

Carbon Credits & opportunities in Uganda

Makerere University

Kampala, Uganda

Friday, March 14th 11:00am-1:00pm

Objectives



Climate Change



Carbon Trading



Compliance market



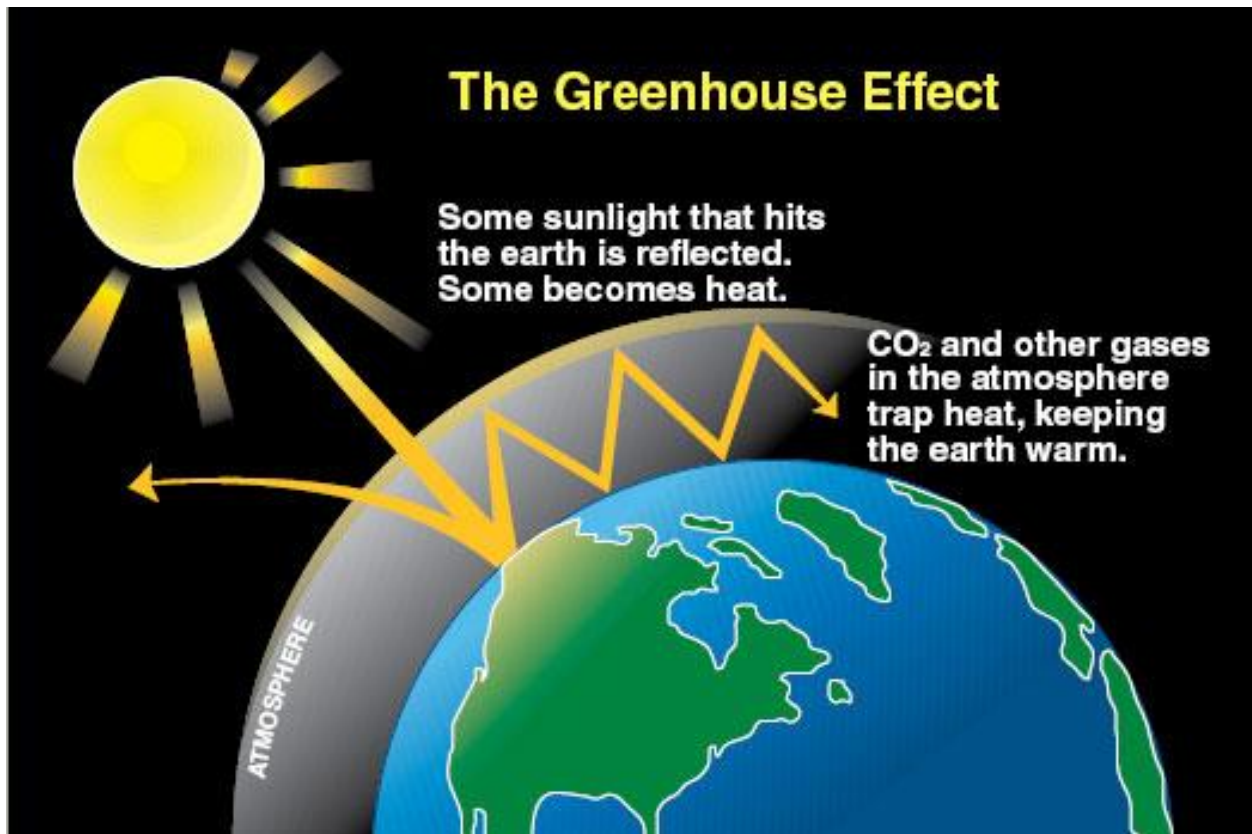
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Climate Change



Climate Change



*“Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia”
(IPCC 2013)*



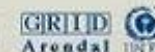
Climate Change

The main greenhouse gases

Greenhouse gases	Chemical formula	Pre-industrial concentration	Concentration in 1994	Atmospheric lifetime (years)**	Anthropogenic sources	Global warming potential (GWP)*
Carbon-dioxide	CO ₂	278 000 ppbv	358 000 ppbv	Variable	Fossil fuel combustion Land use conversion Cement production	1
Methane	CH ₄	700 ppbv	1721 ppbv	12,2 +/- 3	Fossil fuels Rice paddies Waste dumps Livestock	21 **
Nitrous oxide	N ₂ O	275 ppbv	311 ppbv	120	Fertilizer industrial processes combustion	310
CFC-12	CCl ₂ F ₂	0	0,503 ppbv	102	Liquid coolants. Foams	6200-7100 ****
HCFC-22	CHClF ₂	0	0,105 ppbv	12,1	Liquid coolants	1300-1400 ****
Perfluoromethane	CF ₄	0	0,070 ppbv	50 000	Production of aluminium	6 500
Sulphur hexa-fluoride	SF ₆	0	0,032 ppbv	3 200	Dielectric fluid	23 900

Note : pptv= 1 part per trillion by volume; ppbv= 1 part per billion by volume, ppm v= 1 part per million by volume

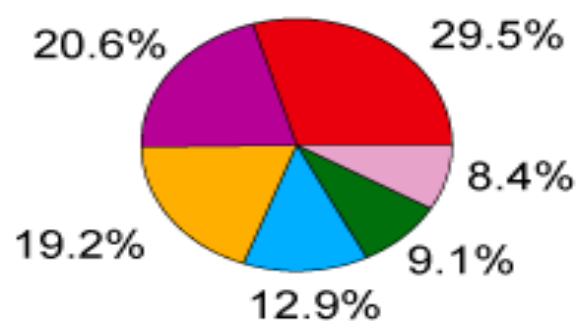
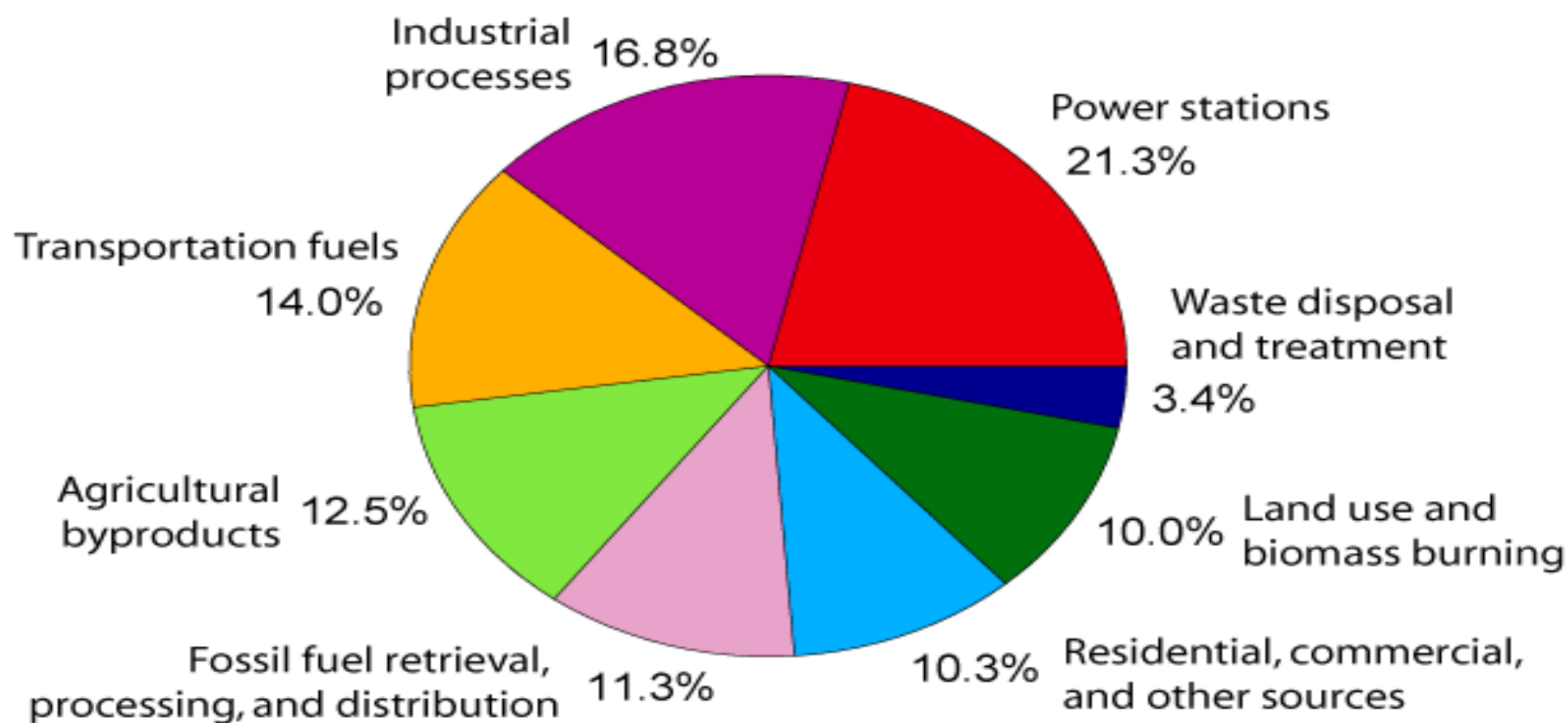
* GWP for 100 year time horizon. ** Includes indirect effects of tropospheric ozone production and stratospheric water vapour production. *** On page 15 of the IPCC SAR. No single lifetime for CO₂ can be defined because of the different rates of uptake by different sink processes. **** Net global warming potential (i.e., including the indirect effect due to ozone depletion).



Source: IPCC radiative forcing report; Climate change 1995, The science of climate change, contribution of working group I to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge press university, 1996.

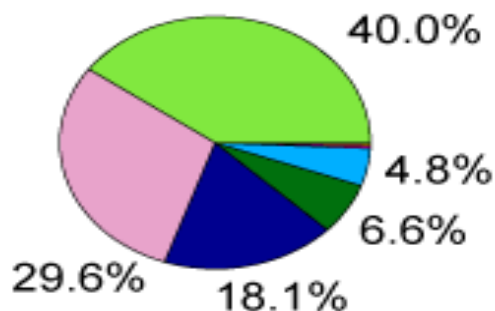


Annual Greenhouse Gas Emissions by Sector



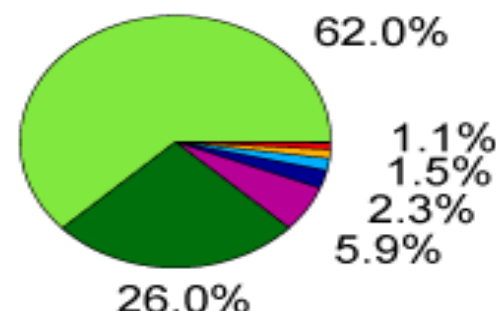
Carbon Dioxide

(72% of total)



Methane

(18% of total)



Nitrous Oxide

(9% of total)

Impacts of Climate Change

Climate change is apparent now across our nation. Trends observed in recent decades include rising temperatures, increasing heavy downpours, rising sea level, longer growing seasons, reductions in snow and ice, and changes in the amounts and timing of river flows. These trends are projected to continue, with larger changes resulting from higher amounts of heat-trapping gas emissions, and smaller changes from lower amounts of these emissions. The observed changes in climate are already causing a wide range of impacts, and these impacts are expected to grow. Select examples follow.

Sea Ice and Permafrost

Risks and costs in Alaska increase as thawing of permafrost damages roads, buildings, and forests, and declining sea ice increases coastal erosion and threatens the existence of some communities.



Forests

Forest growth is generally projected to increase in much of the East, but decrease in much of the West as water becomes even scarcer. Major shifts in species are expected, such as maple-beech-birch forests being replaced by oak-hickory in the Northeast. Insect infestations and wildfires are projected to increase as warming progresses.



Coldwater Fish

Salmon, trout, and other coldwater fish will face additional stresses as water temperatures rise and summer streamflows decline. Ecosystems and the tourism and recreation they support will be adversely affected.



Coral Reefs

Rising water temperatures and ocean acidification threaten coral reefs and the rich ecosystems they support. These and other climate-related impacts on coastal and marine ecosystems will have major implications for tourism and fisheries.



Heavy Downpours

More rain is already coming in very heavy events, and this trend is projected to increase across the nation. Such events are harmful to transportation infrastructure, agriculture, water quality, and human health.



Coastal Communities

Sea-level rise and storm surge will increase threats to homes and infrastructure including water, sewer, transportation, and communication systems. Many barrier islands and coastal marshes that protect the coastline and support healthy ecosystems will be lost.



Agriculture

Increasing heat, pests, floods, weeds, and water stress will present increasing challenges for crop and livestock production.



Heat Waves

Heat waves will become more frequent and intense, increasing threats to human health and quality of life, especially in cities.



Water and Energy Interactions

As warming increases competition for water, the energy sector will be strongly affected because power plants require large amounts of water for cooling.



Energy Supply

Warming will decrease demand for heating energy in winter and increase demand for cooling energy in summer. The latter will result in significant increases in electricity use and higher peak demand in most regions.



Water Supply

Water supplies in the rapidly growing Southwest will become increasingly scarce, calling for difficult trade-offs among competing uses.



Interacting Stresses

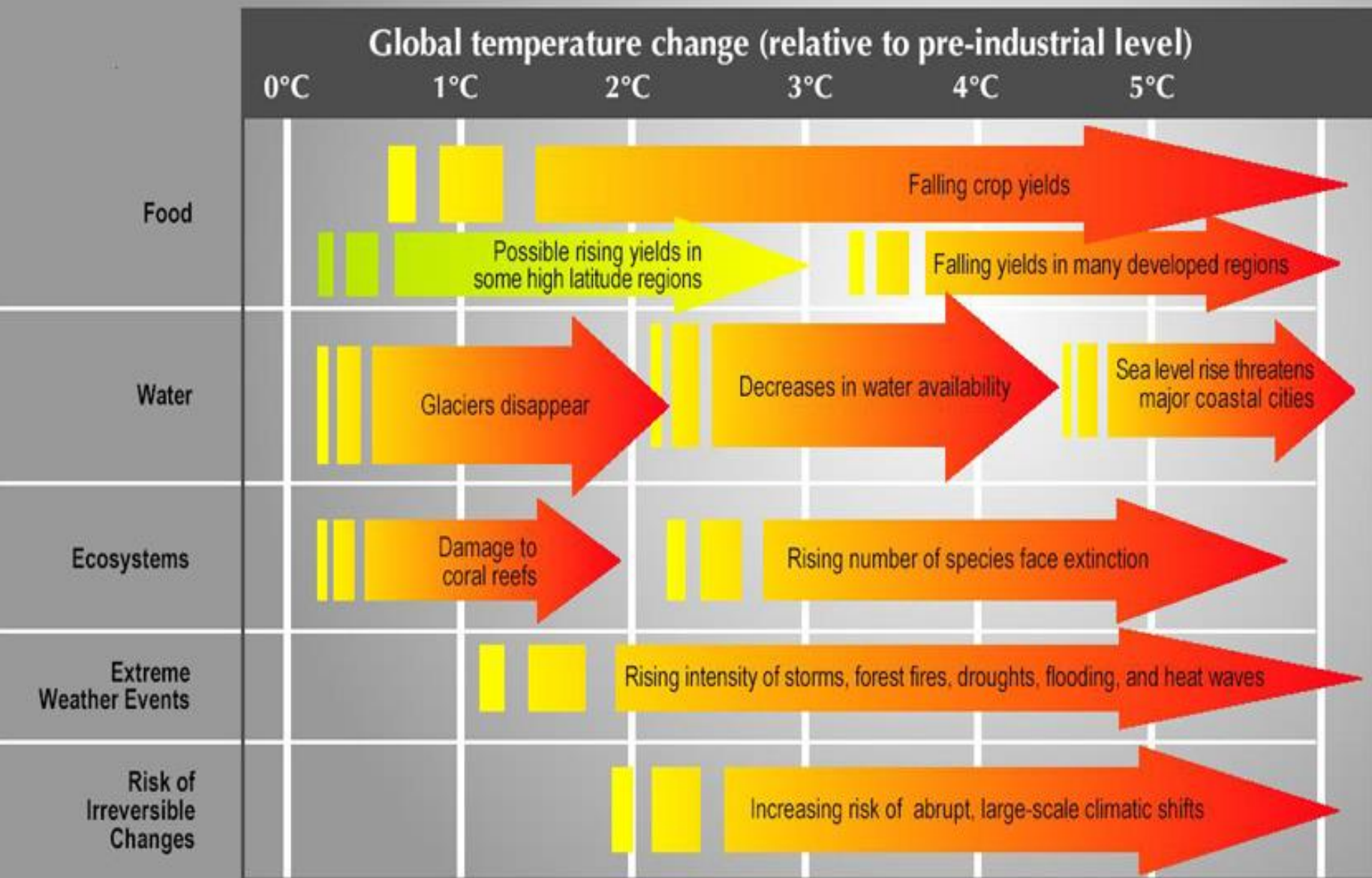
Population shifts and development choices are making more Americans vulnerable to the impacts of climate change. An aging populace and continued population shifts to the Southeast, Southwest, and coastal cities amplify risks associated with extreme heat, sea-level rise, storm surge, and increasing water scarcity in some regions.



Responding to Climate Change

Responses to climate change fall into two major categories. "Mitigation" focuses on reducing emissions of heat-trapping gases or increasing their uptake to reduce the amount and speed of climate change. "Adaptation" refers to changes made to better respond to present or future climate conditions in order to reduce harm or take advantage of opportunities. Both are necessary elements of a comprehensive response strategy.

Projected Impacts of Climate Change



C = Celsius; CO₂ = Carbon Dioxide

Source: Adapted from the *Stern Review on the Economics of Climate Change*.



"Climate change is a result of the greatest market failure the world has seen. The evidence on the seriousness of the risks from inaction or delayed action is now overwhelming. The problem of climate change involves a fundamental failure of markets."

Sir N. Stern – The Stern Report



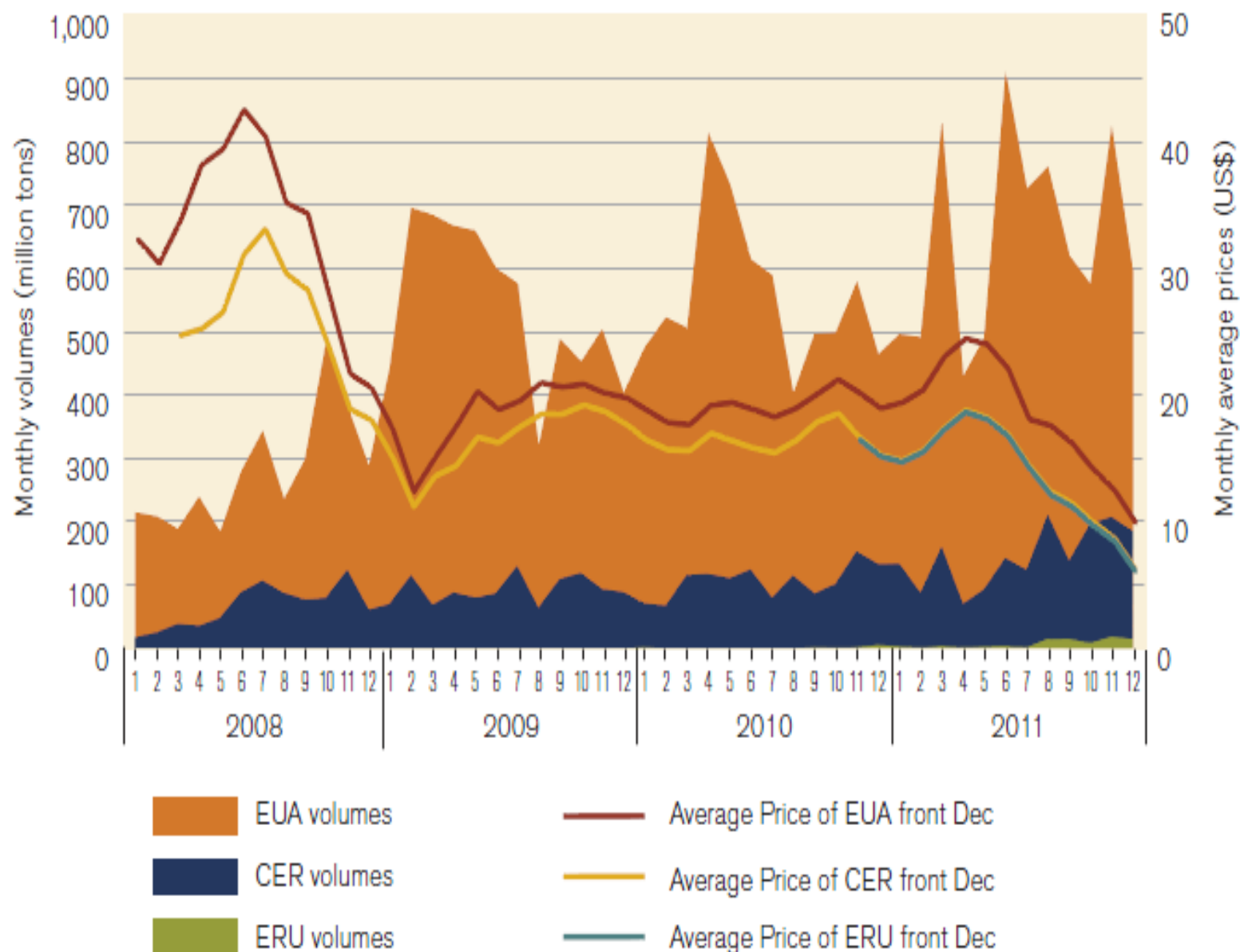
Objectives



Carbon Trading



Figure 1:
Prices and volumes
for EUAs, CERs
and ERUs in the
secondary market,
2008-2011²¹



Carbon Market Evolution, values (\$ billion), 2004–10

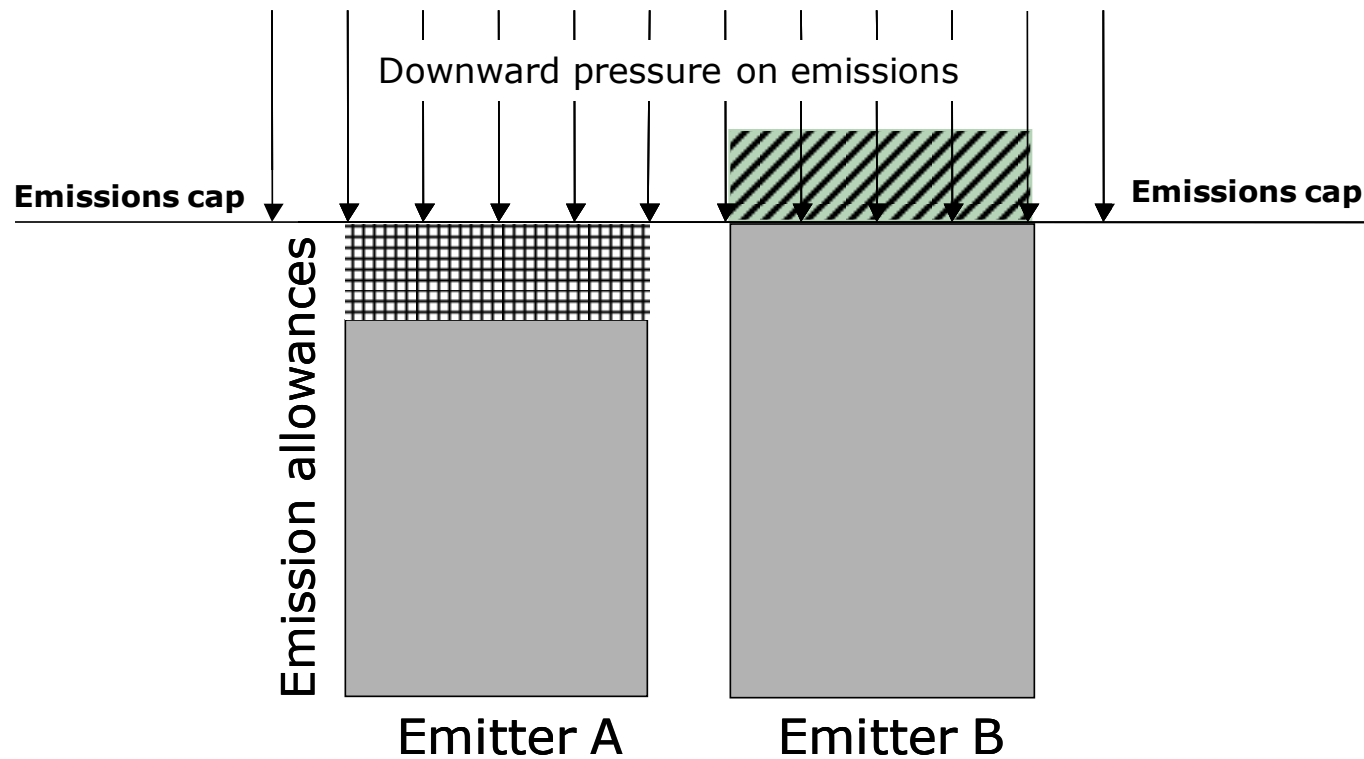
Table 1. Carbon Market at a Glance, Market Values, 2004–10

	EU ETS Allowances	Other Allowances	Primary CDM	Secondary CDM	Other Offsets	Total
2005	7.9	0.1	2.6	0.2	0.3	11.0
2006	24.4	0.3	5.8	0.4	0.3	31.2
2007	49.1	0.3	7.4	5.5	0.8	63.0
2008	100.5	1.0	6.5	26.3	0.8	135.1
2009	118.5	4.3	2.7	17.5	0.7	143.7
2010	119.8	1.1	1.5	18.3	1.2	141.9

Sources: World Bank, Thomson Reuters Point Carbon, Bloomberg New Energy Finance and Ecosystem Marketplace

Note: Numbers may not add up due to rounding.

Emissions Trading



 = **Emission allowances to sell**

 = **Emission units/credits needed**

Objectives



Compliance market



The Kyoto Protocol

- **Legally binding targets** for emissions of six major greenhouse gases in industrialized countries during first commitment period
- New **international market-based mechanisms**, creating a new commodity: carbon
- Facilitate **sustainable development**



Sustainable Development & Carbon Credits



projects are issued
saleable credits

• 1 **CER** = 1 tonne of CO₂



Contribution to Sustainable Development
- employment, income generation,
health benefits and infrastructure
development



Market based Mechanisms



The CAP –
Legally binding targets
for emissions of
greenhouse gases –
Allowances

- **Emission Trading (ET):**
exchanging emission allowances among Kyoto Protocol Parties
- **Clean Development Mechanism (CDM):** credits for emissions reduced/avoided through sustainable development projects in developing countries (non-Annex I countries)
- **Joint Implementation (JI):**
credits for emissions avoided through projects in Annex I countries



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and ERUs in the
secondary market,
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