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Girls and Women Connecting
for Environmental Change

We4Change: Girls and Women Connecting for Environmental Change

We4Change Changemakers Event Curriculum

Climate change and environmental awareness from a gender perspective

Focus on:

- **Clean Energy**
- **Sustainable consumption**
- **Mobility**

Contents

Introduction

This module is part of the **We4Change Changemakers Curriculum**, and it represents the course support for the sessions introducing the audience to the topic of climate change during the **We4Change Changemakers Events**. This module aims to give trainers and youth workers background information and further resources for them to explore during these sessions and throughout the entire event. Power Point presentations are also available as course support and can be used as such or adapted for each event.

It aims to raise awareness on the impact human activity on environmental change, how it affects specifically women and advice on what can be done to reduce its negative consequences. The focus is on three thematic areas that we propose for the events:

- Clean Energy
- Sustainable Consumption
- Mobility

All training materials and further educational resources can be found at:

http://we4change.eu/educational-resources/

Climate change from a gender perspective

When we think about the climate movement, female figures may likely come to mind. From Rachel Carson, who in the 1950s published "Silent Spring" her landmark work credited to kickstart the environmental movement, to Greta Thunberg, the most prominent climate activist of today who made herself known for striking school on Friday and kickstarting the international movement Fridays for Future.

Last century the environment movement was marked by remarkable women either in conservation on land, with the work of world-renowned Jane Goodall, and on the blue side, Sylvia Earle one of the most recognized names in ocean conservation.

Not only in the global North, women in the global south have also been very much vocal and important voices in mobilizing towards action. Vanessa Nakate is currently one of the most prominent voices in fighting for climate justice in the African continent. In Brazil, Artemisa is active in fighting for indigenous communities' rights against the mining and logging industry. These examples and many others from the Global South are especially inspiring given the social and political context of these regions, in places in

which being a vocal activist may put these people in dangerous situations and it carries a big amount of risks.

According to the United Nations Convention for Climate Change (UNFCC) climate impacts, especially extreme weather events, are affecting the roles of women and men around the world, particularly in rural areas. It also recognized that women are agents of change. It has been shown that inclusive governance, promoted by international bodies and national governments, can result in long-lasting and effective climate-resilient policies that improve social equity in general, and gender equality specifically, through integrating more women and marginalized groups into decision-making.

It is also necessary to recognise the difference in experiences between the Global North and Global South. There is a quite difference in experience among women in these realities. Whilst women of the south have a more prevalent role in resource management and community leadership, and therefore will suffer more from the impacts of extreme weather events worsened by climate change, in the global north there is a lack of representation in the bodies that govern and decide on climate issues, as well in scientific roles. This is not, by all means, mean that women of the global south do not suffer from this, there is a prevalent lack of representation from the realities of the global south. However, recognizing these different experiences is essential to cultivate solidarity between these two parts of the globe, and coordinate a holistic action and support across these interconnected issues.

Women have clearly been at the forefront of mobilization towards environmental and climate issues. But the reality is that women are considered one of the most vulnerable groups to the impacts of Climate Change.

Undoubtedly, Climate Change is the greatest challenge humanity faces in the 21st century. The environmental dimension of Climate Change is possibly the most easily understandable, however, this has social and economical ramifications. Not only this, it is also interconnected with several issues, a connection which on a first glance may not be so understanding. This is why it is essential to look at the problem from different perspectives - lenses if you will. It contributes to having a holistic understanding of the problem as a whole. And that is why it is important to integrate a gender lens when we deal with climate change

Not everyone experiences the same, when it comes to the consequences of climate change, it depends on the characteristics of the region and the population's capacity to react and respond to it. It intensely highlights inequality worldwide, since it disproportionately affects poor and vulnerable

populations the most, due to the lack of means and capacity to respond to extreme events. Gender issues come into play since most of the world's poor are women, who often rely on natural resources to provide for their families and guarantee their livelihoods.

Despite the disproportionate effects women experience, they actually play a crucial role in adaptation and mitigation to climate change, for their local knowledge and leadership in sustainable resource management, for instance, and for leading sustainable practices at the household and community level. Empowering women and addressing gender imbalances in access to management and decision-making spaces can deliver results in several sectors including food, economic security and health

Complex problems cannot be solved by simple solutions. Raising awareness to it is the first step for collective action. By understanding our role as an individual and as a society, each of us can partake in working towards solutions.

Resources:

https://www.un.org/womenwatch/feature/climate_change/downloads/Women_and_Climate_Change_Factsheet.pdf

https://unfccc.int/sites/default/files/resource/sbi2022_07.pdf

Girls & Women Connecting for Climate Change

This module aims to introduce the thematic for the three changemaking events. Each event will be carried out independently, but will share an initial common structure. The overall theme will be focused on climate change, structured in two "acts". The first act is the same across the three events (with a very slight difference in one or two slides between each event), and it is divided three main sections: What is climate change, and what is driving it; the consequences of climate change; the solutions to reduce emissions. For the second act, each event will branch out to its specific thematic.

In this document it is present the script for the two acts, with the following structure and timings:

1. What is Climate change, and what is driving it? (20 minutes)
2. What are the consequences of climate change? (15 minutes)
3. How can we reduce emissions? (10 minutes)

4. Changemaker event thematic (45 minutes)
   a. Girls & Women Connecting for Clean Energy
   b. Girls & Women Connecting for Sustainable Consumption
   c. Girls & Women Connecting for Mobility

Each event will have its corresponding PowerPoint presentation. The script will also be included in each specific slide, to make it easy to understand which slide refers to the information on the script.

Throughout the presentation will be some moments of reflection, which will reference a word map tool that will allow you to interact with the audience, and make the presentation a bit more dynamic. You can access it here: www.mintiminter.com. Feel free to interact with the audience at your will, as well!

What is climate change, and what is driving it? (20 minutes)

First and foremost, we need to understand what is changing exactly when we speak of climate change. No better way to do it than to first know what exactly is the climate. A good way to exemplify it is to differentiate weather and climate. Weather is the day-to-day state of the atmosphere and its short-term variation that ranges from minutes to weeks. Simply put, it is the information that the weather people provide us every morning - humidity, wind, temperature and so on... The climate, however, is a long-term account of the weather patterns, usually on a longer period of a minimum of 30 years. In other words, it is the information on weather patterns that allow you to know what to expect from seasonal weather throughout the year, and know which type of clothes to keep in your closet to face the weather in each season.

Now, to focus our attention on where all of this takes place: the atmosphere. The atmosphere is a complex and layered space that revolves around planet earth, composed of several gases that are fundamental to guarantee a livable planet and where, amongst other, meteorological phenomenon takes place.

The greenhouse effect

A lot happens in the atmosphere, and the most important regarding climate change is the greenhouse effect. The greenhouse effect is a natural process that prevents us from freezing here on the planet. Without it the temperature on the surface of the earth would be -18C°. This effect is like the workings of a greenhouse, hence the name. Solar radiation passes through the atmosphere and is absorbed by the earth's surface, which re-emits the radiation at a lower wavelength in the form of infrared (IR) radiation. This is exactly what happens

in a greenhouse, where light passes through the glass, hits the ground, which heats up and radiates back from the IR radiation, which is retained by the glass, heating the interior of the greenhouse.

Greenhouse gases (GHG) are responsible for heating the atmosphere and the surface of the earth. Carbon Dioxide (CO_2) is probably the most familiar since it is the most well-known, however, it is not the only GHG:

- Natural - and by natural we mean that they exist naturally in the atmosphere and come from natural/anthropogenic environments: Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (NH_2);
- Synthetic - created by us: HFCS - Hydrofluorocarbons, PFCS - Perfluorocarbons, SF6 - Sulfur Hexafluoride.

GHG comes from a wide array of sources. Carbon Dioxide is the most abundant in the atmosphere and comes mostly from the burning of fossil fuels in transportation and industrial processes, as well as from forests and other land uses (such as agriculture, for example). Methane is generated by waste but mostly from agriculture and livestock activities, as is the case of nitrous oxide which mostly comes from the use of fertilizers. Fluorinated gases are mostly generated in industrial processes and refrigeration, our air conditioners and fridges as examples.

You've learned how the temperature of the earth is maintained at a global average of 18°C that prevents us from freezing. And how does it relate to climate change? There can be too much of a good thing. And that is true for the concentration of GHG in the atmosphere.

Since the industrial revolution in the 19th century, and as the global economies progressed and developed, so did the GHG emissions, and today CO_2 is being released into the atmosphere faster than ever before, at least for the last 66 million years. Today, carbon dioxide is being released into the atmosphere faster than ever before, at least for the last 66 million years.

The carbon dioxide emitted to the atmosphere does not stay in full there. There is a balance of absorption and emission of carbon dioxide… This balance is maintained by what it is called "Natural sinks". The natural sinks in the earth are the forest and the oceans, that absorb the CO_2 in the atmosphere via photosynthesis. However, we have surpassed the absorption capacity of these sinks, so a lot of the CO_2 emitted is being accumulated in the atmosphere.

Variations on the concentration of CO_2 in the atmosphere is a cyclical occurrence and are expected, as it has happened throughout the millennia.

These variations coincide with the earth's glacial periods and warmer periods. But what we registered today is an unprecedented record-breaking concentration of CO2 in the atmosphere.

And the concentration is increasing at an exponential rate. 417 parts per million may not look like a lot, but if we bring average temperature differences from the previous century, we can see a correlation between it and the increase in CO2 in the atmosphere. If we take the whole globe into account, as some NASA graphics illustrated in the presentation, we can clearly see a tendency of the temperature to increase since the 19th century.

Today, in the 21st century we are reaching record-shattering temperatures, with these records all concentrating in this century alone, which supports this temperature increase tendency.

When the matter of climate change started emerging, some doubts were cast. First over the certainty of this since, as we've seen before it is common to have cycles of warmer and colder periods. And the second, over the human influence on said warming of the globe. This has been cast mainly by large economic groups that are vested in keeping things as they are, also known as a business-as-usual approach.

But there is unanimous consensus amongst scientists on these two questions raised before. The IPCC – The Intergovernmental Panel on Climate change is composed of top experts on climate science that release every 4-5 years reports that are considered the most important documents on the matter, and they are unanimous on the human influence on climate change, and the necessity to act on the climate crisis. António Guterres, the United Nations Secretary-General classified the latest IPCC report as a "code red for humanity".

Not all emissions are evenly distributed through the countries. In fact, nowadays more than 60% of global emissions come from only 10 countries. The economic disparities between countries are reflected on countries' individual emissions since emissions are intrinsically connected with economic development. The current emissions panorama encompasses the richest countries and countries with emerging economies, such as China and India, as the top contributors to global carbon emissions..

However, on the debate of emission reduction the question arises on how to distribute the reduction in an equitable and fair manner – since developed countries had the chance to grow their economies, shouldn't developing

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countries have the same opportunity? This is the case because if we look at the historical panorama on cumulative emissions, the ranking of the top emitters shifts.

Although the biggest part of global GHG emissions belongs to only 10 countries, the vulnerability to and risk to climate change is not proportionally distributed between the biggest contributors to emissions. We can look at the case of Mozambique or the countries in Central America that have a residual contribution to carbon emissions but are some of the most vulnerable to climate change. Brings light to disparities and inequality between the biggest drivers of the climate crisis, and the ones that have contributed the least but nonetheless suffer the consequences and often have the less economic capacity to react to the extreme weather events.

Global greenhouse gas sources

Let's narrow the scope and talk about emissions by source.

[You can ask the audience to reflect on the main sources, and create a word map using www.mentiminter.com]

One thing to be aware of is that the source data may vary. Some analyses focus on different categorizations of the sources – for instance in the case of energy, which can be considered a broader category that includes electricity production, buildings, and transportation. The characterization of emission sources in the chart was devised by the Fifth assessment report produced by the IPCC in 2014. It may be subject to change when the 5th report is released during this year and throughout 2022.

Energy for the production of electricity and transports is responsible for almost 40% of global emissions, mainly due to the burning of fossil fuels that produce GHG. Land uses, which include deforestation and represent a fifth of global emissions. cutting down forests not only deprives the storage and sequestration capacity of the cutdown biomass, but to add insult to injury, the process also releases the CO2 stored in the soil and on the plants.

What are the consequences of climate change? (15 minutes)

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Now that you understand a bit better what climate change is, and what it is driving it, you should be wondering what are the practical effects of all of this in our daily lives. Let us focus on the consequences of climate change.

Extreme weather events

As the global climate patterns are disrupted it contributes to the increase of extreme weather events such as heatwaves, changes in precipitation, floods, droughts, wildfires, and more intense storms and hurricanes. There is a tendency for an increasing number of extreme events, which will worsen in number and intensity in the future.

[*Go through several examples included in the slides, of extreme weather events that have occurred in the last years*]

Defrost

An increase in the temperature causes ice to melt, both glaciers (ice over land) , like Greenland and Antarctica and on the mountains all over the world, and icebergs (ice floating in the sea) such as the big ones in the Arctic Ocean. There is a clear tendency of ice cover decrease in both glaciers and icebergs. Loss of glaciers causes sea level rise and affects coastal and island populations. Loss of ice on mountain glaciers causes a decrease in water resources for populations living in those areas. Iceberg melt, however, doesn't cause sea level rise. Think of an ice cube on a glass of water, however, it can cause changes in ocean currents, and furthermore, it decreases reflection from sunlight, which in turn increases the temperature.

Sea level rise

There are two main drivers for sea-level rise: the melting of the glaciers and thermal expansion which is caused when seawater expands because of the higher temperature of the water. Since the oceans absorb heat from the atmosphere, when the atmosphere becomes warmer so will the oceans. … The increased volume will cause the level of the water in the oceans to rise.

Currently, there is a tendency of rising sea level, in 2020 that variation was about 1 cm. Coastal areas are the most vulnerable to sea-level rise, which threatens the coastal communities. Amsterdam is one of the particular areas that are threatened by this since the city is 4 meters below sea level.

Tuvalu Island, located in the Pacific Ocean is facing the risk of being submerged if the sea level continues to rise. Island states and coastal areas are the most vulnerable places that face the threat of sea levels rising

Ocean acidification

The oceans are also a natural sink of absorption of CO2. As the CO2 concentration in the atmosphere increases, so does the absorption in the ocean, and the consequential acidification of the water. This has dire consequences on marine life, which are particularly sensitive to these types of variations. As an example, more acidic waters deteriorate the shells of marine organisms that are made of calcium carbonate – caused by chemical reactions between carbon and the chemicals of the shells.

Effects on ecosystems

Rising temperatures have catastrophic consequences on ecosystems. One example is coral reefs, which are fundamental to entire marine ecosystems, and are considered biodiversity hotspots. They are also incredibly sensitive to temperature and pH variations. Temperature increase and acidification of the oceans contribute to the phenomena called coral bleaching that results in the death of the reef – entire organisms perish in these conditions, which means that the marine life that coexists in this ecosystem vanishes completely.

Effects on human health

Warmer temperatures, and changing climate patterns in countries, creates conditions for pathogens and diseases common to warmer weather to emerge in regions of the world that have never seen them before. This is the case of Malaria, which is transmitted by a mosquito that is common in warmer/tropical climates, but it is predicted to emerge in northern regions of the world.

Climate refugees

Madagascar, one of the region's most vulnerable and at risk of climate change, is already facing the consequences of it, where 1 million people are currently facing famine linked to climate change. Climate change is changing weather patterns in the country, which deeply depends on agriculture, disrupting seasonal weather that allows for this economic and subsistence activity to persist in the area. Again, the countries that least contributed to climate change are the ones that are already facing the consequences.

 More and more populations in the world will face grave consequences caused by climate change in their regions. Today, many people in developing countries are suffering from droughts and windstorms on a scale never seen before, depriving them of daily food and basic needs. It is still fresh in our memories that last November many people from the Central American countries of Honduras, Guatemala, and El Salvador, which were hit by two massive hurricanes, poured across the border into Mexico and headed toward the US border.

The term "climate refugee" was first coined to describe the increasing large-scale migration and cross-border mass movements of people that were partly caused by such weather-related disasters. As the weather events worsen, so dies the need for these populations to migrate to other countries to seek refuge.

Tipping points

Think about tipping point as a game of Jenga, you remove pieces one by one, and then comes a point where the tower comes down and there is no stopping gravity. This is an analogy for the climate tipping points, which once surpassed will lead to irreversible changes. A specific example, melting of the glaciers and icebergs is a dangerous positive feedback loop on the climate, which means that the effect of temperature increase, ice melt, increases its cause, the temperature itself, keeping a circle of ever-increasing temperature which can lead to the disappearance of the glacier.

Resources:

5 questions about climate change, TED

Climate Change FAQS, Nature

We answer your most common climate change questions, WWF UK

Explainer: Nine 'tipping points' that could be triggered by climate change

What can be done to reduce emissions? (10 minutes)

Moving on from the doom and gloom of the climate crisis, what can then we do to try and resolve this pressing issue?

On a global large scale level, we need to focus on reducing our global carbon emissions, plain and simple. There are two main ways to seek to balance our emissions and absorption, which is through preserving and restoring our natural sinks and fundamentally change our energy system

Preserve and restore our land sinks

As we have seen previously, natural sinks are essential to maintaining a balance of carbon dioxide in the atmosphere, and we have long surpassed the absorption capacity. Carbon dioxide concentrations have been increasing, for

one, because of the ever-increasing emission rate, but also because we are tearing down one of our natural sinks: Forests.

Increasing pressure of human activity - population rise, economic and technological development, and other pressures driving deforestation. Brazil has one of the worst rates of deforestation in the world, and it shows no signs of slowing down. The countries in the Indian-pacific also experience a high rate of deforestation, mainly driven by industry exploration. Brazil is an alarming case for example, a country that hosts one of the largest areas of forest cover.

Does this mean that we can just plant more trees and solve the issue? Not quite. Research shows that preserving our current natural sinks brings more benefits than restoring, in terms of "emissions gains", because as we mentioned before, cutting down forests not only generates emissions but also reflects in CO2 absorption losses. As trees regrow, the absorption capacity also rises, but it always starts at a smaller level, so it may take up years to actually start to have a meaningful impact on balancing emissions. The time that we currently do not have to address the climate crisis. Research shows that preserving our current natural sinks brings more benefits than restoring, in terms of "emissions gains", because as we mentioned before, cutting down forests not only generates emissions but also reflects in co2 absorption losses. So in terms of reducing our emissions, preserving the standing forest is preferable to restoration and reforestation practices. But this is not to say that regeneration shouldn't be an option altogether to the damage already done to our forest areas.

Reshaping our energy system

There are several ways we can look at the breakdown of emissions. By sector, by economic activity, and so on. If we account for energy emissions as a whole, it accounts for a staggering 75% of total global emissions. This means that 75% of total emissions come from generating energy. Why is this?

Reshaping our energy system means changing how we produce electricity and how we generate energy to move around in our transportation system, which are the largest consumers of energy production currently and the biggest slice of emissions. There are two main sources from where we produce our energy and electricity. Fossil fuels: Oil, gas, and coal. And renewable energy.

Energy production takes up that much of global carbon emissions because it is still mostly reliant on fossil fuels. Almost 85% comes from burning fossil fuels, which are very carbon-intensive. Changing the source of energy and

transitioning from fossil fuels to renewable energy is fundamental to cutting down emissions.

<u>Renewable energy</u>

Renewable energy sources include:

- Solar: Photovoltaic panels, concentrating solar thermal energy through mirrors
- Hydroelectric: Water reservoirs, or water strands
- Biomass is the burning of wood, agricultural waste, and other organic material, to generate electricity and heat. Although the burning of biomass does release carbon dioxide to the atmosphere, the organic material during its growth phase absorbs a considerable amount of carbon dioxide, so it balances it with emissions.
- Wind: located onshore or offshore
- Oceans: waves and tides
- Geothermal energy uses the heat of the earth to generate electricity

The distribution of renewable energy sources varies between countries that source them – it depends on various economic and environmental factors (wind, yearly sunlight) and the infrastructure investment of each country. However, globally speaking, the overall renewable energy consumption remains at about 11%. The energy mix is a group of different primary energy sources from which secondary energy for direct use - such as electricity, transports, and heating - is produced.

Projections on the installed capacity by renewable sources show an increase in these energies, particularly on solar energy, which does harness a lot of energy potential for our demands.

There is a lot of potential for renewables to source our energy demands, nowadays there are some positive examples of almost all the grid relying on renewables. However, a challenge that has an energy system fully reliant on renewable energy is that it relies on an inconstant factor: the weather. So future challenges ahead rely on this inconsistency, on power storage, and more reliable and constant alternatives that provide a stable flow of clean energy

Our energy demands increase year after year, and it shows no signs of slowing down. As economies grow and develop, so does the energy demand to accompany this process. It is necessary to invest in energy efficiency and our individual and collective consumption of energy.

<u>The carbon footprint of the internet</u>

An increase in energy use does have a correlation with the growth of the technology sector. Internet users are rapidly increasing around the world, and today we are reliant on the services on the web, for both our work and personal daily lives. From servers powering the internet and technology information, to the actual devices we use. The pandemic actually highlighted the importance of staying connected whilst physically apart.

All the energy consumed for our technology and internet needs does carry a carbon footprint, in other words, sending an email does produce carbon emissions. And web surfing also has its footprint, because of the servers needed to host most web services. You can check a website's carbon footprint at www.websitecarbon.com! Data centers and web service providers can opt for renewable energy to source their power needs.

But the technology sector does rely on energy use, and it is troublesome because as we mentioned, our energy sector is still mostly dependent on fossil fuels. Energy-intensive activities of the technology sector are actually surpassing the energy consumption of whole countries, as is the case of the emerging technology of the blockchain, and more mediatic bitcoin. Bitcoin mining consumes more energy than some countries, and it will continue to rise.

All in all, reducing energy consumption is necessary to address global carbon emissions, not only because our energy system is still dependent on fossil fuels, but also as a means to reduce the pressure and strain we put on the energy system to better control demand and supply of energy.

Resources:

Can YOU fix Climate Change?, Kurzegezast

Responding to Climate Change – Adaptation and Mitigation, NASA

Global Warming solutions, explained. National Geographic

Girls & Women Connecting for Clean Energy
(45 minutes)

Energy is an essential component for our lives in the 21st century, and it accounts for the biggest portion of greenhouse emissions. It is the sector that requires the most radical shift to address climate change. The solutions to decarbonize the energy sector are a reality today on a systemic level, but individually there are also steps you can take, and new approaches to rethink

the energy system. This thematic will address current challenges and solutions for the energy system.

Household energy consumption

Final energy consumption in our households is still mostly reliant on fossil fuels, or fossil sources for the production of energy, and it also shows the biggest potential for reducing emissions. Changing the source of our energy and the amount we consume are the two possible approaches in order for us to reduce emissions on the final consumption of energy.

What do we spend the most amount of energy on in our homes? The biggest use in energy goes towards heating of space and water, followed by lighting and appliances. Reducing energy consumption also means reducing our energy bills. Here are some tips to reduce energy consumption and the electric bill [You can interact with the audience and ask some tips and tricks they think may help]

[*To introduce the concept of energy poverty that will be presented next, you can interact with the audience and ask if someone has experienced situations of being cold at home, at school, or other buildings*.]

Energy poverty

There is no commonly agreed-upon definition of Energy Poverty because as a concept it has broad and contextual meanings. Here are two possible definitions:

(1) Energy poverty is a set of conditions in which individuals or families are unable to properly warm, cool, or access other necessary energy services in their home at an affordable cost

(2) Inability to satisfy their basic needs as a direct or indirect result of the lack of access to reliable and trustworthy energy services, considering the alternative means available to satisfy those necessities.

Energy poverty in the European context

In Europe, this phenomenon mainly manifests in the inability to properly cool their houses, due to lack of proper isolation and energy prices. About 50 million households in the EU are experiencing energy poverty. This, in turn, results in excess deaths in the wintertime. Not to mention the health and wellbeing issues associated with this phenomenon, since it exacerbates respiratory and cardiac illnesses, and mental health, due to low or high temperatures and stress associated with unaffordable energy bills.

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Energy poverty in the global context

By its own definition, energy poverty manifests differently around the world, depending on the local context of the population. Energy poverty is especially prevalent in African countries, where the lack of access to electricity is very much the norm, highlighting the inequity in access to energy services around the world.

Energy Poverty and Climate change

Energy poverty on one end can be worsened by climate change, on another it can worsen the effects of Climate change. Vulnerable populations are more at risk by climate change effects and face more risks of energy poverty.

Extreme weather events can worsen the climate crisis and energy insecurity issues, pushing more people into situations of energy poverty:

- More frequent heat waves will significantly increase energy demand, the need for expanded energy systems, dependence on household air conditioning for entire populations.

- Power outages caused by storms, cold waves, and heatwaves;

- Inefficiency in buildings and homes drives up energy consumption and consequently an increase in emissions, exacerbating the effects of climate change.

Renewable energy communities

Energy communities are emerging throughout the world, working on empowering people on the energy system and fundamentally changing how energy is sourced and managed. A Renewable energy community (REC) consists of " collective energy actions that foster citizens participation across the energy system". Energy communities can take any form of a legal entity, for instance, that of an association, a cooperative, a partnership, a non-profit organization, or a small/medium-sized enterprise. In a nutshell, energy communities are groups of people that invest in energy projects to power their communities.

REC contributes for citizens to work together to meet their energy needs through renewable energies at affordable prices. Engaging citizens in decision-making through collective actions provides empowerment for the community and fosters a decentralized energy system transition. It helps tackle energy poverty by establishing a stable and fair price, and by investing in community projects that support energy savings

How do they work?

As mentioned before, energy communities are a group of citizens or other entities that join forces to invest in small energy projects - solar panels in their homes or other locations, wind farms, or even small hydro power plants. The energy produced is then integrated into the energy grid to power homes and businesses in the community. These projects generate economic returns from selling clean energy, which is then invested in more small renewable energy projects. This generates economic, social, and environmental benefits since people get an economic return on their investments, the energy produced is renewable, and people are engaged through all the phases of the process to reclaim their power!

The REScoop Network is a European federation of citizen energy cooperatives and gathers a database of these initiatives through the EU. You can go through it to find these initiatives in your country, with a wide array of renewable energy sources available.

Resources

Can 100% renewable energy power the world?, TED-ed

Renewable energy 101, National Geographic

Energy poverty: effects on development, society, and environment

We the Power – The future of Energy is Community Owned (Patagonia)

Girls & Women Connecting for Sustainable Consumption
(45 minutes)

Consumption is an action we partake in everyday, from our food and clothes, to how we choose to move around. Big or small, individual choices have an impact on the world around us, and on Climate Change. Understanding the impacts of these choices can help us choose better, and have a meaningful impact on our individual emissions. The thematic "sustainable consumption" will focus on that precisely, and what you can do to reduce your consumption footprint.

Environmental and Carbon footprint

Our daily actions carry an environmental cost. Consuming resources, in turn, does result in GHG emissions also known as the carbon footprint. You may stumble across more than one type of footprint. There is the environmental footprint, which may also be named the ecological footprint, which compares the total resources people consume with the land and water area that is needed to replace those resources. And the carbon footprint focuses strictly on the greenhouse footprint and also deals with resource usage but focuses strictly on the greenhouse gases released due to the burning of fossil fuels. Greenhouse gas calculations make up a portion of an ecological footprint but are not used in the same way as those in a carbon footprint. However, both calculations illustrate the impact of human activity on the environment.

The world's ecological footprint is ever-increasing, just like global greenhouse emissions. This coincides with population growth and other factors that come from our ever-increasing number and consumption. This puts a lot of pressure on earth's ecosystems, and everything is rising!

However, consumption is not equal throughout the world. Just like in the emissions panorama, which is intrinsically connected with economic development. Currently, it would take about 1,7 earths - in terms of resources, to support the world's population. But even between countries, this varies. If the whole world population had the same lifestyle as the inhabitants of the united states, it would require 5 earths to support that lifestyle. If we all had the consumption levels as someone that lives in India, it would require 0,7, well below the earth's full capacity.

This brings us up to earth's overshoot day. Earth Overshoot Day marks the date when humanity's demand for ecological resources and services in a given year exceeds what Earth can regenerate in that year. We are reaching it sooner as the years pass by because global consumption is on the rise.

Reduce energy consumption

Our energy system is still mostly reliant on fossil fuel sources, which is responsible for around 75% of global emissions as we've seen previously. On a large scale, it is required that we Shift these sources to renewable energy sources to cut down the emissions on.

What can you do?

- Opt for energy-efficient devices
- Wash clothes in a full load and using cold water, and dry your clothes outside;
- Unplug devices that you are not using, when in stand-by they still consume energy

- Make use of natural light, and switch off your lamps
- Switch your light bulbs for LED lights
- Lower your thermostat - use an extra layer of clothes and make use of sunny days to open the blinds and letting light enter

Change your email habits. Avoid unnecessary emails by avoiding replying to all, and sending simple one-line "thank you" or other types of emails. You can also unsubscribe from newsletters and another email list you are not interested in. Avoiding going through search engines and directly to a website helps avoid an extra server to get to the site. There are some cloud services and server providers that are committed to running fully on green energy that are better options to reduce emissions. Dimming your monitor not only helps reduce the energy your computer or laptop consumes, but it is also better for your eyes. The same goes for choosing to use your device in dark mode! Finally, opting for a laptop instead of a desktop computer helps with energy consumption, since the latter is more energy-intensive, and often is left plugged in when not in use.

Transportation

On transportation, there are choices we can partake in every day, such as opting for public transportation, walking, and cycling, all whilst avoiding using an individual mode of transportation, which has more emissions per person and per km. Sharing rides is a way to cut some emissions because the bill is taken up by two people rather than just one. Air transportation has the biggest impact per person and km, and it is the most inefficient way to travel, taking only emissions into account. So avoiding air travel whenever possible is a way to cut down emissions.

Food

Our diets and daily choices in terms of food have a big impact on our daily footprint. There are three main approaches we can take in this regard to cut down emissions. Opting for plant-based meals, avoiding letting your food go to waste, and opting for products with less transport – sourcing locally!

Meat consumption

Our diet choices can greatly impact the carbon footprint. As we saw before, livestock has one of the biggest carbon footprints from production until it reaches our plate. Opting out of meat is one of the most significant choices we can make to greatly reduce our carbon footprint. Some movements promoting going meatless at least once a week arose, precisely because cutting out even for one day can have a meaningful impact on the environment.

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Plant-based diets

Plant-based diets have a smaller carbon footprint than meat-based ones. It brings benefits to your wallet and your health! You do not have to fully rely on vegetarian diets, but opting for vegetarian options has a great impact on your individual carbon footprint.

Where do you source your food?

Where our food comes from does have a great impact on our carbon footprint. Some food travels great distances to reach our plates, and the closer you get your food, the smaller the carbon footprint in transporting the food. Seasonality also plays a big role in this. Out-of-season food probably had to be transported by another country or means an increase in the resources spent to grow it.

So how can you act on this exactly? Opt for seasonal food and produce by local farmers in farmers' markets or buy directly from the producers. Community gardens are also a good option to grow your own food. If you live in an apartment you can also opt for vertical gardens that are easily maintained in small spaces.

Food waste

Food waste is a massive issue that is responsible for one of the biggest slices of emissions. ⅓ of food produced in the world goes to waste, which is a deeply perverse environmental and social problem.

It is not only the food at home that we let go to waste that is a problem. A lot of food that is unsold at the end of the day in supermarkets, ends up in the trash. Some people even partake in a movement called dumpster diving, in which they literally dive in dumpsters near restaurants or supermarkets and salvage food that is thrown out and it is still perfectly good to be consumed.

Going to the store without a plan or on an empty stomach can lead to buying more than we need. To keep your kitchen on track, try to eat leftovers, think of meals you might eat out, and avoid unnecessary purchases by planning your grocery list ahead of time.

While there are plenty of benefits to eating fresh food, frozen foods can be just as nutritious. They also stay edible for much longer. A lot of seafood, for example, is frozen before it reaches your supermarket and then thawed and put on display. That means it will only stay fresh for a few days. By buying frozen seafood, you can extend the shelf life of the product considerably.

Cooking and freezing food—especially produce—before it goes bad is a great way to avoid having to toss it.

Before you shop, use the food you already have. Websites like Big Oven, Supercook, and MyFridgeFood allow you to search for recipes based on ingredients already in your kitchen. You can also use apps like Epicurious and Allrecipes to make the most of what's in your fridge and pantry.

Fruits and vegetables that are beyond ripe may not look pretty, but that doesn't mean they can't still taste delicious in recipes. Try using your wilting, browning, or imperfect produce to make sweet smoothies, bread, jams, sauces, or soup stocks.

Preventing food waste is the most effective way to shrink its impact on the planet. If we avoid producing food that we don't eat, we can save the land, water, and energy that would have been used to make it. And awareness is a good first step; according to ReFED, educating consumers about food waste could prevent 7.41 million tons of greenhouse gas emissions.

Other creative ways to avoid food waste:

To face this massive challenge of food waste, here are some creative and meaningful ways to avoid it.

- Refood - Reefod is an organization that supports families in need with meals. The food comes from restaurants and other establishments that have a lot of food leftovers. It functions on a volunteering basis, and the volunteers are responsible for collecting the food and distributing the meals to the families. They are spread in a lot of locations around Portugal.
- Too good to go - is an app that restaurants, cafés, and other food establishments can sell the leftovers for the day at a reduced price. They are limited offers and they are only up for a limited period of time (usually after meal hours) and you never know exactly what you end up buying, but this avoids a lot of meals and food simply going to waste.
- Good after - It is a sort of supermarket that sells expired food, in essence. Often expired food is still good to be consumed since the expiration date is merely a bureaucracy that results in a lot of food waste.
- Fruta feia- The literal translation of this is called "Ugly fruit". This movement started to salvage fruits and vegetables that are considered under the standard to be sold to the public. Facing this, producers mostly had no choice but to throw this food out because there were no buyers. Fruta feia buys these products directly to local farmers, and then they are sold in baskets to people that subscribe to the service.

This not only avoids food going to waste, but also contributes economically to the producers.

<u>Consumption</u>

Consuming in a sustainable manner means making sufficient and efficient use of resources to minimize our environmental impact on the planet. This ranges from the food we consume to other goods and products, such as clothes, technological devices, and so on.

All these choices usually contribute to the waste problem. As consumption increases, materials and other resources are used to supply our habits, and most of it ends up filling up landfills everywhere around the world.

<u>Waste</u>

For waste we cannot avoid producing, recycling is still our best option to reduce material waste and extract more resources from the earth. Another thing that is beneficial for both emissions and the environment is to compost food waste and scraps. For one, this contributes to returning organic matter back to earth and it is good for our soils.

Reducing consumption is essential to avoid waste being created. Opting for a more minimal lifestyle, or other options to buy clothes and other products. Buying secondhand clothing or swapping clothes you no longer use in swapping events is an option to avoid purchasing new clothes, and contributing to the fashion industry that has a big carbon footprint. You can also opt to repurpose or repair your old clothes and devices!

<u>Planned obsolescence and right to repair</u>

Ever wonder why your phone gets slow after a few updates on the software? Or how difficult the devices are to repair once a component malfunction, and often you end up needing to replace the whole device? This is all by design, called planned obsolescence. Planned obsolescence is a business strategy in which the obsolescence (the process of becoming obsolete, that is, unfashionable or no longer usable) of a product is planned and built into it from its conception, by the manufacturer.

This is a problem because of the e-waste it generates. The right to repair electronics refers to proposed legislation that would provide the practical means for equipment owners to repair their devices and not a new legal right. Advocates observe that while the repair is legal under copyright law and patent law, owners are often prohibited from making their own repairs or hiring technicians they trust to help by manufacturer limitations on access to

repair materials such as parts, tools, diagnostics, documentation, and firmware

Are there any other alternatives for technological devices? Yes, modular devices! They have a better rate of repairability, if a component malfunctions you can easily replace it with another modular piece of that component, instead of having to buy a new one altogether. There are some options currently available for phones, the fair phone, and recently for laptops to with the framework laptop

<u>Circular economy</u>

Currently, our economic system works more in a line, in which a lot of resources you extracted from earth end up in waste. The circular economy is a new paradigm that aims to close the cycle, and avoid new resource extraction, essentially making use of what we already have by recycling it, repurposing it, repairing and reducing.

<u>Degrowing the economy</u>

Degrowth essentially means to reduce the global production and consumption in society, to "slow down", and shift the paradigm of economic growth to an economy that focuses on social and environmental wellbeing, rather than growth and more consumption

Resources

<u>The true cost</u> – Documentary on the Fashion Industry

<u>One-Third of Food Is Lost or Wasted: What Can Be Done</u> (National Geographic)

<u>The diet that helps fight climate change</u>, Vox

<u>The EU is giving citizens the "right to repair" electronics — here's what that could mean for the world</u>

Girls & Women Connecting for Mobility

(45 minutes)

Transportation has a significant impact on global emissions. But it is an essential sector for our day-to-day lives. Our society is in constant movement, and guaranteeing environmentally friendly ways to move around is essential to transition to a carbon-free society. In this thematic we will explore the emissions that several types of transportation has, and what the future may

look like for mobility, aiming for a low carbon society, and what solutions and movements already exist in this sense.

You can start this specific thematic by asking the audience to reflect on which type of transport contributes the most (in quantity)

<u>Global CO2 emissions from transportation type</u>

Let's have a look at which transports most of the carbon emissions come from. Which mode of transportation do you think has the greatest carbon footprint overall? Road transportation accounts for more than half of total carbon emissions, and in this category cars take the prize for the biggest source of emissions. Which does make sense considering that on earth there are almost 1.5 billion cars!

And what about emissions per person and per km traveled in each type of transportation? Essentially which is the least efficient way to travel taking into account the distance traveled against the emissions? In that case, aviation wins. Cars also have a significant inefficiency when it comes to emissions per distance traveled, mainly because, usually, we travel alone in our cars.

<u>Aviation</u>

Aviation is certainly the least efficient, because of the amount of fuel and the power planes consume to travel. And they are increasing more than ever in the skies, mainly due to the affordability of plane tickets, which were very expensive several decades ago.

<u>Cars</u>

Carbon dioxide is not the only problematic gas that is emitted from cars. They are one of the greatest contributors to air pollution and respiratory problems caused by these substances. They emit other gases and small particles that are very dangerous for human health. They are also very inefficient in terms of converting energy from fuels to generate power to move, seeing that only 30% of the energy from burning gasoline and diesel is in fact used - this means that we have to use more gasoline to move around if the energy use was 100%.

There are indeed new technologies to substitute petro vehicles. Electric cars are at the top of the array of alternatives. Electric vehicles have existed for some years now, and the technology is evolving evermore. On the electric modality there are some other vehicles that were popularized earlier: hybrid cars, that run on electricity and petrol.Electric vehicles essentially run on large lithium batteries.

Another alternative, from an emerging technology is hydrogen powered vehicles. Hydrogen is around for some time now, it is the gas that made Zeppelins fly. Electric vehicles are powered by energy from the grid, but the process to get hydrogen to power vehicles has some extra steps to take. It starts from water(h2o), the hydrogen is separated from the oxygen in a process that requires energy. After that the hydrogen is stored, which does require more energy, and transported to fueling stations. The hydrogen is pumped in the car, similar to fueling a petrol vehicle, and takes about just four minutes to fill!. In the car deposit, the hydrogen reacts with the oxygen of the air that comes in the container and the reaction generates electricity that makes the motor run. The result of this reaction is water, it is so pure you can actually drink it!

Cons: Hydrogen vs Electric

The biggest pro arguments for these vehicles are in fact the zero emissions in transit for these types of cars. But there are some cons particular for each type.

Hydrogen vehicles biggest con is the lack of infrastructure at the moment. This limits the range a car can travel, and you need to take into account where the infrastructure exists, which is still lacking in most parts of the world. The inefficiency of the hydrogen conversion is also a big con, since the process takes up a lot of energy, and only has a conversion of 15%, because the hydrogen is a very volatile gas. And of course, the cost of these vehicles is still very prohibitive for most people, since it is still a novel technology with limited availability, the cost is very high at the moment.

Electric vehicles take a long time to charge. There are supercharging stations, and leaving them to charge overnight is an option. But this limits, for instance, people that live in apartments with no garages or do not have charging infrastructure nearby. The range, although it is getting better and better, is still limited for a long range option, and worsened by the charging times, it can make a long drive take even longer. The environmental impacts to construct an electric car, especially the lithium batteries is significant.

Electric vehicle infrastructure is much more developed at this point than Hydrogen vehicles infrastructure, which is noticeable by the number of charging stations available for each, which is considerably less than hydrogen cars.

The electric and hydrogen alternatives do not produce emissions in transit. However, they can only be true alternatives if the energy system fundamentally changes, and transitions to renewable energy sources. These vehicles rely on electricity to function, and if the energy system of a country

with the best electric vehicle grid still relies mostly on fossil fuels to power it, emissions wise, this is nothing more than a false solution. In fact, carbon emissions on the overall life cycle of an electric vehicle that is powered by fossil fuels is greater than a petrol vehicle.

<u>Train, trams and subways</u>

Railway wise, we can count on trains, trams and subways. These locomotives are powered by electricity from the grid. Although there are some trains that move on diesel - following a similar principle as the trains from last century that runned on steam, they are a minority compared to electric trains.

To make "avoiding aviation" a valid option, trains need to become a viable alternative. But there is still a need to invest in high speed infrastructure and services for cross border train travel to be an efficient alternative.

<u>Buses</u>

Buses are one of the best options to travel between small towns and other localities which do not have railroad connections. And they do have a smaller individual carbon footprint than an individual car. However, they are still mostly reliant on fossil fuels. Not all run on diesel or gasoline, there are some fuel alternatives such as natural gas, Liquified petroleum gas, biofuels and ethanol vehicles, but they too have considerable emissions.

<u>Bicycles and other two-wheel modes of transportation</u>

Apart from walking, bicycles are the best option to travel emission free. The benefits reflect economic, health, and environmental gains. Of course not all places have the best infrastructure to accommodate a cycling lifestyle, or have flat surfaces to make it easier to ride a bicycle, such as the Netherlands. But there are some interesting electric options emerging to help fight the steep climbs!

All throughout cities, two-wheel sharing options are starting to emerge. The equipment can be expensive for an individual to bear the cost of investing, if the travels do not justify that. These grids of scooters and bicycles are a great option to move around the city with low emissions. Usually you pay for the kms you use, and there are stations spread out in the cities that you can leave the equipment for another person to use.

The discussion around using cars is not only about emissions, but also for the space they take, and how cities accommodate this vehicle. Options for

collective transports or other individual types of transportation free up roads from cities, making way for people to reclaim the space.

<u>Citizen initiatives for cycling</u>

There are a lot of civic movements and associations that focus on this type of transport. These groups of citizens usually gather to route by bicycle to their works or to leave their kids at school - this is particularly significant in places where bicycle infrastructure is lacking. Traveling in groups significantly increases the security of traveling by bike and makes drivers aware of their presence. These associations also offer repair workshops and other logistic support to make sure you have your gear ready to cycle. These groups can start anywhere, you just need to gather interesting people to make this idea happen.

Two examples of these initiatives in Portugal are:

- Ciclo espresso - Known as a "Bicycle train", this initiative is composed by groups of children that gather with monitors to ride their bicycles to school in Lisbon and Aveiro. They travel together to ensure safety for all, and parents can join as monitors if they want!

- CiclAveiro - is an association that promotes the use of bicycles for the well being of people and the planet, in Aveiro, Portugal. They offer an array of workshops and services for members.

<u>Integrated services</u>

Integrated systems are the future for interconnecting smart cities. MobiCascais is an example of that, in just one app it gathers together a network of transportation that is free for people who live, study or work in Cascais, a municipality in Lisbon. It also offers reduced prices for everyone else to use any of the services available. For instance, you can buy a day ticket for 1,5 euro and make use of any type of transport in the network for the whole day - bicycles, electric scooters, trains or buses in Cascais. It also shows where to park your car, and where to locate nearby charging stations if you have an electric vehicle.

<u>15 minute cities</u>

Urban planning plays a significant role in how mobility is planned in devised. It is also a major challenge to fundamentally change the fabric of already

existing cities, but that does not mean it is not possible. The 15-minute city is a concept which imagines a place where everyone living in a city should have access to essential urban services within a 15-minute walk or bike. This would significantly reduce the need to move around using cars, and would free up the space of cities for communities to better enjoy the space, would significantly reduce air pollution and increase the quality of life in these places.

Pandemic and the impact on mobility

It is interesting to analyse the impact that the global lockdowns caused by the 2020 pandemic had on emissions. The most significant reduction was precisely on ground transportation emissions, which has the biggest contribution by individual cars. This provides an overview of the reduction potential on emissions if we leave our cars at our homes, and to support alternative means to move around the cities. What could this mean for the future? It is an interesting reflection to have, now that discussions around the future of work vs telework are also on the table.

Summing up, what can you do?

To sum up all this information, what big small actions can you make to reduce your transportation emissions footprint? For starters, avoid air travel! Opt for taking your vacations in your home country, also known as staycations - it will also support local economies if you opt to stay in. If you live far away from the place you study or work, opting for public transportation, riding your bicycle or walking are the best options. But of course, this depends if you are able to use these options. If you have no other option than riding your car, make sure to share your rides!

Resources

Hydrogen vs. Battery Electric Cars

Cycling across Europe in the pandemic - BBC World Service

Cycling: the way ahead for towns and cities

The Future of Mobility: 2050 and Beyond | Carla Bailo | TEDxOhioStateUniversityX

Cities Rise to the Challenge – Sustainable Mobility, WWF International

What is Smart Mobility?