



# **GLOBALIZATION, TRADE AND GLOBAL WARMING**

**University of Glasgow**

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**Personal opinions that not necessarily coincide with those of the  
rest of members of the Board of Directors of the Bank**



## **Agenda**

- 1. Why Should Central Bankers and Other Policy Makers be Concerned About Global Warming?**
- 2. Kyoto and Mdl, The First Positive Answer Worldwide so far**
- 3. Other New Business Opportunities Within the Framework of Sustainability**
- 4. Mega-project of Colombia for Benefiting Itself and the Rest of The World**



## Primary objective of macroeconomic policy

Maximize welfare under conditions of sustainability and social equity

To achieve this is essential to ensure low and stable inflation, as well as firm will power of policy makers to correct the market failures that hinder the superiority of public interest over the interests of particular industries or sectors



## The most formidable failure market the humanity has ever experienced

Climate Change

It began to develop since the industrial revolution, due to the growing emissions of greenhouse gases, derived from over-use in the utilization of fossil fuels - oil, coal and natural gas -



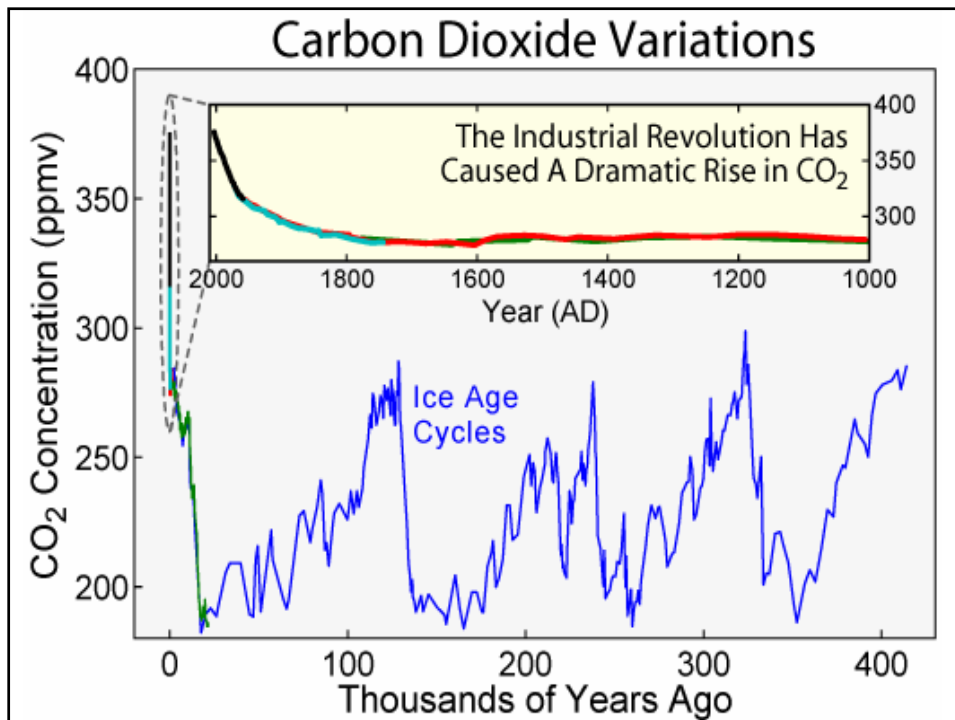
## Greenhouse Gases

( 6 gases targeted by Kyoto Protocol )

house Gases covered by Kyoto Protocol]

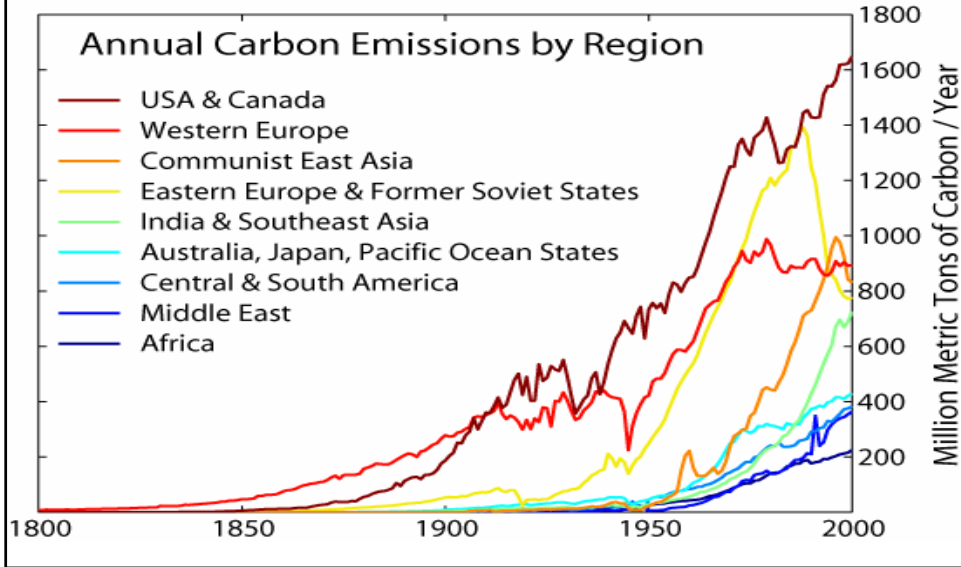
Greenhouse Gas	GWP*	Characteristics	Uses / Sources
Carbon Dioxide (CO <sub>2</sub> )	1	Major greenhouse gas	Combustion of fossil fuels (coal , petroleum, natural gas), etc.
Methane (CH <sub>4</sub> )	21x	Major component of natural gas and gaseous at normal temperatures. Burns well.	Rice production, intestinal fermentation in domestic livestock, landfill , etc.
Nitrous Oxide (N <sub>2</sub> O)	310x	The most stable of the many oxides of nitrogen. Not toxic like other nitrogen oxides (e.g. Nitrogen dioxide)	Combustion of fuels, production process of nitric acid (chemical fertilizer ingredient) and adipic acid (nylon ingredient), etc.
<CFC Substitute> Hydrofluorocarbons (HFCs)	HFC 23 11,700x	Not inclusive of chlorine, does no harm to the ozone layer. A powerful GHG.	Sprays, refrigerant for air conditioners and refrigerators, production of chemical materials
<CFC Substitute> Perfluorocarbons (PFCs)	PFC 14 6,500x	Composed only of carbon and fluorine. Powerful GHG.	Manufacturing process of semiconductors, electrolytic refining of aluminum
Sulfur Hexafluoride (SF <sub>6</sub> )	23,900x	Composed only of sulfur and fluorine. Does no harm to the ozone layer. Powerful GHG.	Electric insulator, etc.

(\*) GWP:Global Warming Potential  
Source: Mitsubishi Corporation



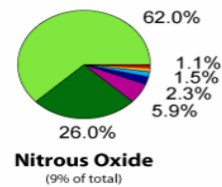
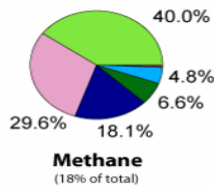
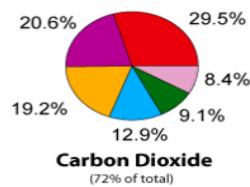
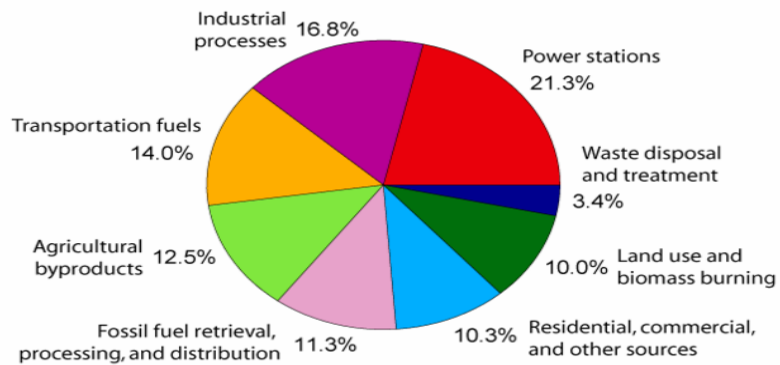


## Annual carbon emissions by region Perfect correlation between GDP per capita and GHG emissions



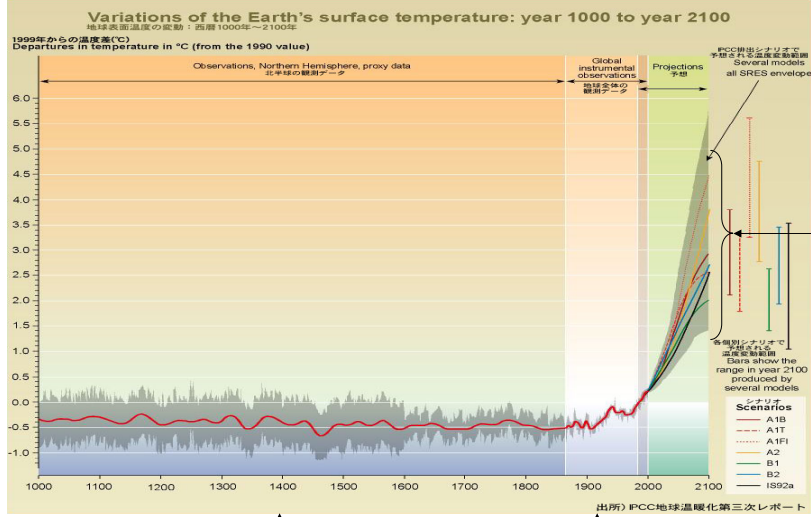
## The major 'sinners'

### Annual Greenhouse Gas Emissions by Sector





# Variations of the Earth's Surface Temperature and Future Forecast ( 1000 ~ 2100 )



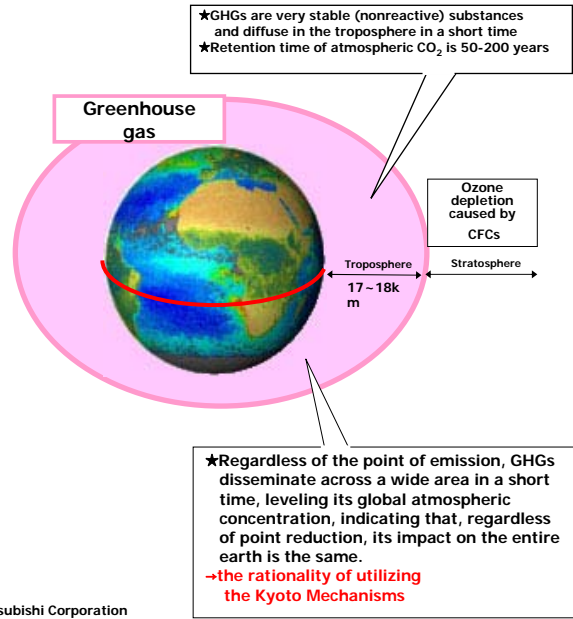
Estimated data based on tree-rings, coral, ice sheet core

Actual measurement value

Source: IPCC Third Assessment Report (2001)



# Climate Change due to GHG emission is truly a global issue



© 2005 Mitsubishi Corporation



## The most notorious effects of climate change

Rise of sea levels due to melting of glaciers and polar icecaps

Deterioration of soils due to fall of water tables, erosion and expanding deserts

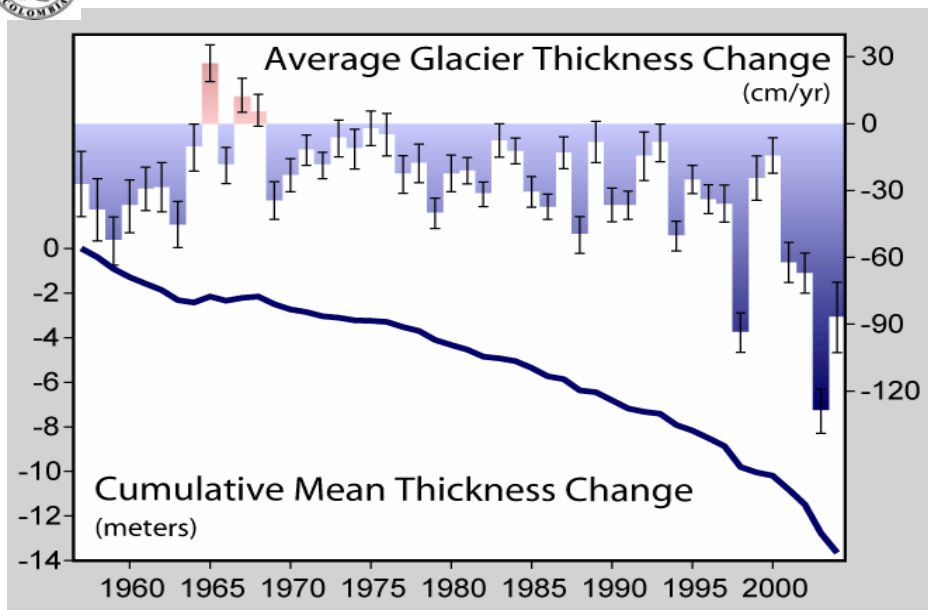
Loss of ecosystems and biodiversity

Changes in regional climate patterns: monsoons, Niño, Amazonia, hurricanes

Migration to milder climates of tropical bacteria, viruses and plagues like malaria, dengue and mosquitoes

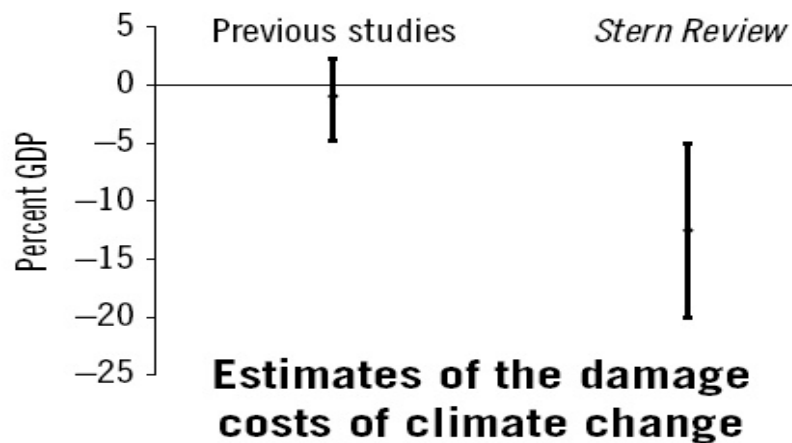


## One of the most visible effects





## Global economic costs of climate change according to Sir Nicholas Stern: *The Economics of Climate Change*



## The Stern report: confronting climate change is an economic and moral imperative

There is a 25-55 years gap between collective action and its first significant impacts on climate change, maybe longer

In 2035 concentration of GHG in the atmosphere would be 560 ppm, double than that of 1850, and the temperature two more degrees Celsius

But it could keep rising up to five, an unknown scenario by the science and humanity of today



## A feasible target

Stabilize concentration of GHG between 450 y 550 ppm. Today it is 430 ppm, growing at **two ppm per year**

That means that emissions in the year 2050 would have to be 25% below the present level



## Five ways to meet the proposed target

1

Curbing demand of goods and services intensive in emissions. Beginning with oil and coal themselves!

2

Increasing production and consumption energy efficiency

3

Fighting deforestation

4

Multiplying tree planting to sequester carbon dioxide

5

Shifting towards technologies of much lesser emissions intensity, mainly in power generation, industry, transport industries and agriculture



## The instrument, the greatest challenge for the economics science today

### Price System

Market signals through the price system, powerful enough to induce an effective transit of the global economy towards much cleaner production and consumption modalities, are the most efficient alternative to reduce the use of fossil fuel and lower emissions intensity



## First step

**Ecological fiscal reform based on the theory of externalities of British economist A. Pigou (1920): those who do harm must pay**

Zero subsidies and incentives for use of fossil fuels

High levies or 'eco-tariffs' on their consumption and on deforestation actions

Markets must be corrected to reflect the ecological truth

That means that all prices should incorporate the full burden of costs of the externalities provoked by environmental deterioration



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## The Kyoto Protocol is an amendment to the United Nations Framework Convention on Climate Change

### Kyoto Protocol

Opened for signature	December 11, 1997 in Kyoto, Japan
Entered into force	February 16, 2005.
Conditions for entry into force	55 parties and at least 55% CO2 1990 emissions by UNFCCC Annex I parties.
Parties	169 countries and other governmental entities (as of December 2006)



## Kyoto Mechanism

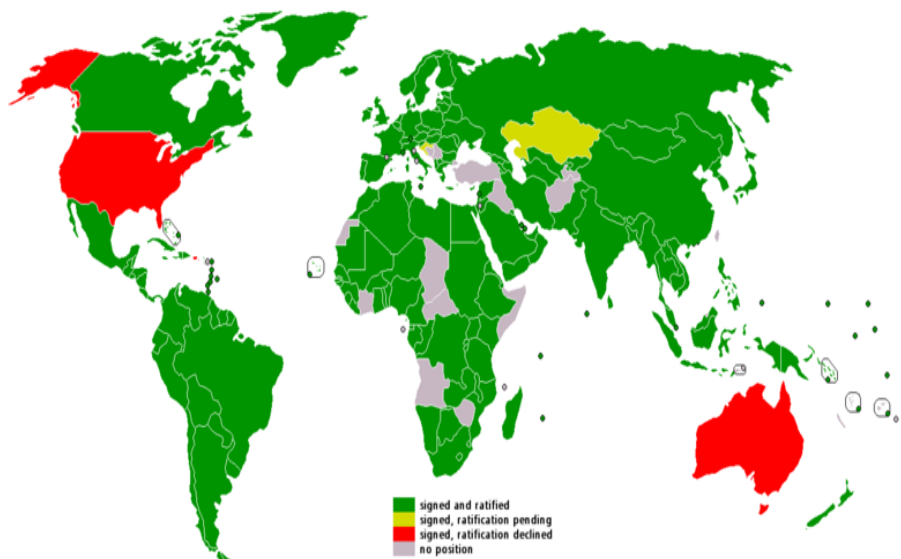
### Reduction Commitments in relation to the Potential Demand

COMMITMENTS & EXPECTED EMISSION LEVELS						
	Emission levels 1990 - Mton	Protocol Target	Assigned Allowances	B - A - U 2010 - Mton	Demand Mton	%
USA	1,362	93%	1,267	1,838	571	32%
JPN	298	94%	280	424	144	33%
EEC	822	92%	756	1,064	308	28%
Otros OECD	318	95%	301	472	171	36%
Europa Oriental	266	104%	277	395	118	42%
Ex Unión Soviética	891	98%	873	763	0,00	0%
<b>TOTAL</b>	<b>3,957</b>		<b>3,754</b>	<b>4,956</b>	<b>1,312</b>	

Fuente : MIT(1998a)

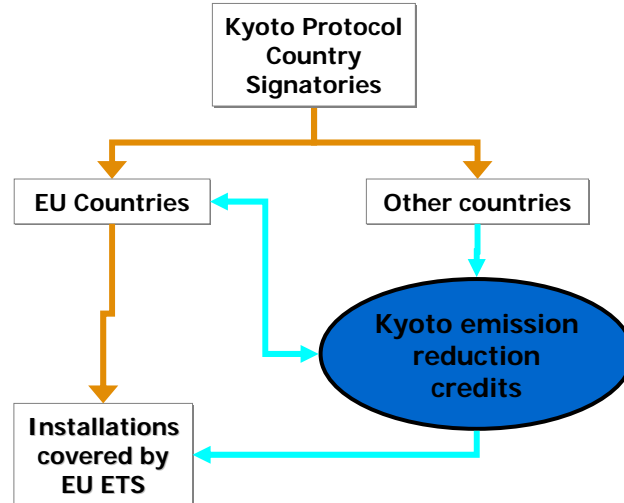


## Kyoto Protocol participation map





## Links to Kyoto Trading Mechanisms



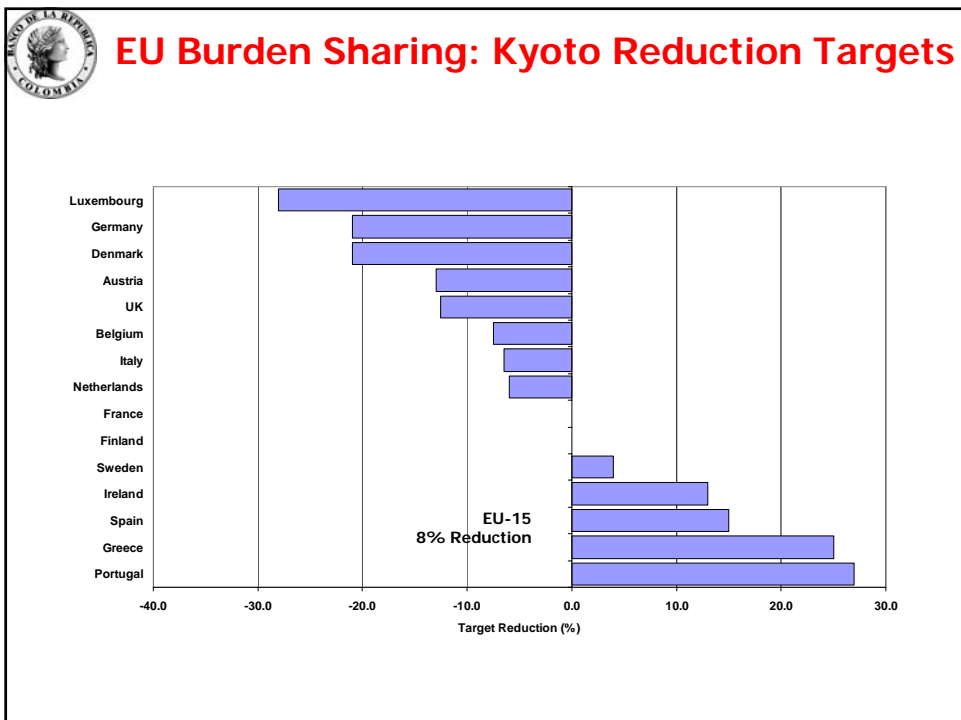
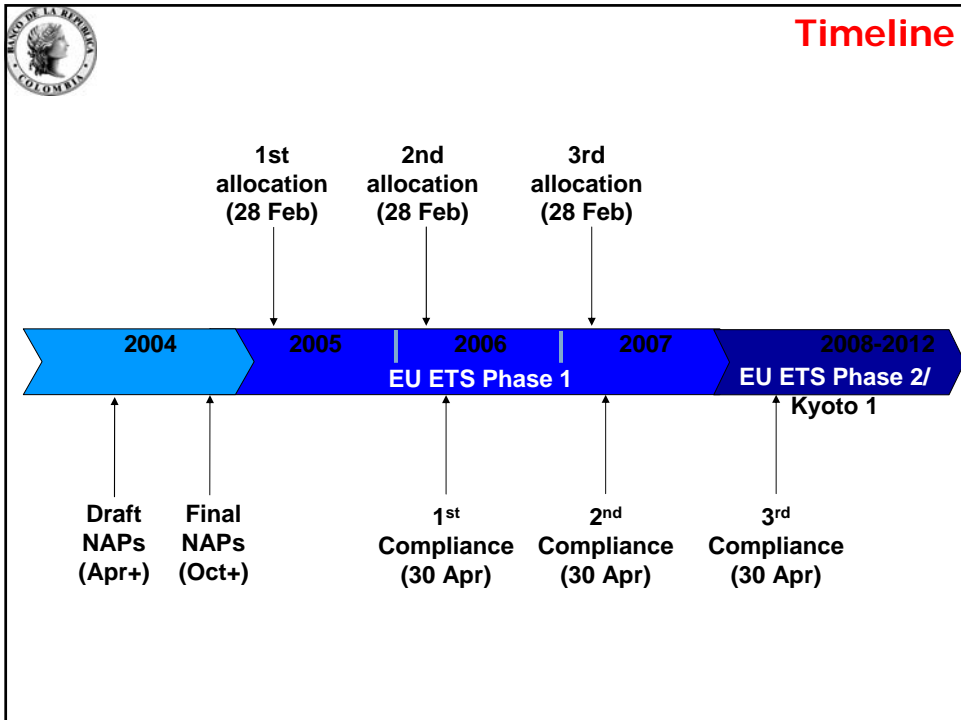
## The UE

### GHG Emissions

- EU ETS started controlling GHG emissions since 1st January 2005:
  - €40 per ton penalties for companies that do not comply with limits. €100 from 2008.
  - Companies can purchase Permanent Carbon Emission Reduction Certificates (CER's), from the market, to fulfill their requirements.

### Exchanges

- The Chicago Climate Exchange and London's International Petroleum Exchange formed The European Climate Exchange to trade CER's



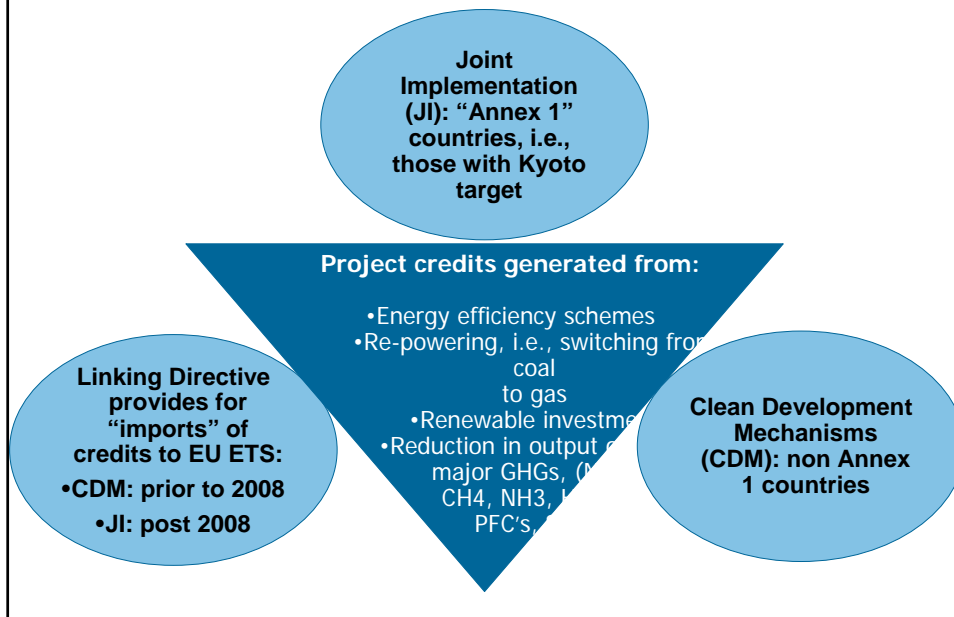


## Change in GHG emissions from 1990 to 2004 for some countries

Country	Change in GHG Emissions (1990-2004)	EU Assigned Objective for 2012	Treaty Obligation 2008-2012
Germany	-17.0%	-21.0%	-8.0%
Canada	27.0%	N/A	-6.0%
Spain	49.0%	15.0%	-8.0%
U. States	16.0%	N/A	N/A
France	-0.8%	0.0%	-8.0%
Greece	27.0%	25.0%	-8.0%
Ireland	23.0%	13.0%	-8.0%
Japan	6.5%	N/A	-6.0%
U. Kingdom	-14.0%	-12.5%	-8.0%
Portugal	41.0%	27.0%	-8.0%
EU-15	-0.8%	N/A	-8.0%
<b>China</b>	<b>47.0%</b>		
<b>India</b>	<b>55.0%</b>		

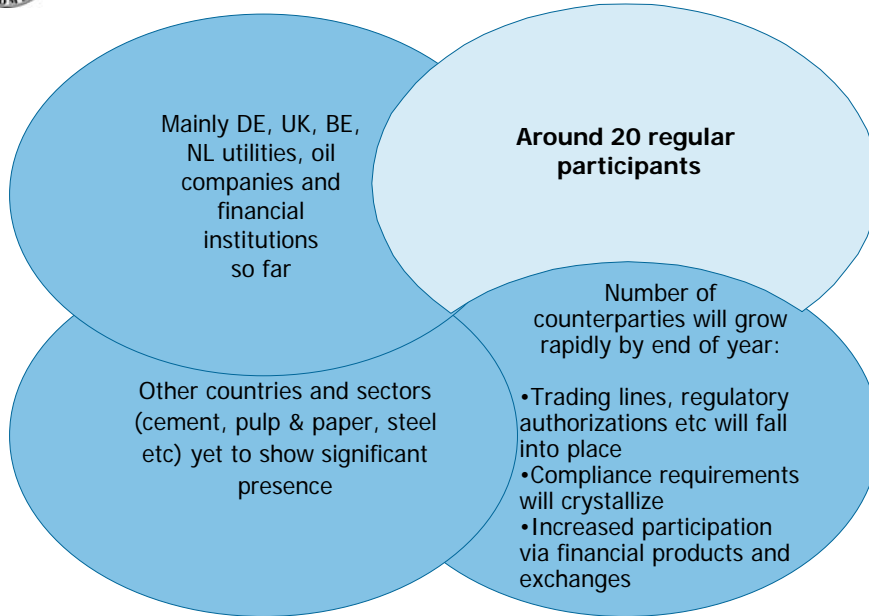


## Kyoto Project Credits

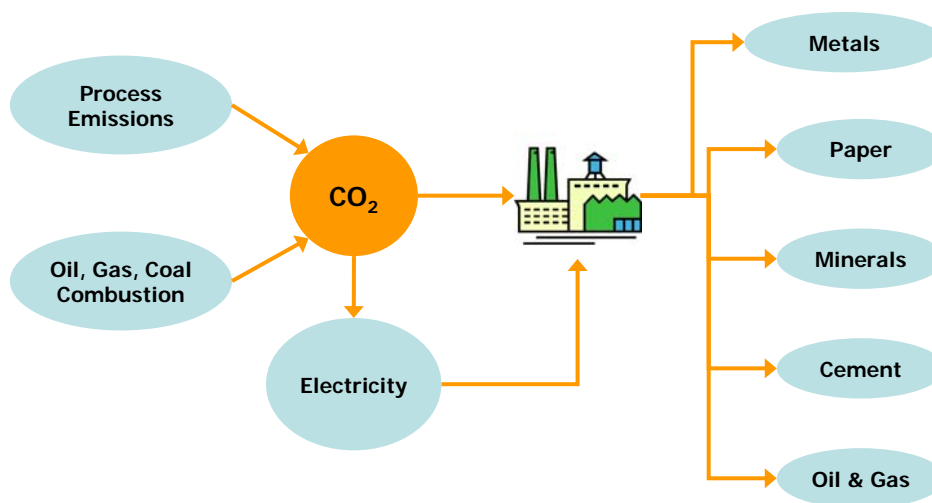




## Who is trading?

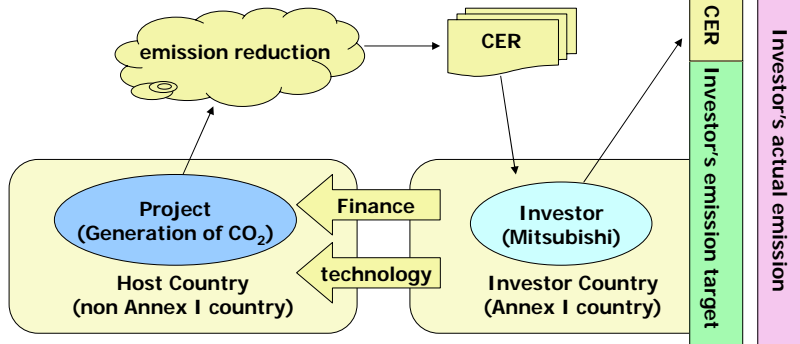


## CO<sub>2</sub> is now part of the industrial cost base





## Outline of Emission Reduction Project (CDM)

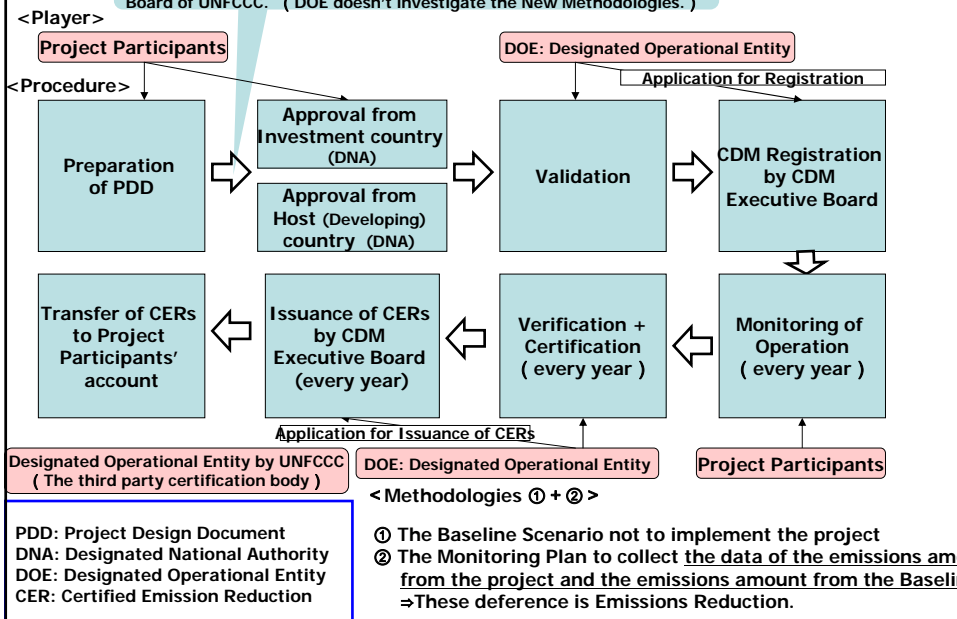


- Investor country (its business entity) invests or finance in a project in host country (with its business entity).
- If the project is approved as CDM, it will generate emission reduction credits (CER) during "crediting period" (7 years x 3 or 10 years x 2).
- Investor country will use the CER to cancel the excess emission.
- Certified Emission Reductions (CERs) will be shared, or sold jointly.



## CDM Procedure

For using the New Methodologies which is the calculation method of emissions, it is necessary to be submitted through DOE and to be approved by CDM Executive Board of UNFCCC. ( DOE doesn't investigate the New Methodologies. )





## Japan

### Japan's first carbon fund

Japan Bank for International Cooperation (JBIC) and the Development Bank of Japan (DBJ) established Japan's first carbon fund together with 20 companies on October 1st, 2004.

### CDM projects

JBIC signed an agreement with BCIE (Central American Bank for Economic Integration) to promote CDM projects in Central America and to acquire Certificates of Emission Reduction (CER's).

### Investment in the World Bank Carbon Fund

Daiwa Security SMBC Co., Nippon Oil Corp., Idemitsu Kosan Co. and Okinawa Electric Power Co. invested in the World Bank Carbon Fund.



## US

### Reducing gasoline consumption

US has not subscribed yet Kyoto. But its government already established a target for reducing gasoline consumption 20% by 2015

### CER's market

The Chicago Climate Exchange is leader in the voluntary trade market of CER's. Goldman Sachs acquired 22% of its equity

### Bioethanol production

This year the US will overcome Brazil in bioethanol production with 4.3 bill gallons. Additionally, it is studying the opening of its market for free imports



## Pending task: North-South trade of CERs

### Extending the EU ETS mechanism

Extending the EU ETS mechanism to the rest of the world, in such a way that private sectors as well as governments of all rich countries environmentally indebted can acquire CER's in emerging markets, based on MDL projects in the fields of technological transformation, reforestation and conservation

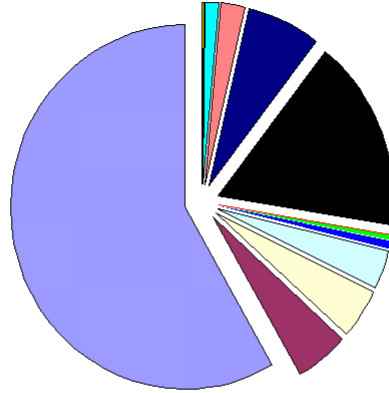


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## World Renewable Energy 2005



Large hydro 58.23%	Small hydro 5.12%	Wind power 4.58%	Biomass elec 3.42%
Geothermal elec 0.72%	Photovoltaic 0.42%	Other elec** 0.05%	Biomass heat* 17.08%
Solar heat 6.83%	Geothermal heat 2.17%	Biodiesel fuel 1.21%	Bioethanol fuel 0.16%



## Bioenergy, a new and growing option

### Bioethanol

- Mix with gasoline up to 23% without modification of motors. But up to 100% in flex-fuel motors. Between 2000-05 its world consumption grew 165%, from 4.6 bill gallons to 12.6 bill gallons

### Biodiesel

- For replacing up to 100% fossil diesel in current motors. Between 2000-05 tripled, from 0.251 billion gallons to 0.790



## Bioenergy yields in terms of gallons per hectare

### Bioethanol

- Beet in France (1785)
- Sugar cane in Brazil (1655)
- Cassava in Nigeria (1025)
- Sweet sorghum in India (935)
- Corn in US (885)

### Biodiesel World Averages

- Palm oil (1270)
- Coconut oil (575)
- Rapeseed (255)
- Peanuts (225)
- Sunflower (205)
- Soybeans (140)



## Some tips on bioethanol and gasoline

### World Production

World Bioethanol production represents 80% of alcohol production

### Big Producers

90% of bioethanol is produced only by Brazil and US

### Brazil and US

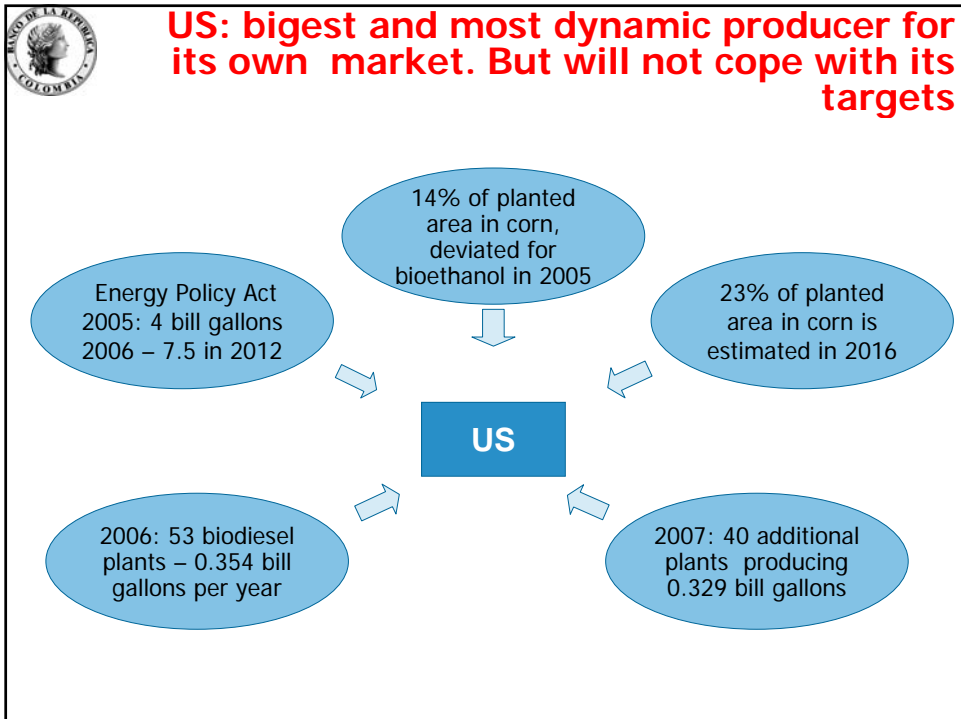
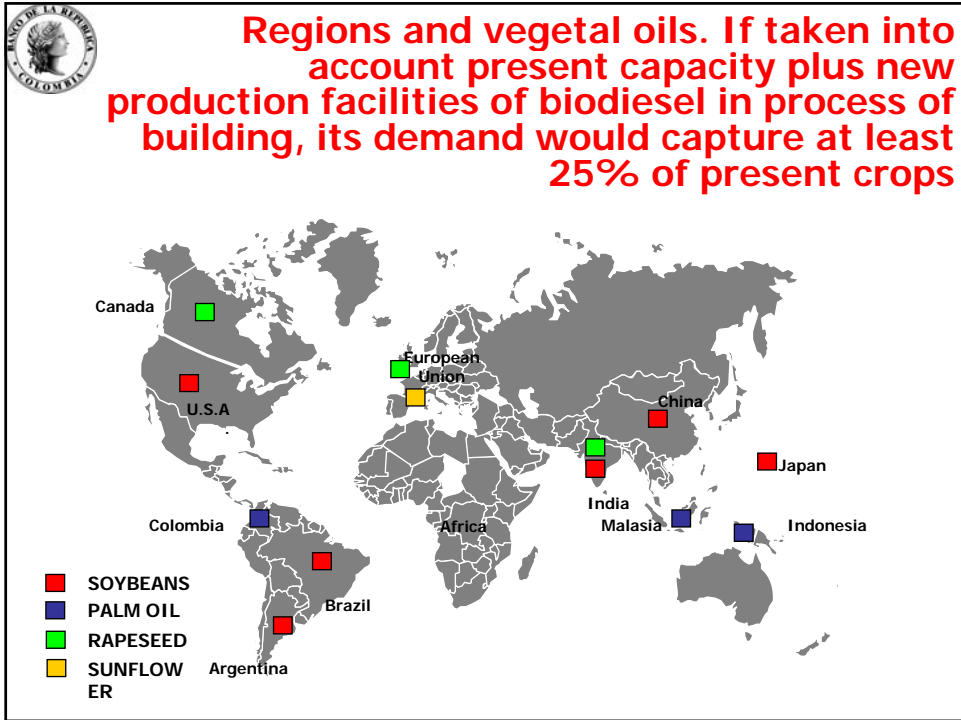
This year the US will overcome Brazil in bioethanol production. Nevertheless Brazil plans to have in 2012 400 additional distilleries producing 9.5 bill gallons

### Bioethanol and Gasoline

Today Bioethanol only reaches 2.5% of the world consumption of gasoline

### Consumers

US consumes near a third of the gasoline of the world





## Rise of food prices, a new inflation source?

Due to rising demand for biofuels, farmers are enticed to convert from production of food, feed and natural fibers to production of raw materials for biofuels

However, in the developing world, where a majority of people are farmers and where a vast mass of unused agricultural land exists, the biofuels opportunity may benefit millions of farmers and fuels economic growth and rural development

## What might be happening is a new and profound change in relative prices

### Kyoto Protocol

Under Kyoto Protocol norms and CDM criteria, the global market for CER's and biofuels is becoming very dynamic

### Prices

Rise of raw materials prices for biofuels are taking place, and the vulnerability of the global economy in front of fossil fuels, as well as its demand, would diminish. If so, a fall of prices may occur

### Policy Makers

Central bankers and policy makers should keep analyzing these probable and other alternative scenarios in order to fine tune monetary and fiscal policies according to the pace of transit towards a sustainable global economy, less intensive in emissions of GHG



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## Renaissance of High Orinoco Region

### *A Dream, a Vision, a Challenge ...*

Revival during the next 30 years of the ancient tropical rainforest where the Colombian Orinoco river basin used to be

The Renaissance of six millions hectares with a unique opportunity to develop productive biological corridors





## Benefits for the World and Colombia

- Leadership by the State
- Local and international private sector investment
- Long term vision - 30 years
- Agro-forestry environmentally friendly production systems
- Inspired by Gaviotas

### MEGA - PROJECT

- Supporting UN's Millennium Goals and Kyoto Protocol targets
- Productive Biological Corridors with interconnection of ecosystems
- Environmental conservation and social progress
- Clean Development Mechanism



- Carbon dioxide sink
- Drinking water
- Eco-energy: biodiesel, solar
- Produce and fruits
- Recovery of biodiversity
- Sustainable technologies
- Democratic Security
- Poverty reduction
- 1.5 MM new jobs
- Health, Education, Housing
- Biocities, biotowns
- Value Added Products



## The Renaissance of Colombia's High Orinoco Region

### Goals

Gainful employment and better quality of life, mainly for people displaced by violence and crime

Restoration of biodiversity and conservation of Orinoco ecosystems

Long term production of environmentally friendly goods and services for global and local markets:  
Sustainable rural-environmental development



## General Project Description

### Friendly Production

- Forestry and agro-forestry environmentally friendly production
  - Including fine cocoa, high quality latex, palm oil, colophony, fine hardwoods, tropical pine, rare tropical fruits, and pure spring waters
  - Managed under the criteria of environmental conservation and social progress
  - CDM reforestation and afforestation programs, with key indicators tracked by local environmental NGOs

### Biological Corridors

- Applies the concept of Productive Biological Corridors as defined by Conservation International

### In general

- Sequester of CO<sub>2</sub>, restoration of endemic biodiversity and the mitigation of global warming



## Requirements to accept a project as a Clean Development Mechanism (CDM)

- **Respecting, consulting and including into the project the local stakeholders, including indigenous communities**
- **Restoration of biological corridors**
- **Ensure that the amount of carbon sequestered will be additional (Additionality)**
- **Fixation of carbon (Non-permanence)**
- **Minimize and control leakage**
- **Improvement of the environmental attributes of the areas and minimizing any potential social impacts**
- **Monitoring and measurement**
- **Regulatory and approval processes to comply with UNFCCC CDM**



**THANK YOU!**