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## Climate and Threats on Cultural Heritage

### CATCH



**“Saving The Planet”**



## **Erasmus + KA 2 School Exchange Partnership**

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## FOREWORD

“Saving The Planet” is the main result of the Climate and Threats on Cultural Heritage project (Erasmus + KA2: Strategic Partnership in School Education). It includes daily life tips to reduce carbon footprint. Also, it includes detailed information about disaster scenario of the scientists next 20 years if we don't protect the planet. The partner cities are Massafra from Italy, Tychy from Poland, Despotovac from Serbia, Kolarovo from Slovakia, Alfaro from Spain and Kütahya from Türkiye.

In an era marked by unprecedented technological advancement and globalization, humanity finds itself at a pivotal juncture. The collective choices we make today reverberate far beyond our immediate surroundings, shaping the destiny of our planet and all life that calls it home. At this crucial moment, the imperative to address climate change and reduce our carbon footprint has never been more urgent.

The Earth, our precious blue-green oasis suspended in the vast expanse of space, is facing an existential challenge. The traces of human activity are becoming increasingly evident in the changing climate patterns, rising temperatures, and alarming ecological disturbances. The evidence is undeniable, and the science unequivocal: our actions are driving a perilous trajectory, one that jeopardizes the delicate balance of our ecosystems and threatens the well-being of current and future generations.

May our efforts inspire hope, catalyse action, and set us on a course towards a sustainable and thriving future.

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## INTRODUCTION

The EU is committed to taking action to limit global warming to well below 2°C above pre-industrial levels, in line with the 2015 Paris Agreement. In November 2018, the Commission adopted the 'clean planet for all' strategy, aiming for a prosperous, modern, competitive and climate-neutral economy by 2050. Education is an essential element of the global response to climate change.

As it was stated in the project summary, The general aim of the project is to build student awareness on the cultural heritage of their city, the preservation of cultural heritage and a critical awareness of climate change problems related to them. Other project objectives include:

- To provide permanent behavioural changing on the students about saving our planet and preserving cultural heritage areas through project activities;
- Raising awareness on tangible and intangible cultural heritage safeguarding in schools;
- To share best practices on cultural heritage and climate education among partner schools;
- To raise awareness level of importance of cultural heritage areas at town level;
- To develop foreign language and teamwork skills of the pupils and staff;
- To promote cultural diversity and EU citizenship and respecting other countries' cultures;
- To make the participants feel that they valuable members of the wide EU cultural family.

We expect these long-term benefits at the end of the project on participants:

### **Students**

- Gaining permanent behavioural change on daily life routine to protect our planet;
- Willing to volunteer to save cultural heritage areas;
- Knowing about importance of cultural heritage and handing it over to the next generations;
- Knowing partner countries' cultures;
- Respecting to the cultural and linguistic diversity and human rights;
- Breaking the prejudices about other cultures and nations.

- Improving the English Language skills;
- Developing teamwork and ICT skills;
- Feeling a part of European Cultural Family.

### **Educational Staff**

- Breaking the prejudices about other cultures and nations;
- Developing professional skills and comparing the teaching methods with partner countries' education systems;
- Gaining new methods of cultural heritage education;
- Making long-term transnational cooperation with European colleagues;
- Promoting cultural and linguistic diversity;
- Fighting xenophobia and racism;
- Carrying the ongoing activities of the school to the international area;
- Improving the teamwork, ICT and foreign language skills;
- To eagerly continue to the international partnership projects.

### **Project Period**

01.09.2020 – 31.08.2023

[www.catcherasmus.eu](http://www.catcherasmus.eu)

## ECOLOGICAL FOOTPRINTS

Ecological footprints measure the resources used to support our lifestyle and compare our resource use to what is sustainable, considering the carrying capacity of the planet. This method uses land as a measure needed to support lifestyle. A sustainable lifestyle would mean each person on Earth using about 1.8 global hectares.



These ecological footprint figures also show that if everyone lived like the average person in India, then we would be living within the limits of our planet. But millions of people in India live in poverty and hunger and without access to electricity. If we all lived a more affluent lifestyle, such as people in Japan, then we would need 2.6 planets to sustain us all.

If everyone adopted the average life style of the highest footprint countries, namely the United Arab Emirates, Qatar, Denmark, the United States, and Belgium, we would need up to six planets to support everyone. This reveals strong imbalances that have serious consequences on people's life. Rich countries need to consume less and better. Conditions of



living in developing countries need to be improved through more responsible and sustainable consumption.



Measuring our ecological footprints as individuals, communities, cities, businesses and countries allows us to better manage our ecological assets by taking collective and personal action.

### **Get Active!**

Every day we are exposed to hundreds of messages that attempt to influence our lifestyle choices. Here are a few tips to help you understand how this has an influence on you:

- Next time you are shopping or reading a magazine, look at the advertisements and think about the lifestyles they are trying to encourage. Which messages help encourage behaviour to reduce climate change and which could make it worse?
- Next time you watch TV, think about both positive and negative role models and messages.

## CARBON FOOTPRINT

The modern world, fueled by technological advancements and industrial progress, has brought unprecedented convenience and prosperity to humanity. However, this progress has come at a significant cost—our carbon footprint. The carbon footprint, a measure of the total greenhouse gas emissions produced by human activities, stands as a looming challenge that demands immediate attention. As we witness the dire consequences of climate change and environmental degradation, the need to reduce our carbon footprint has become an imperative for safeguarding the health and longevity of our planet.



The carbon footprint encompasses a wide range of human activities that release greenhouse gases, primarily carbon dioxide (CO<sub>2</sub>), into the atmosphere. These gases trap heat and contribute to global warming, resulting in the disruption of weather patterns, rising sea levels, and other environmental repercussions. The carbon footprint is a measure of our collective impact on the Earth's climate system, and it encompasses various aspects of our

lives, including energy consumption, transportation, industrial processes, and even the food we eat.

### **Carbon Footprint Calculation**

Carbon footprints are different from a country's reported per capita emissions (for example, those reported under the United Nations Framework Convention on Climate Change). Rather than the greenhouse gas emissions associated with production, carbon footprints focus on the greenhouse gas emissions associated with consumption. They include the emissions associated with goods that are imported into a country but are produced elsewhere and generally take into account emissions associated with international transport and shipping, which is not accounted for in standard national inventories. As a result, a country's carbon footprint can increase even as carbon emissions within its borders decrease.



## THE EU EFFORTS ARE PAYING OFF

Climate change is already affecting Europe in various forms, depending on the region. It can lead to biodiversity loss, forest fires, decreasing crop yields and higher temperatures. It can also affect people's health. The EU was the world's fourth biggest greenhouse gases emitter after China, the US and India in 2019. The EU is a key player in UN climate change talks and has signed the Paris agreement. All EU countries are also signatories, but they coordinate their positions and set common emission reduction goals at the EU level.

Under the Paris agreement, the EU committed in 2015 to cutting greenhouse gas emissions in the EU by at least 40% below 1990 levels by 2030. In 2021, the target was changed to at least 55% reduction by 2030 and climate neutrality by 2050. In 2021, the EU made climate neutrality, the goal of zero net emissions by 2050, legally binding in the EU. It set an interim target of 55% emission reduction by 2030. This goal of zero net emissions is enshrined in the climate law. The European Green deal is the roadmap for the EU to become climate-neutral by 2050.



The EU is also working to achieve a circular economy by 2050, create a sustainable food system and protect biodiversity and pollinators. In order to finance the Green Deal, the European Commission presented in January 2020 the Sustainable Europe Investment Plan, which aims to attract at least €1 trillion of public and private investment over the next decade. Under the investment plan, the Just Transition Fund is designed to support regions and communities that are most affected by a green transition, for instance regions that are heavily dependent on coal.



It is accepted beyond any reasonable doubt that the increase of greenhouse gases (GHGs) in the atmosphere and, regarding CO<sub>2</sub>, in the oceans, is the main cause of the climate and environmental change happening today. These changes will accelerate in future decades due to the already-existing concentrations, and could have serious consequences in the coming decades and extremely serious ones for future generations if we do not quickly stabilize the quantity of GHGs in the atmosphere (mainly CO<sub>2</sub>, which has a long cycle).

## HOW TO REDUCE MY CARBON FOOTPRINT?

Eating, travelling, heating your home... What's the carbon footprint of these activities and how can we make more climate-friendly choices? When you drive your car, buy a pair of sneakers or grill a steak, you contribute to the emission of carbon dioxide and other greenhouse gases into the atmosphere. It's your carbon footprint. Many countries, institutions and companies have committed to reduce their emissions while the EU has even set the objective of being "climate neutral" by 2050. As an individual, you can also estimate your carbon footprint and reduce it. Discover how.

Small changes can make a big difference in the long run, for example when it comes to transportation, food, clothing, waste, etc. Here are some tips:

### - Food

Consume local and seasonal products (forget strawberries in winter)

Limit meat consumption, especially beef

Select fish from sustainable fishing

Bring reusable shopping bags and avoid products with excessive plastic packaging

Make sure to buy only what you need, to avoid waste



### **- Clothing**

Take good care of your clothes

Try swapping, borrowing, renting or buying second-hand

Buy responsibly-made clothes, e.g., made from recycled material or with an eco-label

### **- Transport**

Cycle or use public transport

Be smart about when and how you drive

Try the train for your next holiday

### **- Energy And Waste**

Turn down the heating by 1°, it will already make a difference

Take short showers

Turn off the water while you brush your teeth or clean the dishes

Unplug your electronic equipment and don't leave your phone on charge when the battery is already full

Don't store unnecessary data in the cloud

Select energy efficient products with an "A" label (EU Energy Label)

Limit and recycle your waste

## **TO REDUCE DIGITAL FOOTPRINT WHAT CAN YOU DO**

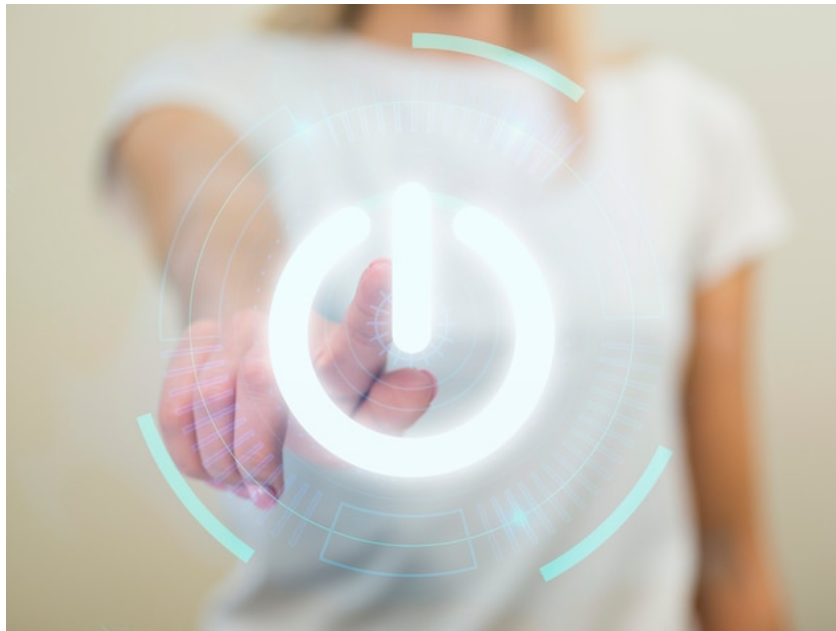
### **- Hardware**

Extend the life of your devices as much as possible. Think twice before upgrading.

Switch off your computer when you leave.

Program your computer to go to sleep mode after a few minutes of inactivity.

Switch off your Wi-Fi when you're not at home – your Wi-Fi router consumes as much energy as a small fridge.



### **- Internet Surfing**

Use environmentally friendly search engines which run on renewables and compensate their carbon footprint through tree plantations or similar projects.

To the extent possible, use Favourites or History rather than searches - performing a search can consume as much electricity as boiling 1 liter of water.

Do 'limited' searches: whenever possible: perform your searches within a relevant website (Wikipedia, etc.) rather than on the entire web.

### **- Email**

Unsubscribe from commercial distribution lists or newsletters that you don't need.

Clean up your mailbox as frequently as possible.

Whenever possible, send links rather than attachments.

Send big attachments through file transfer platforms rather than email.

Do not use huge distribution lists, only send your emails to whoever needs to see them.

Whenever possible, call or meet in person!



### **- Videos/Pictures**

Try to limit streaming and online gaming to the extent possible.

Prefer audio files to videos.

When streaming, use Wi-Fi rather than 4G and avoid viewing in HD whenever possible (doing so you will consume 4 to 10 times less energy).

Because rare is precious, only share your best pictures with the rest of the world! Choosing is hard, but try publishing only your very best selfies!

### **- Data Traffic and Storage**

Be selective, and clean up the data you choose to store on a regular basis.

Store big files on external hard drives rather than on the Cloud.

Have you noticed that all the pictures of your friends' pictures received through WhatsApp get automatically stored on your phone and your Cloud? Delete them, we won't tell your friends... (you can also deactivate automatic download from WhatsApp by going to settings - > Data and Storage Usage -> Media auto-download).

### **- At Work**

Avoid duplication of files saved in different systems.

Manage document's lifecycle: delete them when they are not useful anymore, if not required for audit purposes, for example.

Avoid asking for the restore of a file or an email that could be retrieved in another way.

Finally, If you have teenagers at home who walked from school for climate, but spend hours watching YouTube, playing games online, or sending selfies - have them read this article again.

## FOOD

We all need food and drink to survive, but for some, what they eat and drink is more a matter of lifestyle choice than survival. What are the impacts of the choices we make on food and drink and what alternatives are available to us?

### A world of opposites

As a world population, we have never had so much food. The world produces enough food to feed everyone. Improvements in farming and the easier transportation of food around the world are just two of the reasons why. But this is not the case everywhere. Globally, almost a billion people (around 15 per cent of the world population) go to sleep hungry every night, most of them living in Asia and Africa. For them, choice and access are luxuries they do not yet have. They simply need more food. In other parts of the world, especially the more developed regions, there are over a billion people who are overweight, with 300 million being obese, the majority of them being poor people. Obesity has increased globally by around three times since 1980, mainly because of an increase in high-fat and high-sugar convenience foods.



## LOCAL FOOD

Because of the growing awareness of food miles, there have been many campaigns aimed at persuading consumers to buy food that is produced locally instead of food that is transported from hundreds or even thousands of kilometres away. In many cases, it is possible to find local alternatives, but sometimes, they are more expensive and there may not be enough to provide for everyone. In general, buying local and seasonal foods will reduce the use of fossil fuels, boost local economies and increase people's awareness of where their food comes from.



Across the world, millions of people are growing their own food. This is especially true in developing countries where even the smallest of spaces are put to use to grow crops or keep animals. In large cities like Mumbai in India, it is not unusual to see small plots of land producing food for the local people. However, this can be challenging for some developing countries, which do not produce enough local food, and as a result, they rely heavily on imported foods.

## ORGANIC FOOD

Food produced using organic farming methods produces fewer emissions and uses less energy. This is because it recycles nutrients into the ground instead of adding them using artificial chemicals in their manufacture. This uses large amounts of energy, often from the burning of fossil fuels.



Organic food is generally more expensive than conventional foods because the price not only reflects the cost of food production itself, but a number of other factors that are not part of the price of conventional food, such as environmental enhancement and protection. However, as demand for organic food increases along with more technological innovations, this may help reduce costs of production, processing, distribution and marketing for organic produce, making it cheaper for consumers.

## ENERGY CONTROL

We need energy to create everything we buy, eat, travel in, use, such as electricity, and wear. Energy is the master resource in any society. In developing countries, where many people live in energy poverty lacking electricity and heat, energy is particularly needed to help improve their economies and the lives of people by lifting them out of poverty. Access to electricity helps people live longer and healthier lives. Nonetheless, to help reduce greenhouse gas (GHG) emissions, both developing and developed countries need to lessen their use of fossil fuels as a source of energy. One way of doing this is by relying on renewable energy sources like wind and solar.



### Energy Choices

To meet our current and future energy demands in a way that will not harm the environment, we have two choices – either to use energy from renewable sources such as from the sun and wind or to use energy in a more efficient and wise way. Using energy more efficiently not only helps the environment, but it is also more cost effective. However, this poses a challenge for all. Countries with high carbon footprints, for instance, may want to continue in their path of consumption, while those with lower carbon footprints may want to

increase their economic activities and develop further. Therefore, exploring and using more renewable energy could provide the best solution for all. Aiming for a fairer carbon lifestyle for everyone on Earth is the key objective.

## **Renewable Energy**

As well as using energy in a more efficient way, we can try to use electricity that is not made by burning carbon fuels. One way to mitigate GHGs is to shift from oil and coal to renewable energy sources, such as wind turbines, solar panels or hydro dams. A renewable energy source is a source of energy that is replaced by a natural or carefully controlled process at a rate that is equal to or faster than the rate at which the resource is being consumed.

Although we are not yet able to capture this tremendous amount of energy, enough sunshine reaches the Earth in two hours to meet the world's energy needs for a year. Some scientists believe we could get all the energy we need from renewable sources - sun, wind, water, biomass, heat from within the Earth - within a few decades, making oil and coal nearly unnecessary. Many future careers, such as those in renewable energy and technology sectors, will help shape a green economy, based on sustainable, accessible and clean energy solutions.

### **Carbon footprint can be reduced by;**

- Sharing televisions, computers and other electronic items with other household members.
- Buying energy-efficient electronics and appliances, and plug timer switches.
- Buying a solar charger, such as for a mobile phone. This avoids buying products that use external power transformers (chargers). Better still, try doing without so many electronic devices, and enjoy the alternatives.
- Unplugging all idle appliances from the main switches. Better still pulling out plugs surprisingly saves electricity. If the plug gets even slightly warm, it is still using power.



Transport is necessary to provide access to essential services such as health and education. For instance, in Morocco, the number of girls in school more than doubled in areas where the roads were improved. Better transport can also improve incomes. In parts of rural Africa and South America, road building has allowed farmers to get more crops to markets. Food production and incomes have increased by up to 200 per cent as a result. Transport links also improve lives by allowing people to visit friends and family, to enjoy their leisure time or to visit new places.

We all need to travel, but we can ask ourselves some critical questions to make the best transport choices:

- Can I walk or cycle easily and safely?
- Is there a way to get to my destination using public transport?
- If I have to use a car then can I share my journey with someone else or do several things on one journey?
- Are there alternatives to flying and do I need to fly in the first place?

## Urban Public Transport

More than half of the world's population lives in cities and so their travel choices are very important. Cities often suffer from traffic congestion and poor air quality caused by pollution from transport. But cities also offer some of the most sustainable transport options available. A large population makes it possible to invest in public transport systems such as urban rail, dedicated bus lanes and cycle schemes.





## LEISURE AND ENTERTAINMENT

We all want to enjoy life, but are there ways we can do so that also reduce our impact on the planet and its resources?

### Having Fun

Leisure time is an essential part of healthy living. It is important for young people to break away from their busy lifestyles to take some time out for recreation and pure enjoyment. There are certainly ways to have fun whilst taking action on climate change. There are now many green choices we can make about sports, games, arts, films, festivals, holidays, youth activities and projects. Changing people's behaviour for the better is easier when it's fun! In fact, young people lead the growth in climate-friendly acoustic music jams, board games in cafes and green festivals.



### Organizing Low Carbon Events

Many young people have the chance to organize fairs or festivals in their community or college, or at family gatherings, parties and seasonal celebrations. Why not make them green events?

There are many ways to go green when organizing events, for example, having vegetarian/organic food choices, using washable and recyclable cutlery and crockery, having paperless invitations, relying on natural light, etc.

## **Low Carbon Sports**

Any sport that uses fuel is likely to be carbon costly whether in a powered vehicle, travelling to get to the sport, in the sports clothing or sports equipment or on the surfaces. But think of the sports that are low carbon - activities that allow you to interact with your natural environment like cycling, skateboarding, surfing, climbing, sailing, canoeing, football, etc.

The Otesha Project, Canada, uses bicycle theatre to encourage young people to think about their lifestyle choices. The youth-led project runs cycle tours for young people, stopping off at schools, community groups and festivals along the way to perform their plays or run workshops in sustainable living. The project started in Canada in 2003, but its ideas and actions have since spread to the Philippines, Japan, the United Kingdom and Australia.

## **Climate-Friendly Arts**

Performing and visual arts have the power to express and explore other ways of looking at the world, enabling us to question and change our lifestyles. Organizing events that are climate-friendly can be good for their promotion and reputation, as well as for the planet and the participants.

The visual and performing arts can help to expose and express issues related to climate change, consumerism and sustainable lifestyles.

## TAKING ACTION

Young people are not powerless. Their generation is the first generation with the knowledge, skills and technology needed to prevent the catastrophic impacts of climate change – but perhaps the last that can actually do so.



Climate change is happening and it needs to be dealt with now. We must be the agents of change in addressing this crisis we have created and everyone has a role to play. As a global community, the lifestyles we lead as individuals, the policies our governments implement, and the way our industries behave all have an impact on this one Earth that we all share. We can find solutions and change the way we are living. This can be done collectively, through the environmentally conscious and sustainable solutions we introduce in our homes, our workplaces, our communities, our cities and countries, but also, individually, by adopting more sustainable lifestyles.

Young people have shown concern about climate change through their engagement in various initiatives around the world. They have been active and vocal at international

conferences on climate change, and have taken leadership roles in a wide range of adaptation and mitigation projects addressing climate change.



### **Choice of Actions**

At the global level, there are five main types of action that could reduce global warming. All of these need government support and most need inter-governmental agreement:

- Changing the behaviour of institutions, individuals and businesses;
- Increasing energy efficiency;
- Switching to low or zero carbon energy sources;
- Speeding up the development of new technologies;
- Using natural carbon sinks, especially forests;

Changing individual behaviour is the trigger for many other actions because as consumers, voters and citizens, we can influence the decisions of others. The demand from our consumer choices can direct the supply of low carbon, energy- efficient products and services. The bottom-up approach to change can work.

It is important that we know the different impacts that our lifestyle choices have on greenhouse gas emissions. For example, some common and popular green behaviour has relatively little impact on emissions, such as buying energy efficient products or recycling. Others such as avoiding unnecessary short-haul flights are less common and popular but have a big impact. These impacts also vary in different countries.

In industrialised countries, the biggest elements of personal carbon footprints are usually housing, transport, food and electrical appliances, in that order. In those countries, people typically consume 40 per cent fuel/electricity, 40 per cent food and 20 per cent for everything else by mass. However, the big elements of personal carbon footprints in developing and emerging countries are usually food followed by housing. However, richer populations in developing countries often have similar personal carbon footprints to those in developed countries.

### **Group Action**

Taking action with other people, in the community, school, college or university, can be more motivating, easy and fun than personal action. But successful group action needs people with a wide range of skills.

### **Skills For Group Action**

- Practical skills - Plant lots of trees as carbon sinks, preferably species that add shade, beauty, fruit and nuts. (See the Billion Tree Campaign)
- Marketing skills - Ask shopkeepers to sell recycled products if they don't already. Recycling paper saves trees. Recycling most materials saves energy.

- Writing and design skills - Show your local or national politicians that you are serious about climate change. Write to them. Visit them.
- Speak out at public meetings - Many policy makers love to hear from young people. Write blogs, letters for websites and local newspapers. Produce posters, leaflets or videos.
- Facilitation skills - Run a workshop for other youth groups.
- Leadership skills - Set up a group and link to sites like Taking Global. Run a local campaign. Join a national or international campaign. Organize a special event, fair or festival.
- Link a campaign to a special day like World Environment Day June 5.



We must act now and we must act fast by adopting low carbon lifestyles and transforming our societies into low carbon societies, both of which are geared towards reducing greenhouse gas emissions. The longer we wait to do this, the more we damage our environment and ecosystems and eventually our daily lives.

## THE CLIMATE DISASTER

The enormous, unprecedented pain and turmoil caused by the climate crisis is often discussed alongside what can seem like surprisingly small temperature increases – 1.5C or 2C hotter than it was in the era just before the car replaced the horse and cart.

These temperature thresholds will again be the focus of upcoming UN climate talks at the COP26 summit in Scotland as countries variously dawdle or scramble to avert climate catastrophe. But the single digit numbers obscure huge ramifications at stake. “We have built a civilization based on a world that doesn’t exist anymore,” as Katharine Hayhoe, a climate scientist at Texas Tech University and chief scientist at the Nature Conservancy, puts it.



The world has already heated up by around 1.2C, on average, since the preindustrial era, pushing humanity beyond almost all historical boundaries. Cranking up the temperature of the entire globe this much within little more than a century is, in fact, extraordinary, with the oceans alone absorbing the heat equivalent of five Hiroshima atomic bombs dropping into the water every second.

Until now, human civilization has operated within a narrow, stable band of temperature. Through the burning of fossil fuels, we have now unmoored ourselves from our past, as if we have transplanted ourselves onto another planet. The last time it was hotter than now was at least 125,000 years ago, while the atmosphere has more heat-trapping carbon dioxide in it than any time in the past two million years, perhaps more.



Since 1970, the Earth's temperature has raced upwards faster than in any comparable period. The oceans have heated up at a rate not seen in at least 11,000 years. "We are conducting an unprecedented experiment with our planet," said Hayhoe. "The temperature has only moved a few tenths of a degree for us until now, just small wiggles in the road. But now we are hitting a curve we've never seen before."

No one is entirely sure how this horrifying experiment will end but humans like defined goals and so, in the 2015 Paris climate agreement, nearly 200 countries agreed to limit the global temperature rise to "well below" 2C, with an aspirational goal to keep it to 1.5C. The latter target was fought for by smaller, poorer nations, aware that an existential threat of unlivable heatwaves, floods and drought hinged upon this ostensibly small increment. "The



difference between 1.5C and 2C is a death sentence for the Maldives,” said Ibrahim Mohamed Solih, president of the country, to world leaders at the United Nations in September.

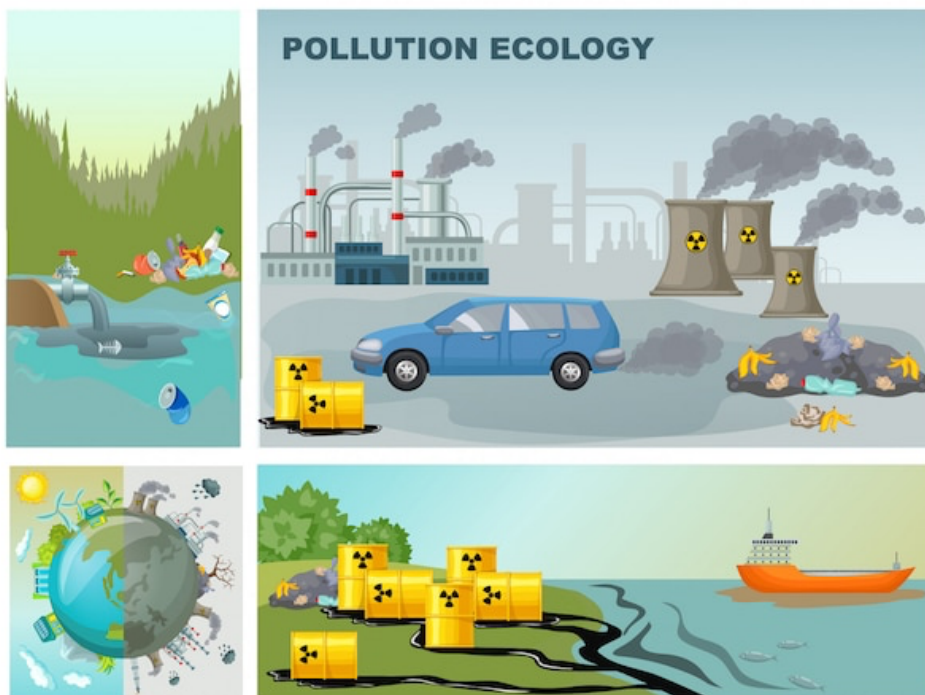
There is no huge chasm after a 1.49C rise, we are tumbling down a painful, worsening rocky slope rather than about to suddenly hit a sheer cliff edge – but by most standards the world’s governments are currently failing to avert a grim fate. “We are on a catastrophic path,” said António Guterres, secretary general of the UN. “We can either save our world or condemn humanity to a hellish future.”



We don’t need to time travel to 2050 to imagine the impact of climate change on the air. Reducing greenhouse gas emissions would not only reduce health problems related to air pollution impacts, but it also could bring along other benefits, like spurring technological innovation, improving the reliability of the power supply by diversifying energy sources, reducing fuel costs and boosting employment.

## Oceans and Water in 2050: Beneath the Surface

More than 90% of the warming created by humans since the 1970s has been absorbed by the oceans. And just as on land, there is a shift underway in the sea that will affect the global oceans of 2050, says David Hutchins, a USC Dornsife professor of marine and environmental biology. “The ocean is warming, acidifying, losing oxygen and being overfished and choked with pollutants ranging from nutrients to plastic,” he says. “Nearly the entire marine environment is in flux right now.”



Numbers of large predator fish have plunged, and about half of the world’s coral reefs have been lost to bleaching caused by warming temperatures, Hutchins says. By 2050, most reefs may have vanished, according to a National Oceanic and Atmospheric Administration report.

Scientists warned that human-induced climate change is warming the planet to the point where it is causing irreversible damage in some parts of the world. The report was released by the United Nations Intergovernmental Panel on Climate Change.

However, the scientists say there is still time to avoid the worst impacts of climate change and every bit of carbon pollution makes a difference.

- It was now "unequivocal" that climate is changing as a result of human activity, and that it is a threat to human societies and the natural world

- Climate change is already making extreme weather events more frequent with 3.3 to 3.6 billion people living in places "highly vulnerable" to these changes

- Cuts to emissions need to be "deep, rapid and sustained" if the world is to limit warming to 1.5 degrees Celsius this decade

- If warming goes above that, adaptation will likely be too much for some communities and ecosystems to survive.

Is this really a 'final warning' from the world's scientists?



Dr Perkins-Kirkpatrick described this report — which completes the IPCC's sixth round of assessments — as a "final warning" because a 1.5C rise in global temperature would threaten the planetary systems human life depends on. AR7, the next assessment report, is expected to be issued after 2030, when global warming is on track to have already breached the 1.5C limit.

"This is the final warning to limit the climate warming," Dr Perkins-Kirkpatrick said. "In the next 10 years, we'll overshoot that 1.5-degree threshold, but then we can bring it back down again — with heavy climate mitigation, heavy investment in renewable energy and also carbon capture and storage," she said.



Macquarie University's Professor Lesley Hughes said what happens in the next seven years would be vital if we're to leave a world that's habitable for our children and grandchildren. "One of the things this IPCC report emphasises is that the window of opportunity for a safer climate in the second half of this century is closing rapidly, but it's not yet closed," she said.

"So, what we do, particularly between now and 2030, is absolutely critical."



