



Clean Development Mechanism - An introduction and Way Forward

By

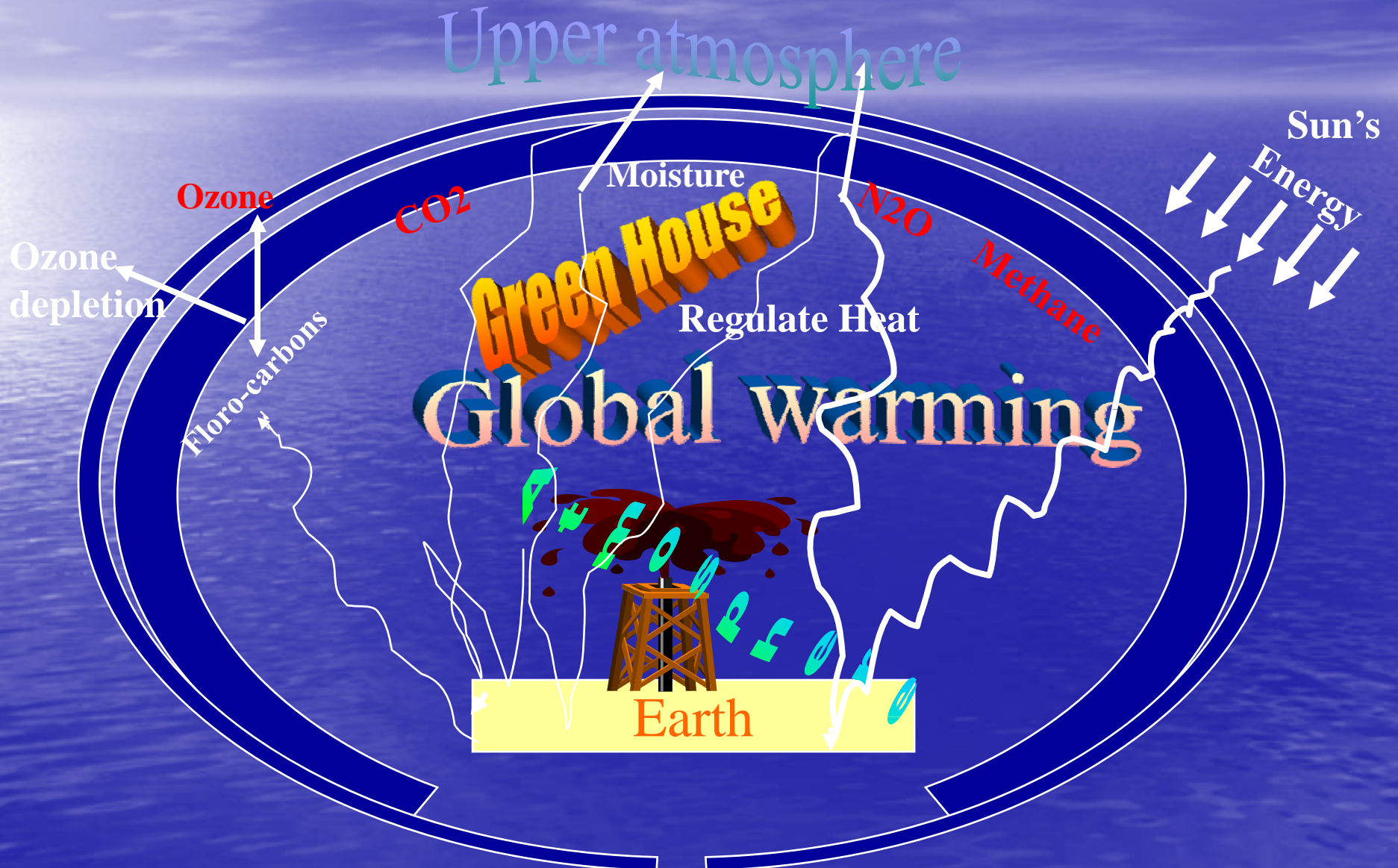
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29th July 2010

Overview of Presentation

- Global Warming and Climate Change
- Clean Development Mechanism a Tool to Address Adverse Impacts of Climate Change
- Role of Ministry of Environment as Designated National Authority (DNA) for CDM in Pakistan
- CDM Potential Opportunities in the country
- Ways Forwards for Promotion of CDM Project Activities in Pakistan

Climate Change/ Global Warming Phenomena



Potential Climate Change Impacts

Climate Changes



Temperature



Precipitation



Sea Level Rise



Water Resources

Changes in water supply
Increased competition for water



Agriculture

Crop yields
Irrigation demands



Health

Weather-related mortality
Air-quality respiratory illness



Forests

Change in forest composition
Shift geographic range of forests
Forest health and productivity



Coastal Areas

Erosion of beaches
Inundation of coastal lands
Costs to protect coastal communities



Species and Natural Areas

Shift in ecological zones
Loss of habitat and species

Source: EPA

A blue-tinted photograph of a vast ocean under a cloudy sky. The text "Can this be denied..." is centered in white.

Can this be denied...











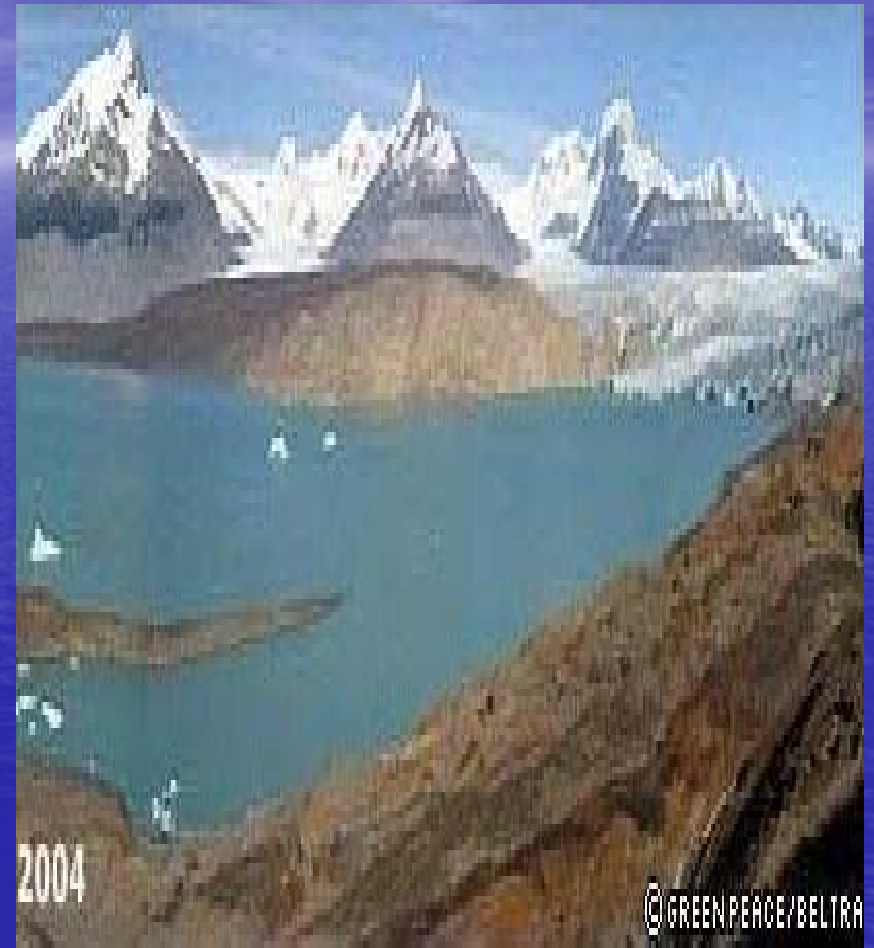
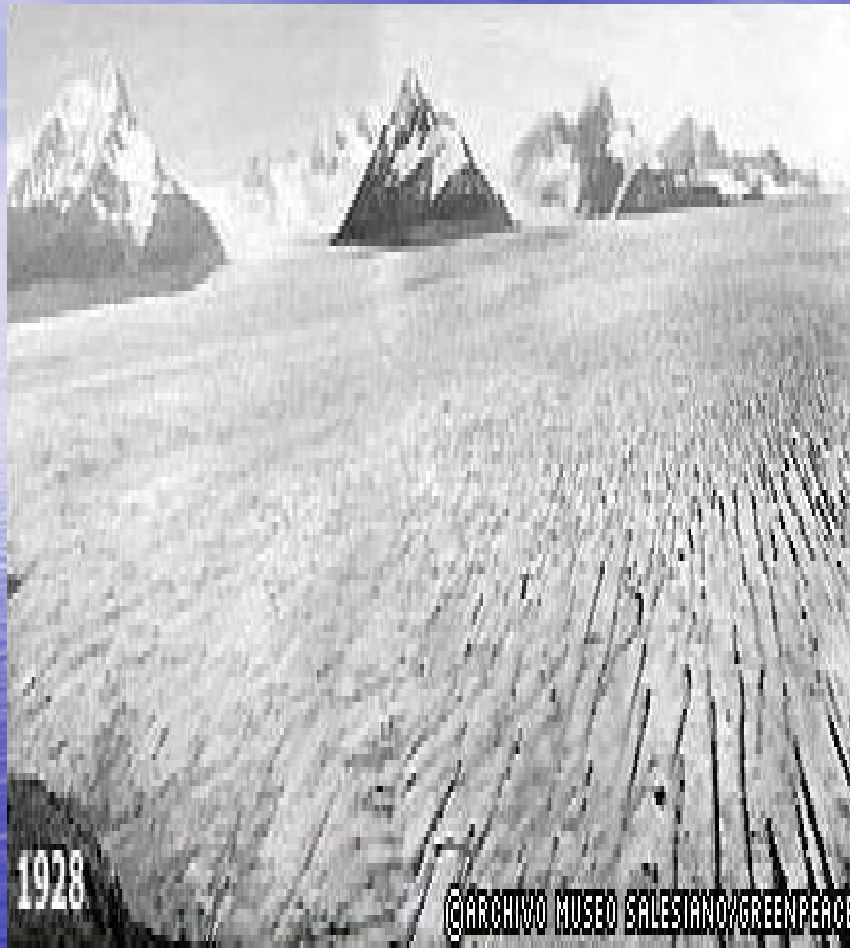




A blue-tinted photograph of a vast ocean under a cloudy sky. The text is overlaid in white. The sky is filled with soft, wispy clouds, and the ocean surface shows gentle ripples. The overall mood is serene and contemplative.

**IS IT REALLY
HAPPENING??**

Some Glimpses...

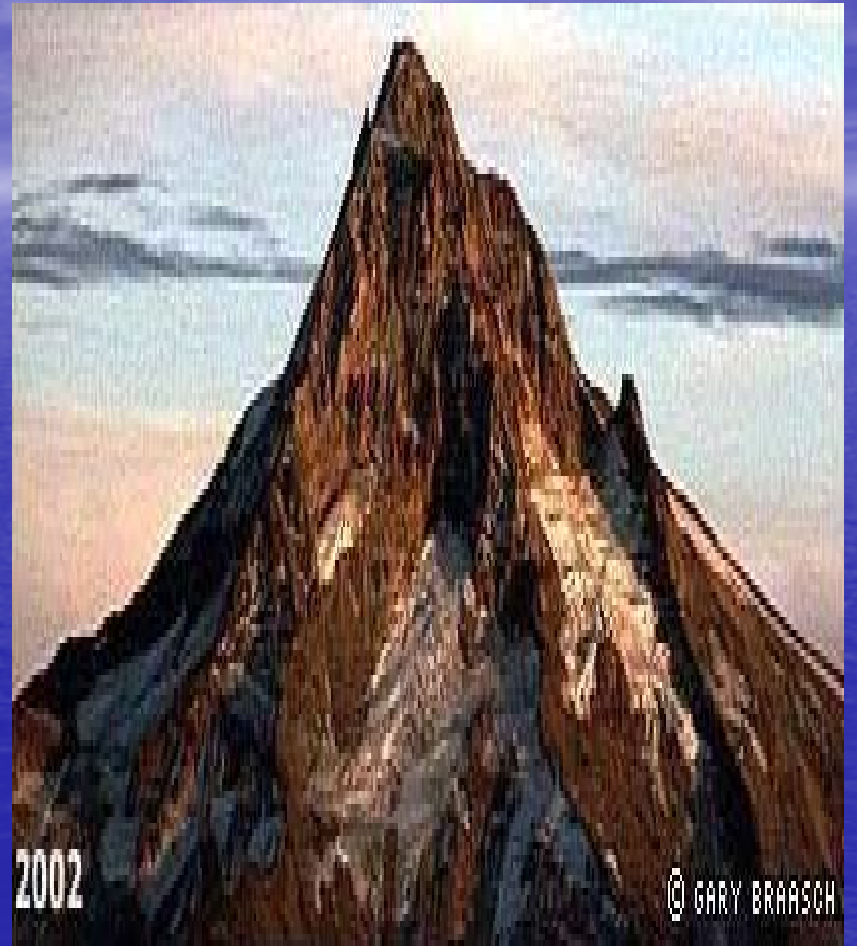
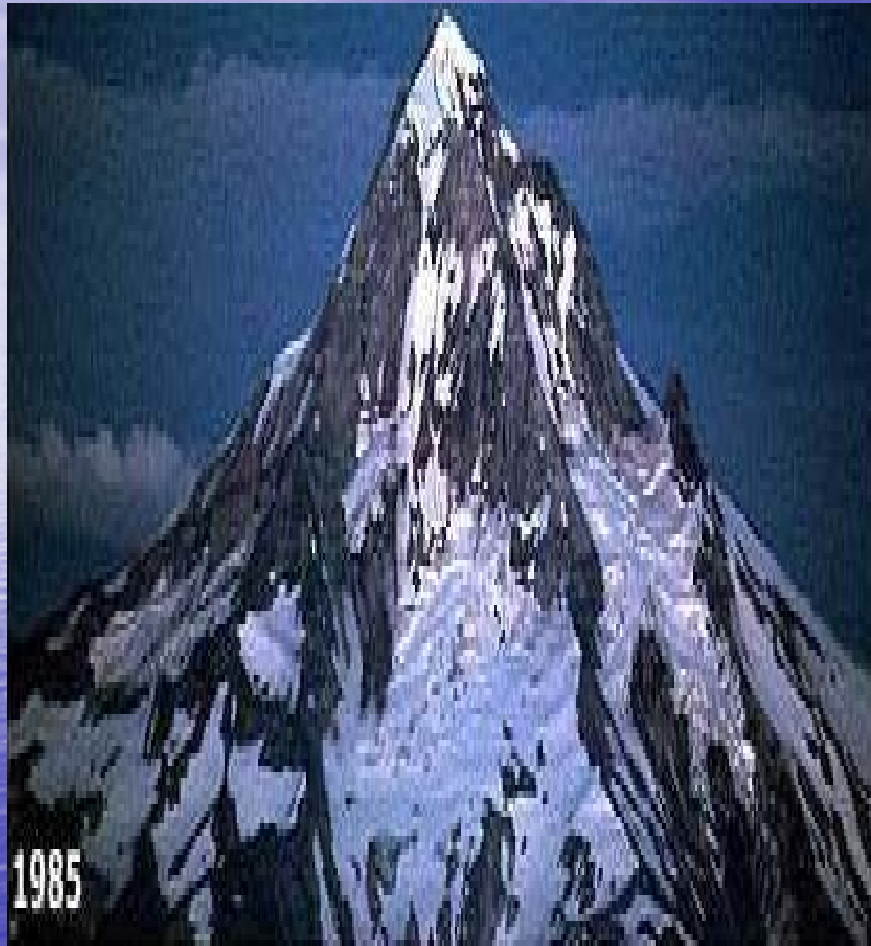




Rhone Glacier in Switzerland



Shoreline at Cape Hatteras in North Carolina, USA



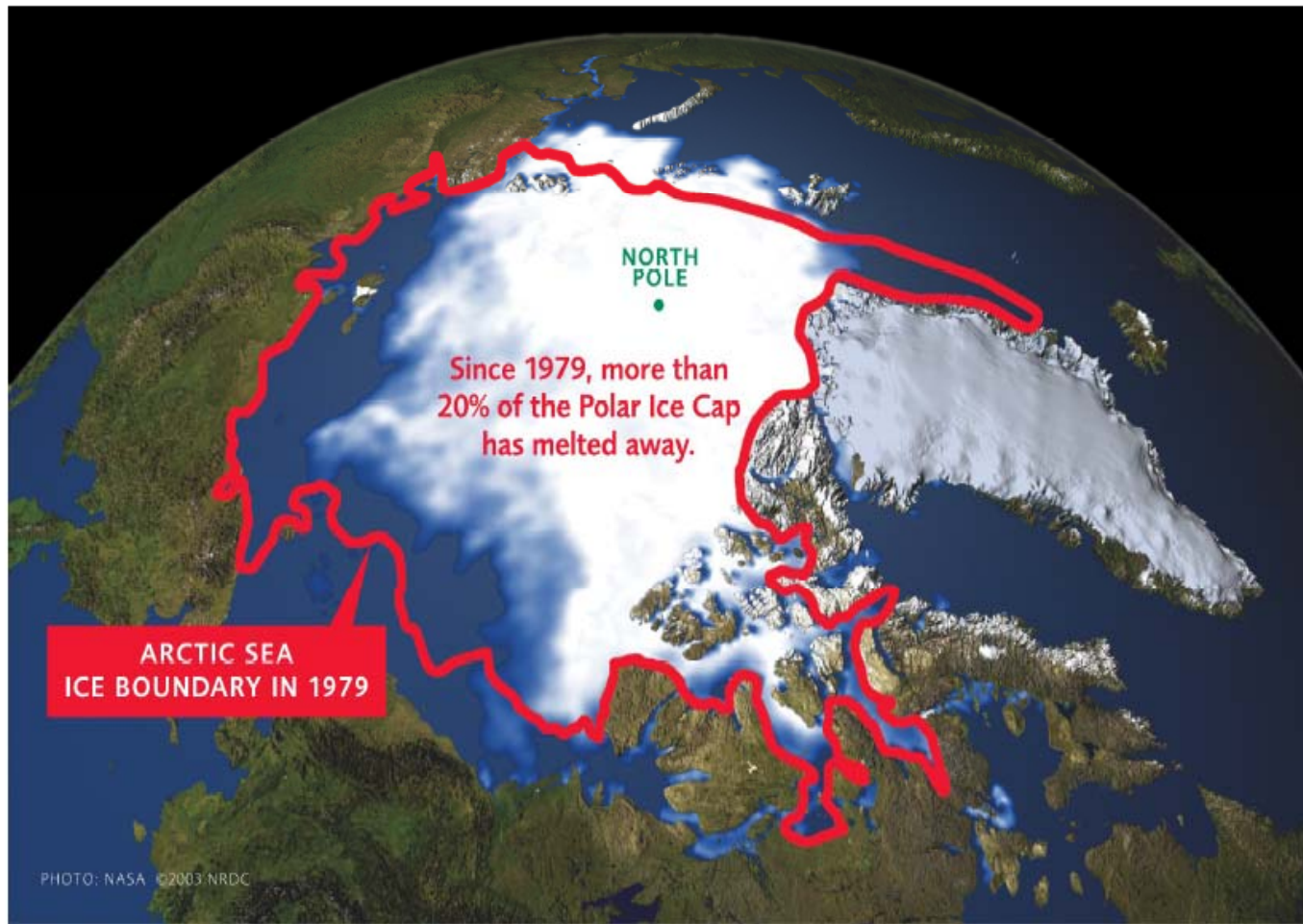
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Mount Hood in Oregon, USA

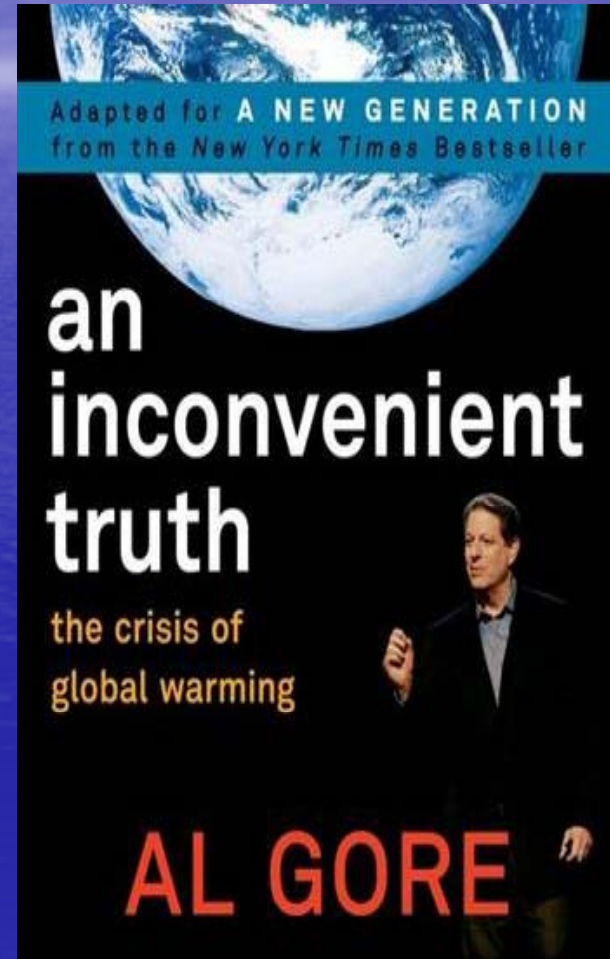



Mount Kilimanjaro, Tanzania

The Earth is de-glaciating



MUST WATCH....





Scientific Evidence of Climate Change/Global Warming

Global Concerns

FOURTH ASSESSMENT REPORT OF IPCC

The 4th Assessment Report of Inter- Governmental Panel on Climate Change (IPCC) published in 2007 indicates that:

- Global temperature rises of 2 – 4.5 °C are almost inevitable due to increased concentration of green house gases as caused by human activities (fossil fuel use, land use changes etc.).
- The above global warming (or in broader term Climate Change) is expected to have serious consequences for:
 - Agricultural production
 - Biodiversity
 - Health
 - Sea Level rise
- Poor will be most affected by the Climate Change.

GLOBAL ENVIRONMENT OUTLOOK (GEO- 4)

GEO- 4 is the most comprehensive UN document published in 2007, indicated that:

- 11 of the last 12 years (1996- 2006) are the warmest years since 1850.
- Average temperature have increased 0.74 °C during last century.
- Impacts include: shrinking glaciers
- Thawing permafrost earlier breakup of river ice,.
- Lengthening of growing season,
- Changes in precipitation patterns,
- Increase in frequency and intensity of heat waves,
- Storms, floods and droughts.

A blue-tinted photograph of a vast ocean under a cloudy sky. The text "How to Address Climate Change" is centered in the image.

How to Address Climate Change

ADAPTATION AND MITIGATION

Adaptation to global warming involves taking action to minimize the effects of global warming

Mitigation of global warming involves taking actions aimed at reducing the extent of global warming

.

International Response

The United Nations Framework Convention of Climate Change (UNFCCC)

Adopted in June 1992 by over 180 countries at the “Earth Summit” in Rio de Janeiro, Brazil.

The Convention was ratified by 154 states (including Pakistan) and entered into force on 21st March, 1994.

UNFCCC is a non-binding legal framework:

- Aims at stabilization of GHG concentration in the atmosphere at safe level.
- To balance out the response along mitigation and adaptation measures

Principles of UNFCCC

Based on the principle of common but differentiated roles

On one hand it recognises the

Primary Responsibility of Developed Countries for higher emissions, and therefore,

Asks Developed Countries to take a Leading Role

On other hand it establishes

Social and Economic Development as the Rightful Priority of the Developing Countries, and

The need to assist developing countries that are vulnerable to climate change

The Kyoto Protocol of UNFCCC

Adopted in Kyoto, Japan in 1997 and ratified in February 2005
(Pakistan ratified the Protocol on 11th January, 2005)

The Kyoto Protocol: Aims to reduce GHG emissions by 2012 and distinguish two types of countries:

Annex-I countries: With binding emission targets (industrialised countries):

Western and Eastern Europe, Canada, Japan, New Zealand, Russia, Ukraine etc.

Non-Annex I countries: With voluntary participation (developing countries):

China, India, Pakistan, South Africa, Philippines, Uruguay, Brazil, and other developing countries.

The Kyoto Protocol Mitigation Options

Source oriented measures

- Energy conservation and efficiency improvement
- Fossil fuel switching
- Renewable energy

Sink enhancement measures

- Capture and disposal of CO₂ (under discussion)
- Enhancement of forest sinks (limited options)

The Kyoto Protocol Targets

Under the KP the Annex- I countries have been given binding targets: i.e. to reduce their combined GHG emission by 5.2 percent below their 1990's level, between the period 2008 - 2012.

USA	-7%
EU	-8%
Japan	-6%
Russian Federation	0%
all developed countries	-5.2%

Mechanisms Under the Kyoto Protocol

The Kyoto Protocol introduces three market based flexible mechanisms for the emissions reduction:

- Joint Implementation (JI),
- Activities Implemented Jointly (AIJ), and
- **Clean Development Mechanism (CDM).**

Clean Development Mechanism (CDM)

CDM is a market based instrument under the Kyoto Protocol of UNFCCC:

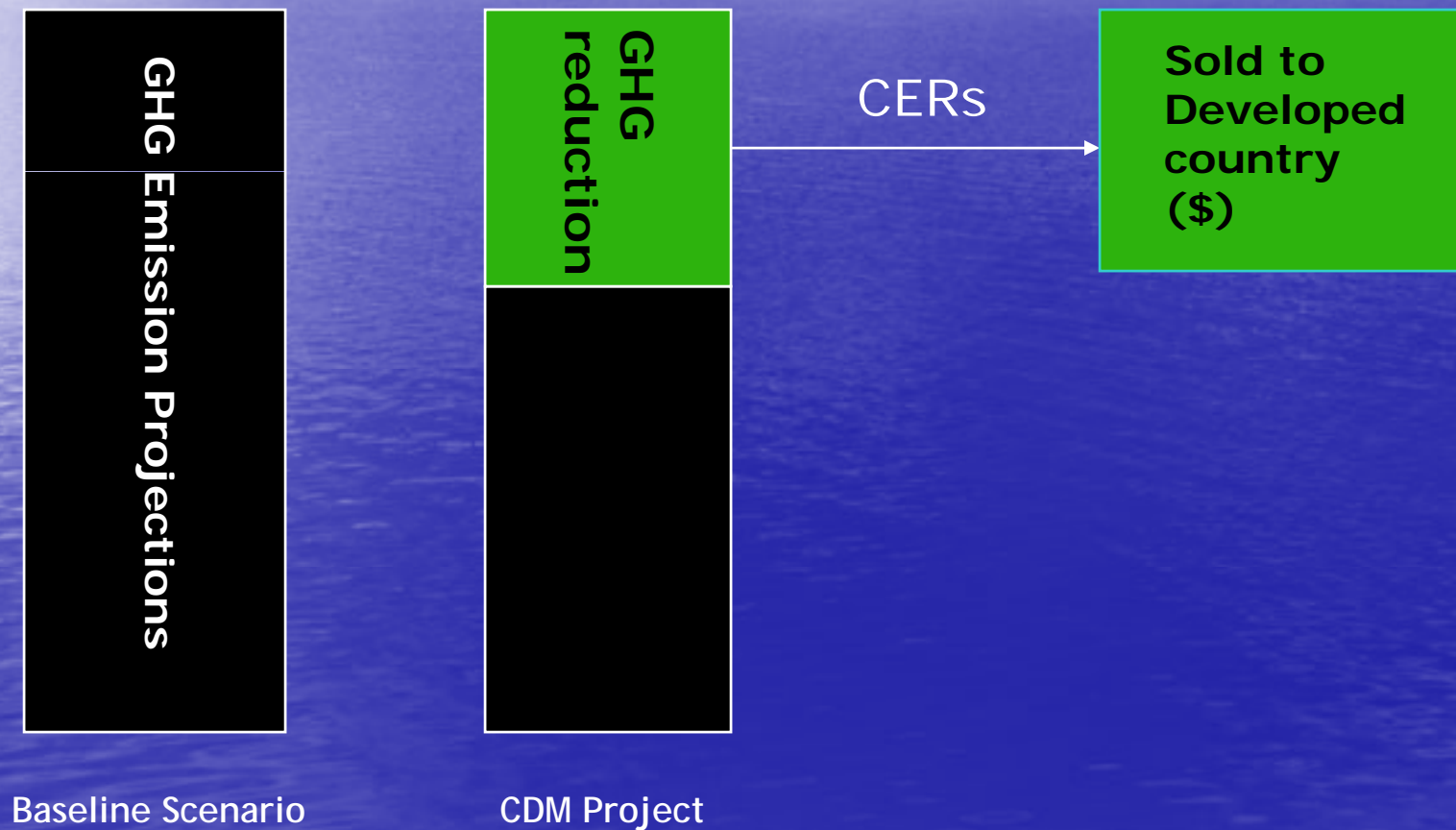
Assists developing countries in sustainable development while at the same time contributing to the ultimate objective of the Convention.

Developed countries to support project activities that reduce GHG emissions in the developing countries in return for Certified Emission Reductions (CERs)/ Carbon Credits.

The CERs generated by such project activities can be used by developed countries as credits to meet their emissions targets under the Protocol.

Concept of CERs/ Carbon Credits

Developing Country (host)



GHG's Eligible under Kyoto Protocol

The KPs emissions targets cover the six main GHGs:

Name	Formula	GWP (CO ₂ eq.)
1. Carbon- dioxide	(CO ₂)	1
2. Methane	(CH ₄)	21
3. Nitrous oxide	(N ₂ O)	310
5. Per- fluorocarbons	(PFCs)	92,00
4. Hydro- fluorocarbons	(HFCs)	11,700
6. Sulphur hexafluoride	(SF ₆)	23,900

Sinks (carbon sequestration)

Types of CDM Projects

- Unilateral, Bilateral and Multilateral CDM Projects are allowed in following sectors
- Energy
 - Renewable/alternate energy,
 - Energy efficiency/conservation, and
 - Fossil- fuel cogeneration
- Waste Management
 - Landfill gas capture
 - Recycling
 - Energy from solid waste etc.
- Transportation
 - Alternative fuel vehicles
 - Mass transit systems
 - Cleaner engines, CNG

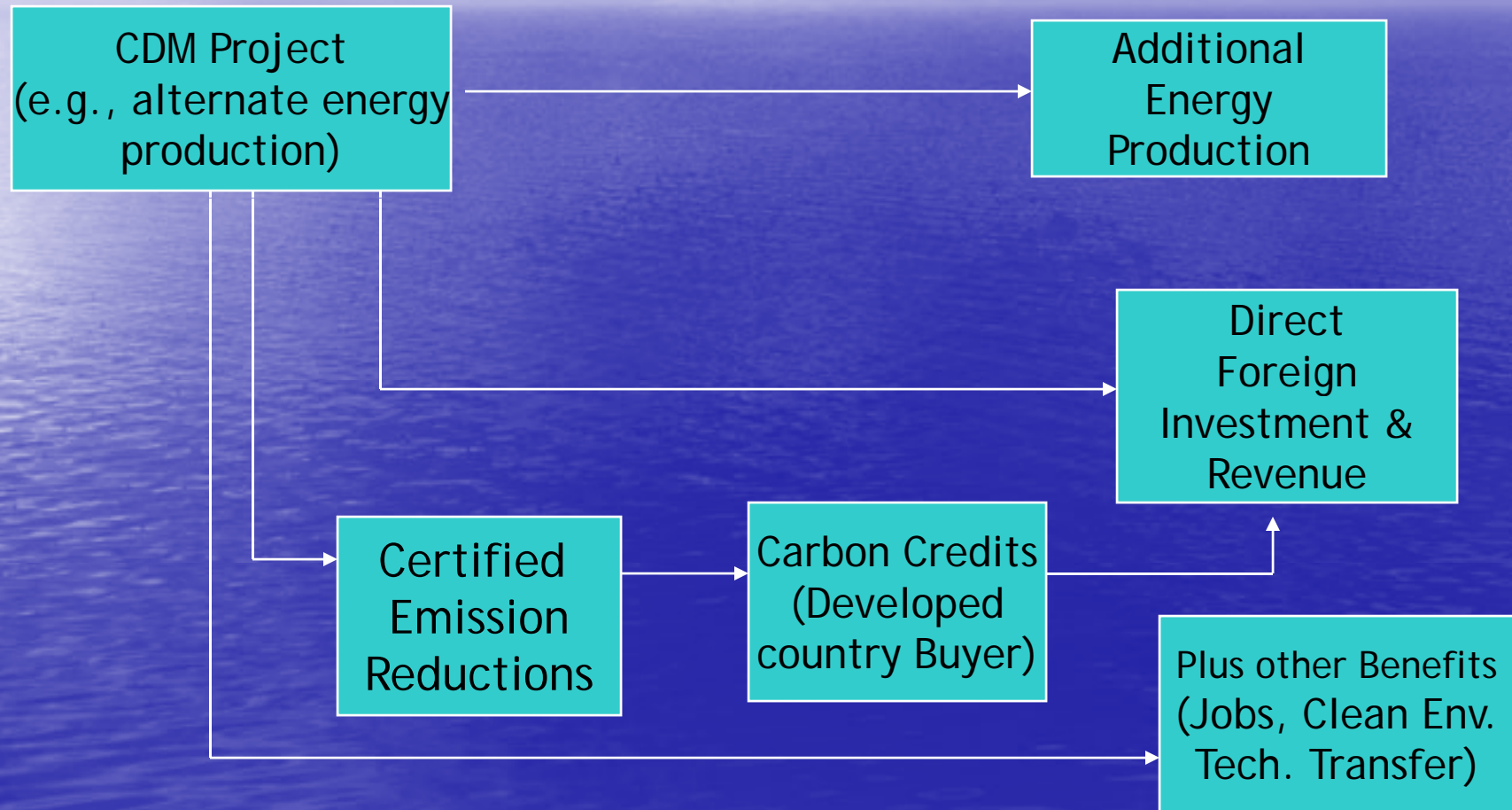
Cont---

- Industrial processes (Steel, Fertilizer, Textile etc.)
- Land Use, Land Use Change and Forestry (watershed management, sustainable forest management, Afforestation and reforestation)
- Agricultural and livestock practices
- Any other project resulting in GHG mitigation or carbon sequestration.

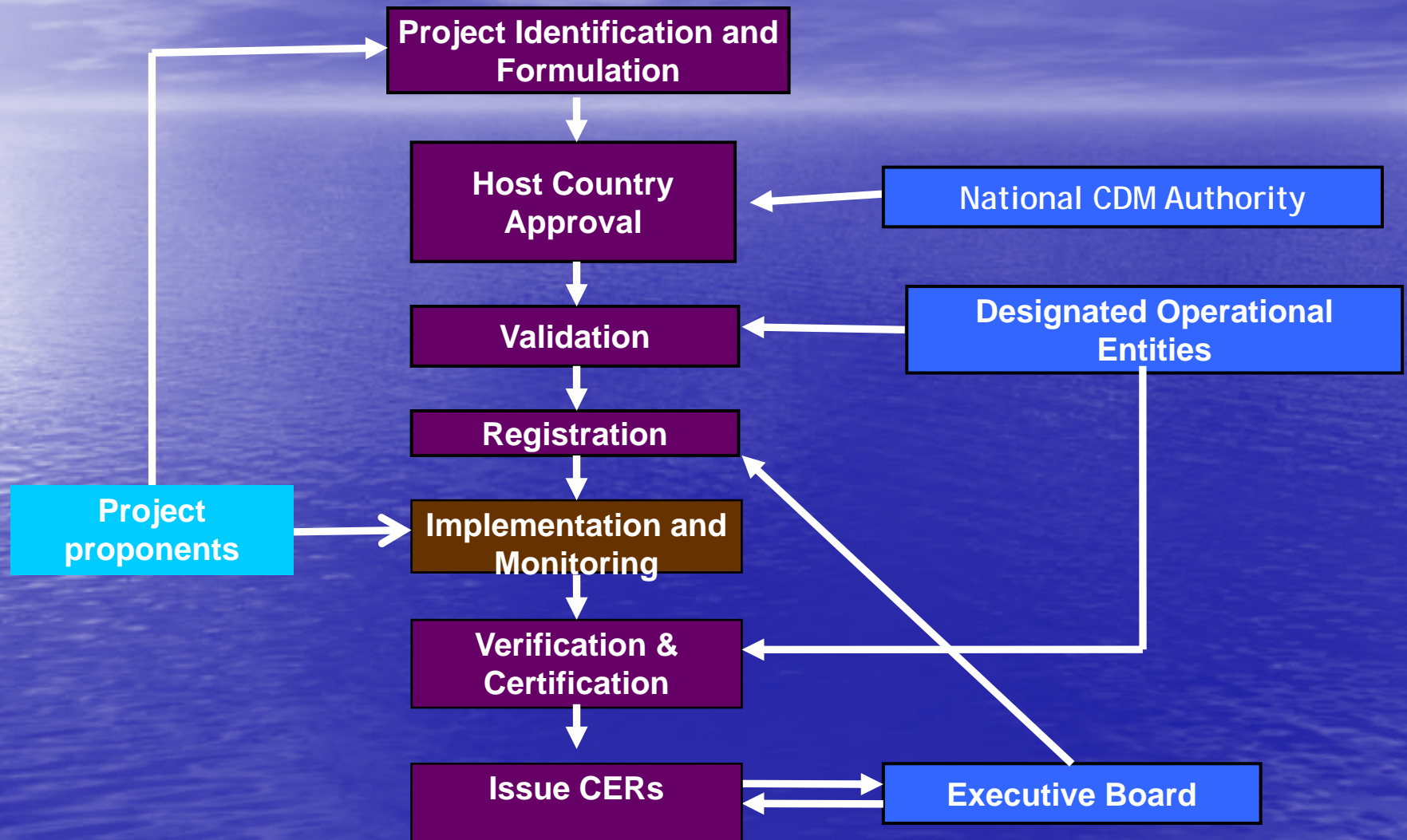
BENEFITS FROM CDM (CARBON FINANCE)

(An Example)

Benefits to Host country



CDM Project Cycle



CDM INCENTIVE FOR DEVELOPED COUNTRIES

Developed countries have been subjected to legally binding emission targets.....**2008/12.**

Due to **un-localized** nature of CO₂...it does not matter for environment where reduction occurs.

Costs of abatement or reduction of emissions :

Developed Countries : **U\$ 50-100/ton**

Developing Countries : **U\$ 1-10/ton**

Reductions of GHG is much **cheaper in developing countries.**

CDM INCENTIVES FOR DEVELOPING COUNTRIES

Capitalize an **“unvalued”** commodity..... CER

“Additional” financing for local Sustainable Development priorities and as such has potential of **“Catalyzing”** large Foreign Direct Investment (FDI) flows

Instrument for **“appropriate”** Tech. Transfer

Linkage with local environmental issues – (air pollution etc.)

Financial viability ~ Carbon financing can increase project Internal Rate Returns (IRRs) between 0.5 to 50% (WB)



**Role of MoE as DNA for Clean
Development Mechanism in Pakistan**

MoE Initiative for promotion of CDM in Pakistan

- Pakistan ratified Kyoto Protocol in January, 2005
- Ministry of Environment has been declared as Designated National Authority for CDM
- CDM Cell has been established under DNA for promotion of CDM, and for policy/ technical support to DNA.
- Pakistan National Operational Strategy for CDM has been approved in February 2006 (www.cdmpakistan.gov.pk)
- Pakistan has granted Host Country Approval to twenty Five (25) CDM projects and more than 125 CDM projects are in process of development which require host country approval in future
- 50 Number of CDM Awareness Raising Events have been conducted under this project for promotion and enhancement of CDM Projects in Pakistan
- CDM Cell has created Awareness Raising by organizing 28 Events in 2009 which was Year of Environment and achieved the target of Development of Pipelines of 100 CDM Projects in Pakistan

CDM Capacity Building Initiatives

- World Banks Project for Capacity Building for Development and Implementation of Carbon Finance Projects under Japanese Policy and Human Resource Development Grant
- Hands on Capacity Building of Forest Official in Developing Proposals for Afforestation/ Reforestation Project Design Documents (PDDs) under CDM
- Norwegian Grant through United Nations Industrial Development Organization (UNIDO) for Institutional Capacity Enhancement for CDM in Pakistan.

Memorandum of Understanding (MoU)

- Government of Pakistan has signed a Memorandum of Understanding (MoU) on Cooperation in CDM with Federal Republic of Germany on 8th July 2009.
- Government of Pakistan has signed a Memorandum of Understanding (MoU) on Cooperation in CDM with Japanese Carbon Fund (JCF) through Japan Bank for International Cooperation (JBIC) in July 2008.
- Government of Pakistan has signed a Memorandum of Understanding (MoU) in August 2008 with CAMCO International, British Company for the realization of CDM projects in Pakistan.
- A number of similar MoUs for promotion and enhancement of CDM Project Activities are under progress

Summary of CDM Awareness Raising and Capacity Building Campaign (2007-2010)

Activities	Objectives	Year 2007	Year 2008	Year 2009	Year 2010	Total
CDM Awareness Raising and Capacity Building Campaign by Ministry of Environment	<u>Consultative Meetings</u> to provide enabling environment for CDM Project Promotion	01	02	08	02	13
	<u>Seminars</u> to aware the academia about updated information on the issue of Climate Change and CDM	03	04	06	01	14
	<u>National Sectoral Workshops</u>	03	04	06	01	14
	<u>CDM Trainings</u> for Capacity Building in Public and Private sector	01	-	8	-	09
	Total Events	08	10	28	04	50

Schedule of Activities for Implementation of PHRD by Ministry of Environment in 2010

No	Name of Activities	Time Period 2010					
		Jul	Aug	Sep	Oct	Nov	Dec
A	Local Trainings						
1	Basic CDM Training Course at Peshawar						
B	Provincial Stakeholder Consultation/ Workshops						
2	Carbon Credit Opportunities in CDM Potential Sectors in Punjab Province at Faisalabad						
3	Carbon Credit Opportunities in CDM Potential Sectors in Sindh Province at Hyderabad						
4	Carbon Credit Opportunities in CDM Potential Sectors in Balochistan Province at Quetta						
5	Carbon Credit Opportunities in CDM Potential Sectors in KP Province at Peshawar						
6	Carbon Credit Opportunities in CDM Potential Sectors in AJK Province at Muzaffarabad						
7	Carbon Credit Opportunities in CDM Potential Sectors in Sindh Province at Karachi						
8	Carbon Credit Opportunities in CDM Potential Sectors in Gilgit-Balchistan at Gilgit						
9	Carbon Credit Opportunities in CDM Potential Sectors in Punjab Province at Sialkot						

No	Name of Activities	Time Period 2010						
		Jul	Aug	Sep	Oct	Nov	Dec	
C	Stakeholder Consultation							
	Stakeholder Consultation at Federal Level							
10	Representative of Print and Electronic Media of Pakistan at Islamabad							
11	Representative of Stock Exchanges of Pakistan at Islamabad							
12	State & Commercial Banks of Pakistan and Ministry of Finance at Islamabad							
13	Representative of Renewable Energies of Pakistan at Islamabad							
	Total Number of Events	1	2	3	2	2	3	13

Criteria for Host Country Approval

- Consistency with the national laws and sustainable development policies, strategies and plans.
- No obligation of the GoP to the investors other than CERs.
- **Environmental Criteria**
 - Significant reduction in the emissions of GHGs
 - Conservation of local resources and/or improvement of the local environment.
- **Social Criteria**
 - Poverty alleviation, jobs creation, benefits to local communities etc.
- **Economic Criteria**
 - Positive impact on balance of payments (not result in net increase in external debt burden), cost effective.
- **Technological Criteria**
 - Technology and know how transfer
 - Not result in import of obsolete technology

Tax and Credit Sharing Policies

- No income tax or duty on transfer/ sale of CDM emission credits
- Credits to be awarded fully to the project Proponents
- Banks and other financial institutions to be encouraged to provide special incentives to CDM Project Proponents

Potential CDM Project Opportunities

- **Industrial Energy efficiency and energy substitution:**
 - Brick manufacturing, vehicle transport, oil & gas, textile industry, fertilizer, cement, oil & steel, glass.
- **Power Sector & Renewable energy:**
 - Hydropower, wind, biomass cogeneration, T&D Losses, domestic and municipal EE, combined cycle power plants, solar PV.
- **Solid waste management and methane capture:**
 - Land-fill methane capture, composting, wastewater treatment, biogas.
- **Fertilizers and other chemical industries;**
 - Catalytic N₂O Abatement, nitric acid, waste heat recovery.
- **Land use, agriculture and forestry.**
 - Afforestation/reforestation.

Potential CDM Project Opportunities in Energy Sector of Pakistan

1. Municipal Energy Efficiency
2. Off Grid Micro/Mini Hydro
3. Grid Connected Micro/Mini/Small Hydro
4. Grid Connected Large Hydro
5. Bagasse Co-generation
6. Solar Home Systems & Water Pumps
7. CNG Busses
8. Combined Cycle Power Generation
9. Reduction in Transmission and Distribution Losses
10. Domestic Energy Efficiency
11. Wind Energy

Potential CDM Opportunities in Renewable Energy Sector

• Small Hydro (Off-grid Micro/Mini Hydro) (45 MW)	0.276
• Grid Connected Mini Hydro (1,815 MW)	5.56
• Large Hydro (25,641MW)	56.15
• Bagasse Cogeneration (760 MW)	1.66
• Solar Home Systems	0.05
• Domestic Energy Efficiency	3.6
• Reduction in transmission & distribution losses	4.0
• Combined Cycle Power Plant	4.0
• CNG Buses	0.024
• Municipal Energy Efficiency	0.47
• Wind Energy	12

Units: Million tones/yr

Industry wise Total CDM Potentials

<i>Potential Sectors</i>	<i>CDM Potential of CO₂ equivalent (Million Tons/year)</i>
Brick Manufacturing	10.0
Transportation	8.8
Oil and Gas Sector	6.53
Textile Industry	5.62
Fertilizer Industry	5.03
Cement Industry	4.71
Iron and Steel Industry	1.78
Glass Industry	0.88
Inorganic Chemicals	0.3

Barriers Facing Industrial Sectors

- **Technological Barrier**
 - Sophisticated Operation
 - Technical expertise required for troubleshooting and maintenance needs
- **Investment Barrier**
 - Large Capital investment required
 - Innovative technology more expensive
 - High risk due to uncertainty on return on investment
- **Barrier due to Prevailing Practices**
 - Conservative nature of the industry
 - Slow rate of diffusion of technology
 - Uncertainty regarding reliability and success of new technology
- **Barrier due to Uncertainty of Fuel Supply**
 - Shortage of fossil fuels, in particular, Natural Gas in the country
 - Major barrier for all fuel switching activities in the country

CDM Potential and Opportunities in Waste Management

Baseline Situation

- Municipal Solid Waste includes household garbage and rubbish, street sweeping, construction and demolition debris, sanitation residues, and non hazardous refuse.
- ALGAS study estimated methane release equivalent of 4.22m tons of CO₂e per year during 1989-90.
- Presently, total solid waste generation is 78,000 tons/day and there is no sanitary landfill.
- The present baseline methane release is equivalent to 6.51 Million tons of CO₂e per year.

Volume of Waste Generated in Ten Major Cities of Pakistan

City	Population 2008 in millions	Waste Generated tons/day*
Karachi	12.22	7,489
Lahore	6.67	4,091
Faisalabad	2.61	1,597
Rawalpindi	1.85	1,136
Multan	1.56	955
Hyderabad	1.52	930
Gujranwala	1.48	908
Peshawar	1.30	798
Islamabad	1.05	646
Quetta	0.74	452
G. Total	31.00	19,000

* Rate of waste generation @0.613 kg/c/d

Potential CDM Opportunities in Waste Management Sector

Solid Waste Management, Methane Capture and biomass energy

Abatement Areas Emissions Abated (Million Tons/ year)

Sanitary landfills	2.04 m
Composting plants	1.70 m
Commercial and industrial wastewater	1.63 m
On farm biogas	15.00 m
Ethanol production	0.23 m

GRAND TOTAL

20.6 million ton/year

Barrier Analysis of Waste Management

- **Lack of funds:** Municipalities lack financial resources to establish sanitary landfills, composting and wastewater treatment plants.
- **Lack of public private partnership:** Few success stories mainly in collection and composting. Generally there are lack of incentives to private sector on their equity.
- **Lack of awareness about CDM potential**
- **Lack of enforcement of environmental regulations** pertaining to discharge of effluent by industrial units into water bodies

CDM Potential in Forestry Sector of Pakistan

- **Afforestation:**
 - 29.7 tC/ha for agroforestry,
 - 54.6 tC/ha for commercial plantations and
 - 7.5 tC/ha for plantations on farm lands
- **Reforestation:**
 - Coniferous forests 39 tCO₂/ha,
 - Riverian Forests 33 tCO₂/ha.

Barrier Analysis of Forestry Sector

- High life cycle cost for initiatives that would yield high carbon sequestration rates.
- Lack of awareness regarding appropriate species
- Capacity constraint of forest staff in new technologies and monitoring skills
- State owned forests, local communities not interested in conservation. Communities can not be involved in forest management in a meaningful manner.
- Lack of precise historical data on the forest and vegetative cover

Current CDM Projects in Pakistan

No.	Name of Project	Host Country Approval	Cost in Million (US\$)	Emission Reduction/Year (Million)
1.	Catalytic Nitrous-oxide (N ₂ O) Abatement Project in the Tail Gas of the Nitric Acid Plant of Pakarab Fertilizers, Multan.	26-04-2006	15	1.3
2.	Cattle Waste Management, Landhi Cattle Colony, Karachi.	02-04-2007	102	1.53
3.	84 MW. New Bong Escape Hydropower Project, AJK.	25-05-2007	148.55	0.22
4.	Pakarab Fertilizer Cogeneration Power Project, Multan.	28-01-2008	34.95	0.11
5.	Maple Leaf Generator Change Project, Mianwali.	12-02-2008	12.39	0.022
6.	Fuel Switch and Energy Efficiency Project at PWML, Lahore.	05-03-2008	0.29	0.017
7.	Construction of Additional Cooling Tower Cells at AES Lal Pir, Muzzaffargarh.	10-05-2008	1.6	0.009

No.	Name of Project	Host Country Approval	Cost in Million (US\$)	Emission Reduction/Year (Million)
8.	Almoiz Bagasse Cogeneration Project, D.I Khan.	19-05-2008	7.5	0.032
9.	Fuel Switch to a less carbon intensive fuel at SFS Pvt. Ltd (SFSPL), Karachi, Pakistan.	23-06-2008	0.98	0.009
10.	Community Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan.	30-07-2008	17.86	0.065
11.	Gul Ahmad Combined Cycle Gas Turbine Project, Karachi	29-12-2008	7.35	0.035
12.	Composting of Organic Content of Municipal Solid Waste in Lahore, Pakistan.	16-01-2009	5.5	0.078
13.	Installation of 8 MW Biogas Gensets and displacement of grid electricity at Shakarganj Mills Ltd.– Distillery in Jhang, Pakistan"	16-02-2009	6.8	0.024
14.	Installation of natural gas based Cogeneration system at Century Paper & Board Mills Ltd., Lahore, Pakistan,	03-03-2009	19.58	0.052

No	Name of Project	Host Country Approval Date	Cost in Million (US\$)	Emission Reduction/Year (Million)
15.	DGKCC Waste Heat Recovery and Utilization for 10.4 MW Power Generation at Dera Ghazi Khan Plant.	10-06-2009	19.7	0.040
16.	Waste heat recovery and utilization project at Cherat Cement Factory Ltd., Pakistan	10-06-2009	12.1	0.032
17.	Reduction of Heavy Fuel Oil usage for Power Generation at Lucky Cement, Pezu, Pakistan	10-06-2009	22.8	0.017
18.	Waste Heat Recovery and Utilization for Power Generation at Maple Leaf Cement Factory Limited, Iskanderabad, Pakistan	10-06-2009	25.20	0.047
19.	ICI Polyester Co-generation Project, Shekhupura.	10-06-2009	6.87	0.019
20.	Waste Heat Recovery based 15MW Power Generation project Bestway Cement Limited, Chakwal, Pakistan	10-06-2009	29.6	0.036
21.	Grid connected combined cycle power plant project in Qadirpur utilizing permeate gas previous flared.	10-06-2009	204.66	0.16

No	Name of Project	Host Country Approval	Cost in Million (US\$)	Emission Reduction/Year (Million)
22.	Waste heat recovery and utilization for power generation at Lucky Cement Factory Limited, Karachi Plant (Version 01).	06-10-2009	21.46	0.05
23.	Waste heat recovery and utilization for power generation at Lucky Cement Factory Limited, Pezu Plant (Version 01).	06-10-2009	15.62	0.03
24.	Installation of Energy Efficient Products and Technologies for CO2 Emission Reduction in Gilgit and Ghizer Districts of Northern Pakistan	04-06-2010	1.71	0.030
25.	Installation of Energy Efficient Products and Technologies for CO2 Emission Reduction in Chitral District of Northern Pakistan.	04-06-2010	2.45	0.038

Status of 25 Approved CDM Projects in Pakistan

H C A 25		Validation 17		Registration 8		Total 25	
FI	GHGs	FI*	GHGs**	FI	GHGs	FI	GHGs
742.52	4.002	504.69	2.169	237.83	1.833	742.52	4.002

FI* Foreign Investment in Million US \$
 GHGs** Million tons Co₂ eq/year

Status of 125 CDM Project in Pipeline

CDM projects in Pipeline 125		Overall CDM Projects 150	
FI	GHGs Reduction	FI	GHGs Reduction
2046.05	28.53	2788.52	32.53

FI* Foreign Investment in Million US \$

GHGs** Million tons Co₂ eq/year

Ways Forward for Promotion of CDM Projects in Pakistan

- Development of policies to encourage CDM projects in all relevant sectors
- Need more Awareness Raising about CDM in all potential Sectors by involving all relevant sectors including Media
- Capacity building initiatives for Project Design Documents (PDD) for both public and private sectors need to enhance CDM Projects activities in Pakistan
- Development of a strong supportive institutional framework
- Need to develop Programmatic and Bundling Approaches for Taping CDM Potential in all eligible sectors
- Need to enhance the portfolio of CDM Project through public/private partnership like development of linkages among all stakeholders of CDM

**Movie Clip on Climate Change Issues and Mitigation Measures
to address these Issues**



Contact DNA- Pakistan

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THANK YOU