MH1

Introduction to Clean Development Mechanism (CDM)

CDM: An Opportunity for developing countries as well as developed countries.

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Slide 1

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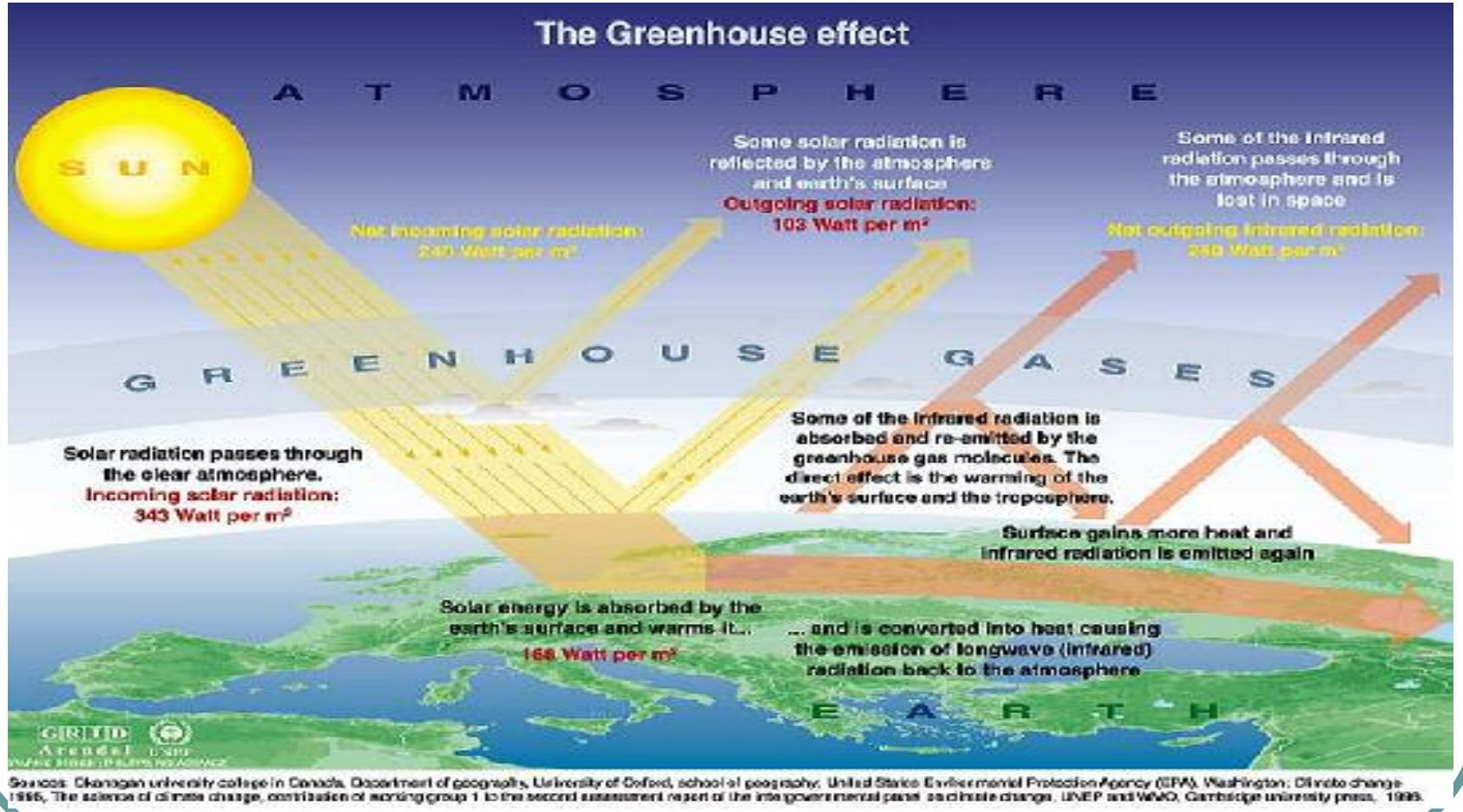
The Greenhouse Gases (GHGs)

- The atmospheric gases responsible for causing global warming and climate change.
- The major GHGs are:
  - carbon dioxide (CO_2),
  - methane (CH_4) and
  - nitrous oxide (N_2O).
  - Less prevalent --but very powerful -- GHGs are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6).

Greenhouse Effect: Warming the Earth's Surface

- Greenhouse gases (1% of the atmosphere) act like a blanket around the earth, or the glass roof of a greenhouse, they trap heat and keep the earth warmer.
- Human activities are making the blanket thicker:
  - CO_2 from burning of coal, oil, natural gas
  - CH_4 and N_2O from farming activities and change of land use
  - Long-lived industrial gases that do not occur naturally.
  - Computers models estimate that the global average temp will rise 1.4 to 5.8 deg C by the year 2100.

The Greenhouse Effect



Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography, United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1995.

What is the Climate Change Convention?

- A United Nations (UN) agreement to stabilize greenhouse gases (GHG) in the atmosphere, at a level that would prevent dangerous changes to the climate.
- The Convention was agreed at the UN Conference on Environment and Development (UNCED) in Rio, 1992. To date, 186 countries have ratified the convention.

Kyoto Protocol

- To put the Climate Change Convention into operation, a protocol was outlined in Kyoto in 1997. the protocol entered into force on 16 Feb. 2005.
- Legally binding commitments for 39 developed countries to reduce their GHG emissions by an average of 5.2% relative to 1990 levels. These emission reductions must be achieved by 2008-2012.

Kyoto Protocol: Flexibility Mechanisms

The Kyoto Protocol defined three innovative “flexibility mechanisms” to lower the overall costs of achieving its emissions targets. These mechanisms enable Parties to access cost-effective opportunities to reduce emissions, or to remove carbon from the atmosphere, in other countries. While the cost of limiting emissions varies considerably from region to region, the effect for the atmosphere of limiting emissions is the same, irrespective of where the action is taken.

Kyoto Protocol: Flexibility Mechanisms

Kyoto Protocol allows developed countries to reach their GHG reduction targets through the following three Flexibility Mechanisms including:

- Emissions Trading: trading of emission allowances between developed nations
- Joint Implementation: transferring emission allowances between developed nations, linked to specific emission reduction projects
- Clean Development Mechanism (CDM)

What is Clean Development Mechanism (CDM)?

- CDM is the only Flexibility Mechanism that involves developing countries.
- Designed to provide developed countries with flexibility to meet GHG emission reduction targets that they agreed to achieve under the Protocol.
- Developed countries may finance GHG emission reducing (avoiding) projects undertaken in developing countries and receive credits to help them to meet their mandatory limits.
- Assist developing countries who host CDM projects to achieve sustainable development.

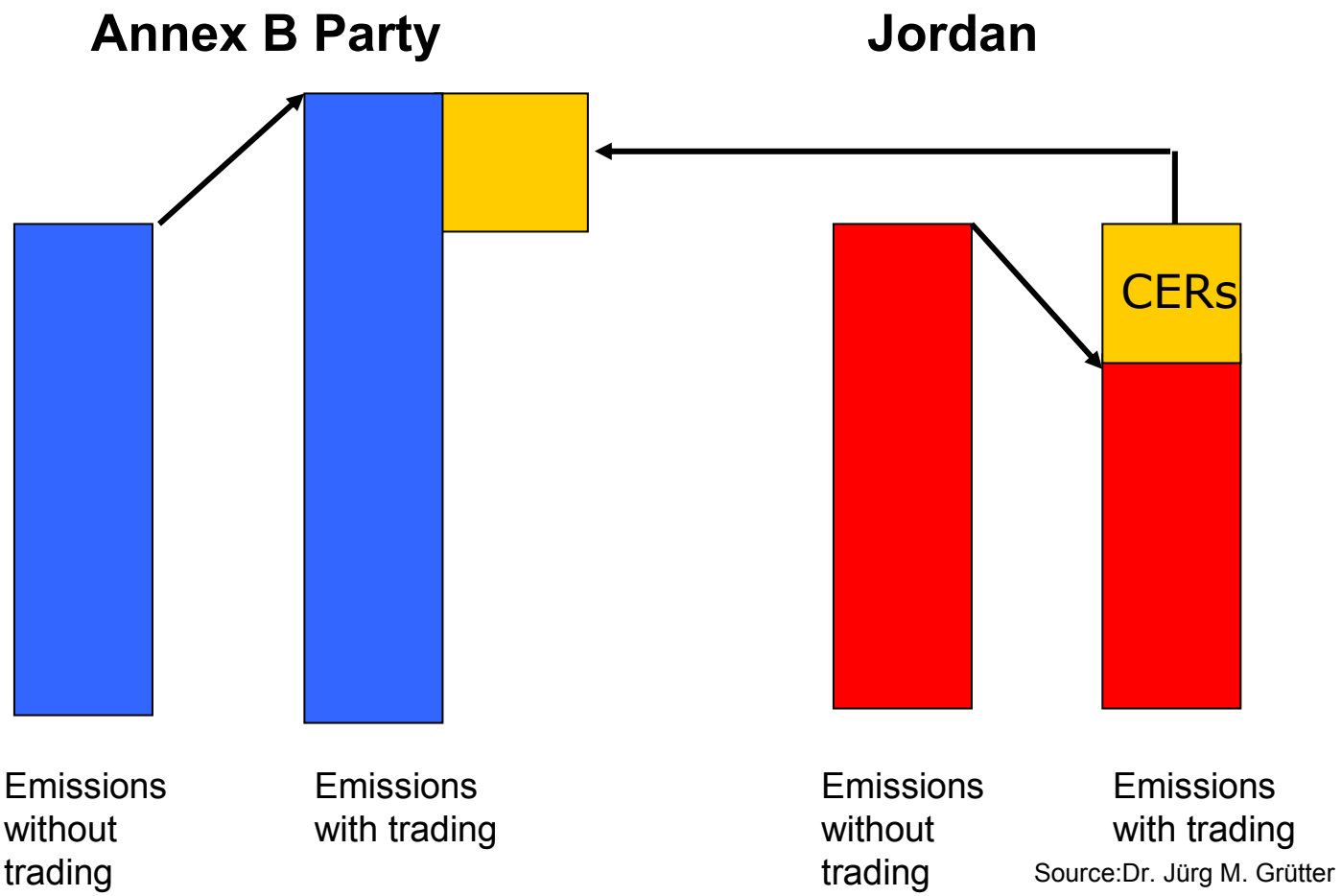
How does the CDM affect developing countries?

- Although developing countries have no obligations to constrain their GHG emissions, they are able, on a voluntary basis, to contribute to global GHG emission reductions by hosting projects under the CDM.

- The GHG benefits of each CDM project will be measured according to internationally agreed methods and quantified in standard units, known as 'Certified Emission Reductions' (CERs), expressed in tons of CO_2 emission avoided.

- When the Kyoto Protocol becomes fully operational, it is anticipated that these 'carbon credits' will be bought and sold in a new environmental market; they are already becoming a commodity.

CDM Concept



Source:Dr. Jürg M. Grütter

CDM Project Steps

- The Project Proponent (PP) prepare the Project Design Document (PDD).
- The PDD is validated by a Designated Operational Entity (DOE)
- The project should be approved by a Designated National Authority (DNA)
- Monitoring is done by PP
- Certification/Verification is done by DOE
- Issuance of Certified Emission Reductions (CERs) by the Executive Board (EB) of United Nations Framework Convention on Climate Change (UNFCCC)

CDM Methodologies

- A new Baseline and/ or Monitoring Methodology shall be submitted by the DOE to the EB for review, prior to a validation and submission for registration of a project activity.
- The previously approved methodology by the EB are made publicly available along with any relevant guidance. Using approved methodologies the DOEs may proceed with the validation of the CDM project activity and submit PDD for registration.

Sustainable Development

- The project must comply with national criteria for sustainable development including
  - Environmental impact apart from GHG
  - Social impact
  - Economic impact
- DNA is in charge of checking according to national criteria

Registration of the CDM project activity

Registration is the formal acceptance by the EB of a validated project (by DOE) as a CDM project activity. Registration is the prerequisite for the verification, certification and issuance of CERs related to that project activity.

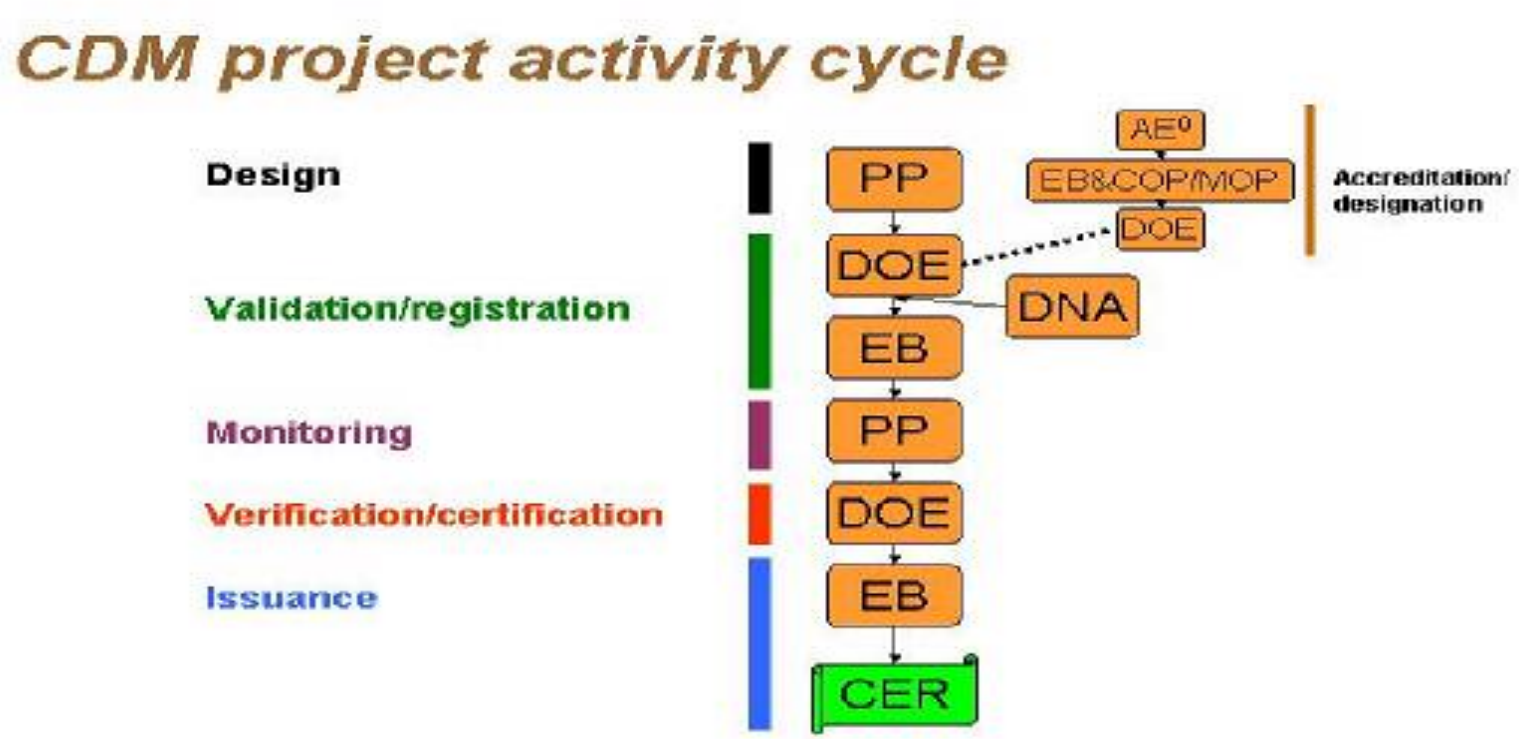
Monitoring

- Follow the methodology with a pre-established protocol
- The protocol determines what to measure, how, in which frequency, where and how to record data
- Monitoring of certain parameters of the baseline, project and leakage
- QA/QC system must be described
- Annual monitoring report, external verification by DOE, EB approval

Certification/ Verification of the CDM project activity

Verification is the periodic independent review and determination by the DOE of the monitored reductions in anthropogenic emissions by sources of greenhouse gases that have occurred as a result of a registered CDM project activity during the verification period. Certification is the written assurance by the DOE that, during a specified time period, a project activity achieved the reductions in anthropogenic emissions by sources of greenhouse gases as verified

CDM Project Steps



Baseline

- Describes emissions in absence of the project
- You have to identify first the baseline
- You have to follow an approved methodology
- *The baseline is not what you have currently*

Additionality

- Concept: you have to prove that the project is not the baseline i.e. that the emissions reduced by the project are additional to those that would have ocurred in absence of the CDM

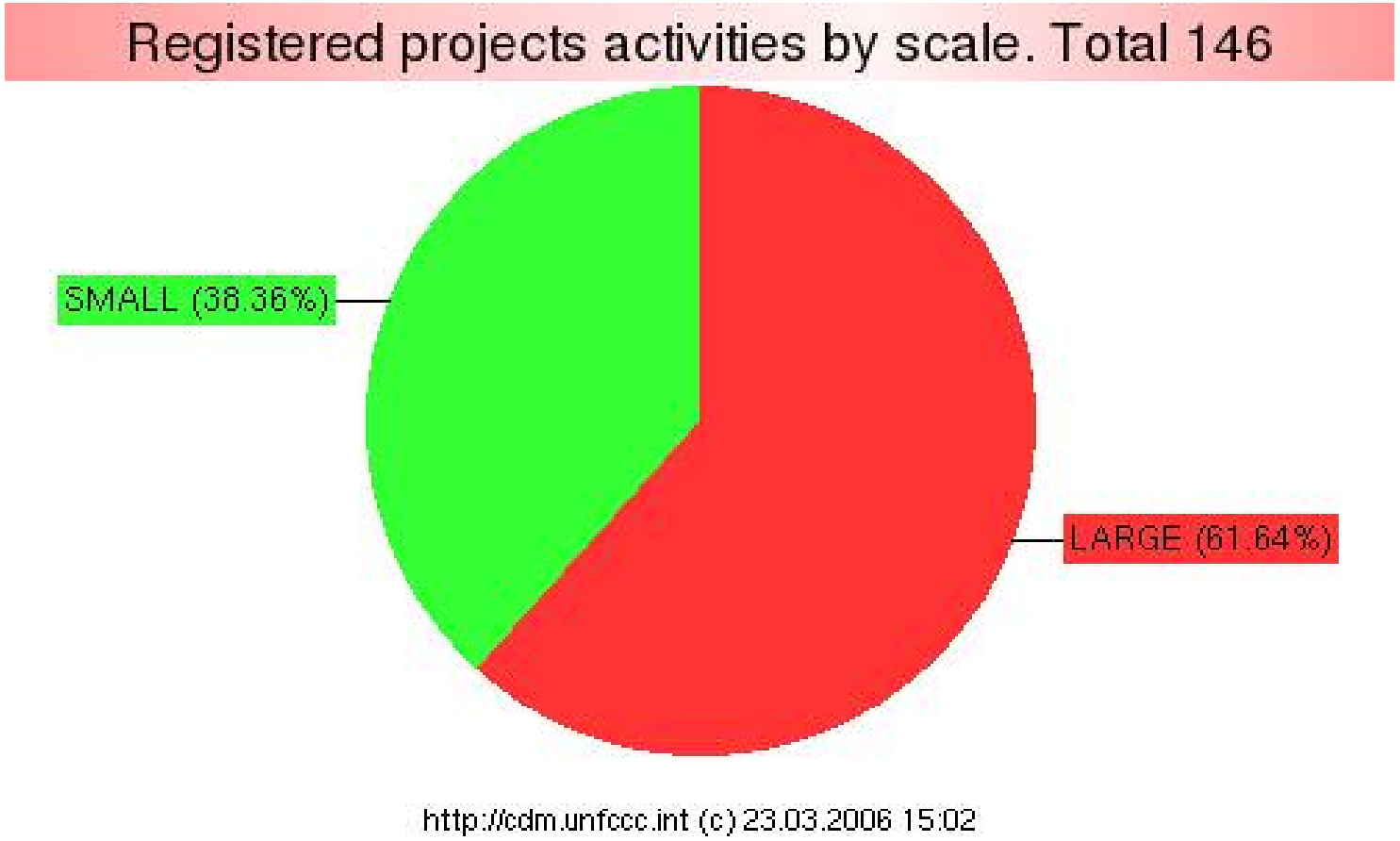
Leakage

- Concept: Emisions outside the system, originated and attributable to the project and measurable
- Depends much upon the system borders
- Examples:
  - Transport of fuels
  - Land-use change with biofuel plantations

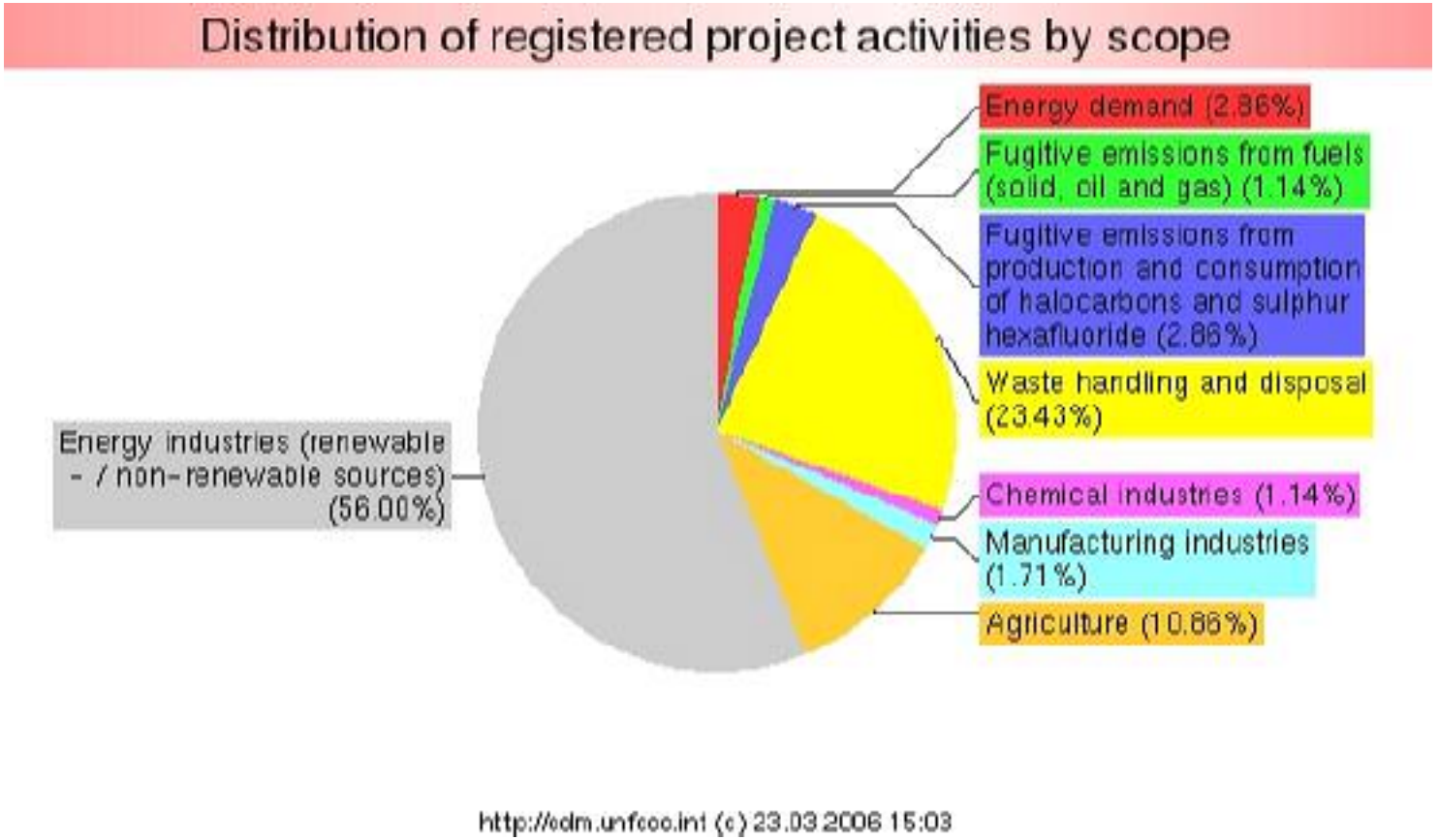
Current status of CDM (March/Jan, 06)

- Registered CDM project activities: (146)/(73)
- Request for registration of project activities: (45)/(65)
- Approved large scale baseline and monitoring methodologies: (25)/(25)
- Approved small scale baseline and monitoring methodologies: (19)/(15)

Distribution of Registered CDM Projects by Scale



Distribution of CDM Registered Projects by Scope



Types of CDM Projects

- Energy, **Industry**, Transport, Landfills, Agroprojects, Land-Use & Land-Use Change
- Full sized and **small-scale projects**
- **CO_2** and other gases (CH_4, N_2O, freones)

Industrial Projects

- Most popular categories are:
  - Co-generation with bagasse
  - Projects using biomass
  - Methane capture of oxidation ponds
  - Fuel switch to gas
  - Heat recovery
  - N_20 or HFC projects

Examples of Registered CDM Projects

- Energy Effeciency through Installation of Modified CO_2 Removal System in Amonia Plant, India, 24‘449 tCO_2/yr
- Tetouan Wind Farm Project for Lafarge Cement Plant Morocco,; reduction of 28‘651 tCO_2 /yr
- Landfill Gas Extraction and Utilization at the Matuail Landfill Site , Dhaka, Bangladesh; reduction of 80‘000 tCO_2 /yr
- Essaouira Windpower project in Morocco with around 160‘000 tCO_{2eq} reduced per year

Examples of Registered CDM Projects

- Project for GHG emission reduction by thermal oxidation of HFC23, India, reduction of 3‘000‘000 tCO_2 /yr
- Vikram Cement India: Usage of alternative fuels in the production of cement; reduction of 30‘000 tCO_2/yr
- Mondi Business Paper: use of waste wood for heat production; reduction of 120‘000tCO_2/yr
- 3.5MW Rice Husk Based Cogeneration Project at Nahar Spinning Mills Ltd, Mexico, reduction of 22‘267 tCO_2/yr