

Forum:Environmental Commission

Issue:Counteracting the anthropogenic greenhouse effect with special focus on the reduction of carbon dioxide emissions from the transportation sector

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Description of the issue:

The anthropogenic greenhouse effect describes the warming of the earth due to human influences. In addition to the natural greenhouse effect, Greenhouse Gases (GHGs) reach the atmosphere to an enormous extent and thus let less rays into space, so that more heat remains in the atmosphere. The rising of the earth's temperature results in major consequences not only from an ecological, but also from social, political and economic points of views.

The impact of climate change concerns all countries, since the problem affects the entire world population. However, the consequences of the enhanced greenhouse effect depend on the specific climate conditions, the geographical position and the economic development status of each country. For example, an island in the tropical zone is more likely to experience periods of drought or to be flooded completely.

Because of these massive impacts, solutions on this issue are of enormous importance.

In the atmosphere, carbon dioxide has the largest share of all greenhouse gases. A lot of carbon dioxide is emitted into the earth's atmosphere by the transport sector and this area continues to grow, which can be explained, for example, by increasing globalization.

This means that these CO₂-emissions have to be reduced drastically and sustainable alternatives need to be found within the transport sector.

Solutions to the problem could be alternative drives or fuels for vehicles, ships and airplanes, stricter regulations by law to guarantee more sustainable transport routes or the promotion of consumers buying more locally produced goods, especially in the food and clothing sector.

In any case, measures must be implemented quickly, because climate change is a drastically increasing threat that therefore must be taken very seriously.

Background information:

Natural vs. anthropogenic greenhouse effect

To counteract the greenhouse effect, you first have to be aware of how it works. This involves understanding the difference between the natural and the anthropogenic greenhouse effect.

The natural greenhouse effect works as follows: The sun sends short-wave radiation towards the earth. Parts of the radiation is reflected or absorbed in the troposphere and stratosphere. Because of GHGs, water vapor and aerosols. Half of the radiation reaches the earth's surface directly or diffusely, where it is also absorbed or reflected.

Absorption means that the short-wave rays are converted into

long-wave rays. These rays also give off heat. Dark surfaces such as the sea absorb the sun's rays.

Reflection means that the rays go back into the atmosphere as short-wave rays and do not give off any heat. Light surfaces such as ice reflect strongly. Overall, more rays are absorbed than reflected on earth.

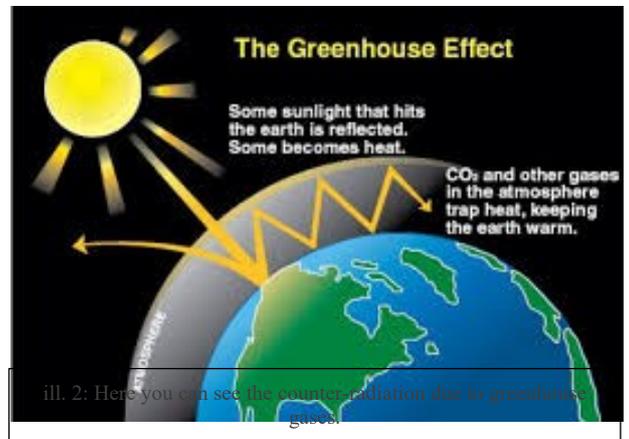
Most of the reflected radiation returns to space. The absorbed radiation, however, reaches the atmosphere which contains the gases carbon dioxide (CO₂), methane (CH₄), laughing gas (N₂O), water vapor, ozone (O₃) and other greenhouse gases. These gases absorb most of the heat radiation and partially radiate it back to earth.

This counter-radiation (cf. ill. 2) causes the natural greenhouse effect and contributes to the warming of the Earth's climate.

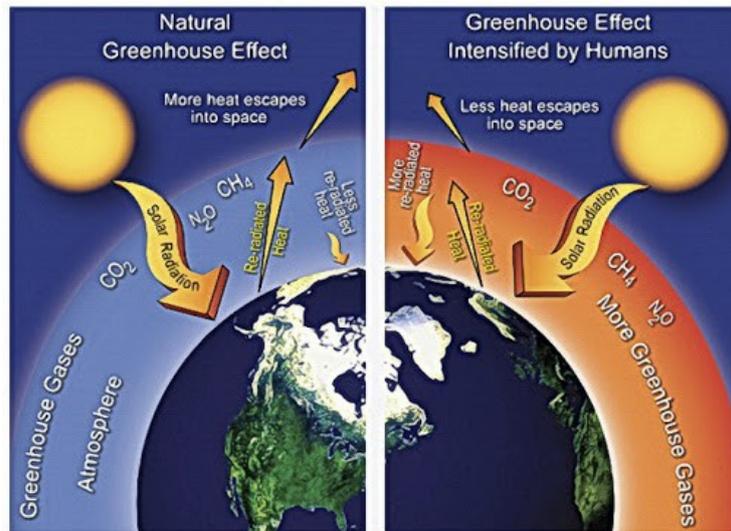
Because of that, the average temperature of the earth's surface is 15 degrees Celsius. Without the natural greenhouse effect, the average temperature would be minus 18 degrees Celsius, 33 degrees cooler. In that case, this planet would not provide the necessary living conditions for most species including humans to survive. Consequently, the natural greenhouse effect is a necessary and beneficial process.



ill. 1: The troposphere and the stratosphere are the closest parts of the atmosphere to the earth's surface.



ill. 2: Here you can see the counter-radiation due to greenhouse gases.



ill. 3: This comparison shows you the great impact of having more greenhouse gases in the atmosphere.

The same process occurs with the anthropogenic greenhouse effect, but with a greater impact. The proportion of greenhouse gases in the atmosphere accelerates drastically due to anthropogenic influences. This means that more heat radiation is absorbed in the atmosphere and fewer rays go back into space. The counter radiation is many times higher than with the natural greenhouse effect (cf. ill. 3).

Causes (CO₂-emissions)

Carbon dioxide has the largest share with 60% of all greenhouse gases in the atmosphere. Until the beginning of the industrialization, the Earth's carbon cycle was largely unaffected by people. But since 1860, global CO₂ emissions have increased eightyfold and the carbon dioxide content in the atmosphere has been steadily increasing.

There are two causal complexes for this enhancement in CO₂ concentration in the atmosphere, which are closely related: on the one hand, this is the increase in CO₂ sources (e.g. energy, transportation, manufacturing) and, on the other hand, a decrease in CO₂ sinks (e.g. rainforests, plankton in the oceans).

Most CO₂ emissions are caused by burning fossil fuels. The burning of fossil fuels is especially used for energy production as well as a drive for motors in the transportation sector. Due to the growing world population and the worldwide rising standards of living, the energy demand continues to extend.

Slash-and-burn agriculture especially applied in the tropics (e.g. for livestock farms, soybean cultivation) contributes to the increase in the CO₂ content in two ways: on the one hand by the

emissions caused when burning down forests, on the other hand by the reduction of the absorption of CO₂ caused from the lack of the original vegetation in that area.

Emissions from the transport sector which primarily involve road, rail, air and marine transportation, are major contributors to climate change.

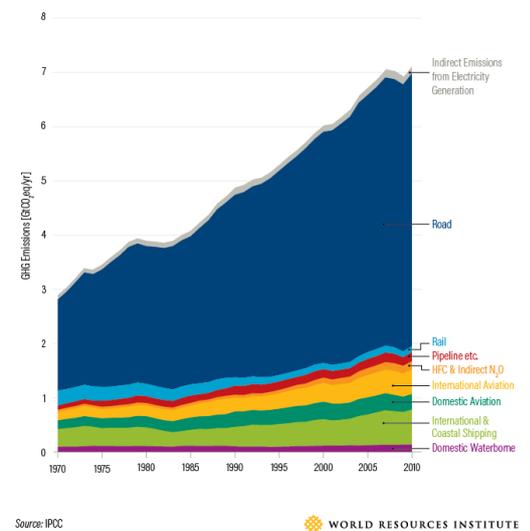
They make up about 14% of annual emissions (including non-CO₂ gases) and around a quarter of CO₂ emissions from burning fossil fuels. Furthermore, the transport sector is currently responsible for the fastest increase in CO₂ emissions.

72% of global transport emissions come from road vehicles, which accounted for 80% of the rise in emissions from 1970 –

2010. Emissions have also increased in other transport modes, especially international/domestic aviation and international/coastal shipping. Only rail emissions, of which a significant share is now powered electrically, have actually declined (cf. ill. 4).

In terms of geography, transport emissions mostly come from emerging and industrialized countries. The 10 countries with the largest transportation emissions were (in descending order):

Where do transport emissions come from?



ill. 4: The development of transport emissions from 1970-2010 is presented in this graphic.

United States, China, Russia, India, Brazil, Japan, Canada, Germany, Mexico and Iran. Together these countries contributed 53% of global transport emissions in 2014 (cf. ill. 5).

Effects

The rise in temperature has massive consequences:

Global warming causes glaciers and ice caps to melt. This meltwater drains into the ocean, causing sea levels to rise, resulting in flooding and erosion of coastal and low-lying areas.

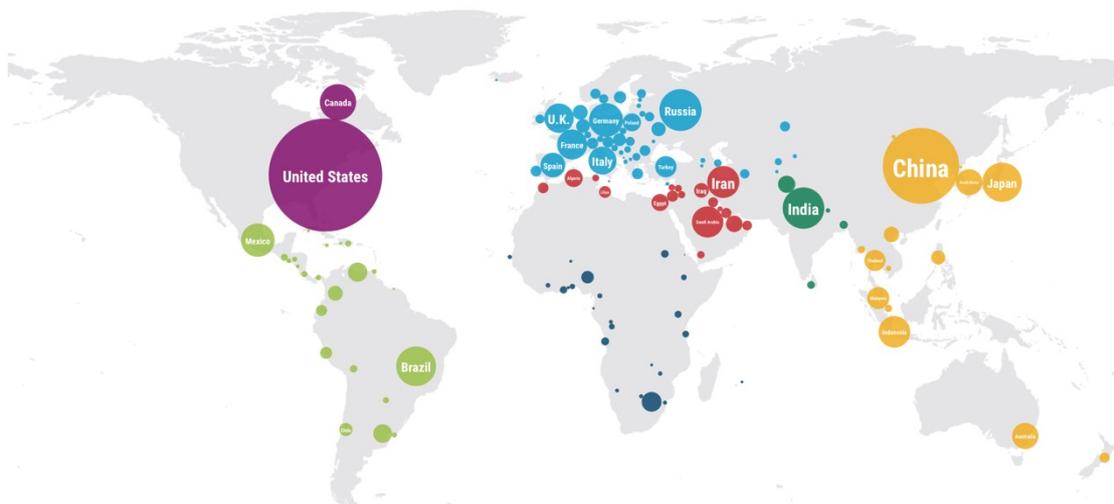
Furthermore, extreme weather events can occur more often, for example, periods of extreme heat or extreme cold as well as a change in rainfall patterns. Storms (e.g. the monsoon, hurricanes, typhoons) can become more intense. This can lead to a decrease in water quality, but also to decreasing availability of water resources. The climate and vegetation zones will also shift.

Many poor developing countries are among the most affected. People living there often depend heavily on their natural environment and they have the least resources to cope with the changing climate.

~~Damage to property and infrastructure and to human health imposes heavy costs on society and the economy. Climate change is happening so fast that many plants and animal species are struggling to cope. Many marine species have already moved to new locations. Some plant and animal species will be at increased risk of extinction if global average temperatures continue to rise unchecked.~~

Ill. 5: Here you can see a geographical overview of the global transport emissions in 2014.

Historical background:



Source: [Climate Watch](#)



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1750: The level of CO₂ in the atmosphere is about 280 ppm, the average global temperature is about 13.5 degrees Celsius. This is the pre-industrial baseline for all discussions of the impact of human activity on the atmosphere and climate.

1800 – 1910: The first and second stage of the Industrial Revolution lead to a rising world population, more GHG emissions and economic growth.

1920 – 1925: Opening of the Texas and Persian Gulf oil fields enables access to cheap and plentiful fossil-fuel energy.

1950: Continuously strong growth of fuel powered transportation like passenger cars, trucks, airplanes and ships due to the economic upswing after World War II.

1975: The first complex computer models of the global climate show a warming of several degrees if there is a doubling of pre-industrial levels of CO₂ in the atmosphere.

1979: The first World Climate Conference is held in Geneva and brings together a range of scientists. The Conference leads to the establishment of the World Climate Programme and the World Climate Research Programme. It also leads to the creation of the Intergovernmental Panel on Climate Change (IPCC) by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) in 1988.

1997: 164 countries agree on the Kyoto Protocol which mandates cuts in emissions by industrialized countries of an average of 5.2 percent from 1990 levels by 2008-2012. The EU agrees to cut its emissions by eight percent. Nevertheless, regulations for developing and emerging countries (e.g. China, India) could not be agreed.

2012: Based on the trade in pollution rights, the goals of the Kyoto Protocol were met by 2012. However, it was a major failure because emissions rose by around 30 percent over the same period. In the extension phase of the Kyoto Protocol until 2020, some industrialized nations (e.g. Russia, New Zealand and still the USA) were no longer willing to support the process.



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2015: The Paris Agreement is adopted to maintain the increase in global temperatures well below two degrees Celsius above pre-industrial levels, whilst making efforts to limit the increase to 1.5 degrees. It is the first-ever universal, legally binding global climate deal. Every country has to set new goals every five years that are more ambitious than the previous goals. Yet, each country sets its goals by its own terms.

2019: The UN climate conference takes place in Madrid; its main goal was to complete the rules of the Paris Agreement. An understanding should be found for Article 6, which regulates the cooperation between the individual countries and includes the handling of pollution rights. But this goal was postponed to the next year. So far, no agreement has been found.

2020: The economic crisis caused by the corona pandemic has a measurable positive impact on the carbon footprint, especially in the transportation sector. Emissions decrease in the short term, but the effects are not yet predictable in the long term. Furthermore, the UN climate conference in Glasgow was postponed to 2021.

Glossary:

GHG	–	Greenhouse Gase
CO ₂	–	Carbon Dioxide, greenhouse gas
cf.	–	confer
ill.	–	illustration
aerosols	–	smallest particles floating in the air, especially smoke and dust
ppm	–	parts per million
WMO	–	World Meteorological Organization, IGO and specialized agency of the UN, dedicated to international cooperation and coordination on the state and behavior of the earth's atmosphere
IPCC	–	Intergovernmental Panel on Climate Change, IGO, dedicated to providing the world with objective, scientific information relevant to understanding the scientific basis of the risk of human-induced climate change
UNEP	–	United Nations Environment Programme



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NGO – Non-Governmental Organization

IGO – Intergovernmental Organization

How to prepare as a delegate:

As a delegate, you are required to write at least one draft resolution and two position papers. You can choose which topic you want to write which document for, but no topic should appear twice.

Therefore, all topics of the forum are covered and you can prepare yourself thoroughly for the debates. Each of your documents must comply with the following formal rules:

Font: Times New Roman

Size: 12

Line pitch: 1.5

Since English is the official language at MUNoH, your documents must of course also be written in English.

You can find an example of a resolution and an example of a position paper on the official MUNoH website: <https://munoh.de/sample-papers/>.

Please make sure that your documents do not reflect your own opinion, but only the opinion of the country you represent. Furthermore, you should use trustworthy sources. You can inform yourself by

using the “Useful links” section or you can check out the official UN websites. Also, you can look for information on the official websites of your country.

When writing your papers, you should ask yourself the following questions:

1. How much does my country contribute to the world's CO₂ emissions, especially in the transportation sector?
2. How is my country affected by the repercussions of the anthropogenic greenhouse effect?
3. What is my country doing against these emissions in the transportation sector and the anthropogenic greenhouse effect in general?
4. How does the Corona crisis affect my country's existing aims and measures in the transportation sector?
5. Is my country part of the Kyoto Protocol or the Paris Agreement, if so, what are its goals and possibly measures?



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Use the writing of the resolution and the position paper as an aid to get an overview of the topic and your position as a delegate so that you can debate well prepared.

We (your presidents) look forward to reading your position papers and your resolution.

The deadline for submission is 23rd August. Please send us your documents in good time, otherwise they will not be corrected by us as Student Officers.

We wish you much success in writing amazing papers!

UN resolutions:

Here you can find UN resolutions regarding the issue:

1. [Strengthening the links between all modes of transport to achieve the Sustainable Development Goals](https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/72/212&Lang=E)
https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/72/212&Lang=E
2. [Role of transport and transit corridors in ensuring international cooperation for sustainable development](https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/69/213&Lang=E)
https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/69/213&Lang=E

Useful links:

You can use the following links to get some further insights on the issue:

1. [What is the greenhouse effect?](https://www.youtube.com/watch?v=BPJJM_hCFj0)
https://www.youtube.com/watch?v=BPJJM_hCFj0
2. [Transport emissions - IPCC](https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter8.pdf)
https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter8.pdf
3. [Causes and Consequences of Greenhouse Effect](http://article.sciencepublishinggroup.com/pdf/10.11648.j.ijsmi.20170304.11.pdf)
<http://article.sciencepublishinggroup.com/pdf/10.11648.j.ijsmi.20170304.11.pdf>
4. [CO₂ emissions from transport 1971-2014 by country](https://data.worldbank.org/indicator/EN.CO2.TRAN.ZS)
<https://data.worldbank.org/indicator/EN.CO2.TRAN.ZS>

Sources:

<https://sustainabledevelopment.un.org/topics/sustainabletransport>

<https://www.unenvironment.org/explore-topics/transport/why-does-transport-matter>



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<https://climate.nasa.gov>

<https://www.sciencedirect.com/science/article/pii/S0386111214601795>

<https://www.sciencedirect.com/science/article/pii/S1877705812023582>

https://carnegieendowment.org/files/transport_climate_disruption.pdf

<http://carnegieendowment.org>

<https://www.bgs.ac.uk/discoveringGeology/climateChange/CCS/man-madeEffect.html>

<https://think-asia.org/bitstream/handle/11540/1402/adb-wp09-transport-co2-emissions.pdf>

<https://www.un.org/sustainabledevelopment/blog/2015/12/transport-industry-present-10-initiative-to-reduce-carbon-emissions-at-un-conference/>

<https://www.un.org/sustainabledevelopment/blog/2015/12/un-joins-france-and-private-sector-partners-for-action-on-electro-mobility/>

<https://sustainabledevelopment.un.org/topics/sustainabletransporthttps://>

sustainabledevelopment.un.org/content/documents/2375Mobilizing%20Sustainable%20Transport.pdf

<https://www.un.org/sustainabledevelopment/blog/2015/12/transport-industry-present-10-initiative-to-reduce-carbon-emissions-at-un-conference/>

<https://www.unenvironment.org/explore-topics/energy/what-we-do/transport>

<https://whrc.org/our-work/timeline/>

<https://sustainabledevelopment.un.org/content/documents/2375Mobilizing%20Sustainable%20Transport.pdf>

<https://www.un.org/sustainabledevelopment/blog/2015/12/un-joins-france-and-private-sector-partners-for-action-on-electro-mobility/>

https://www.europarl.europa.eu/infographic/climate-negotiations-timeline/index_en.html