deforestation and greenhouse gas emissions? Common items such as toilet paper, tissues, and paper can all be made from recycled materials or from materials harvested from sustainable plantations. Look for symbols to show 100% recycled or plantation-sourced products. You can search online for "Eco-friendly [product type] in [country/region]," for example, "Eco-friendly toilet paper in America."				☐
Net-zero carbon brands and companies Look for brands and organizations that are making changes now to reduce their emissions and switch to their products and services if suitable. Watch out for companies that are promising but not changing right now.				☐
Building or renovating If you are going to build or renovate a home, ask the architect or builder if they can source low-emissions materials and forest-friendly timber.				☐
Net-zero or low carbon emission events If you're organizing a birthday party or wedding, think about ways to reduce emissions. This could include food choices, non-plastic items, and energy use.				☐

Energy

Actions – Energy

We have many options for reducing energy use, so I've organized them into several areas. If your country has a 100% renewable energy grid, then you don't have to reduce your energy use. However, for people living in countries that are transitioning, we should try to find opportunities to make a difference every time we use energy.

Getting the right numbers

To compare the cost of switching to a renewable energy provider or get a quote to install solar panels, it will help to know how much energy you are using. One way to do this for electricity and gas is to check the bills. Electricity is measured in kilowatt hours (kWh), while natural gas (methane) is often measured in British thermal units (BTU), in megajoules (MJ), or in units of 100 cubic feet (Ccf) in the United States.[17] Obtain the average daily usage for each month. Some providers have an online or mobile app to provide this information, or you can also use an energy monitor.

Review energy use, options, and plans

Several ways are available to reduce or eliminate energy emissions. If you rent, please skip to the next section, "Switching to Renewable Energy." If you own a home, then installing solar is one option to consider.

Installing solar

You might have the opportunity to install solar panels, which will provide energy during the day. You can also add a storage battery, which will supply energy at night. Another option is to buy renewable energy for the times when the panels are not generating power (this is covered in the next section).

Government subsidies or other incentives might be offered in your area. Check to see if the incentives apply to the purchase or financing of equipment. This can be done online by searching for "home solar incentives in [your location]" or by asking a local installer. The following is a process for which might help you to review and select a solar installer:

1. Look at independent reviews of solar installers and pick the top three.
2. Look at their company website and see if they seem professional. Make sure they operate in your area, check for ways to communicate with them, and check their warranty, servicing, and purchase or finance options.
3. Get quotes from two good operators who are licensed and consider that the cheapest option is not always the best.
4. They should also provide an estimated amount of savings each year. If this is divided by the total installation amount, it should be possible to find out how many years it will take to pay off the system.

To get specific information on what the options are available, search online for "How does home solar work in [your location]?" The US Energy Department has a good explanation on their website: www.energy.gov/eere/solar/homeowners-guide-going-solar. They also have a detailed planning guide for implementing solar power systems.

Switching to renewable

Before I started buying renewable energy I completed the energy-saving tips in the next few sections. After saving some money on my monthly bills, I then switched to renewable energy. This is the process I followed for reviewing renewable energy providers:

1. Look at independent reviews of the best renewable energy providers and pick the top three. Search online for "reviews of renewable energy providers in [your location]."
2. Look at their company website and see if they look professional. Make sure they operate in your area, check for ways to communicate with them, and look at their renewable energy options.
3. Get quotes from the best two.

If switching to renewable energy is currently too difficult financially, then see how the energy saving tips go first. We will also look at options for offsetting emissions in the Review and Update your Climate Action Plan section.

Review Options and Create a Switch Plan

Personal action				
Description of the Action	What Action summary	Who will do it	When to do it	Status Completed
Switch away from gas If possible, switch away from natural gas for heating and cooking.				☐
Information Gather information on the different options for installing solar panels or using renewable energy.				☐
Choose a renewable option Option A: Install solar panels and battery. Option B: Install solar panels and use renewable energy when dark. Option C: Use renewable energy. Option D: Offset emissions.				☐
Planning Write out the steps to make this happen.				☐
Track progress If the implementation is complicated, such as installing solar panels, keep track of your progress.				☐

Reduce emissions in the home

Heating and cooling are estimated to make up 44% of energy use in the home in the United States (2020).[18] Reducing energy use will not only reduce emissions, but in many cases will save money as well.

Personal action				
Description of the Action	What Action summary	Who will do it	When to do it	Status Completed
Smaller one-off tasks				
Try turning the water heater down a quarter. If you don't notice the difference, try turning it down again until you find the right level.				☐
In the bathroom, install a water-efficient showerhead.				☐
Reduce gaps under doors and around windows and skylights. Use block-out blinds, curtains, or window insulation film.				☐
Consider a smart thermostat, which can help fine-tune energy use.				☐
Healthy planet habits				
Try turning down the heating a little in winter (21°C/70°F). In summer, use fans before the air conditioner and adjust the setting slightly higher in summer (25°C/75°F); this can save around 10%.[19]				☐
Only heat or cool rooms in use, and close doors and any central heating ducts to rooms not in use. Use windows when the temperature changes instead of relying on heating and cooling.				☐
If you are going away, think about turning the water heater down.				☐
Bigger one-off tasks				
Insulation can make a big difference in saving money on heating or cooling your home and reducing emissions. Prioritize the roof.				☐
When purchasing a water or space heater, consider buying electric. These are also safer than kerosene and gas heaters.[20]				☐

What I did

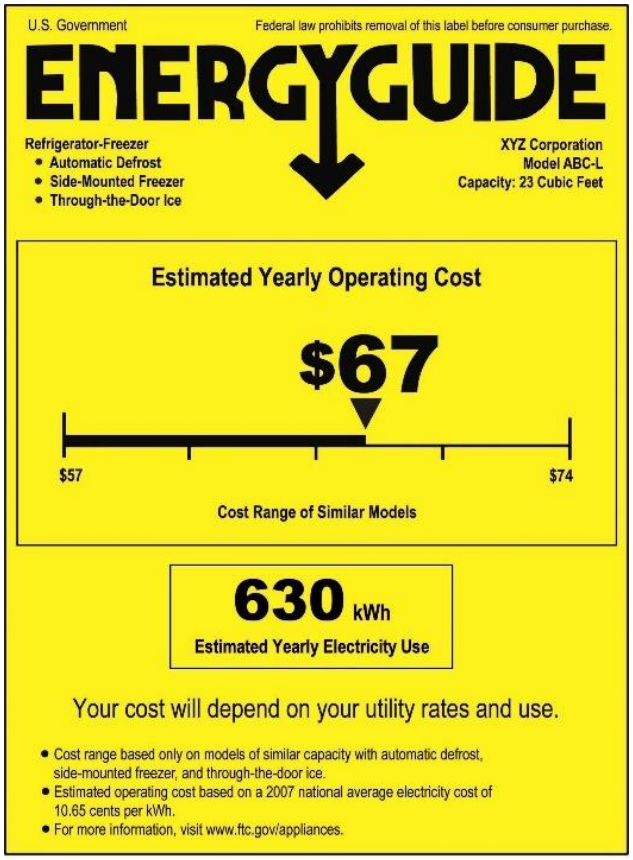
My father and I looked at the alternatives for solar and battery systems. We reviewed different installers and saw a sizeable difference in price. I wasn't sure how important quality was, so I rang a friend who runs a solar installation company that specializes in large systems for business. He told me that about 10% of his business was removing cheap solar installations that had failed. He suggested using a company that had been around for at least a few years, so that if anything went wrong in the future, they would still be around to fix it. We looked at two companies, one of which had been a major electrical component wholesaler for more than 30 years. The quotes we received only had a pay-up-front option, which was not affordable for us at the time. We will continue to try to find more options for solar installation. We also continue to work on many changes that are listed in the following table.

Reduce emissions from other areas

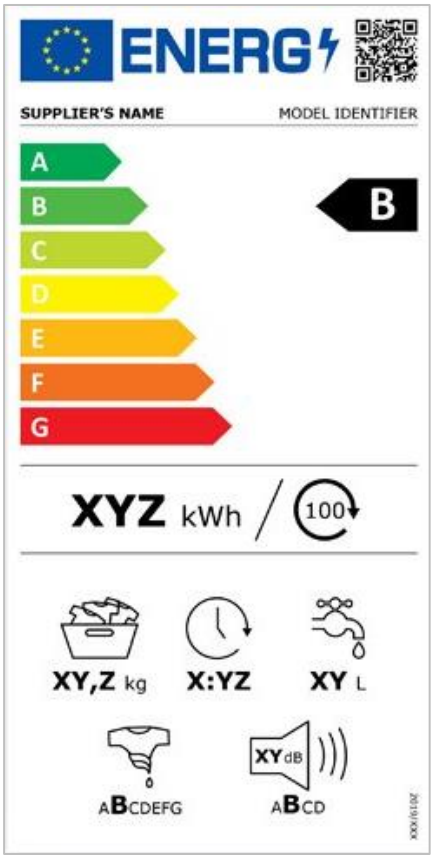
Some appliances use a lot of energy when in standby mode; this can account for up to 10% of residential energy.[21]

Personal action				
Description of the Action	What Action summary	Who will do it	When to do it	Status Completed
Smaller one-off tasks				
Install energy-efficient light bulbs, such as LEDs. You can see the difference that choice of light bulb makes from the table on the next page.				☐
When not using an appliance, turn it off. The worst offenders are TV, recorder/players, game consoles, cable boxes, stereos, computers, screens, laptops, and printers. As often as you can, turn them off at the power socket or plug them into a power strip and then turn the power strip off when not in use.				☐
Another alternative is a smart plug, which can be programmed to turn on or off at specific times.				☐
Unplug rechargers for phones, laptops, tablets, or turn off at the switch when not in use.				☐
Turn off lights in rooms not in use.				☐
Don't leave a laptop or computer running when not in use. Some computer parts will last longer if they are used less.				☐
Bigger one-off tasks				
If you have a pool, consider using a cover to keep the heat in and install an efficient filter pump; also consider solar for heating.				☐

Energy Rating Label from the United States



Energy Rating Labels from Europe



Source: US Federal Trade Commission and the European Commission

Light Bulb Comparisons

Evolution of the Light Bulb				
	Incandescent	Halogen	Compact Fluorescent (CFL)	Light Emitting Diode (LED)
Year Developed	1879	1959	1976	1994
Energy Needed for 250 Lumens	25W	18W	6W	4W
Energy Lost to Heat	90%	80%	50%	10%
Average Life Span	1,000 hours	2,000 hours	10,000 hours	25,000 hours

Source: United Nations Food and Agriculture Organization (FAO)[22] ; Images: Den Potisev on iStock

Transportation

Actions – Transportation

Vehicle usage (motorbike, car, SUV, or van)

I would like to buy an electric vehicle, but I can't afford one now. However, I plan to make my next car purchase an electric one. I found I could make many changes to the way I use transportation to reduce emissions. The following tips are mainly for old technology internal combustion engines, but may also help with zero- or low-emissions vehicles to reduce energy use and increase range.

Personal action				
Description of the Action	What Action summary	Who will do it	When to do it	Status Completed
Smaller one-off tasks				
Reduce weight by removing unnecessary items from the car.				☐
Remove accessories that increase wind resistance, like roof racks, when not in use, as they can decrease miles per gallon (about 17% for fuel cars).[23]				☐
Healthy planet habits				
Regularly check tire pressure. Properly inflated tires last longer and increase miles per gallon.				☐
Keep the temperature setting at the lowest for heating and highest for cooling that will make you comfortable. Parking in the shade on a hot day can help to reduce the amount of cooling needed.				☐
Aggressive driving—speeding, rapid acceleration, and braking—can lower mileage (for fuel cars by about 10% to 40% in traffic).[24]				☐
Mileage improves by observing the speed limit, so try cruise control on freeways, if you have it, to save about 7% to 14% for fuel-based cars.[25]				☐
For fuel cars, use the recommended oil for that vehicle and keep it serviced and tuned regularly.				☐
Bigger one-off tasks				
When buying a vehicle, consider an electric or hybrid. If you can't afford one, then think about a car with a more efficient engine. Information on fuel efficiency is available at www.fueleconomy.gov.				☐

Travel less or change the way you travel

Personal action				
Description of the Action	What Action summary	Who will do it	When to do it	Status Completed
Less travel Try making fewer trips through planning. One way could be to plan shopping more efficiently, to go less often, or to combine shopping for several things in one trip.				☐
People power When not going long distances, look at walking, using a scooter, or riding a bike. The American Heart Association advises that being more active can lower the risk of heart disease, stroke, Type 2 diabetes, high blood pressure, dementia, Alzheimer's, and several types of cancer.[26]				☐
Holidays If you plan a holiday, consider traveling inside your own country or local region and look at lower-emissions options.				☐
Commuting to work While many people don't have the option to work from home, it might be possible for some people. For those whose job does not require them to be at the workplace, this possibility could be discussed with a supervisor. It might not be possible to work all days from home, but maybe one or two per week. If you drive to work, see if might be allowed to start early and finish early (or start late and finish late). This might reduce the time you spend in traffic, reduce emissions, and save money.				☐
Public transport See if you can use public transportation more often. If there are not enough public transportation options in the local area, then consider adding this to the list of things to ask your local or state politicians.				☐

PART 3

Reviewing and Updating the Plan

"Every bit of warming matters,
every year matters,
every choice matters."

IPCC Special Report on Global Warming of 1.5°C

Review Progress

Refresh the process

Now that we have gone through the process of reducing emissions, consider reviewing progress, offsetting, and achieving net-zero. The following is a quick refresh of the process based on *Climate Neutral* by the United Nations Framework Convention on Climate Change (UNFCCC)[27]:

1. **Plan:** Find out the amount of your emissions and create objectives.
2. **Reduce:** Make personal emissions reductions.
3. **Review:** Measure the remaining emissions.
4. **Offset:** When emissions are unavoidable, offsets are activities that balance emissions by reducing or removing greenhouse gases from the atmosphere.[28]
5. **Net-zero:** Achieve a state of net-zero emissions when human-caused greenhouse gas emissions are balanced by removals over a specified time.[29]

The process of reducing emissions

It is important to recommit to the objective of stopping greenhouse gas emissions as quickly as possible. Offsetting should only be used as a temporary measure for unavoidable emissions. It should not be used as an excuse to delay action in reducing emissions for individuals, businesses, or governments.

Review: Carbon Footprinting

Having gone through the process of reducing emissions in the different areas, it's time to review your progress. This means conducting a carbon footprint assessment for your household to see what emissions are left. Some of the reasons there might be emissions left over:

- In many cases, no zero-emissions product or service options exist.
- No labeling or information is offered on the level of emissions created by products or services.
- Some changes take time, such as installing solar panels.
- It might be difficult to afford low- or zero-emissions alternatives.

After finding what emissions remain, we will look at carbon offsets and how they work. I've included instructions for carbon footprinting in the next pages. One calculator is designed for residents in the United States, as provided by The Nature Conservancy. The other calculator has an international approach and is provided by an Australian organization called Trace.

	Personal action	OPTION 1 – UNITED STATES

United States – The Nature Conservatory

Go to the link: www.nature.org/en-us/get-involved/how-to-help/carbon-footprint-calculator/

1. Get Started: Select a zip code, state or city in the United States, how many people live in the house, and the total annual income, then click "*Next*".

2. Travel by Vehicle: You can choose diesel or gasoline on the left, then enter the total number of miles traveled per year. To find this, you can use an online road trip app to determine the distance of each of the regular trips you make in a week and add them up, then multiply by 52. Miles per gallon is the distance, measured in miles, that a car can travel per gallon of fuel. You can use the average default of 22 miles per gallon. Or to find the miles per gallon for your car or motorbike search online: "[your car's make] [model] [year] mpg"
(for example: "Ford Fiesta 2020 mpg"). If you have only one car you can enter zero for the next one, or if you have more than two cars you can use the "+add" at the top to add more vehicles.

3. Public Transport and Air Travel: Select the "Advanced" options to add more information and get a more accurate estimate. Set the modes of transportation that you do not use to zero.

4. Home: Work out from your energy bills how much to enter for electricity or natural gas or use the estimates provided. To work out the size of your living space in square feet, you can enter it if you know, or work out the area of each room by multiplying the length and width of each room and then adding them up. Another alternative is to use the average size of a single family detached home (2,200 sq.ft.), a two-bedroom apartment (1,000 sq.ft), a single-bedroom apartment (710 sq.ft.), or a studio (470 sq.ft.)[30]

5. Food: Click "Advanced" to enter more information and use the average values or adjust them where appropriate using the sliders.

6. Shopping: Click "Advanced" to enter more information and use the average values or enter figures which are more accurate.

Record your results
You can click on the bar chart icon to make it appear. Then click on each bar to find out the value and enter each in the table below and the total footprint. If you entered your footprint information at the beginning, then add these final entries on the right. If this is the first time you calculated your footprint, put them in the left column.

Emissions at the beginning		Emissions at the end		
Travel		Travel		
Home		Home		
Food		Food		☐
Goods		Goods		
Services		Services		
Total Footprint (tons CO2/year)		Total Footprint (tons CO2/year)		

Feel free to use another carbon footprint calculator. Other options are provided by 8 Billion Trees www.8billiontrees.com/carbon-calculator/ and the Global Footprint Network www.footprintcalculator.org.

	Personal action	OPTION 2 – INTERNATIONAL

International – Trace

Go to the link: www.our-trace.com/tools/carbon-footprint-calculator

1. Your Home: Select country and currency (USD=United States, GBP=Great Britain, EUR=Euro, NZD=New Zealand, AUD=Australia). If your country is not on the list pick the closest one or select other and use USD. Then click "*2*".

2. Your Home: Fill out each question then click "Next"

3. Food and Waste: Fill out each question then click "Next"

4. Travel by Vehicle: For transport by motorbike or car you need to estimate how far you travel each week. You can use an online road trip app to find out the distance of each of the regular trips you make in a week and total them.

4. Travel by Public Transport or Flying: For public transport you can use an online trip app to find out the distance of each of the regular trips you make in a week and add them up. For the flights, you can make a list of the trips you've taken and then go online to find out how many hours each flight is. You could search "How long to fly from [departure point] to [destination]."

At the end, you are asked to enter a name and email. Regardless of what you enter, the results will still be shown on the next screen. Trace is an Australian organization, and the results page includes a native animal such as a kangaroo or wombat. You can ignore this and simply collect the results.

Record your results

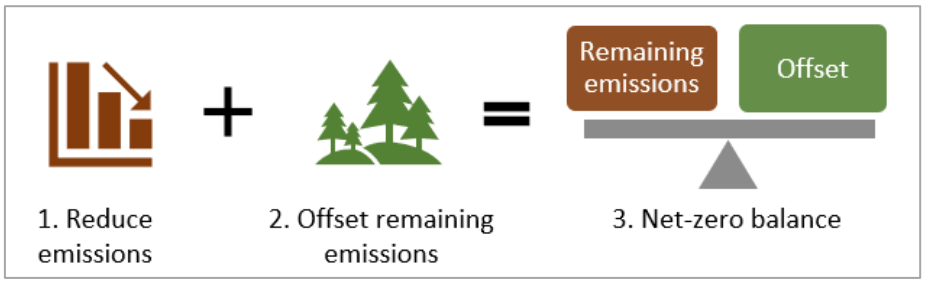
If you entered your footprint information at the beginning, then add these final entries on the right. If this is the first time you calculated your footprint, put them in the left column. Enter the percentages for each of the different areas and then the total amount in metric tons at the bottom.

Emissions at the beginning		Emissions at the end		
Household		Household		
Food & Waste		Food & Waste		
Ground Travel		Ground Travel		☐
Air Travel		Air Travel		
Good & Services		Good & Services		
Total Footprint (metric tons CO2/year)		Total Footprint (metric tons CO2/year)		

Offsetting and Achieving Net-Zero

The IPCC defines net-zero as a point when human-caused greenhouse gas emissions are balanced by human-caused removals over a specified time.[31] One way to balance emissions is to financially support projects which reduce or remove greenhouse gases from the atmosphere. This can be done by buying carbon credits. One carbon credit represents the certified removal of one metric ton of carbon dioxide from the atmosphere.[32] Ten metric tons of remaining emissions could be balanced with ten credits.

Carbon Offsets: A Temporary Process



Source: British Standards Institution (BSI)[33]

Opportunities are available to support projects that reduce emissions and to help communities in developing countries on the front lines of climate change. Some examples include:

- Replanting forests with a biodiverse range of trees and native vegetation while supporting local and indigenous communities.
- Supporting developing countries to create renewable energy, which often means reducing the demand for fossil fuels or providing electricity to people for the first time.
- Many people in developing countries don't have access to energy for cooking and rely on burning wood in fireplaces. Some projects provide stoves that are 50% more efficient. This means fewer emissions, less stress on nearby forests, and less pollution in the home.

You can choose from many other types of projects.

What I did

I saved money by reducing my car usage, and we have also saved on our food, energy, and consumption. We put enough of the savings to pay for carbon credits to offset our remaining emissions. I found many types of organizations offering carbon offsets online. Some projects have been criticized for not achieving what they promised, so I looked for projects that are certified by an internationally recognized organization. This certification confirms that each carbon credit represents one metric ton of carbon dioxide removal.

Two of the main certification organizations are Gold Standard and the Verified Carbon Standard (VCS) by Verra. It was also important to us that the projects aligned with our values by supporting developing countries and the United Nations Sustainable Development Goals. After reviewing several projects, we found the credits can cost from US$11 per metric ton up to US$45. Therefore, if you have ten metric tons to offset, this could cost between US$110 to US$450, depending on the projects you choose. We bought several credits from a few different projects that helped renewable energy development, reforestation, and efficient cookstoves in developing countries. These were certified by either Gold Standard or Verra.

Personal action - Offset remaining emissions				
Description of the Action	What Action summary	Who will do it	When to do it	Status Completed
Emissions Identify the amount of the remaining emissions determined by using the carbon footprint calculator.				☐
Review and select offset projects Review various offset projects, taking into consideration your financial circumstances and values. Gold Standard and South Pole are two well-known organizations that offer certified carbon credits. Their information is listed below. Consider involving other people in your household in the final decision on which projects to choose.				☐
Purchase offsets Ensure that the purchase of carbon offsets will not cause financial hardship to the household, then purchase offsets.				☐

There are many carbon offset programs in place around the world. If you are interested in using other options, search online for "certified carbon offsets in [country name]" for one that suits your region or personal objectives.

Gold Standard

In addition to maintaining an international standard for carbon offsets, this organization has a carbon credit marketplace with a range of carbon removal and emissions reductions projects. These also support the UN Sustainable Development Goals.

How it works: www.goldstandard.org

Projects to choose from: marketplace.goldstandard.org/collections/projects

South Pole

The projects at South Pole are certified by Verra or Gold Standard and have many options that are aligned to the UN Sustainable Development Goals.

How it works: www.southpole.com/carbon-offsets-explained

Projects to choose from: market.southpole.com/home/offset-emissions

Update the Plan

The next step is to update the original plan and then keep the process going.

Update objectives

In our household, we can still improve in several areas. So, we will set a new objective at the beginning of each year. We will update our objective and put it into the SMART criteria format below.

Specific	Reduce emissions by an additional [new target] % from the level of last year. Then offset the remaining emissions to achieve net zero.
Measurable	Calculate emissions at the end and review progress.
Assignable	Work on reducing emissions together as a household.
Realistic	Ensure that the objectives and time frames are both feasible.
Time frame	1 January to 31 December of each year

Personal action | Decide on an emissions reduction objective

Specific		
Measurable		
Assignable		☐
Realistic		
Timeframe		

Update plan

With a new objective, the next thing to do is plan additional actions and future progress. The benefit of calculating a carbon footprint is that we now have information on the remaining emissions to help us decide where to act. Update your plan by looking at your carbon footprint and targeting areas of highest emissions. In addition, review the checklists to identify actions that require additional attention and have the best opportunity for further reductions.

Conclusion

From the Author

One of the main things I have learned is that reducing emissions and encouraging others to make positive change may take some time, and things may not always work out on the first try. Sometimes, when working on a long-term objective, setbacks and obstacles can get in the way. However, I look at these as temporary and make an effort to keep going forward. If we never give up, then we can't fail.

As you progress, I wish you well. I hope you will reduce emissions, encourage those around you, and influence others to act now. I also hope that you will feel more hopeful and confident about your future and life on Earth.

I strongly believe that as more people take action every day, it will create an overwhelming tide of change, making the world a better place and protecting our beautiful home.

Best wishes,

Philip Kent-Hughes

Keep updated about actions at www.climate-action.org

End Notes

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