

BEYOND

SMART CITIES

GLOBAL CARBON MARKETS - EMISSIONS TRADING

TRAINING PROGRAM

FOR ENVIRONMENTAL AND GHG SPECIALISTS

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ENVIRONMENTAL SPECIALIST CURRICULUM





THE UNITED NATIONS FRAMEWORK CONVENTION ON

CLIMATE CHANGE AND THE KYOTO PROTOCOL

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The United Nations Framework Convention on Climate Change and the Kyoto Protocol

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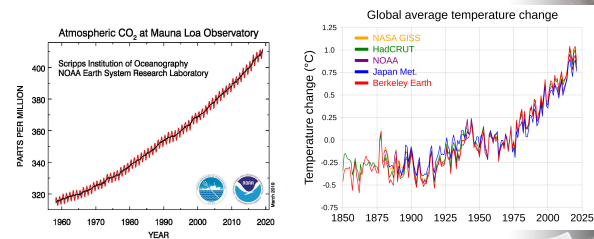


SCIENTIFIC BACKGROUND

It is a fact that greenhouse gases trap heat in the atmosphere – if they did not, the Earth would be significantly colder. It is also known that carbon dioxide is the dominant gas causing the enhancement of the greenhouse effect and that human activities are the primary source of increases in carbon dioxide emissions into the Earth's atmosphere. The largest source of carbon dioxide emissions is the burning of fossil fuels such as coal, oil, and natural gas.

Scientific measurements have shown that the amount of carbon dioxide in the atmosphere has increased significantly since the industrial revolution began in northern Europe and North America in the late 1800's. The carbon dioxide content of the atmosphere, under 280 parts per million on average in pre-industrial times, has now risen to close to 400 parts per million and is expected to continue to rise at an increasing rate.

SCIENTIFIC BACKGROUND +



SCIENTIFIC BACKGROUND +

There is much scientific uncertainty as to the exact impacts from an enhanced 'greenhouse effect' resulting from an overabundance of greenhouse gases in the atmosphere. However, it appears likely that the impacts include a rise in sea levels, changes in precipitation patterns, and potentially even disruption of ocean currents.

Livestock – especially ruminants such as cattle and sheep – produce the greenhouse gas methane during their digestion process. Increased numbers of livestock animals tend to result in increased amounts of methane being added to the atmosphere.

The removal of forests releases the carbon stored in their biomass, unless new trees are grown to replace the ones felled. Conversely, if forests are expanded through reforestation or afforestation, then carbon dioxide is removed from the atmosphere by new trees.

SCIENTIFIC BACKGROUND +

Name	Abbreviation	Global warming potential (CO ₂ e)	% world total emissions
Carbon Dioxide	CO ₂		77%
Methane	CH ₄	21	14%
Nitrous Oxide	N ₂ O	310	8%
Hydrofluorocarbon Gases	HFCs (HFC-23, HFC-22, etc)	140 - 11,700	<1%
Perfluorocarbons	PFCs	7,000	<1%
Sulphur Hexafluoride	SF ₆	23,900	<1%

This table lists the six major greenhouse gas categories, in order of their heat-trapping contribution to the greenhouse effect.

Relatively rare gases with a high global warming potential can stay in the atmosphere for thousands of years. On a per-molecule basis, carbon dioxide is far less potent than fluorocarbons such as HFCs, but its concentration in the atmosphere is much greater.

Methane, emitted from sources such as livestock and also from decomposing waste in landfills, is 21 times as potent as carbon dioxide on a per ton basis.

SCIENTIFIC BACKGROUND +

To make a common unit of measurement, greenhouse gas emissions are accounted for in tons carbon dioxide equivalent, such that the atmospheric heating effect of 1 ton of methane (CH₄) is equivalent to 21 tons carbon dioxide. This factor is called a global warming potential. It is based on the gas's ability to absorb heat and its atmospheric lifetime. Gases with a greater ability to absorb heat and that stay in the atmosphere for a long time have higher global warming potential values. For sake of convenience, carbon dioxide is given a global warming potential value of one.

The fact that different gases have different global warming potential values is important in our discussion of greenhouse gas emission offsets in Lesson 4. Projects that cut emissions of the high-potency greenhouse gases will result in more emission reduction credits being awarded for each unit of greenhouse gas reduced, because related emissions are converted to carbon dioxide equivalents.

Name	Source
Carbon dioxide	produced naturally by living organisms and by the burning of fossil fuels
Nitrous Oxide	produced by fuel burning and in fertilizer manufacturing
Methane	emitted from coal formations, landfills, livestock digestive processes, decomposing waste, vented rice cultivation
Hydrofluorocarbon gases	developed as an alternative to ozone-damaging chlorofluorocarbons (CFCs) banned under the 1987 Montreal Protocol. HFCs do not damage the ozone layer, but do contribute to climate change and are used in refrigeration and semiconductor manufacturing
Perfluorocarbons	by-product of aluminum smelting and uranium enrichment; also manufactured to replace CFCs in making semi-conductors
Sulphur Hexafluoride	used in heavy industry to insulate high-voltage equipment and to assist the manufacturing of cable cooling systems

THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

How did the global carbon market come about?

Concern over the possible scope of the greenhouse effect prompted the international community to hold a series of workshops and conferences on climate change beginning in the 1980s.

In 1988, a newly-established scientific body, the Intergovernmental Panel on Climate Change, or the IPCC, was tasked with assessing the actual threats posed by climate change. The IPCC is widely recognized as the most authoritative source of scientific advice on global warming and provides much of the factual background for international negotiations over a global response to the problem.

In response to warnings from the IPCC, the United Nations General Assembly declared global warming a 'common concern of mankind,' and held the first major global environmental conference in Rio de Janeiro in 1992. This United Nations Conference on Environment and Development saw the creation of the United Nations Framework Convention on Climate Change, which entered into force on 21 March 1994. The Convention has been ratified by over 190 countries, affording it one of the broadest memberships of any international agreement.

THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE +

The UNFCCC secretariat (UN Climate Change) is the United Nations entity tasked with supporting the global response to the threat of climate change. UNFCCC stands for United Nations Framework Convention on Climate Change. The Convention has near universal membership (197 Parties) and is the parent treaty of the 2015 Paris Agreement. The main aim of the Paris Agreement is to keep the global average temperature rise this century as close as possible to 1.5 degrees Celsius above pre-industrial levels. The UNFCCC is also the parent treaty of the 1997 Kyoto Protocol. The ultimate objective of all three agreements under the UNFCCC is to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system, in a time frame which allows ecosystems to adapt naturally and enables sustainable development.

THE KYOTO PROTOCOL

In short, the Kyoto Protocol operationalizes the United Nations Framework Convention on Climate Change by committing industrialised countries and economies in transition to limit and reduce greenhouse gases (GHG) emissions in accordance with agreed individual targets. The Convention itself only asks those countries to adopt policies and measures on mitigation and to report periodically.



Doha, Qatar, on 8 December 2012, the Doha Amendment to the Kyoto Protocol was adopted for a second commitment period, starting in 2013 and lasting until 2020.

As of 28 October 2020, 147 Parties deposited their instrument of acceptance, therefore the threshold of 144 instruments of acceptance for entry into force of the Doha Amendment was achieved. The amendment entered into force on 31 December 2020.

THE PARIS AGREEMENT

The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016.

Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.

To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century.

The Paris Agreement is a landmark in the multilateral climate change process because, for the first time, a binding agreement brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects.

THE FLEXIBLE MECHANISMS

As you will recall, under Kyoto, flexible mechanisms were specified to assist Annex 1 countries in meeting their emissions reduction targets.

The flexible mechanisms specified under Kyoto are: •

- ✓ Emissions trading between countries
- ✓ Clean development mechanism (CDM) and
- ✓ Joint implementation (JI).

The Paris Agreement speaks of the vision of fully realizing technology development and transfer for both improving resilience to climate change and reducing GHG emissions. It establishes a technology framework to provide overarching guidance to the well-functioning Technology Mechanism. The mechanism is accelerating technology development and transfer through its policy and implementation arms.



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