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CARBON FOOTPRINT OVERVIEW
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ONLINE TRAINING BY KRISHNAJI PAWAR
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MODULE 2

The Origins of Carbon Accounting

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CARBON FOOTPRINT OVERVIEW

Climate risk, exacerbated by increased GHG concentrations since the Industrial Revolution, has led to the UN's creation of a legislative framework to prevent harmful anthropogenic interference with the climate system.

Learning Objectives

- Introduction
- Origins of Carbon Accounting
- Fundamentals of carbon accounting
- Kyoto Protocol and beyond
- Professional Certification for Carbon Auditing
- Business Applications of Corporate GHG Inventories
- Summary and Resources

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INTRODUCTION

- Climate risk is a significant challenge to human development.
- Increased GHG concentrations since Industrial Revolution due to organization, production, and consumption methods.
- UNFCCC established a legal framework to prevent dangerous anthropogenic interference with the climate system.

GLOBAL ENERGY SITUATION ON CLIMATE CHANGE

Global sea-level rise could reach 0.2 to 2.5 m by 2100, potentially leading to the disappearance of 48 islands by the end of the century.

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GLOBAL ENERGY SITUATION AND CLIMATE CHANGE

- Rising levels of greenhouse gases like CO2, methane, and nitrous oxide are causing global average temperatures to rise.
- Surface temperatures have been warmer than in any preceding decade since 1850.
- Between 1880 and 2012, global average temperatures rose 0.85°C.
- Ocean warming accounts for over 90% of the energy accumulated between 1971 and 2010.
- The ocean has warmed most in the water closest to the surface.
- Scientists predict an additional 0.3–0.7°C increase from 2016–2035 and likely exceed 1.5°C between 2081 and 2100.



IMPACT OF GREENHOUSE GASES ON EARTH'S HEAT BALANCE

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- Radiative forcing refers to the difference between the radiative energy received and emitted by a climatic system.
- Positive radiative forcing increases the system's heat, while negative radiative forcing leads to cooling.
- Water vapor is the main greenhouse gas, but direct emissions have minimal impact due to the planet's water cover and short atmospheric stay.
- CO2, Methane (CH4), and Nitrous oxide (N2O) are the other main greenhouse gases.
- Human activities have significantly impacted the concentration of GHGs in the atmosphere.





IMPACT OF GREENHOUSE GASES ON EARTH'S HEAT BALANCE +



- The rise in CO2 levels since the Industrial Revolution has led to a rise in atmospheric CO2 emissions.
- Burning fossil fuels releases an additional quantity of CO2, interfering with the natural carbon cycle.
- The Earth's natural process of recycling GHG emissions has been disrupted by human activities.
- The IPCC estimates that around 15 GtCO2e are accumulated annually in the atmosphere and are not recycled.
- The concentration of CO2 in the atmosphere has increased from 280 ppm in the pre-industrial era to 403 ppm in 2016, exceeding the interval of natural variation over the last 650,000 years.

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GLOBAL GHG EMISSIONS GROWTH AND SOURCES



- Global GHG emissions nearly doubled between 1970 and 2010, with the OECD predicting a further increase in the next 40 years.
- China has become the world's largest emitter since 2007, largely due to significant growth in the electricity sector.
- The United States, the second largest emitter, has recently decreased emissions due to a shift from coal to gas in the electricity-generation sector.
- Global anthropogenic emissions can be categorized into six: energy generation, industry, building, and transport.

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GLOBAL GHG EMISSIONS GROWTH AND SOURCES+

- Emissions from agriculture, forestry, and other land uses (AFOLU) increased by 20% from 9.9 GtCO2eq in 1970 to 12 GtCO2eq in 2010, constituting about 20% to 25% of all global emissions in 2010.
- The waste sector, which includes emissions from waste treatment and disposal, accounted for barely 2.5% of total anthropogenic greenhouse gas emissions in 2010.





CLIMATE CHANGE IMPACT ON ECOSYSTEMS AND SOCIETY



- Climate change, particularly temperature rises, is affecting physical systems, biodiversity, and societal organization.
- The IPCC predicts sea levels to rise between 26 and 82 cm from 1986–2005 to 208–1100 cm, threatening coastal areas and requiring adaptation initiatives.
- States with territories slightly above sea level, such as small island states and Bangladesh, could be displaced due to increased water levels.
- Extreme events like heavy rains, cyclones, heatwaves, and droughts are likely to become more frequent and intense.

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CLIMATE CHANGE IMPACT ON ECOSYSTEMS AND SOCIETY +

- Climate change is predicted to increase the risk of extinction for certain species.
- The effects will have significant social and economic impacts, particularly on food production, water access, and health.
- Human societies will need to adapt, with an expected increase in climate refugees.
- The increase in droughts and extreme climatic phenomena will increase the risk and scale of humanitarian crises.



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