



Sustainable
Solutions
for the
Environment

CDM Opportunities in Transportation: BRTS

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Combating Climate Change

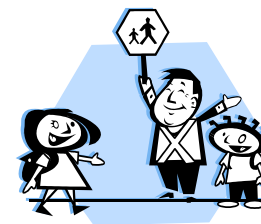
Two approaches are being pursued to deal with Climate Change

Compliance Approach



- Kyoto Protocol signatories such as the EU, Japan, Canada and now Australia have **caps on their emissions**
- Clean projects been implemented in Developing economies to generate CERs

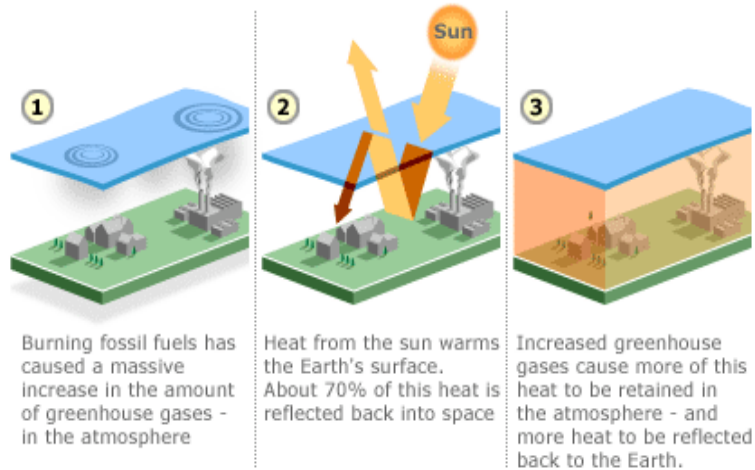
Voluntary Approach



- Corporate houses, business firms and states undertake **voluntary initiatives** to participate in this effort
- After evaluating current level of emissions, they set and achieve targets through in-house projects or financing external projects that result in emission reduction - VERs

Clean Development Mechanism

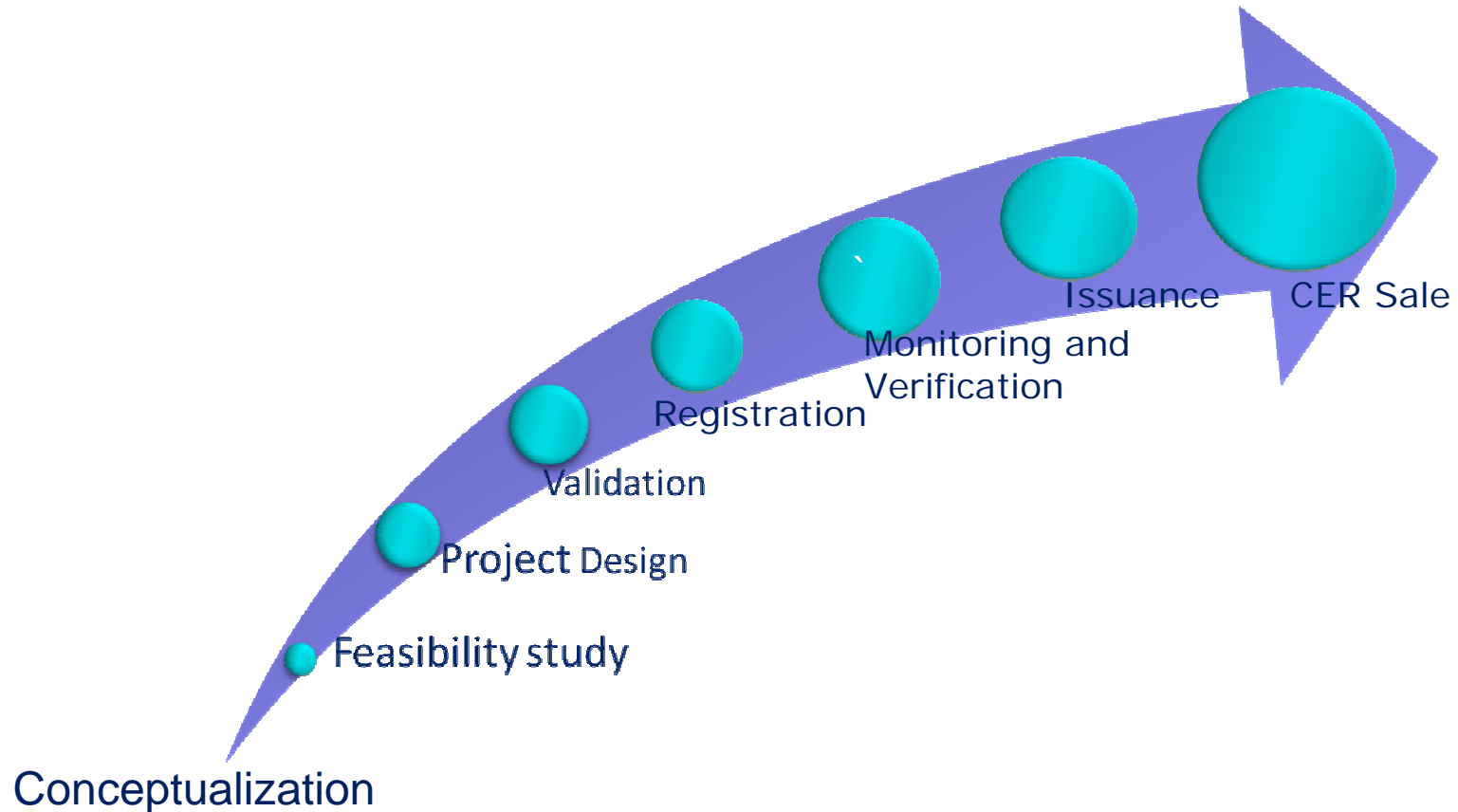
THE GREENHOUSE EFFECT



- ▶ The basic principle of the CDM is simple - GHG emissions contribute equally to climate change irrespective of where they occur
- ▶ CDM encourages investment in clean technologies in Developing Countries
- ▶ The CDM 'rewards' emissions reduction of the 6 key Green House Gases. The 'Credits' are computed in equivalent Metric Tonnes of CO₂ (Carbon dioxide), with multiples being assigned for converting each gas to its CO₂ equivalent e.g. 1 MT of Methane = 21 MT of Carbon dioxide, 1 Mt of SF₆ = 23,900 Mt CO₂.

GHG	Sources
CO ₂	Fossil fuel combustion, deforestation; agriculture
CH ₄	Agriculture, land use change, biomass burning, land fills
N ₂ O	Fossil fuel combustion, agriculture; industrial
HFCs	Industrial / manufacturing
PFCs	Industrial / manufacturing
SF ₆	Electricity transmission, manufacturing

The CDM Cycle



Climate Change Mitigation Opportunities in Transportation Sector



- ▶ **Changing mode of Transportation:** Switching from inefficient private or public transportation systems to more efficient Mono-Rail, MRTS or BRTS kind of public transportation systems.
- ▶ **Vehicle Technology Improvements/changes:** Regulation of vehicle fuel economy, promotion of hybrid vehicles and setting up stringent targets for GHG reduction from Cars, Buses etc would play an important role in GHG reductions.
- ▶ **Alternate Fuels:** Use of fuels such as ethanol, bio-fuels, CNG, LPG, etc. can reduce GHG emissions due to low carbon intensity of such fuels.
- ▶ **Energy efficiency** in Buildings (bus stops, stations, etc.)

Methodologies:

- ▶ Large Scale:
 - ❑ **AM0031**: Methodology for Bus Rapid Transit Projects

- ▶ Small Scale:
 - ❑ **AMS-III.C.**: Emission reductions by low-greenhouse gas emitting vehicles
 - ❑ **AMS-III.S.**: Introduction of low-emission vehicles to commercial vehicle fleets
 - ❑ **AMS-III.T.**: Plant oil production and use for transport applications
 - ❑ **AMS-III.U**: Cable Cars for Mass Rapid Transit System (MRTS)
 - ❑ **AMS III.AA**: Transportation Energy Efficiency Activities

Transportation-CDM: Snapshot

WORLD Over

- ▶ Registered Projects: 2
 - ▶ BRT Bogotá, Colombia: TransMilenio (Ref: 0672)
 - ▶ Installation of Low Green House Gases (GHG) emitting rolling stock cars in metro system, Delhi Metro Rail Corporation (Ref: 1351) [regenerative breaking]
- ▶ In Validation : 13 (8 of them webhosted in 2009)

INDIA

- ▶ Registered : 1
 - ▶ Installation of Low Green House Gases (GHG) emitting rolling stock cars in metro system, Delhi Metro Rail Corporation (Ref: 1351)
- ▶ Validation: 8 (only one BRTS)

INDORE BRTS

ROAD to CDM

Indore BRTS

- ▶ Traffic surveys done to establish baseline
- ▶ Calculations done based on survey results and data; followed by preparation of PDD
- ▶ PDD & PCN sent to Ministry of Environment & Forests (MoEF) for Host Country Approval (HCA)
 - ▶ Host country Approval granted in April 2009
- ▶ Validation process initiated
 - ▶ Webhosted during June 2009
 - ▶ Validation site visit planned on 13th August 2009
- ▶ Further Action
 - ▶ Completion of validation and subsequent submission to UNFCCC

Baseline

- ▶ Continuation of current transport scenario
- ▶ Basic criteria for emission reductions: Change in emissions per passenger per km
 - ▶ Data required
 - ▶ Average Vehicle Occupancy
 - ▶ Average Trip Distance
- ▶ Traffic surveys carried out to find out baseline emission factors as per the methodology (AM 0031 version 1.1)
 - ▶ Surveys done by professional agency

Emission Reductions

- ▶ Reductions in emissions per passenger km
 - ▶ Modal shift from modes such as 2W, 3W, private cars, taxis, private buses, etc to high capacity BRTS buses
- ▶ Signal prioritization and pre-board fare collection reduce bus waiting time
- ▶ Option of using alternative fuels (LNG, CNG, bio-fuels, etc.) in the new BRT buses, thereby further reducing GHG emissions

Leakages

- ▶ Possible increase in the number of private vehicles due to reduced congestion on roads
- ▶ Cement and concrete used in construction
- ▶ Change in load factor of cars/taxis, etc.
- ▶ Scrapping of old buses
- ▶ Reduced congestion on roads; leading to increased average speeds

Traffic surveys

- ▶ Traffic volume counts
 - ▶ Boarding alighting surveys for buses
 - ▶ Average vehicle occupancy
- } Observer based
-
- ▶ Origin destination survey for private modes
- } Questionnaire based

Key Challenges

- ▶ **Comparatively Low awareness regarding CDM:** There is a need to create awareness about climate change mitigation possibilities in transportation sector.
- ▶ **Methodologies:** No methodologies yet for systems such as NMT, large scale fuel switch, Fuel Cell Technology, etc. So for any new kind of project firstly a generic methodology development would be required before proceeding ahead with CDM registration process.
- ▶ **Establishing Baseline:** What would have happened in the absence of the planned CDM project. Lack of authentic & proper data availability regarding baseline is a major challenge for designing a successful transportation CDM project. Detailed **surveys of existing practices (and other parameters as per CDM methodologies)** needs to be conducted

Key Challenges (Contd...)

- ▶ **Integrated Approach:** Developing countries need an integrated approach in which transportation is part of a larger focus on sustainable development that also addresses housing, land use and economic development.
- ▶ **Quantification of GHG Reductions:** To date, very few of the projects under development for the CDM have taken place in the transportation sector, in part because of the difficulties in modeling, measuring and quantifying reductions in this sector



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