The Clean Development Mechanism: Status and Implementation

The Department of Environment and Natural Resources
As the Philippine Designated National Authority for CDM

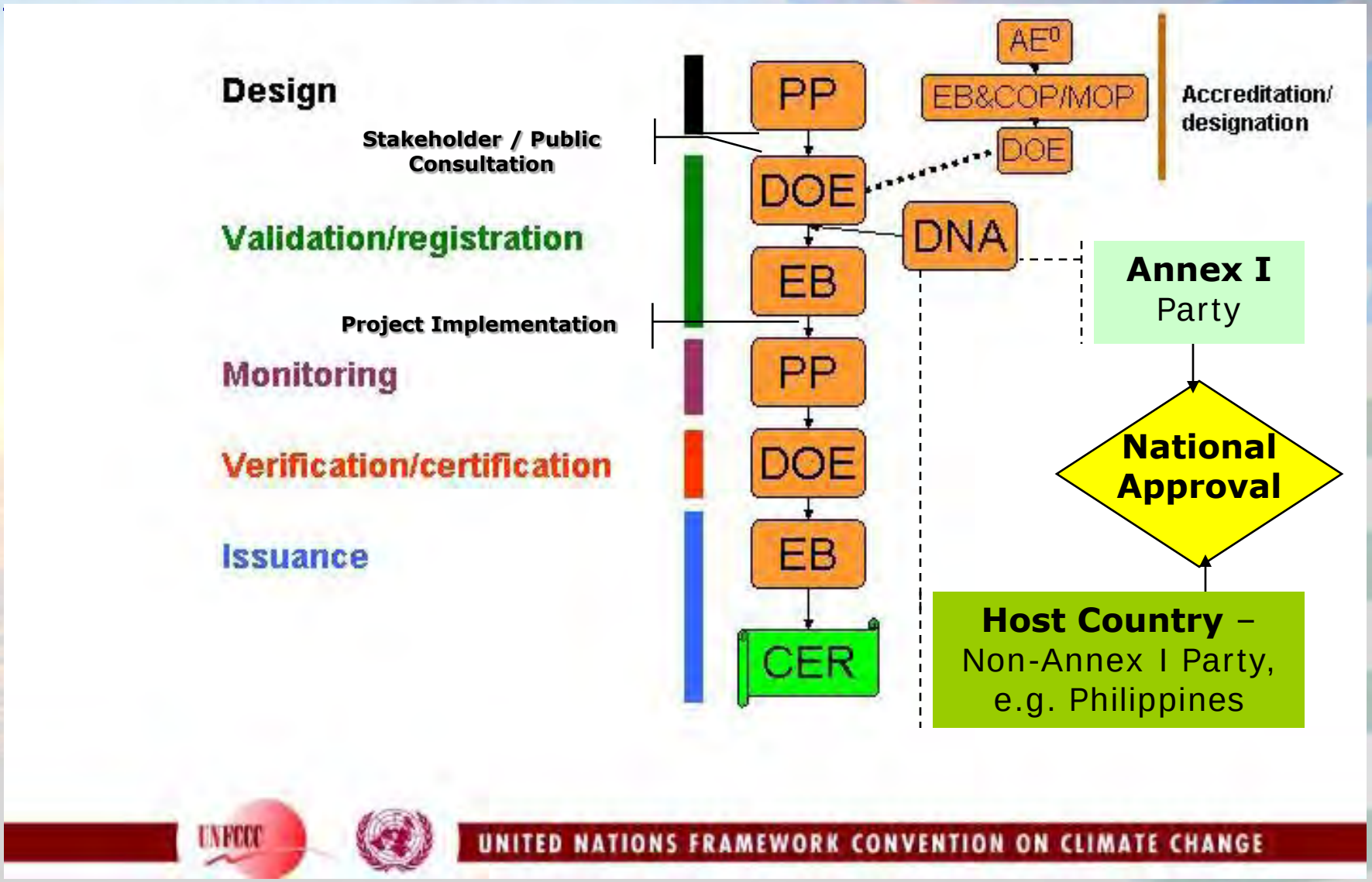
OUTLINE

- The Clean Development Mechanism
- Host Party Designated National Authority (DNA) for CDM
- Project Types Applying for Host Country Approval
- Status of Applications with the Philippine DNA for CDM
  - Status of Registration with the CDM Executive Board (Germany)
- Registered Projects by Host Party
- Certified Emission Reduction units (CERs) issued by Host Party
- Key Issues

The CDM

- The central feature of the Kyoto Protocol (KP) is its requirement that industrialized countries, known as Annex 1 countries, limit or reduce their greenhouse gas (GHG) emissions
- The CDM is one of the 3 market-based flexibility mechanisms under the KP that allows Annex 1 countries to
  - Earn “certified emission reduction units (CERs)” to be used for fractional compliance with their GHG reduction commitments
  - When they undertake emission-reduction (or emission removal) projects in a developing country, i.e. a non-Annex 1 Party not bound by emission reduction targets
  - In return, these CDM projects must contribute to the sustainable development of the developing country that hosts the CDM projects.

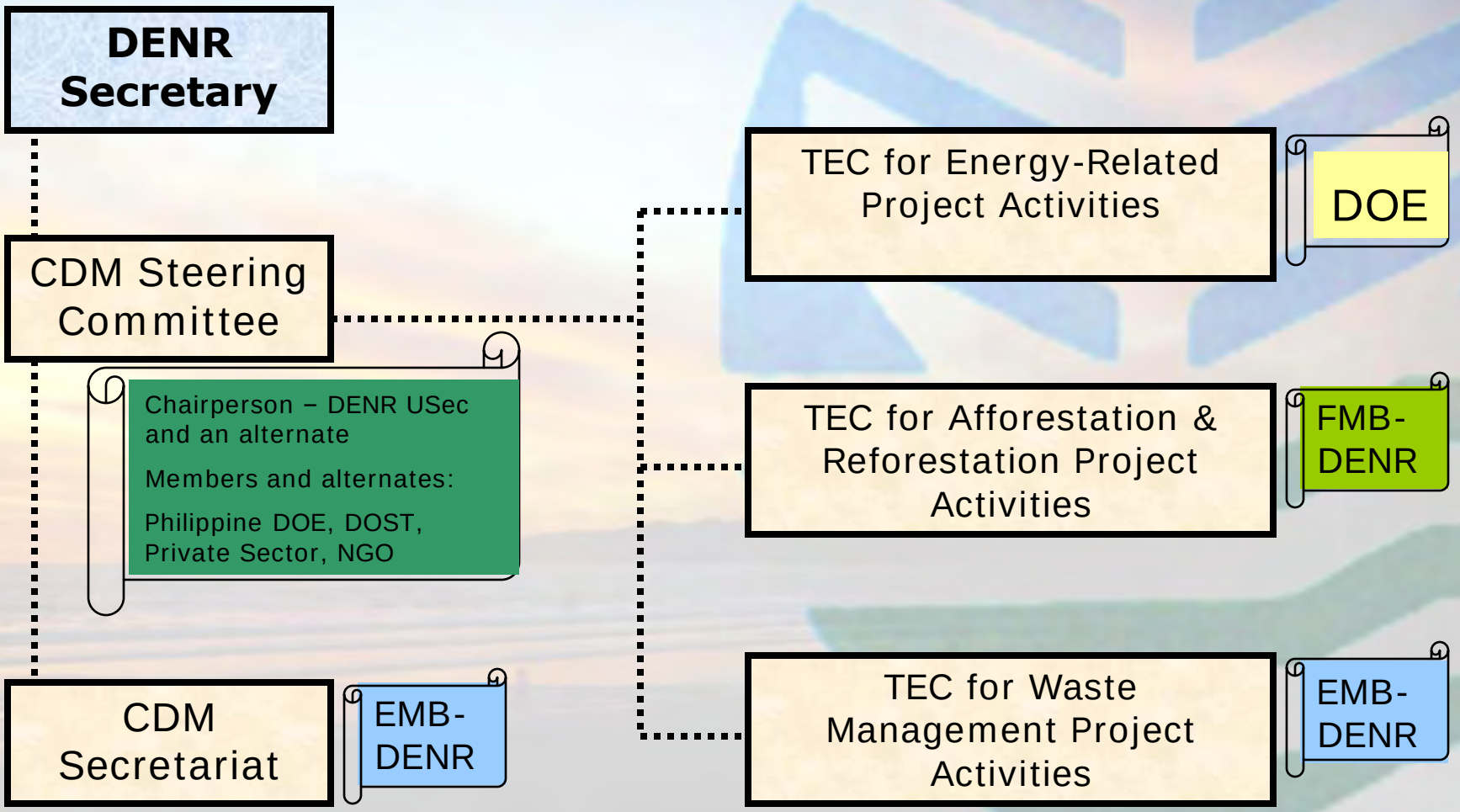
CDM Project Activity Cycle



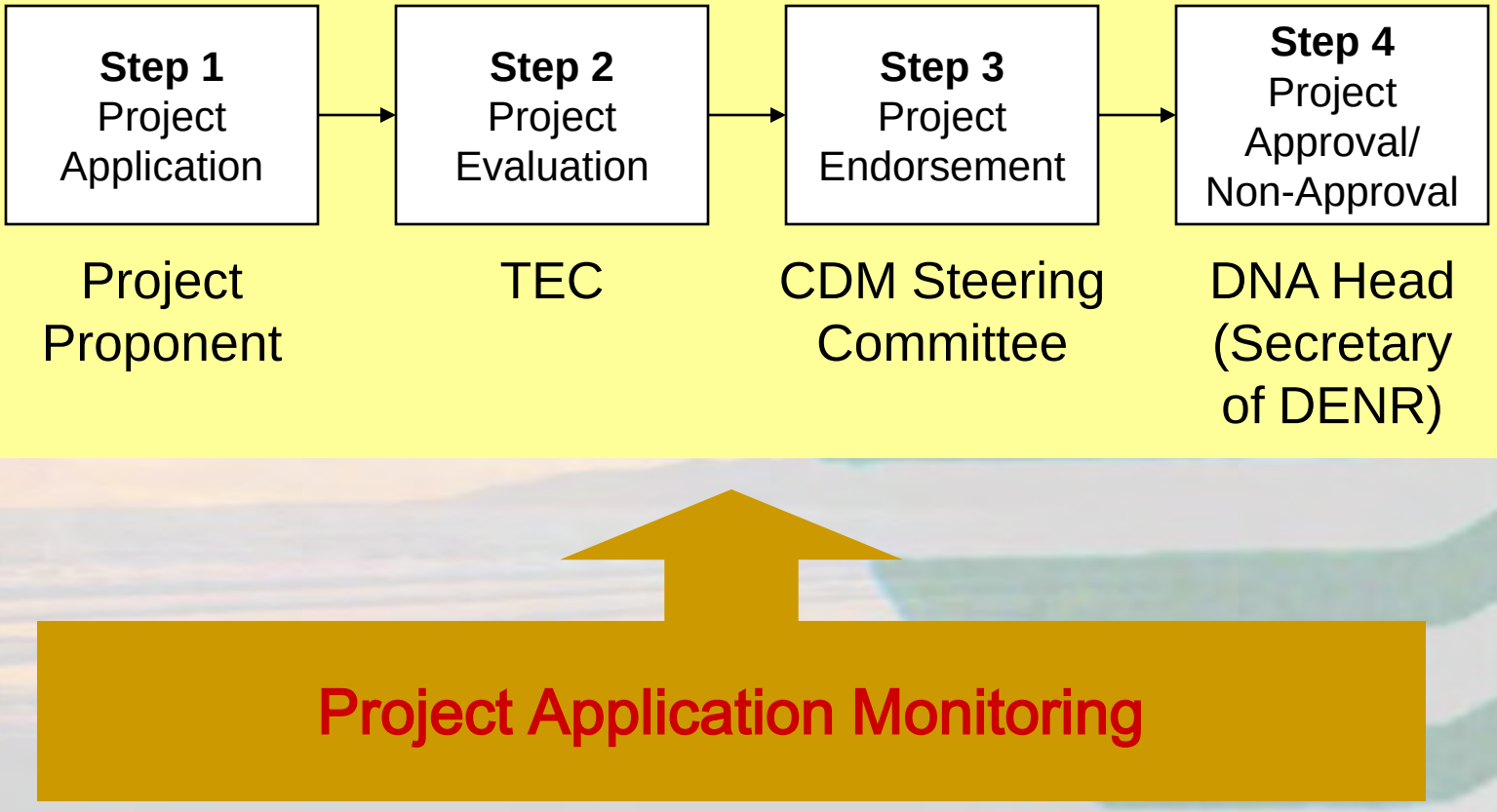
Philippine DNA for CDM

- Participation in CDM is voluntary
- A non-Annex I Party may participate in CDM if it is a Party to the Kyoto Protocol
  - Philippine Ratification of the UNFCCC
    (Signed: 12 June 1992; Ratified: 02 August 1994)
  - Philippine Ratification of the Kyoto Protocol
    (Signed: 15 April 1998; Ratified: 20 November 2003)
- Parties participating in the CDM shall set up a designated national authority (DNA) for CDM
  - Executive Order No. 320 (25 June 2004)
    The DENR as the Designated National Authority for CDM
  - DENR Administrative Order No. 2005-17 (31 Aug 2005) Rules and Regulations Governing the Implementation of EO 320

Organizational Structure



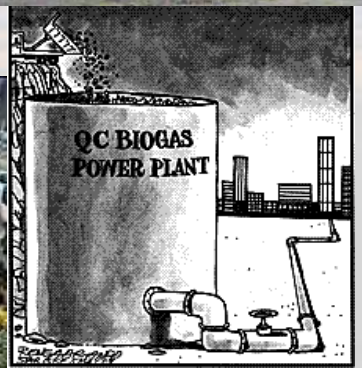
CDM NATIONAL APPROVAL PROCESS BASIC STEPS



Host Country Approval Applications Received by the Philippine DNA for CDM

- **79% small scale**
- **98 – 79,000 CERs/yr**
  - **Mostly methane recovery & electricity generation projects**
    - swine and poultry wastewater
    - sewage treatment
  - **Methane avoidance from biomass decay via composting**
  - **Bagasse (from an ethanol distillery) - biogas (wastewater treatment) cogeneration**
  - **Biomass**
    - Rice-husk - for heat generation at steam laundry, rice mills
    - Coconut husk - for steam boilers at a feedmill
  - **Mini-hydropower**
  - **Watershed rehabilitation**
  - **Tricycle retrofitting**
  - **Waste heat recovery (cement factory)**

Host Country Approval Applications Received by the Philippine DNA for CDM



- **21% regular scale**
- **53,000 – 590,000 CERs/yr**
  - **Renewable energy**
    - Wind
    - Geothermal
    - Hydropower
  - **Wastewater from an ethanol plant**
  - **Waste heat recovery at a sinter plant**
  - **Landfill gas recovery & power generation**
  - **Rice-husk biomass use at cement plants and a sugar mill**
  - **Organic waste composting**
  - **Blended cement**
  - **Secondary Catalytic Reduction of N_2O Emissions at ONPI Nitric Acid Plant**

Status of Applications

Status	Qty	Regular Scale Project Activities	Regular Scale: Estimated Annual CERs (tCO2-e/yr)	Small-scale Project Activities	Small-scale: Estimated Annual CERs (tCO2-e/yr)	Total Estimated Annual CERs (tCO2-e/yr)
DNA Applications Received	**96**	**18**	2,137,361	**78**	>931,151	**>3,068,512**
Year 2009	4	0	0	**4**	>84,899	>84,899
Year 2008	19	3	136,937	16	412,479	549,416
Year 2007	32	9	1,528,404	23	191,467	1,719,871
Year 2006	10	5	415,232	5	137,305	552,537
Year 2005	17	1	56,788	16	105,001	161,789
Total LoAs Issued	**64**	**14**	1,886,813	**50**	>576,787	**>2,463,600**
Year 2009	4			**4**		
Year 2008	32	7	1,266,152	25	416,936	1,683,088
Year 2007	16	4	393,002	12	86,663	479,665
Year 2006	10	2	170,871	8	73,188	244,059
Year 2005	1	1	56,788	0	0	56,788

66% of Total Applications Received by the Philippine DNA have received Host Country Approval

CDM Registration Stage

Status	Qty	Regular Scale Project Activities	Regular Scale: Estimated Annual CERs (tCO2-e/yr)	Small-scale Project Activities	Small-scale: Estimated Annual CERs (tCO2-e/yr)	Total Estimated Annual CERs (tCO2-e/yr)
Applying for Registration (Current)	**0**	0				
Requesting Registration	4	0	0	4	0	
Project Activities w/ Requests for Review	0	0	0		0	
Minor Corrections	4	0	0	4	0	
Corrections following Review	**1**	1	207,628			207,628
Project Activities Rejected	**1**	0	0	1	5,790	5,790
Project Activities Withdrawn	**1**	0	0	1	45,620	45,620
Project Activities Registered	**35**	**8**		**27**		>1,394,582
Year 2009	12	1	589,993	11	>45,647	>635,640
Year 2008	5	3	331,300	2	34,787	366,087
Year 2007	8	1	61,702	7	63,519	125,221
Year 2006	7	3	227,659	4	12,644	240,303
						(ACTUAL)
Project Activities w/ Issued CERs	**1**	1	64,568	0		**64,568**

55% of projects with LOAs have been registered with the CDM EB.

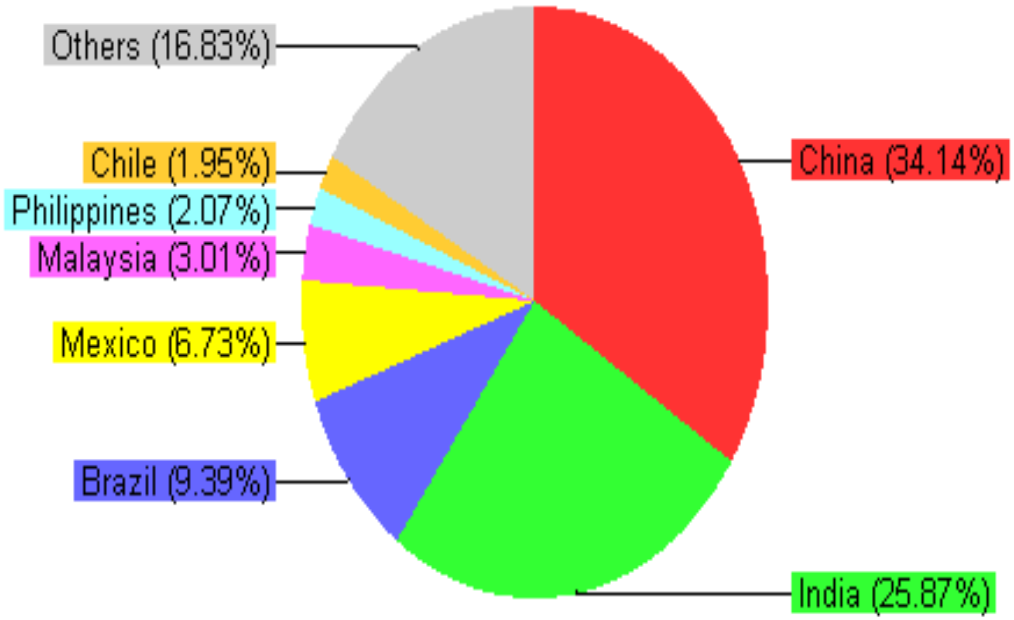
35 Registered Projects/64 LoAs Issued

- 35 projects have been REGISTERED so far, with 4 (6%) more proposed projects currently requesting registration
- NECESSARY STEP before registration:

  completion of the validation process by a third party

  Designated Operational Entity that must be accredited by the UNFCCC

Registered CDM Project Activities by Host Party (as of 26 June 2009)



http://cdm.unfccc.int (c) 26.06.2009 18:53

1. China: 578
2. India: 438
3. Brazil:159
4. Mexico: 114
5. Malaysia:51
6. **RP: 35**
7. Chile: 33
8. Republic of Korea=28
9. Indonesia: 24

2.07% of

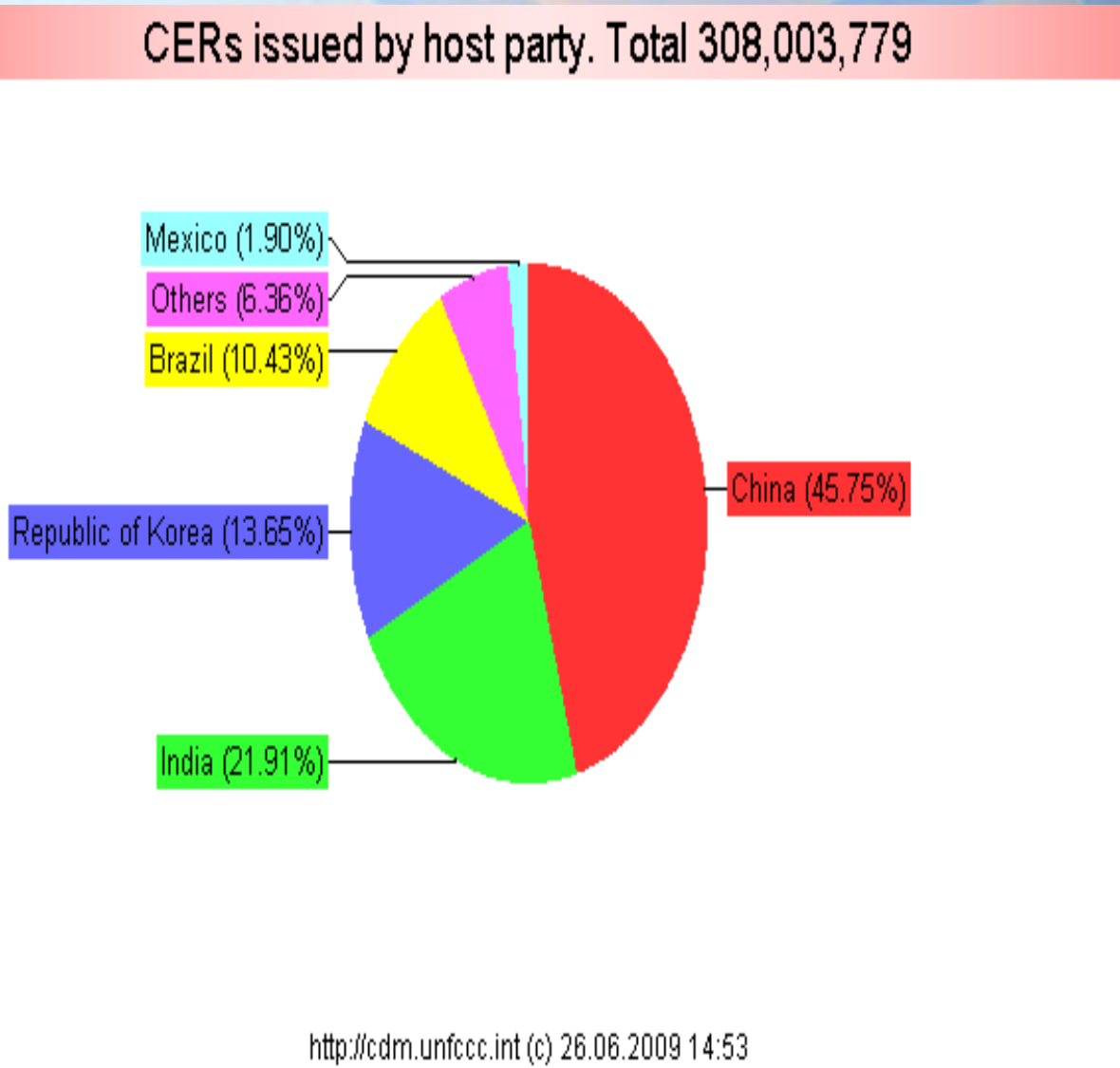
Total: 1,693

CERs Issued by Host Party

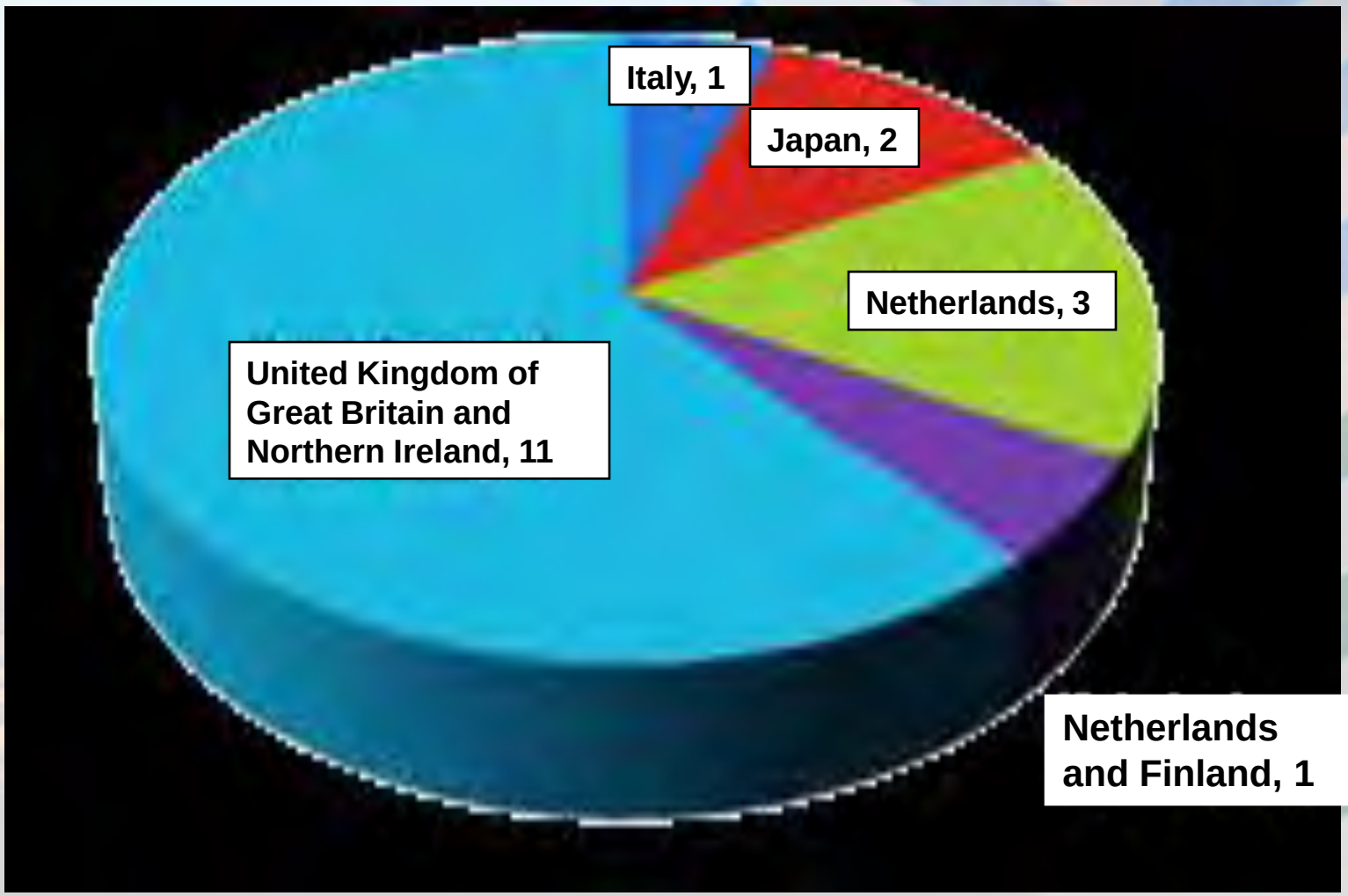
64,568 : CERs Issued to RP (.03% of 208M) Northwind Bangui Bay Project

31,024 : ERs under verificatior by a designated operational entity generated by the Q.C. Controlled Disposal Facility Biogas Project in Payatas

308,003,779 : Total CERs Issued
~45.75% : CERs Issued to China
~21.91%: CERs Issued to India
-10.43%: CERS Issued to Republic of Korea
~10.43% : CERs Issued to Brazil



Philippines: Contribution of Annex 1 Partners of the Philippines in number of CDM Projects



Contribution of Annex 1 Partners of the Philippines in expected average annual CERs

United Kingdom of Great Britain and Northern Ireland, 14%

Netherlands and Finland, 12%

Other Philippine DNA initiatives to support the development of CDM in the country

- **Establishment of a CDM Helpdesk**
- **Establishment of a CDM clearinghouse**
  - http://cdmdna.emb.gov.ph
- **Development of a manual on GHG Emission Reduction Monitoring and Reporting Guideline**
- **Development of a manual the Emission Development of a manual Reduction Purchase Agreements (ERPA): A Seller's Perspective**
- **Continuing Capacity Building and Promotion Activities**
  - CDM Country Guide
  - Regular updating of the CDM Country Fact Sheet
  - Review and Enhancement of the National Approval Process
  - Local, regional and national workshops for various sectors including technical tutorials
  - Investors' Forum, Road Shows, participation in Carbon Expos
- **Archiving of Baseline Data**

Key Issues at the National Level

- Limited underlying project development financing. Upfront costs are usually not provided by Annex I countries
- Absence of locally-based accredited Designated Operational Entities that perform the validation and verification work
- Existing CDM project activities in the Philippines confined to a few sectoral scopes, are small in scale and not widely distributed across the country
- Limited resources for development of new methodologies
- Continuous updating of the requisite information and baseline data for the emission reduction calculations remains a challenge
- CDM participation still dominated by a few groups

Key Issues at the National Level

- Lack of awareness of risk management measures in case of non-/under-delivery of CERs due to non-/underperformance
- Uncertainty in the actual achievement of CDM projects' stated sustainable development benefits in the absence of monitoring or reporting mechanisms
- Lack of full-fledged human and infrastructural resources to sustain operations
- Limited awareness of specific stakeholder groups on CDM, including financial institutions and senior policymakers and officials of various agencies

Key Issues at the International Level

- Uncertainty with respect to the future of CDM beyond 2012
- Non-ratification of the Kyoto Protocol by USA undermines the basic principle of common but differentiated responsibilities: Annex I countries must take the lead
- Lack of internationally accepted criteria for demonstrating high sustainable development contribution of a project activity to ensure that the DUAL objectives of the CDM are met and CERs from such projects with high SD benefits are accorded first-rate values
- Continuously evolving international guidelines requires constant training
- Limited number of Designated Operational Entities to keep up with the increasing number of project activities
- Small scale project participants remain at a disadvantage in terms of CER pricing
- Limited access to climate-friendly technologies due to intellectual property rights issues

More effort is needed to achieve the DUAL Objectives of CDM

- Ensure environmental integrity of project activities:
  needs real GHG emission reductions
- More emphasis must be given to fulfilling its objective of assisting host countries in achieving sustainable development
- Ensure public participation in the development and implementation of CDM projects
- Strengthen intergovernmental collaboration and public-private partnerships on CDM investment promotion
- Expand the portfolio of CDM project activities in the Philippines
  - More renewable energy project activities
  - More afforestation/reforestation project activities
  - Conduct of Technology Needs Assessment
  - Mapping of GHG emission reduction potential

Thank you.

For your questions / queries:

DNA - CDM Secretariat Office

Environmental Management Bureau

2/F, HRDS Building, DENR Compound,

Visayas Avenue, Diliman, Quezon City

T: (+63-2) 920-2251; F: 928-4674

www.emb.gov.ph; http://cdmdna.emb.gov.ph

Methane to Markets Partnership in the Philippines

Raul C. Sabularse
Graciano P. Yumul, Jr.
Department of Science and Technology

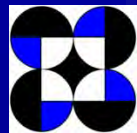
Conference on Mitigating Greenhouse Gas Emissions from Livestock and Agro-Industrial Waste
15 October 2009

Presentation Objective

- Introduce Methane to Markets Program
- Increase awareness on emission reduction opportunities

Outline

- What is M2M?
- M2M Opportunities
  - ✓ Agriculture
  - ✓ Landfill
  - ✓ Coal Mines
  - ✓ Oil and Gas
- Way to go



Methane

Methane

- 16% of global GHG emissions
- 21x more potent than CO_2
- Relatively short lifetime (12 years)
- A clean-burning fuel

Major Methane Emissions Sources

Source	Estimated Global emission, $MMTCO_2e$ *
Agriculture 	234
Landfill 	747
Coal Mine 	388
Oil and Gas 	1165

Source: EPA

*Million tons CO_2 equivalent

Methane to Markets Partnership

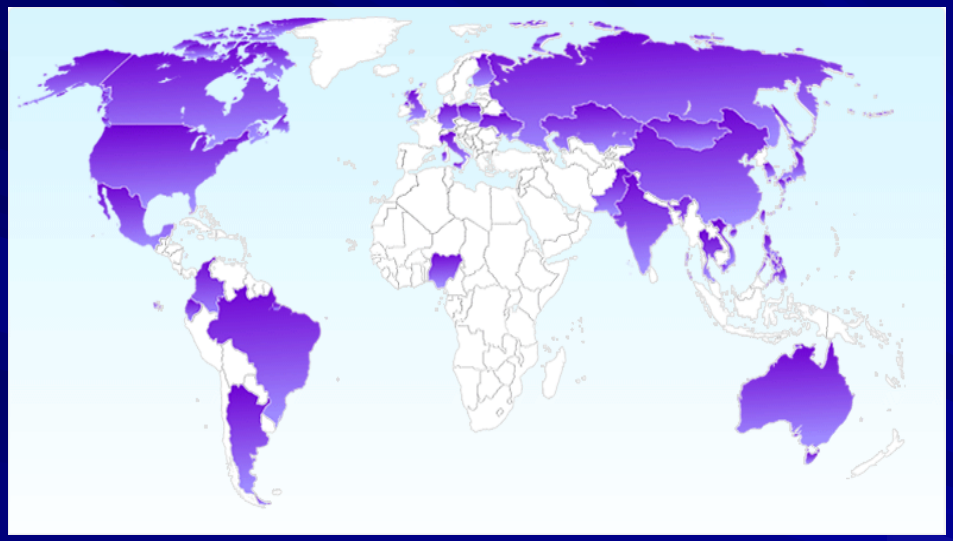
- International initiative to advance near-term methane recovery and use

- Goals:
  - Reduce methane emissions
  - Promote energy security
  - Enhance economic growth
  - Improve environment

- Launched in November 2004

M2M Partner Governments

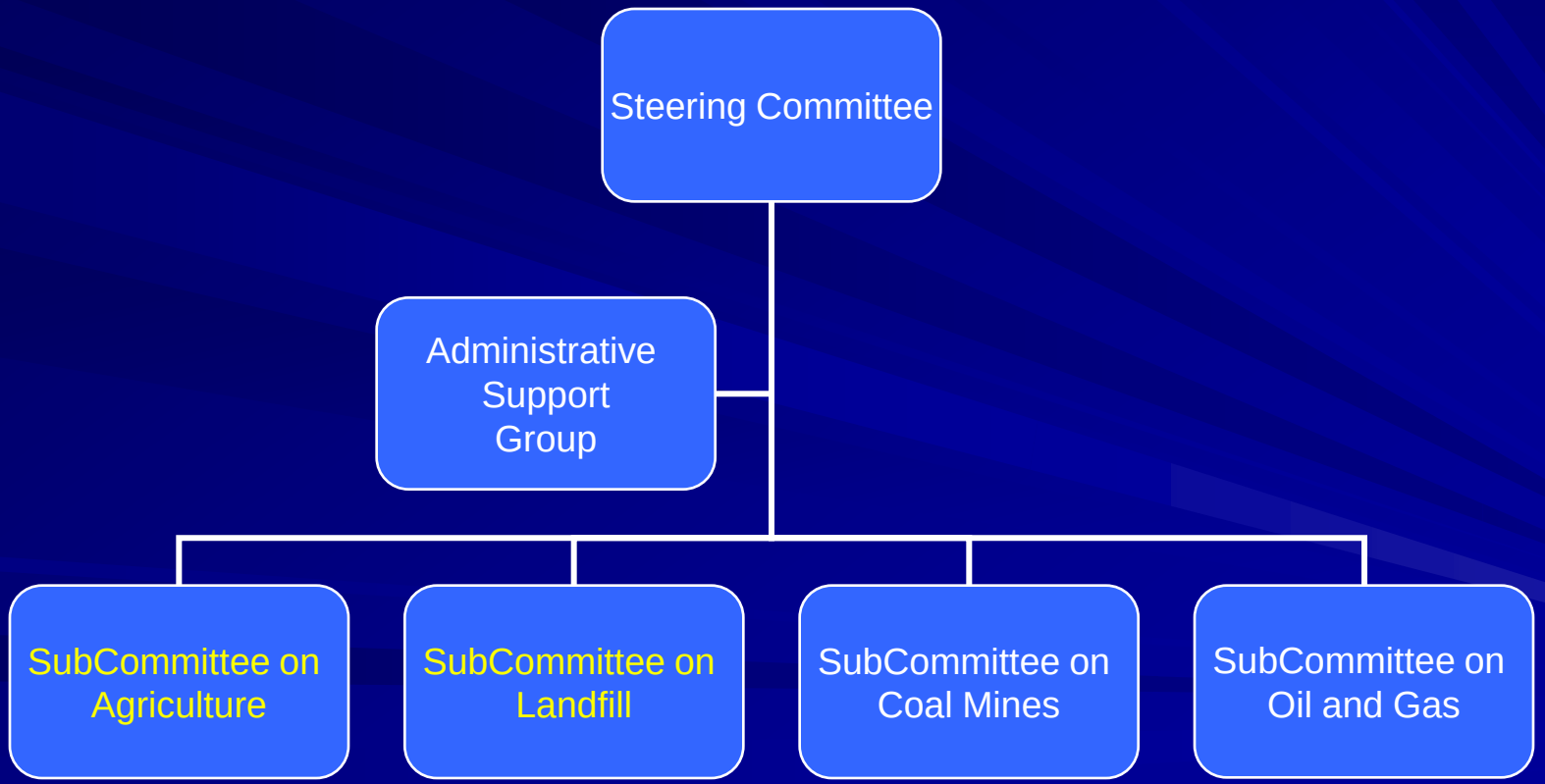
- Argentina
- Australia
- Brazil
- Bulgaria
- Canada
- Chile
- China
- Colombia
- Ecuador
- European Commission
- Finland
- Georgia
- Germany
- India
- Italy



- Japan
- Kazakhstan
- Mexico
- Mongolia
- Nigeria
- Pakistan
- Philippines
- Poland
- Republic of Korea
- Russia
- Thailand
- Ukraine
- United Kingdom
- United States
- Vietnam

14 governments that launched the Partnership

M2M Partnership Organization



Expectations from Partner Countries

- Identify and implement collaborative projects on methane recovery and use
  - (e.g., raising awareness to industry, barriers removal, technology demonstration and project opportunities)
- Develop country-specific action plans
- Identify and address barriers to project development

Project Network

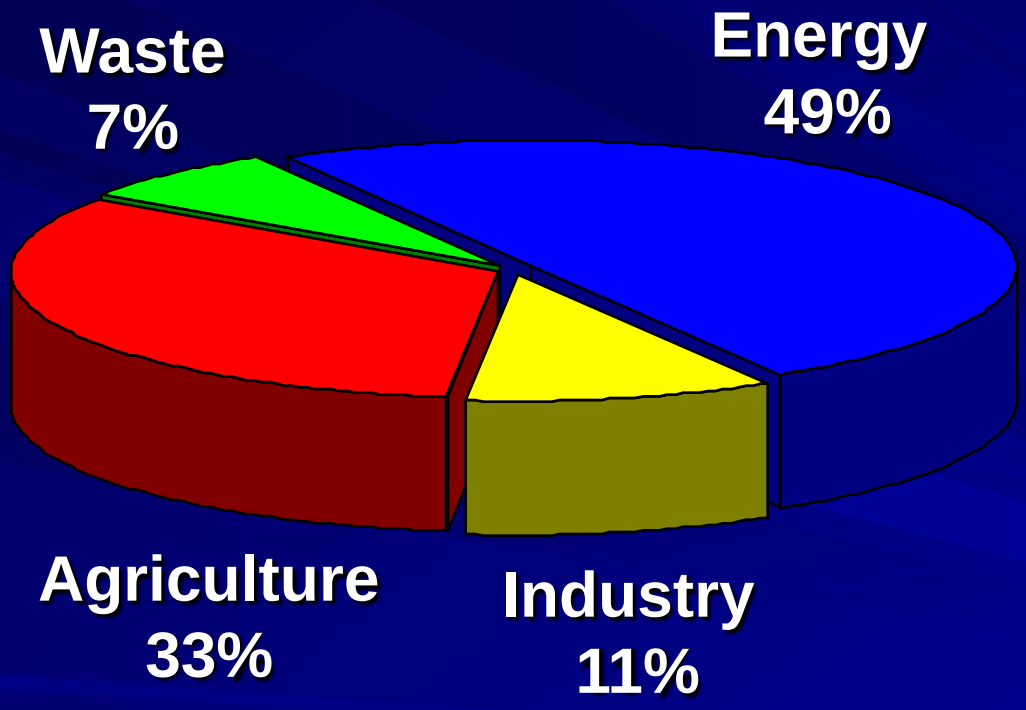
Currently 900+ members consisting of:

- Private sector
- Financial institutions
- Government organizations
- NGOs

Facilitates project development and implementation

Online, non-binding Membership Agreement

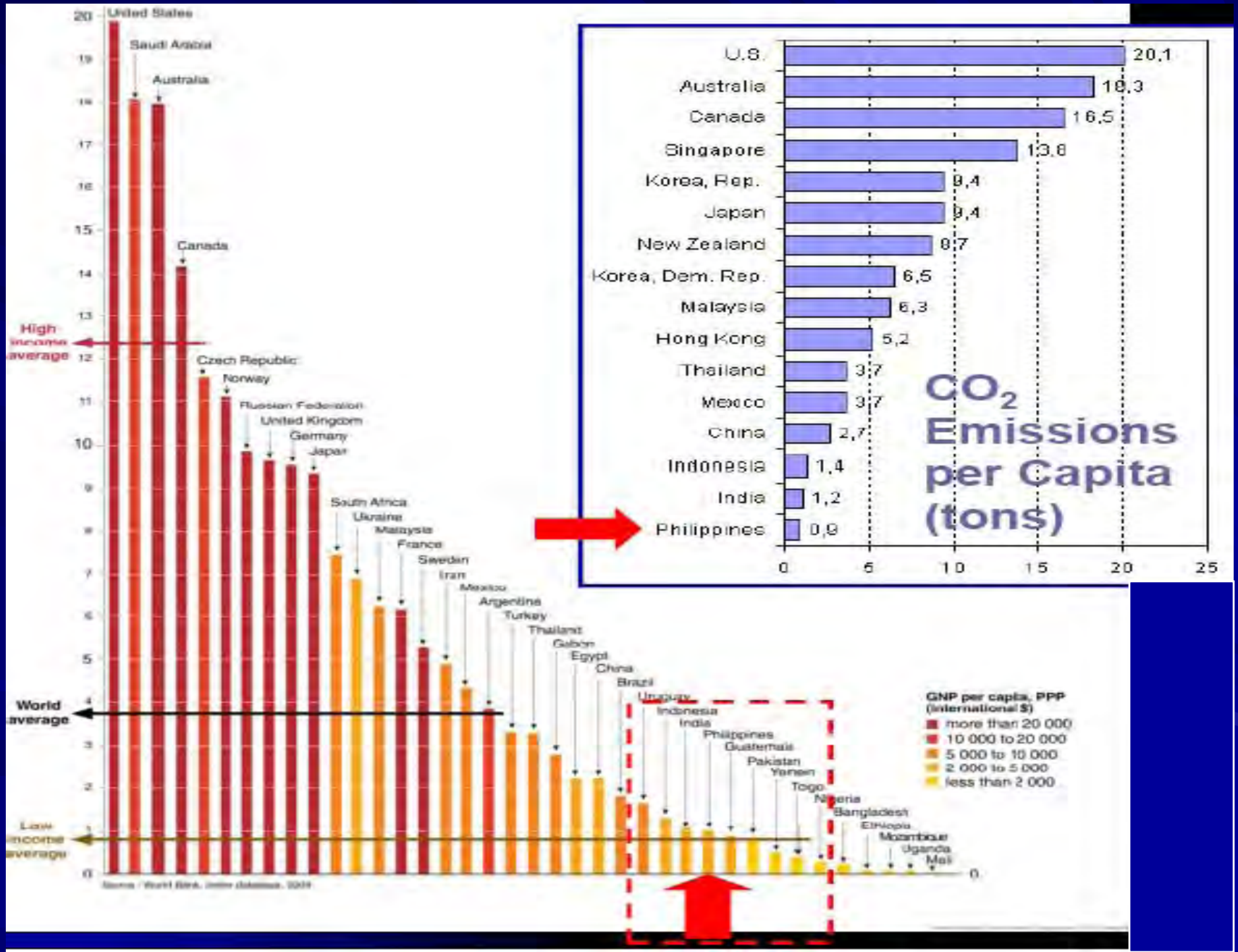
Philippine GHG Emissions



Sector	CO_2 Emissions (million tons)
Energy	50.0
Agriculture	33.1
Industry	10.6
Waste	7.1
Total	**100.8**

(ADB, 1994)

Philippine share in global emissions



Challenges to Methane Project Development

- Awareness
- Technical capacity in design and equipment service
- Financial

Funding Support

Figure 1

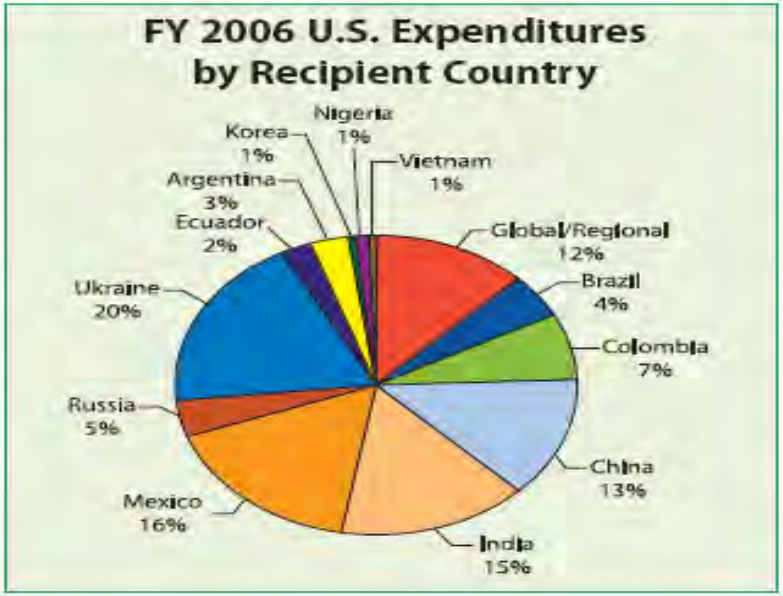
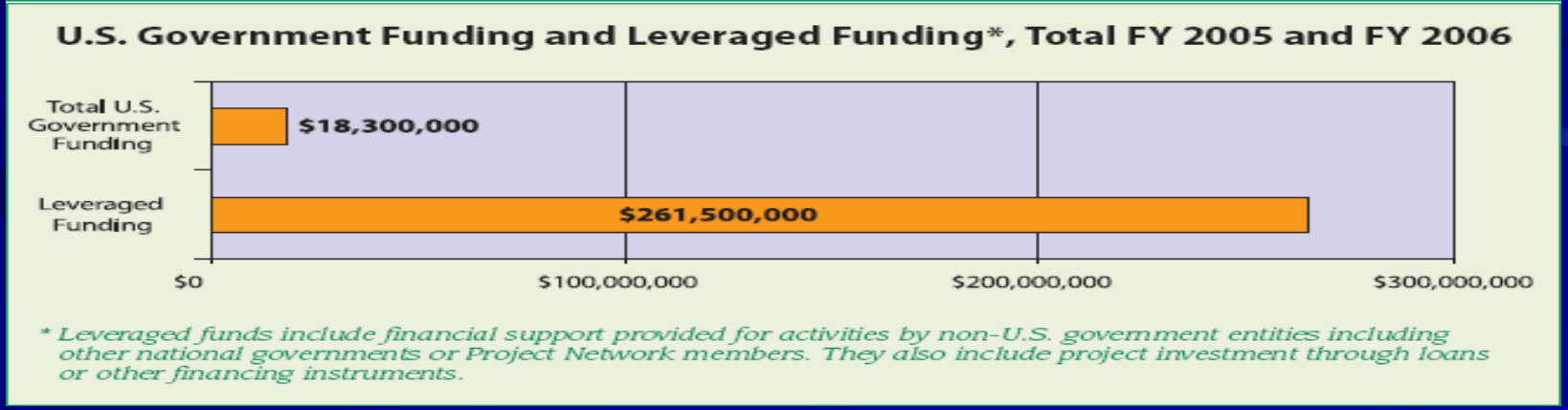


Figure 2

Figure 3



M2M Project Opportunities

- Agriculture
  - Awareness/ Capability Building/ Best Practices
  - Technology demonstration
  - Standards development

Resource Assessment

Criteria for Selection

- A major industry
- High volume of waste
- High organic load
- Geographic distribution
- Energy intensive

Resource Assessment

Most promising industries

Industry	Size	MT CH_4/yr
Pig farming	13.7 M swine	67,000
Alcohol distillery	12 alcohol distilleries	20,137
Desiccated coconut	11 plants	7,744
Slaughterhouse	1,100 slaughterhouses	504

M2M Project Opportunities

- Landfill
  - Inventory
  - LFG estimation models
  - Gas extraction and utilization technology
  - Awareness/ Capability Building/Best Practices
  - Technology demonstration
  - Policy study, standards development

M2M Project Opportunities

- Coal Mines

  Methane removal from underground mines

  - Power production
  - Co-firing in Boilers

M2M Project Opportunities

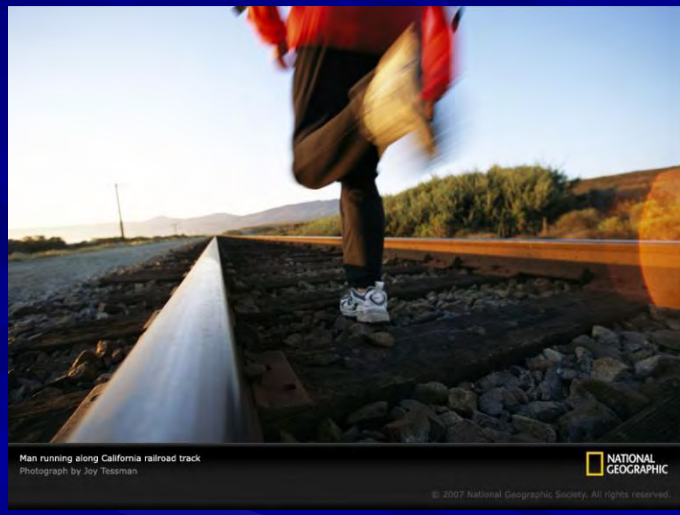
- Natural Gas

  -Reduction of venting or fugitive emissions

  -Improvements in operations

The Way Forward to Advance M2M Goals

- Join the SubCommittees on Coal Mines and Natural Gas
- Capacity Building
  - Conduct of regional consultation workshops
  - Promote methane recovery and utilization projects/technologies
  - Discuss possible M2M proposals and areas of cooperation
- Technology Demonstration Projects



Summary

Methane to Markets Partnership…

- in line with country's energy and environment goals
- presents opportunities for emission reduction
- can be tied to CDM programs

Thank You

M2M website: www.methanetomarkets.org

PCIERD Website: www.pcierd.dost.gov.ph

Conference on

Mitigating Greenhouse Gas Emissions from Livestock and Agro-Industrial Waste

Manila, 15-16 October 2009

The Clean Development Mechanism: How it works and new carbon finance instruments (post-Kyoto)

Josefo Tuyor, Senior Operations Officer
The World Bank, Manila

Contents

- Clean Development Mechanism (CDM)
  - Regulatory context
  - CDM modalities
  - Types of CDM projects
- Carbon Market
  - Market evolution
  - World Bank involvement
- Post-2012 instruments
  - Context
  - CPF and CTF
  - Market transformation
- Message for CDM developer

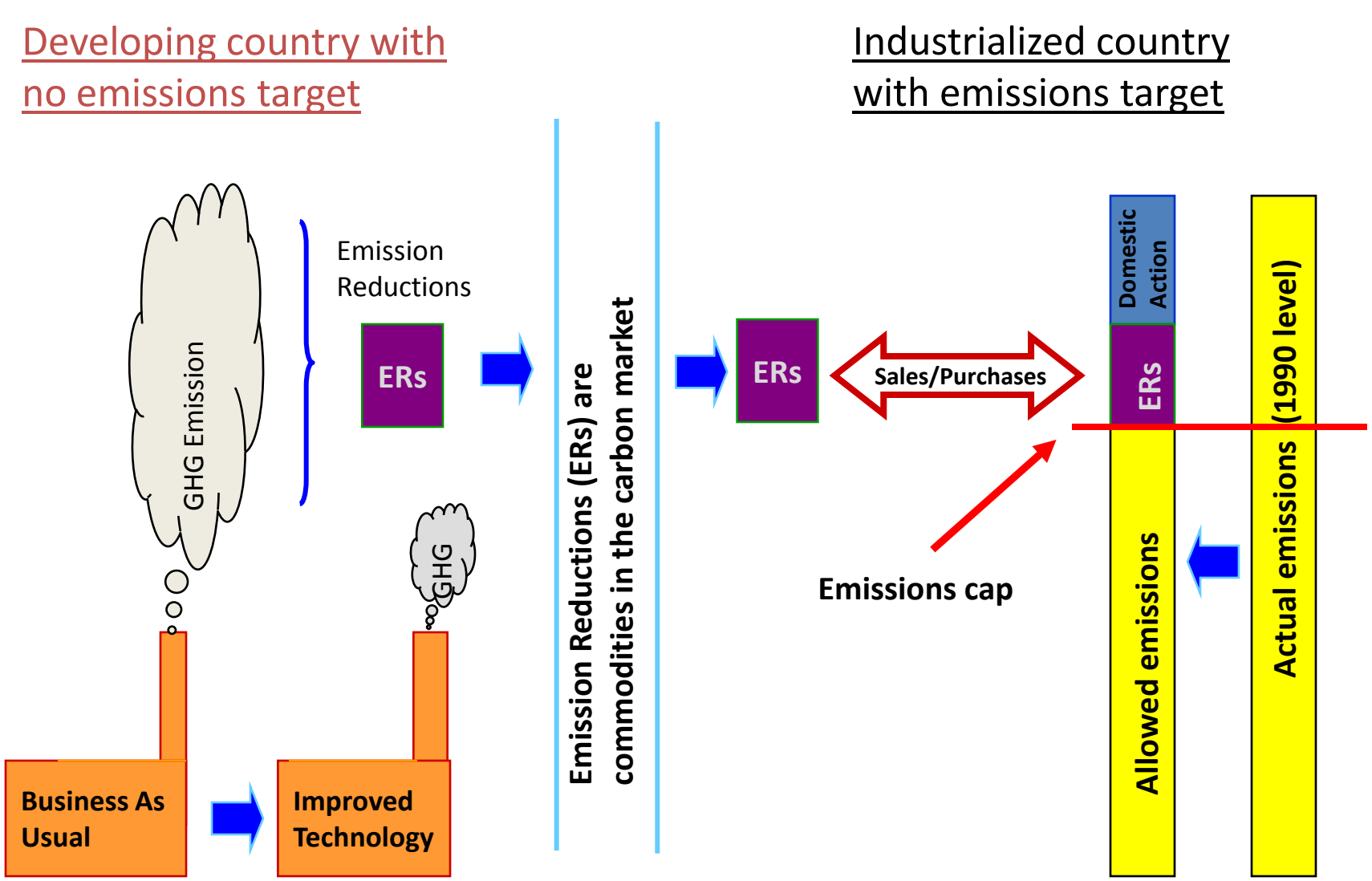
Regulatory Context

- Kyoto Protocol agreed in 1997, entered into force in Feb 2005.
  - Reduce emissions by 4.8% below 1990 levels over 2008-12 for 37 countries.
- Kyoto targets may be achieved by industrialized countries through:
  - reducing domestic emissions,
  - trading emission permits (Assigned Amounts Units - Art. 17),
  - purchasing emission reductions credits from projects:
    - **Clean Development Mechanism - Art. 12**
    - Joint Implementation – Art. 6
- Carbon market mainly a result of regulatory commitments.
  - Kyoto compliance trading
  - EU Emissions Trading Scheme
  - Voluntary Market

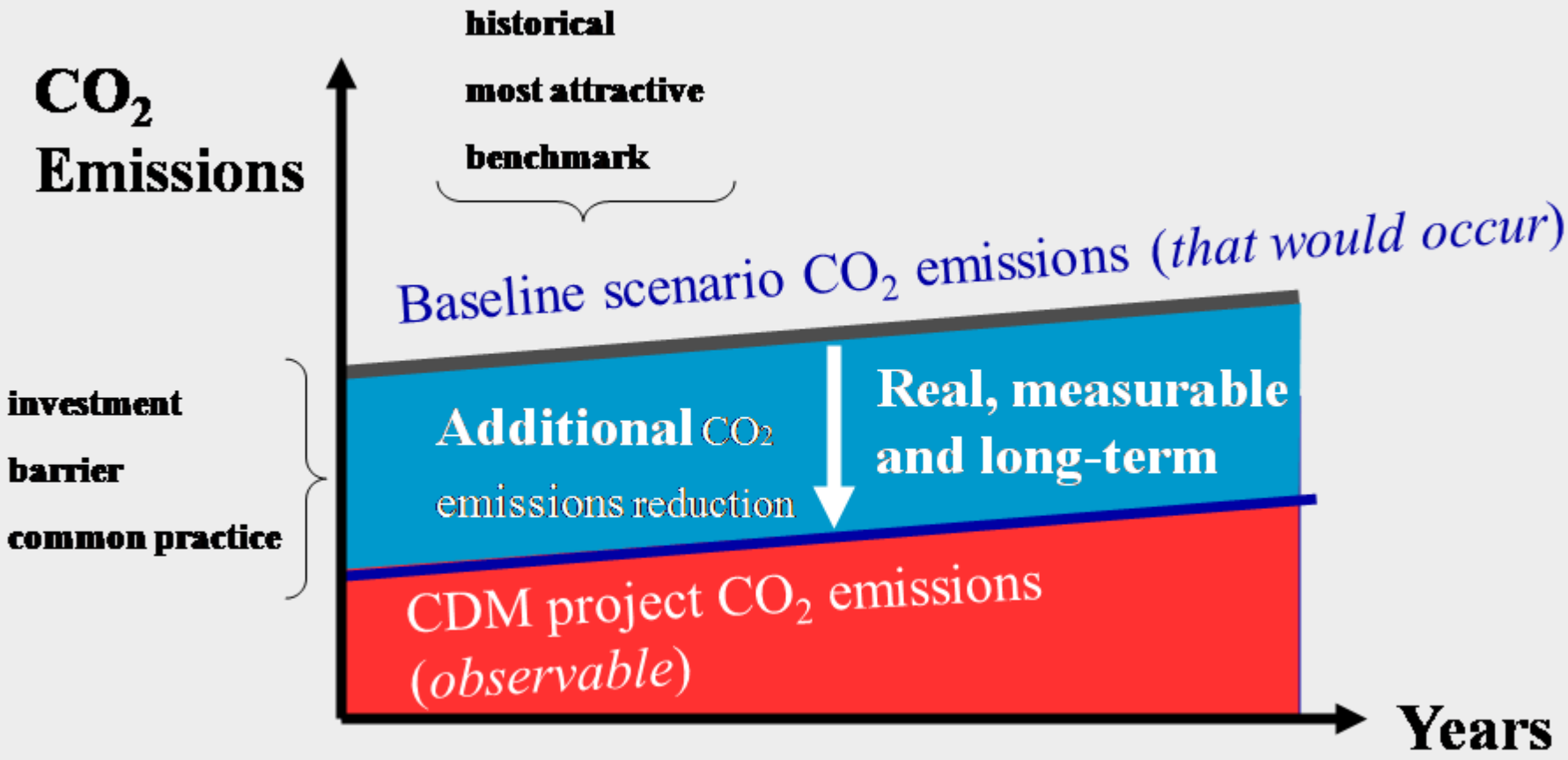
Art. 12 Kyoto Protocol

- The purpose of the CDM is:
  - To assist developing countries
    - in achieving sustainable development and
    - contribute to the objective of the UNFCCC
  - To assist developed countries
    - in achieving compliance with their emission limitation commitments

Carbon Trade

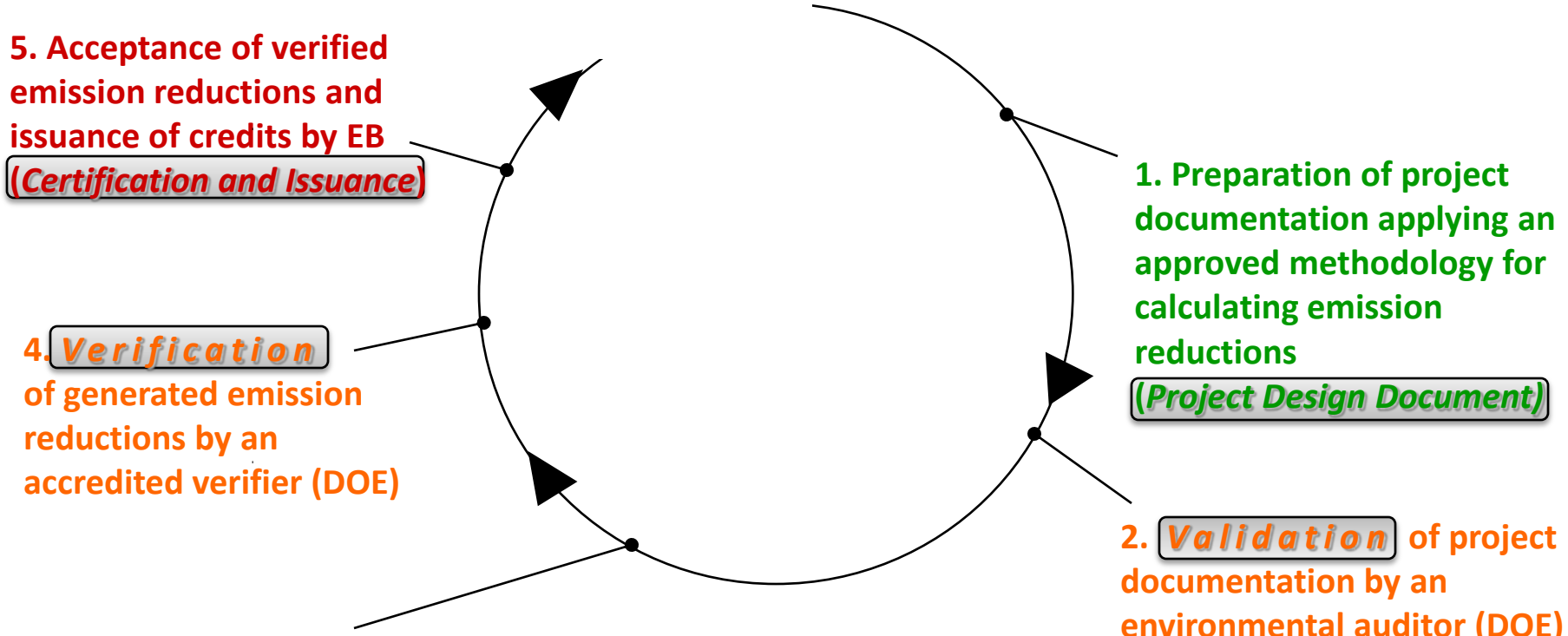


CDM-eligible emission reductions



CDM project cycle

The CDM Executive Board (EB) oversees the CDM project activity cycle:



Project sponsor

Accredited auditor

CDM Executive Board

CDM Institutions

- Meeting of the Parties (COP/MOP)
- CDM Executive Board
  - Accreditation panel
  - Methodology panel
  - Afforestation and reforestation working group
  - Small scale working group
  - CDM registration and issuance team
- Designated Operational Entities (DOEs)
- Designated National Authorities (DNAs)
- CDM Registry
- UNFCCC Secretariat - CDM Team

CDM Documents

Each CDM project is described in a "**Project Design Document**" (PDD), which includes a "**Monitoring Plan**".

The PDD must use an **approved methodology**, which is published on the UNFCCC's CDM website.

Baseline and monitoring methodologies must be submitted for approval to the CDM Executive Board along with a draft PDD demonstrating the use of the methodology.

All documents are available at:

http://cdm.unfccc.int/index.html

Types of CDM Projects

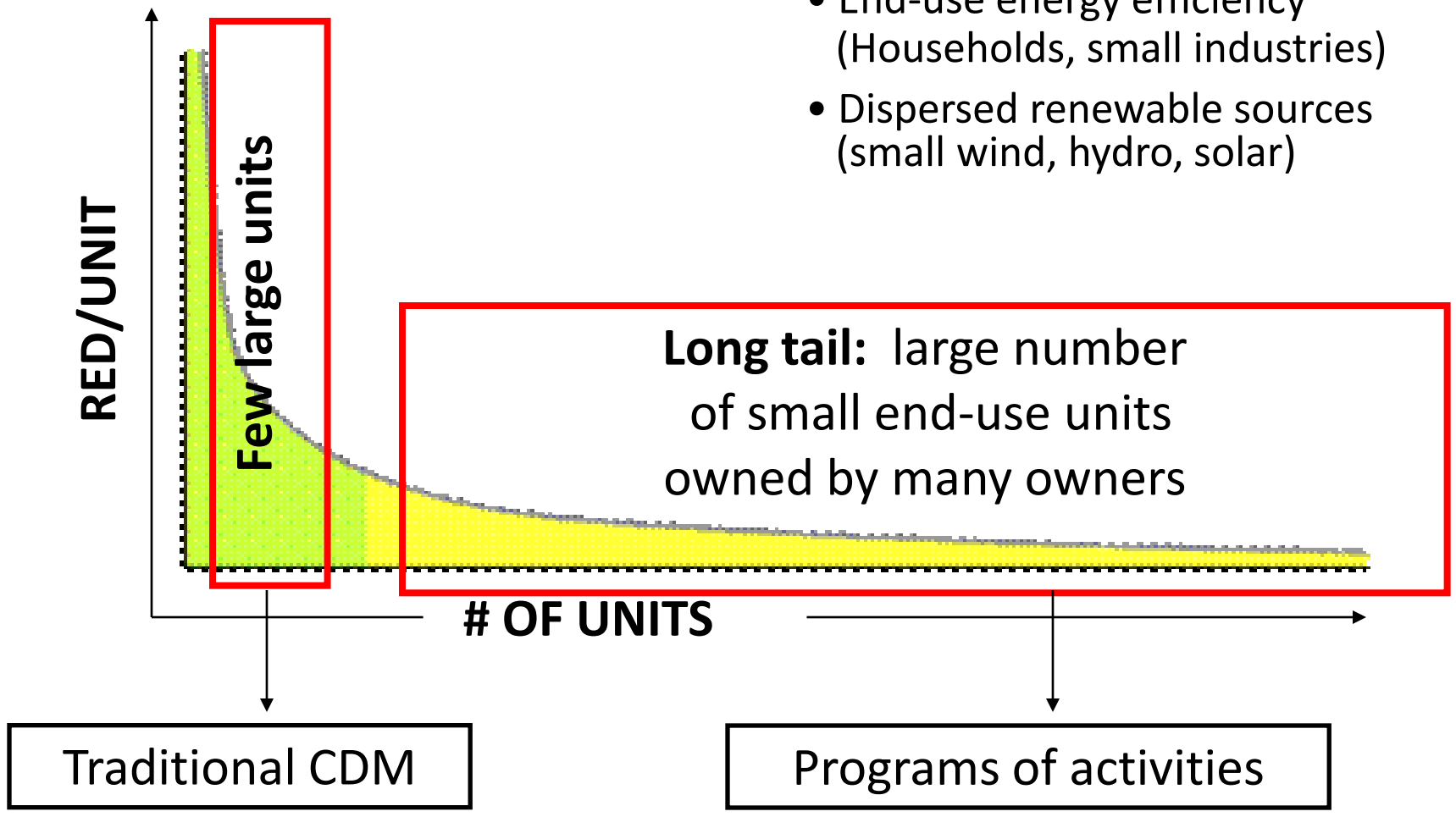
- Regular CDM projects
- Afforestation and reforestation projects
  - Much longer crediting periods
  - Obligation to eventually replace CERs
- Small scale projects
  - Simplified methodologies
  - Bundling of small scale projects
- Programmes of Activities (PoA)
  - Implementation of policies, measures, goals over time
  - Usually very small emission sources (but not only)
  - Managed by a “Coordinating and Managing Entity”

Rationale for programming CDM activities

Source: ESMAP and CFU (2007)

Example

- End-use energy efficiency (Households, small industries)
- Dispersed renewable sources (small wind, hydro, solar)



PoAs provide for …

- Support of investment programs and of policies & measures
  - Lower CDM transaction costs
  - Stronger host country ownership
  - PoAs can "grow" over time (by adding "CDM program activities" or CPAs)

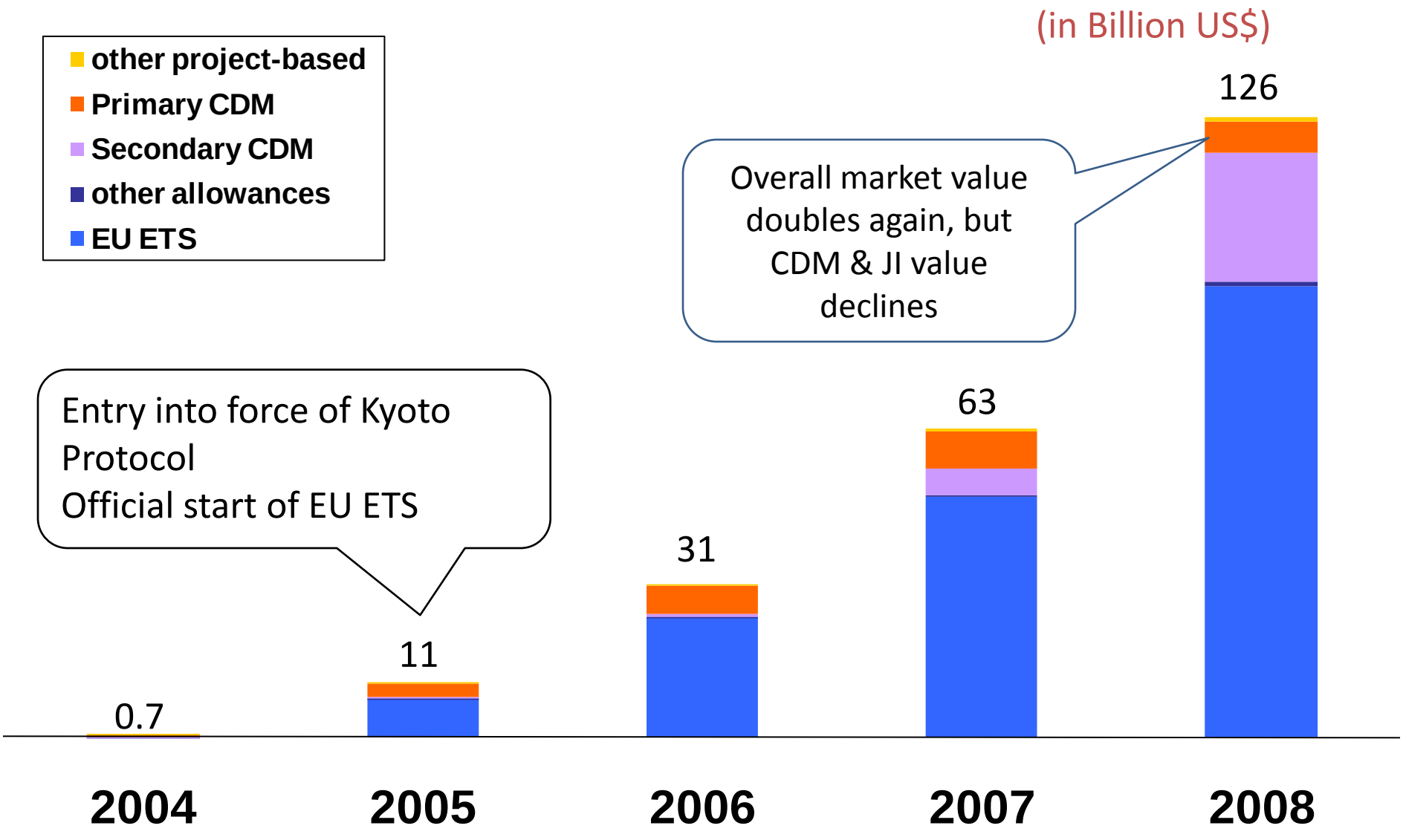
- An institutionalized framework for CDM
  - Adaptable to host country situation and sector
  - Certainty regarding conditions and procedures
  - Flexibility regarding "who" joins a PoA, and "when"

- Leverage of existing relationships
  - Government agencies, vendors, banks, …
  - Diverse incentives to join (& reduce emission)
  - Competitive (PoAs can coexist) and scalable (no size limit)

➔ **… a "machine" that generates CERs**

Carbon Markets

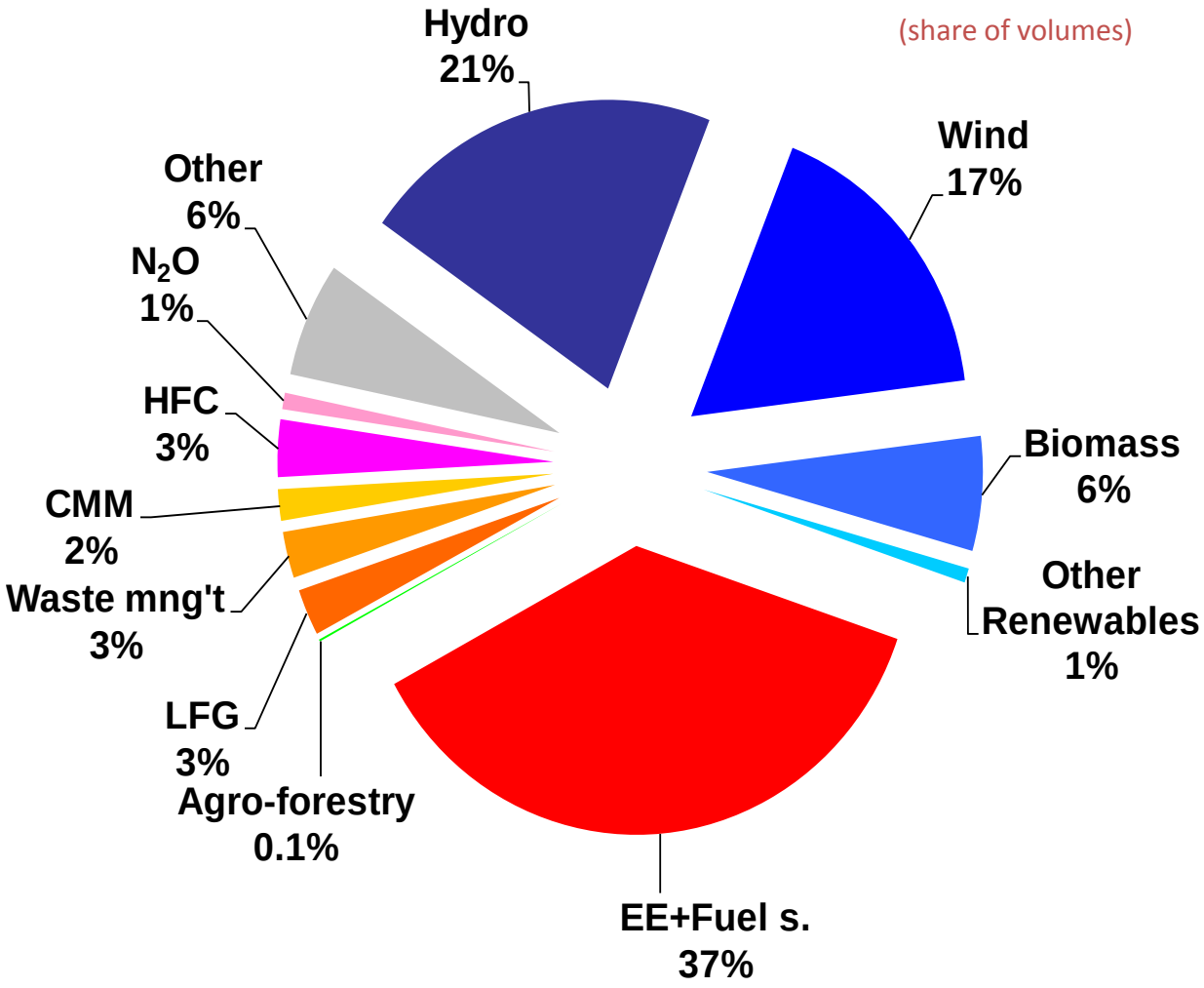
Carbon Market Growth Continues



CDM as a major catalyst of low-carbon investment

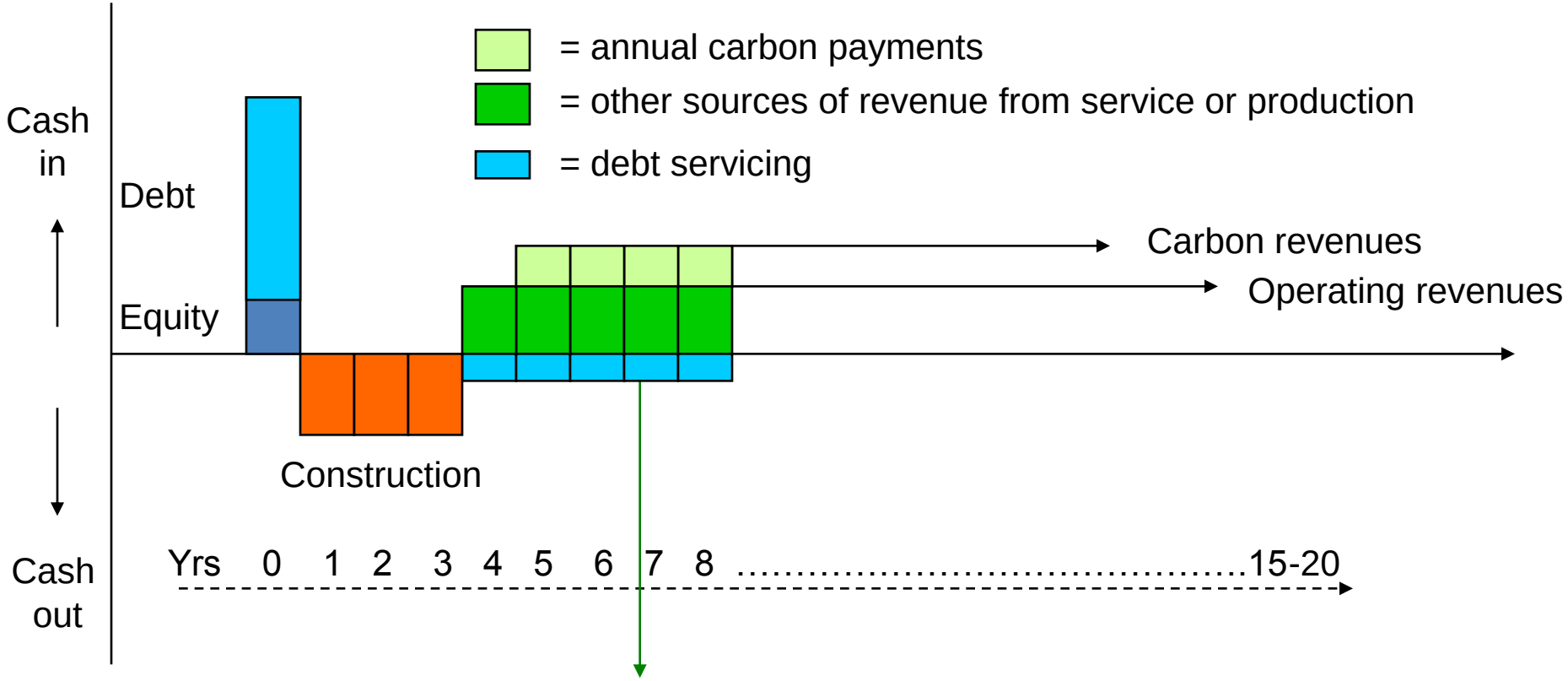
CDM delivers on clean energy: 82% of 2008 contracts for clean energy

US$95 billion in clean energy investment benefited from CDM over 2002-08



Carbon finance: payments for a stream of emission reductions

Payments are made through an Emissions Reduction Purchase Agreement (ERPA) – a *forward contract* for the purchase and sale of carbon credits.



Emission reductions are created only after the project is implemented, operational and registered by the UN regulator.

The World Bank and the Carbon Market

- Engaged in building the carbon market since 1999
  - Climate change as a global challenge
  - Sustainable development
  - Financial flows to developing countries
- US$ 2.1b in various Kyoto Carbon Funds since 2000
  - Development and testing of new concepts and methodologies
  - Purchase of emission reductions
  - Capacity building
- Next stop: Low-carbon sustainable growth
  - Scaling up of long-term investments post-2012
  - Linkages with GEF, Clean Technology Fund, WB operations
  - Strategic Framework for Development and Climate Change

World Bank "Kyoto" Carbon Funds & Facilities

16 governments, 66 companies: funds pledged: US$2.2bn – ca. $60m uncommitted

Specialty funds

Prototype Carbon Fund: $180m, multi-purpose, pilot fund.

Community Development Carbon Fund – T1: $128.6m, small-scale CDM projects.

BioCarbon Fund – T1: $53.8m CDM and JI LULUCF projects.

BioCarbon Fund – T2: $38.1m

Umbrella Carbon Facility – T1: $737.6m (2 HFC-23 projects in China).

Country funds

Netherlands European Carbon Facility: NL Min. Economic Affairs. JI projects.

Netherlands Clean Development Mechanism Facility: NL Min. Env., CDM energy, infra-structure and industry projects.

Carbon Fund for Europe: €50m, multi-purpose.

Italian Carbon Fund: $155.6m, multi-purpose.

Danish Carbon Fund: €58m, multi-purpose.

Spanish Carbon Fund – T1: €220m, multi-purpose.

Spanish Carbon Fund – T2: $70m, multi-purpose.

Carbon Finance Post-2012

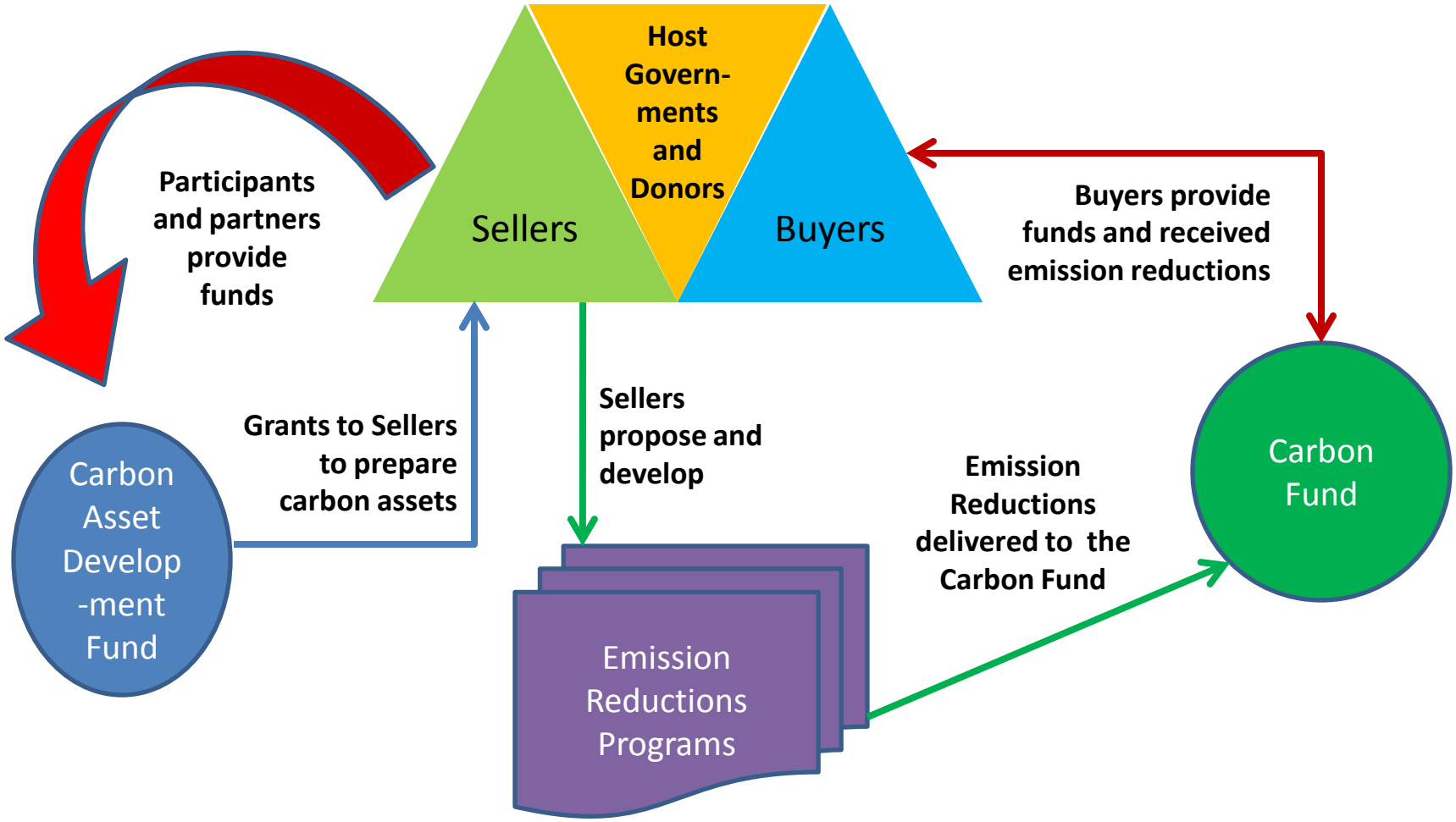
Carbon and Climate Finance: The next phase

- "Kyoto"
  - A pilot phase for defining and testing institutions.
  - Carbon market instruments are a success.
- "Copenhagen"
  - The real test for mitigation commitments and action.
  - Financial architecture to be agreed.
  - US$150-220bl needed to support mitigation in developing countries.
    - Carbon markets and CDM will continue to evolve and likely expand (new modalities, new project categories, CDM programs, sectoral crediting?).
    - Supplemented by public funding from OECD countries for NAMAs (nationally appropriated mitigation actions) by developing countries.

- New instruments to deliver climate finance will be needed.

Carbon Partnership Facility (CPF)

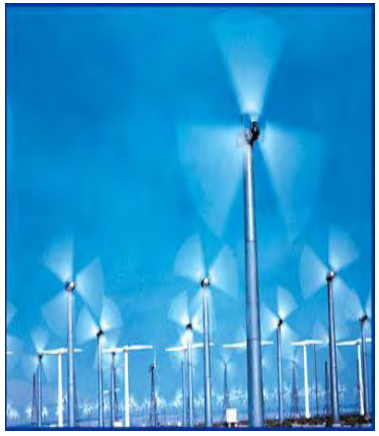
Participants and partners work together to develop programs to achieve "larger scale and longer term" emission reductions



CPF – Rationale and Objectives

- Commensurate with the climate change challenge, there is an urgent need to step up mitigation efforts.
- This calls for **scaling up** of carbon finance through efforts that:
  - integrate carbon into investment decisions early on
  - work on multiple sectors at the country level over a long period of time
  - move to more programmatic approaches
  - focus on the period post-2012

- The CPF
  - Builds on World Bank dialogue with client countries
  - Assists WB client countries in the transition towards a low-carbon economy and contribute to global climate change mitigation efforts
  - Support greenhouse gas emissions mitigation programs that are strategic and entail transformational interventions



Climate Investment Funds (CIF)

A collaboration between donors, World Bank and regional development banks to support a transformation towards low-carbon development

Clean Technology Fund (CTF)

Finance scaled-up demonstration, deployment and transfer of low carbon technologies with significant potential for long-term GHG savings

- Supports countries' development strategies and low-carbon programs
- Leverages financial products of International Financial Institutions
- Stimulates private sector engagement

$5 billion (mostly concessional finance)

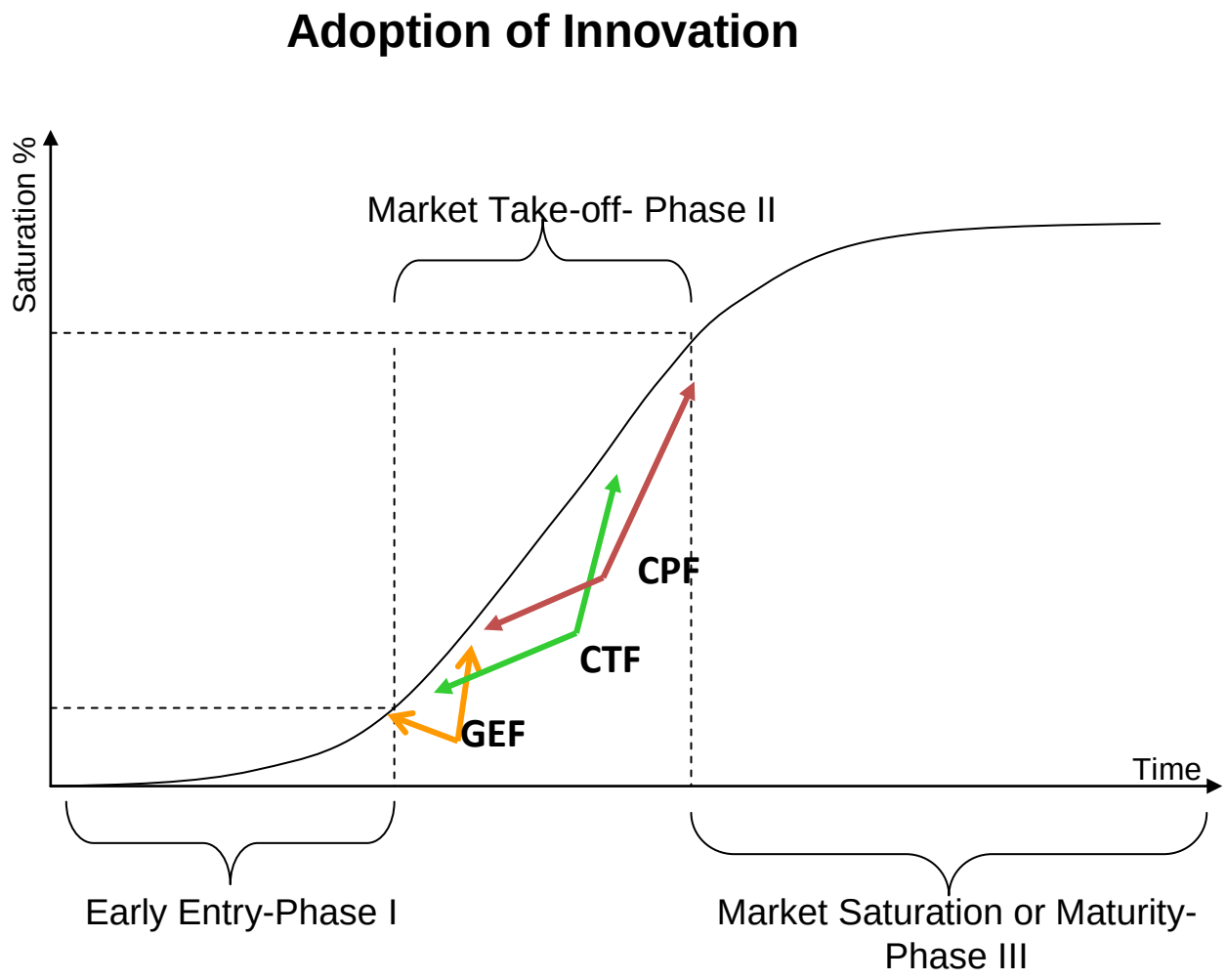
Strategic Climate Fund (SCF)

Targeted programs with dedicated funding to pilot new approaches with potential for scaling up

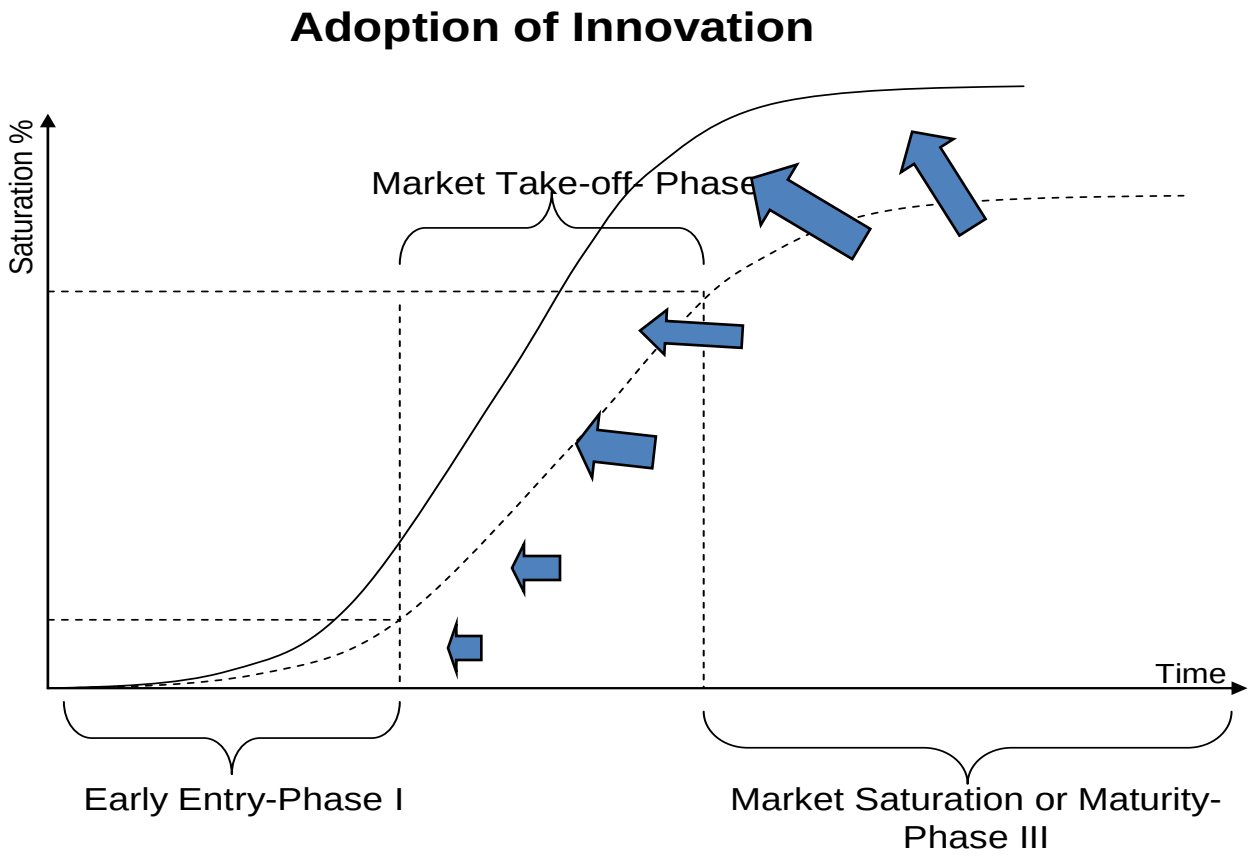
Pilot Program for Climate Resilience	Forest Investment Program	Scaling Up Renewable Energy in Low Income Countries
Mainstream climate resilience into core development planning	Reduce emissions from deforestation and forest degradation (under design)	Transformational change to use of renewable energy (under design)

$1 billion

GEF, CTF and CPF working to grow low-carbon market



Result: A market transformed



Final Message

Summing it up … for CDM project developers

- Understand the CDM, its risks and opportunities.
- Avoid unreasonable expectations.
- Be aware of the CDM modalities, procedures and methodology.
- Consider CDM opportunities early in project development.
- Get help with your first CDM project.

Thank you!

More information:

jtuyor@worldbank.org

http://www.carbonfinance.org

http://www.cfassist.org

http://cdm.unfccc.int

Presentation on
A case of Bundling of Projects for CDM Funding
(Nepal Biogas Programme)

Conference on Mitigating Greenhouse Gas Emission From Livestock and Agro Industrial waste
A Carbon Program for the Philippines
October 15-16, 2009

BSP is Funded/Assisted Mainly by:

AEPC/GoN SNV/DGIS KfW

Implemented by:
Biogas Sector Partnership – Nepal
(BSP-Nepal)

Presentation by

Prakash Lamichhane
Manager
BSP-Nepal
prakash@bspnepal.wlink.com.np

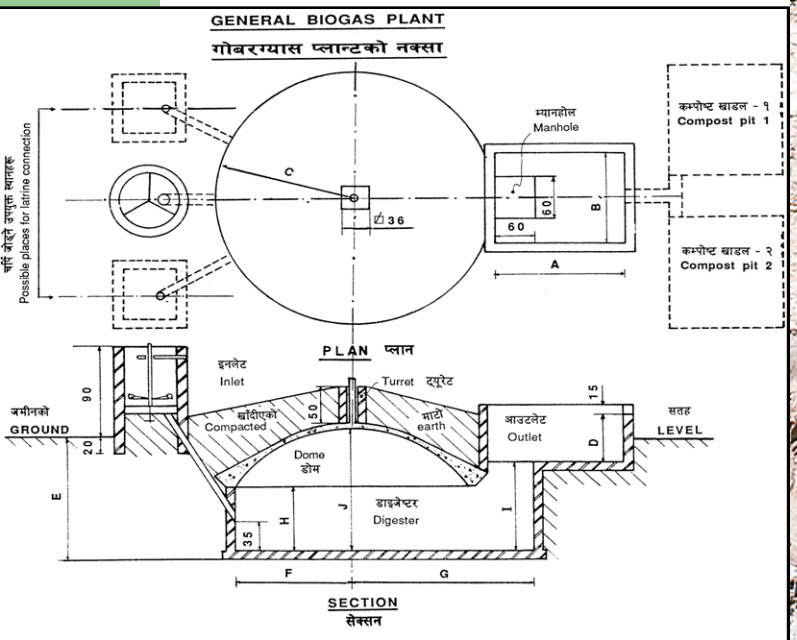
Presentation Overview

- Introduction
  - Biogas Technology
  - Biogas Programme
- Doing CDM In Biogas
  - 1st Battle
  - 2nd Battle
- New Hope with CDM in Biogas
- Differences in the 2 Methodologies.

Biogas Plant Design in Nepal (1)

- Biogas Plant (GGC 2047 Design)

Plant Drawing



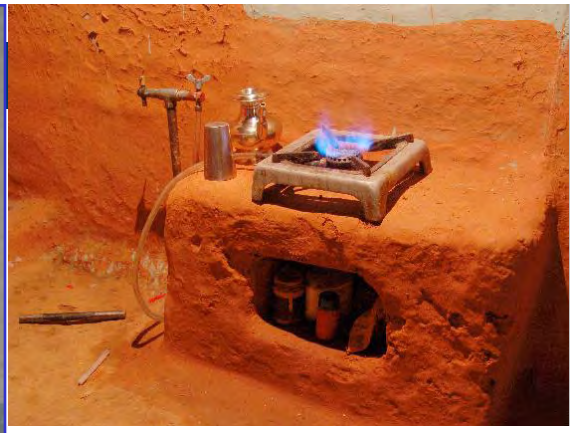
Plant construction almost final.

Plant in operation

Life without Biogas …

- Women, Children and Environment Bear the Brunt!

And Life with Biogas.



- Biogas brings multiple Socio-economic & environmental benefits.
- Bio-slurry or bio-compost is equally useful product.

Slurry, As A By-Product: High Quality Organic Fertilizer

Biogas for Better Life!

Pioneering the Technology in Nepal (1)

- **In 1955**
  - **Father Soubolle of St. Xavier's School, Godawari, Nepal Constructed 1st Experimented & Demonstrated Biogas Plant in Nepal.**
- **In 1968**
  - **Khadi Village Industry Commission (KVIC) of India constructed 250 cft biogas system at an exhibition in Kathmandu.**
- **In 1975/76 (Agriculture Year)**
  - **Promotion of domestic biogas (cattle dung) was initiated by Nepal govt. under DoA and 199 plants constructed in that year.**

Pioneering the Technology in Nepal (2)

- **In 1977:**
  - **A Biogas Company (GGC) was established as a joint venture among ADBN (now ADBL), UMN and Nepal Fuel Corporation.**
  - **ADBN provided soft loan to users at 6% interest rate for biogas construction.**
- **In 1990**
  - **A fixed dome design (GGC 2047) was recognized as the standard design in Nepal after several research and modifications from a Chinese fixed dome design.**

Introduction of Biogas Support Programme (BSP) - 1

- **In 1992**
  - **Biogas Support Programme (BSP) was established by SNV Nepal with funding from the Dutch Government.**
- **From BSP-III (1997-2003), KfW and Gov't of Nepal also started funding BSP for subsidy part.**
- **The Phase IV of the national programme BSP (Jul '03 - Jun '09) is being implemented by BSP-Nepal, successor of BSP/SNV.**

Introduction of Biogas Support Programme (BSP) - 2

- In 2005
  - BSP became the 1st CDM Project in Nepal with registration of 2 Biogas CDM Projects (19,396 plants).
- A separate project called Gold Standard VER Biogas Project (GSP) is being implemented from 2007 with the same modality with funding of WWF.
- Preparation of the Next Phase of BSP is underway for period after 2010 with new elements and improvement in the strategic approach.

Approach & Strategy of BSP

- Sector Programme Support with a long-term perspective
- Making Market Work
  - Demand-driven (private sector as prime movers)
  - Technical assistance and subsidy
  - Emphasis on quality of goods and services
  - Support to easy and wider credit availability
  - Gradual scaling down of activities.
- Making Market Work for the Poor
  - Pro-poor orientation and social inclusion
  - Increased emphasis for linkages with micro credit and other rural dev. activities.

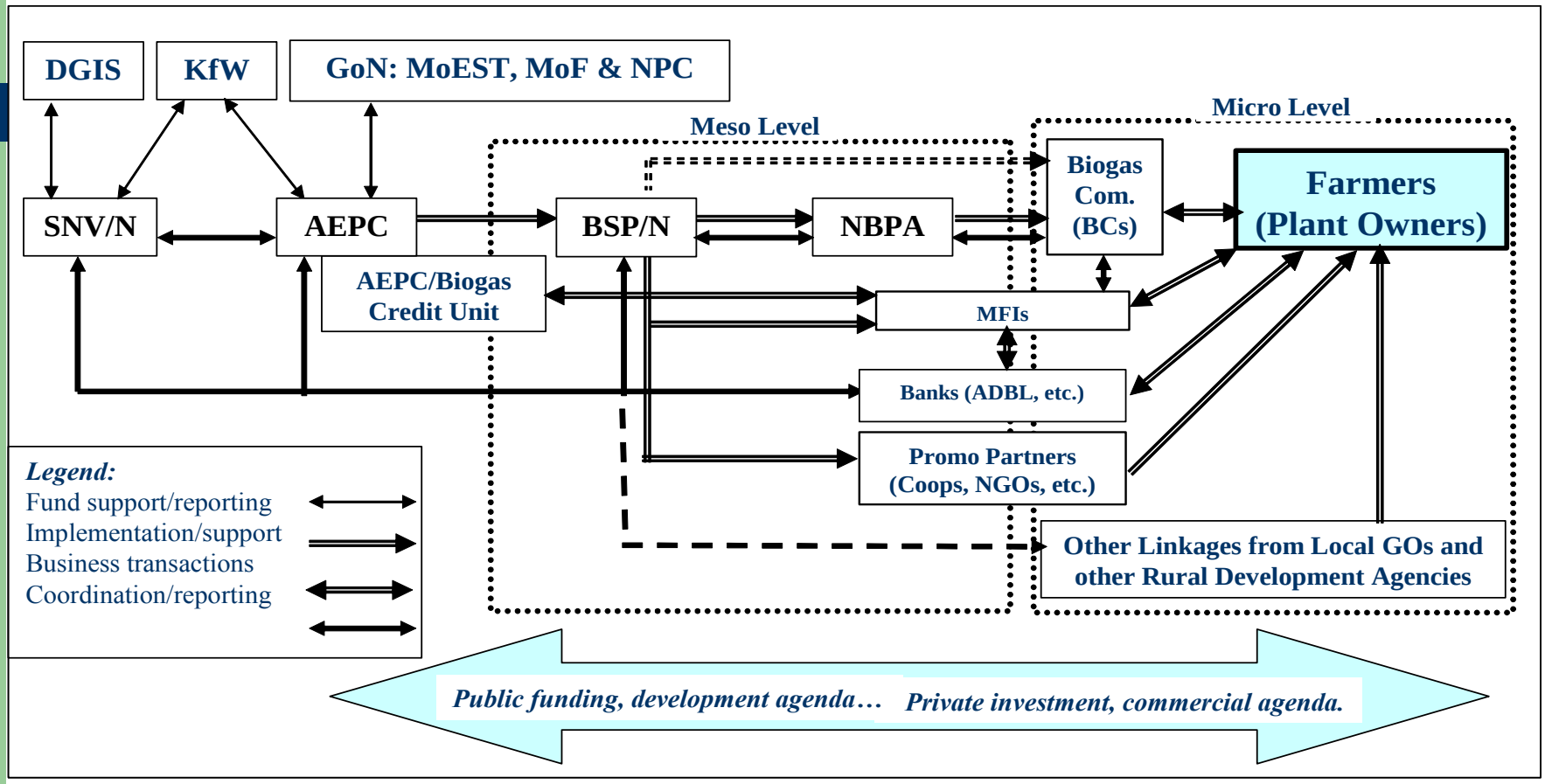
Key Programme Elements of BSP

- Programme Policy & Guidelines
  - National subsidy policy and delivery mechanism
  - Criteria and mechanism for company qualification, subsidy approval, performance evaluation, grading, reward, penalty, disqualification, etc.
- Standardisation and Quality Assurance
  - Component Standardisation and Testing
  - Quality Assurance & Monitoring in the field
- Capacity Building – awareness building, training, etc.
- Research and Development
- Credit Facility – working with banks & MFIs.
- CDM for Financial Self-Reliance.

Programme Objective of BSP Phase-IV

- **The overall objective of the BSP – IV is *to further develop and disseminate biogas plants as a mainstream renewable energy solution in rural Nepal, while better addressing poverty, social inclusion and regional balance issues and at the same time ensuring enhanced commercialisation and sustainability of the sector.***

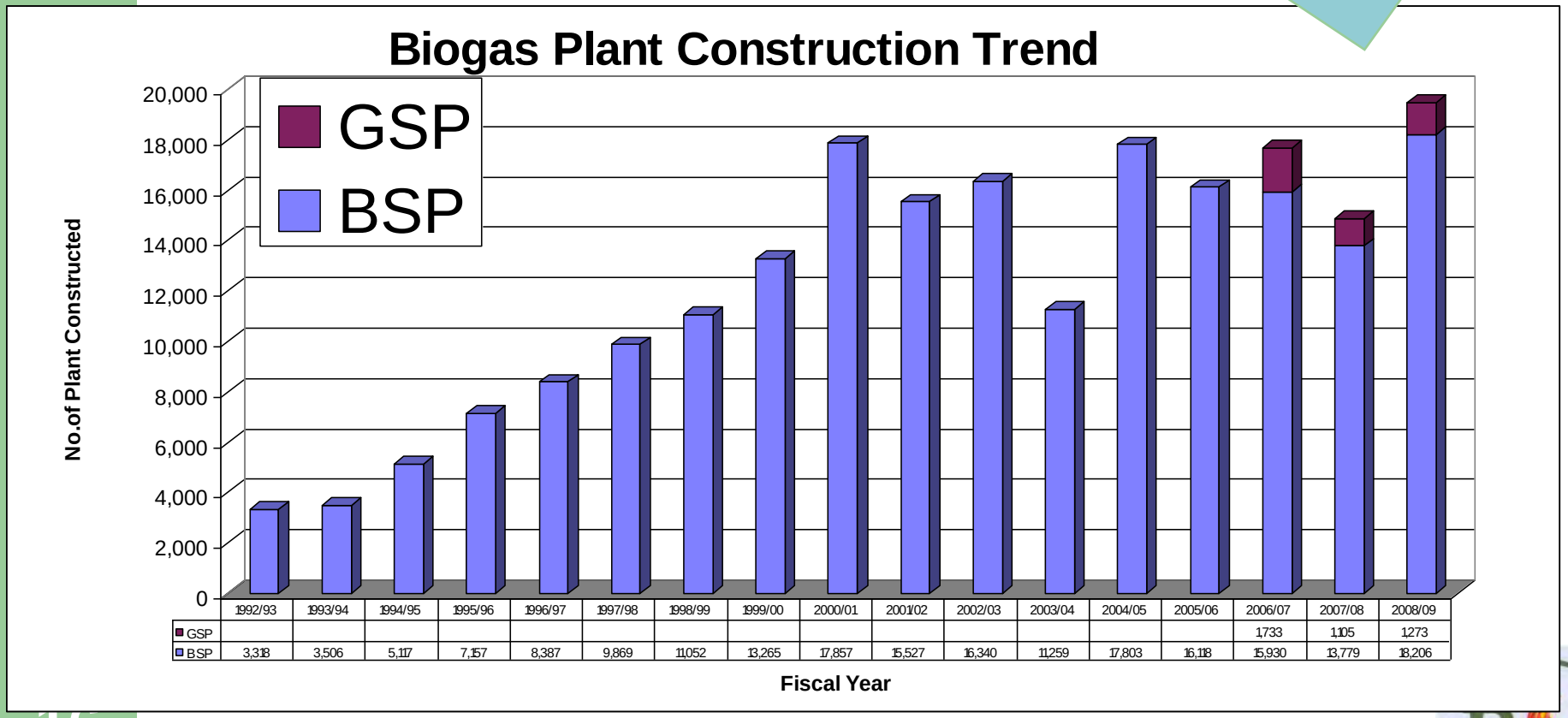
Institutional Set-Up of BSP Phase-IV



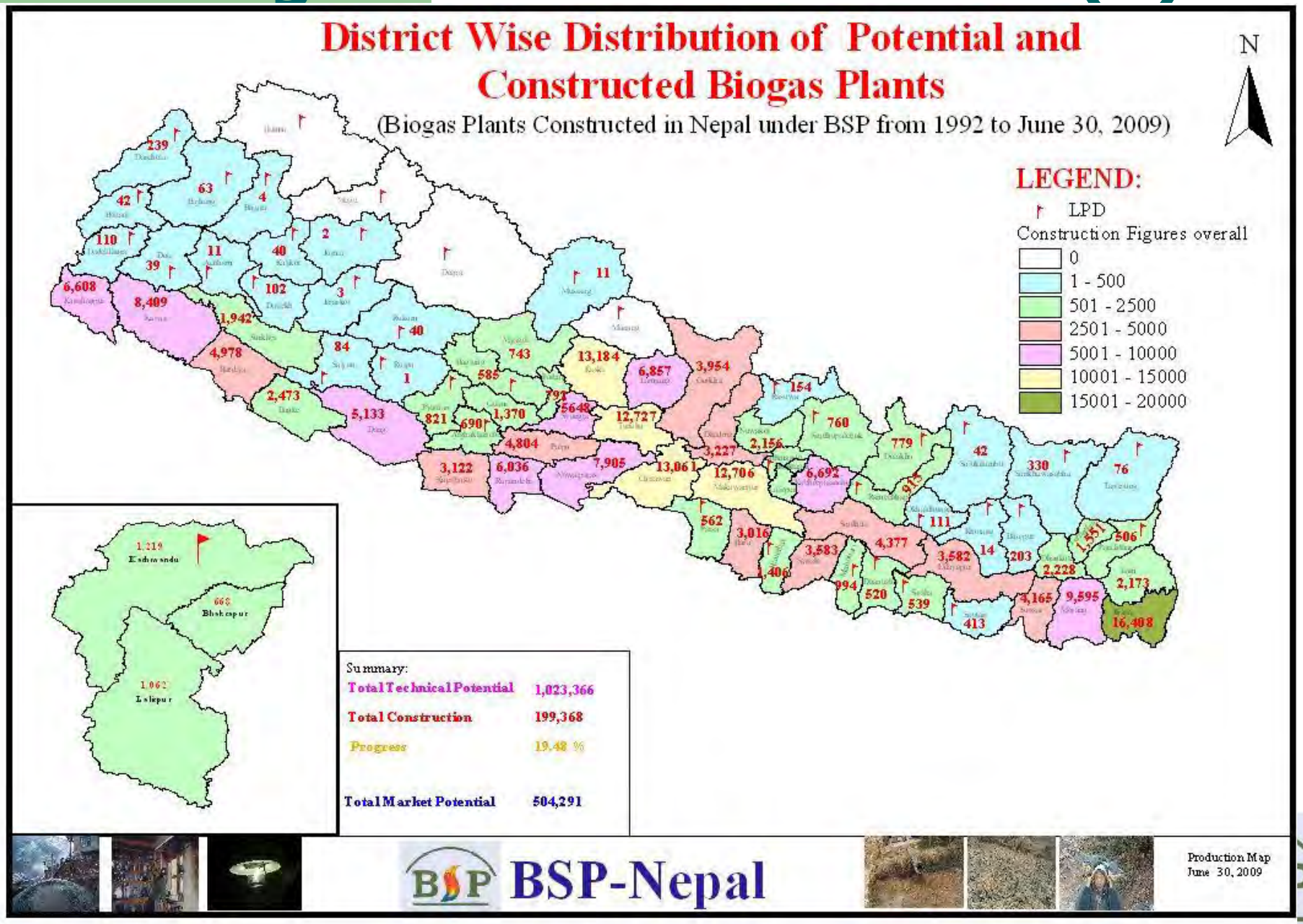
- There is Biogas Coordination Committee (BCC) with reps from govt., donors, FIs, Biogas Companies and implementing agency.

Biogas Plant Construction (2)

Annual average plant construction rate in the last 5 years (Phase IV period) has been around 17,190.



Biogas Plant Construction (3)



Initiating CDM in Biogas: The 1st Battle (1)

- In recognition of BSP's substantial contribution in socio-economic & environ. impacts, it was decided to develop CDM Projects in biogas, as early as 2001.
- Consultants were hired in Dec 2002 for all the preparatory work
  - Baseline, methodology, Project Identification Note (PIN) and Project Design Document (PDD).

Initiating CDM in Biogas: The 1st Battle (2)

- A Letter of Intent was signed with the World Bank in January 2005 for trading at US $ 4.5 per ton.
  - The methodology gave 4.99 tons per plant per year.
- Nepal submitted its Instrument of Accession to Kyoto Protocol in September 2005.
  - MoEST becomes DNA in November 2005.

Initiating CDM in Biogas: The 1st Battle (3)

- CDM Executive Board could not approve the biogas CDM methodology, pointing out a number of arguments against including projects that replace non-renewable biomass in CDM.
- However, after request, keeping soft corner, the EB did allow registration of the 2 projects that were ready with a total of 19,396 plants (on Dec 27, 2005).

Initiating CDM in Biogas: The 1st Battle (4)

- Agreement signed with the World Bank on May 3, 2006 for Sale of 1 million tons of Emission Reduction at the rate of US $ 7.
  - The annual ERR and Community Benefit Report sent regularly.
  - 1st round of Verification in Dec 2006.
  - These projects give ~ US $ 600,000 as net income, annually.
  - Two payments of total US $ 848,784 received so far.

Initiating CDM in Biogas: The 1st Battle (5)

- In fall 2008, CDM EB refused to issue Certificate.
  - "Flaws" pointed out in the Monitoring Plan.
  - Appeal made to reconsider, pleading all the requirements will be made as per EB's expectations.
  - No response so far.
  - Improvement in the Monitoring Plan being carried out.

2nd Battle for CDM in Biogas (1)

- CDM EB developed an alternative methodology
  - that requires assumption if households did not have biogas, they would switch to kerosene.
  - Nepal delegation in the 2006 CoP/CMP in Nairobi strongly lobbied and at least saved the agenda for next meeting.
  - CDM EB further improved the methodology with input from BSP and its partners.

2nd Battle for CDM in Biogas (2)

- The Bali CoP/CMP in Dec 2007 gave nod to the methodology with some improvement.
- CDM EB approved the methodology in January 2008.
  - It only gives around 2.5 tons of CO_2 per plant per year.
  - However, rate has gone up by around 3 times compared to the agreement with the World Bank (US $ 7).

New Hope with CDM in Biogas (1)

- **MoU Signed on Oct 17, '06 with KfW**
  - **For development of Biogas CDM Project hoping a new methodology be approved soon.**
- **New CDM Projects with PoA Approach**
  - **Consultant (Climate Focus B.V.) hired and**
  - **New Baseline and PDDs are being prepared.**
  - **PoA is new thus riskier, but can reduce costs.**

New Hope with CDM in Biogas (2)

- In case of failure in PoA approach, Small-Scale Bundling is a fall back position.
- VER options, including the Gold Standard are also available.
- Over 60,000 plants can immediately be registered.
- With new rates, the annual CDM revenue could reach as high as US $ 4 million soon.

Differences in the 2 Methodologies (1)

- **Old Methodology**
  - ***I.C.: Switch from Non-Renewable Biomass to Renewable Energy Sources.***
- **New Methodology**
  - ***I.E: Switch from Non-Renewable Biomass for Thermal Applications by the User.***
- **Other Methodologies Not Applicable for Nepal**
  - ***I.C: Replacement of Fossil Fuel by Renewable Energy.***
  - ***III.D: Methane Recovery in Agricultural and Agro Industrial Activities.***

Differences in the 2 Methodologies (2)

- **Rationale**
  - ***Old Methodology*: GHG Emission Reduction takes place when users of non-renewable biomass switch to renewable energy like biogas for thermal energy use.**
  - ***New Methodology*: GHG Emission Reduction takes place when users of non-renewable biomass switch to renewable energy like biogas for thermal energy use. And in absence of renewable energy like biogas, the users would switch to fossil fuel like kerosene.**

Differences in the 2 Methodologies (3)

- **Formula of Old Methodology**
  - **Emission Reduction (ER) Factor for a Biogas Plant in tons of CO_2 eqv. = CO_2 ER from kerosene saving in tons of CO_2 + CO_2 ER of fuel wood saving in tons of CO_2 (factored for Non-Renewable Biomass) + CH_4 ER from fuel wood saving in tons of CO_2 eqv. – CH_4 leakage from biogas digester in tons of CO_2 eqv.**
- **Net Emission Reduction per plant per year**
  - **Roughly 7.40 tons of CO_2 eqv. GHGs.**
  - **Can claim only 4.99 tons due to limitation of small scale CDM methodology.**

Differences in the 2 Methodologies (5)

- **Formula of New Methodology**
  - **Emission Reduction (ER) Factor for a Biogas Plant in tons of CO_2 eqv. = Quantity of Biomass in tons that is substituted X Fraction of Non-Renewable Biomass (NRB) X Net Calorific Value (in TJ/ton) of the NRB X Emission Factor (in tons of CO2/TJ for the projected fossil fuel consumption in the baseline.**
- **Net Emission Reduction per plant per year**
  - **Roughly 2.5 tons of CO_2 eqv. GHGs.**

Thank you

Thailand Pig Waste Program

Conference on
Mitigating Greenhouse Gas Emissions from Livestock and Agro-Industrial Waste

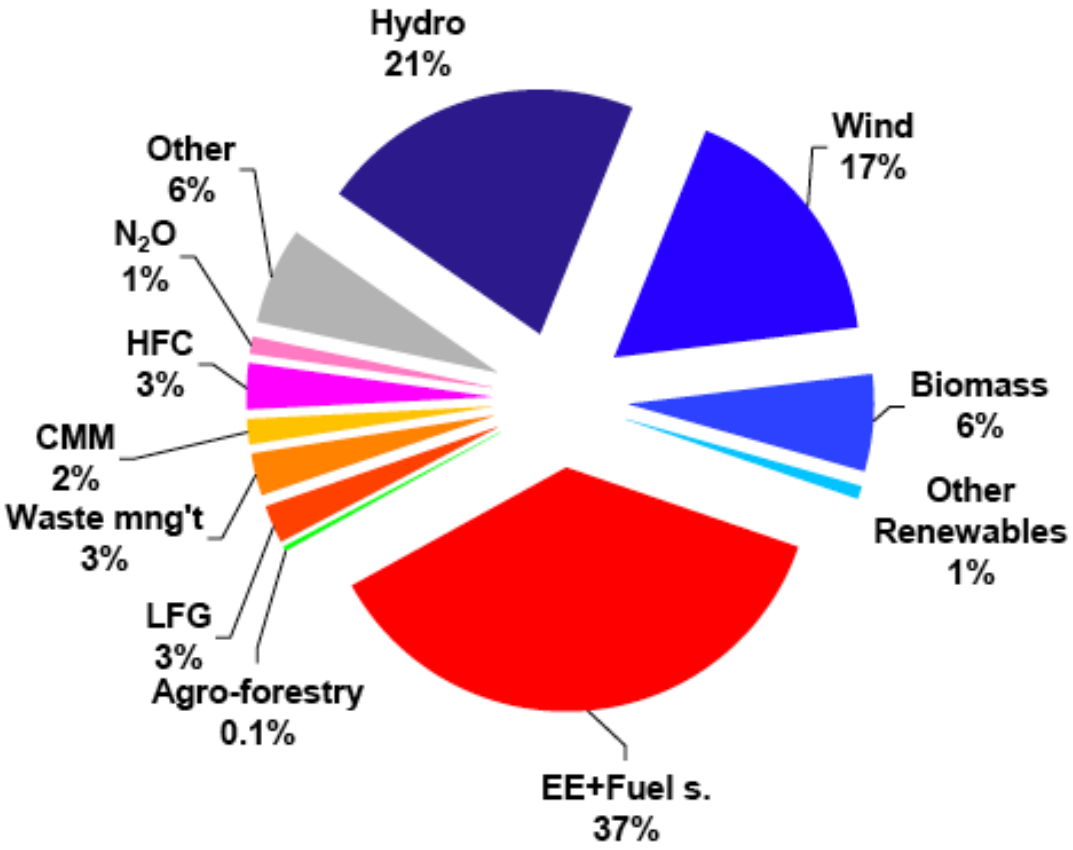
15-16 October 2009, The Peninsula Manila

Pongtip Puvacharoen
Carbon Finance Analyst, The World Bank

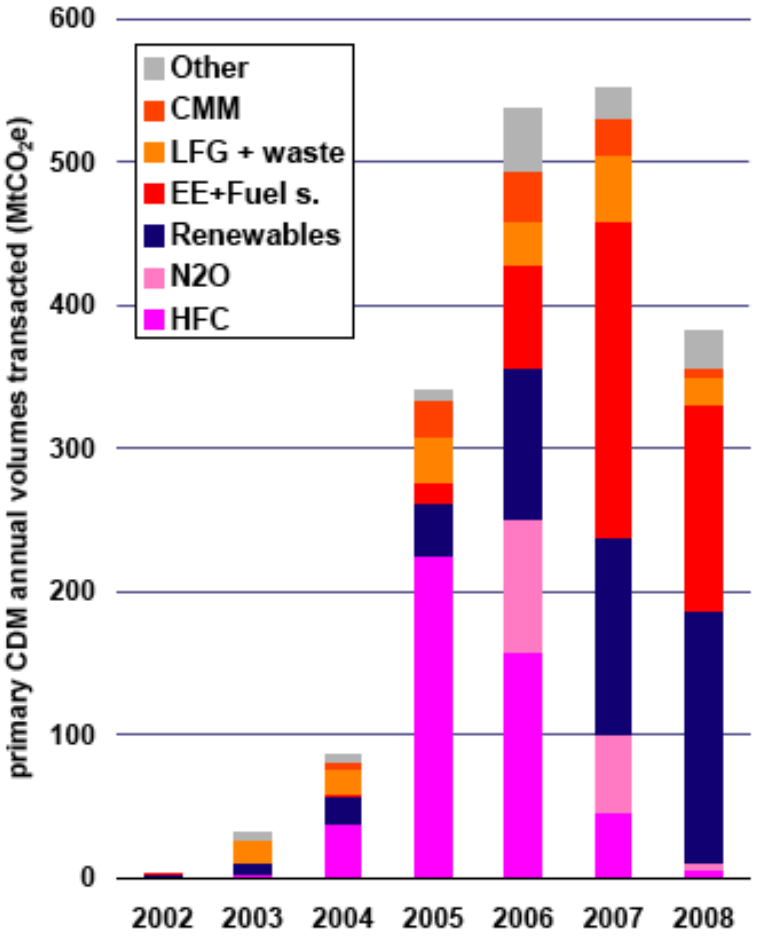
Types of CDM projects according to the Kyoto Protocol

1. Energy industries (Renewable/non-Renewable sources)
2. Energy distribution
3. Energy demand
4. Manufacturing industries
5. Chemical industries
6. Construction
7. Transport
8. Mining/Mineral production
9. Metal Production
10. Fugitives emissions from fuels (solid, oil and gas)
11. Fugitives emissions from production and consumption of halocarbons and sulphurhexafluoride
12. Solvent use
13. Waste handling and disposal
14. Afforestation and reforestation
15. Agriculture

What was sold?



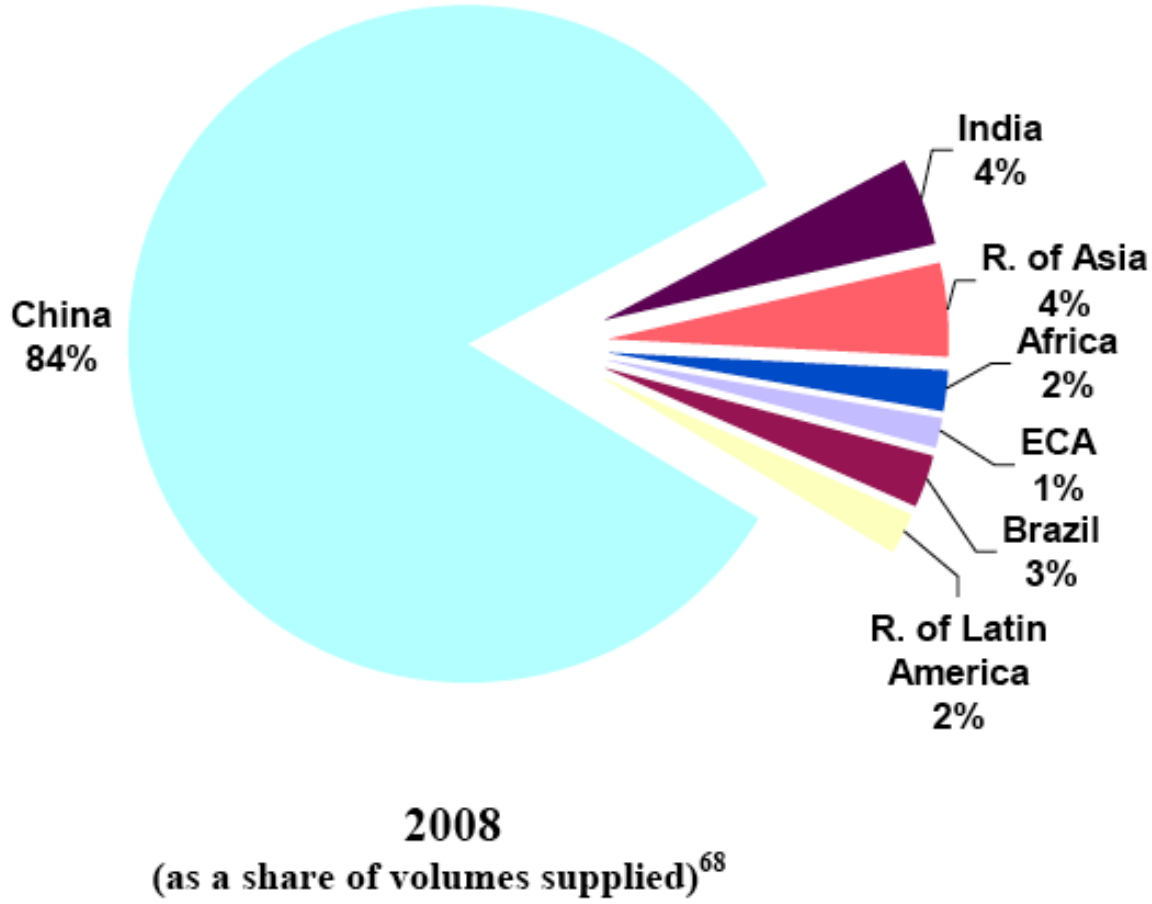
2008
(as a share of volumes supplied)



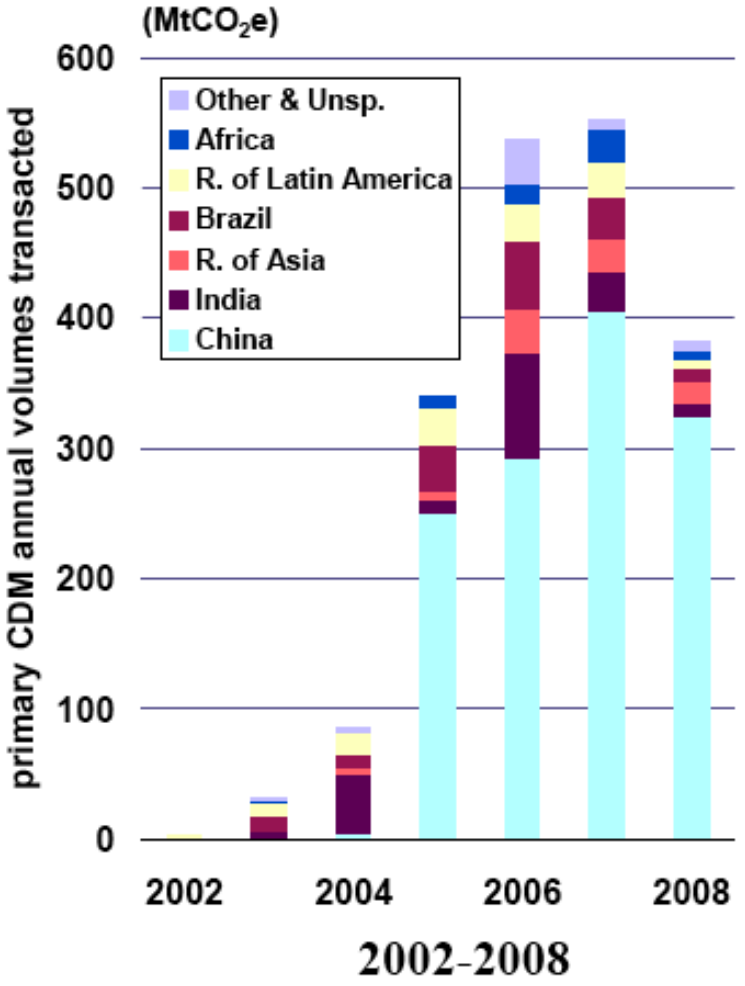
2002-2008

Source: State and Trends of the Carbon Market 2009, www.carbonfinance.org

Who's selling?



2008
(as a share of volumes supplied)[68]

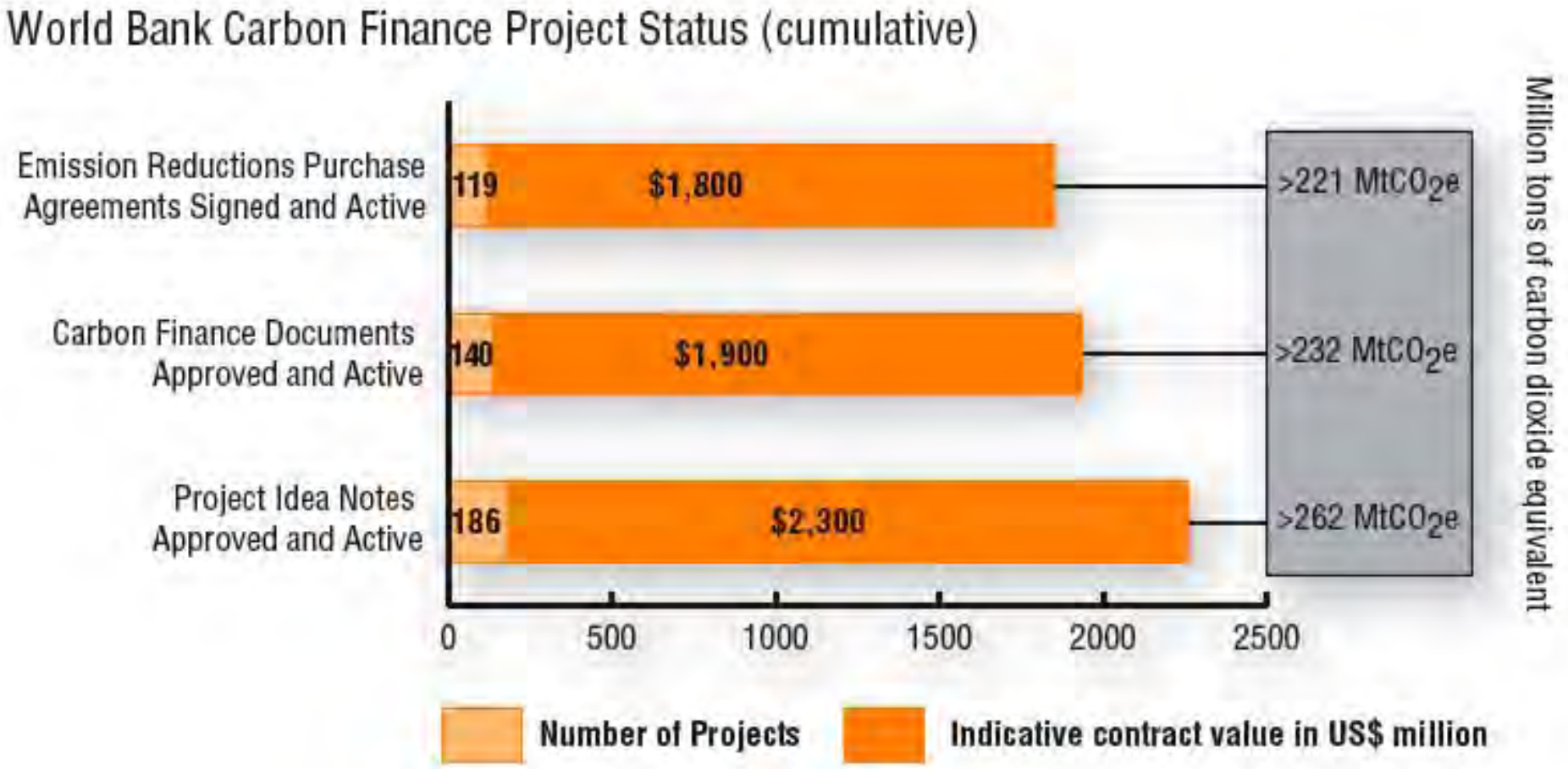


2002-2008

Source: State and Trends of the Carbon Market 2009, www.carbonfinance.org

The World Bank Carbon Finance

Carbon Finance at the World Bank 2008



World Bank's Carbon Funds

Total funds pledged = US$ 2.03 billion (16 governments, 66+ companies)

- **Prototype Carbon Fund**. $180 million. Multi-shareholder. Multi-purpose.
- **Community Development Carbon Fund**. $128.6 million. Multi-shareholder. Small-scale CDM energy projects.
- **BioCarbon Fund**. Tranche I: $53.8 million. Multi-shareholder. CDM and JI land use and forestry projects. Tranche II: $10 m. initial CDM/JI plus other land use.
- **Umbrella Carbon Facility**. $737.6 million. 2 HFC-23 projects in China.
- **Netherlands Clean Development Mechanism Facility**. $268.3 million. Netherlands Ministry of Environment. CDM energy, infrastructure and industry projects.
- **Italian Carbon Fund**. $155.6 million. Multi-shareholder (from Italy only). Multipurpose.
- **Netherlands European Carbon Facility**. $56.6 million. Netherlands Ministry of Economic affairs. JI projects. IFC manages similar fund.
- **Spanish Carbon Fund**. $282.4 million. Multi-shareholder (from Spain only). Multipurpose.
- **Danish Carbon Fund**. $69.4 million. Multi-shareholder (from Denmark only). Multipurpose.
- **Carbon Fund for Europe.** $66.5 m. With EIB. Multipurpose.

Two new facilities for the post-2012 era

- Carbon Partnership Facility (CPF):
  - Focus on mitigation on a large scale in a strategic manner
  - Start now, not wait for agreement on post-2012 regime
- Forest Carbon Partnership Facility (FCPF)
  - To reduce emissions from deforestation and land degradation ("REDD"; being discussed in the UNFCCC)
  - Additional benefits sought in water management, biodiversity, poverty reduction, adaptation
  - Piloting possible approaches to provide incentives

Carbon Finance Projects Supported by the World Bank in Thailand







Sapthip

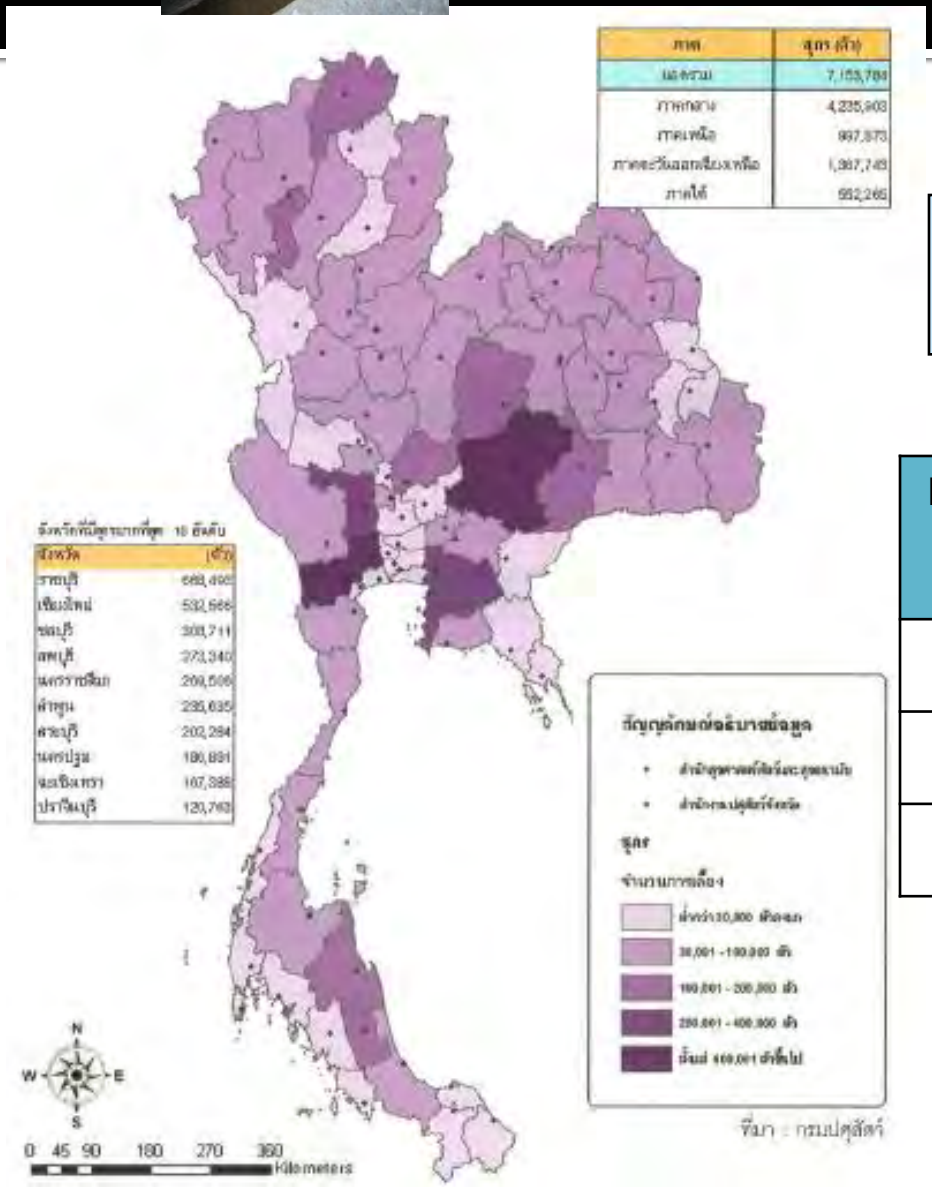
- The purpose of the project activity is to mitigate greenhouse gas (GHG) emissions from ethanol production from tapioca.
- The project activity will convert the plan to adopt open anaerobic lagoon to a closed anaerobic digester (UASB) at a newly build ethanol plant.
- The system will recover methane gas and use as fuel to feed the boiler for steam production (replacing coal) and electricity generation (600 kw).
- Total emission reductions from the project activity are expected to be 154,864 tCO_2e per year.



TSM Bio Energy Wastewater Management and Methane Capturing for Electricity

- The project development objective is to reduce greenhouse gas (GHG) emissions through: (i) the avoidance of methane emissions from the wastewater treatment system of the ethanol plant; and (ii) the displacement of electricity produced from fossil fuel to electricity from methane collected from the new wastewater treatment system.
- It is estimated that the GHG emission reduction from the project would be approximately 148,638 ton of CO_2 equivalent (tCO_2e) per year.

Livestock in Thailand



There are 7.15 million swine in Thailand

Farm Size	No. or pigs	No. of Farms	Total Pigs head (million)
Small	50-500	>200,000	3
Medium	500-5,000	1,309	1.36
Large	>5,000	186	2.78

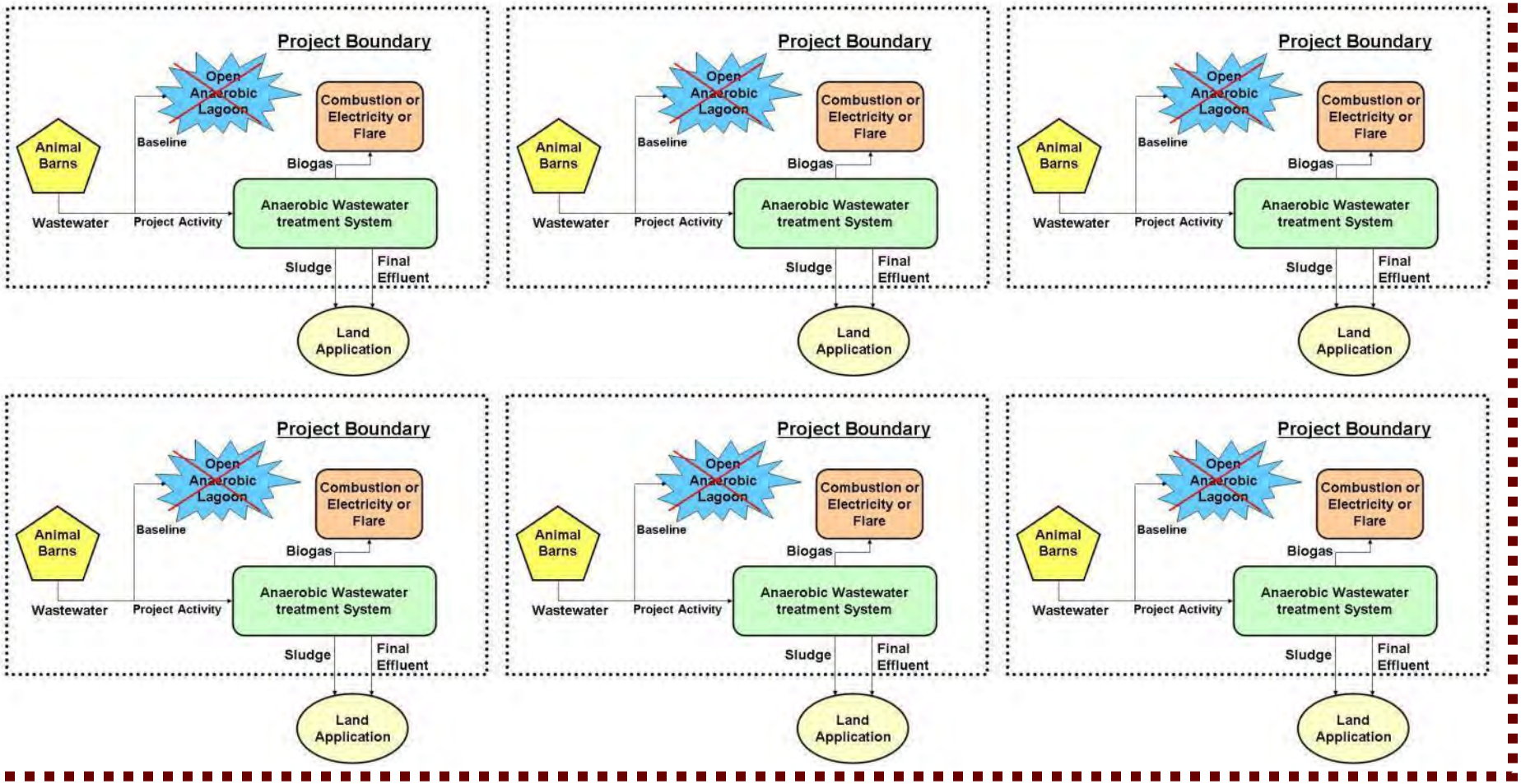
Source: Department Livestock Development, 2006

Thailand AEP Livestock waste management Project

- The project aims to improve the livestock waste management practice and take advantage of the captured renewable energy in the form of biogas in 10 swine farms with the total of 130,000 animals
- The project is expected to reduce GHG emission by 530,000 t CO_2e by 2019.
- The project will convert open anaerobic lagoons to covered lagoons to capture and utilize methane to generate electricity for consumption within the participating swine farms
- The project activity started in December 2008, where the bidding process for construction begin.
- The 10 farms are located in 2 provinces, Ratchaburi (9 farms) and Chonburi (1 farm).
- The project is own by each farm owner, but manage by a bundling agency.

Bundled CDM project Boundary

Benefit of Bundled CDM project

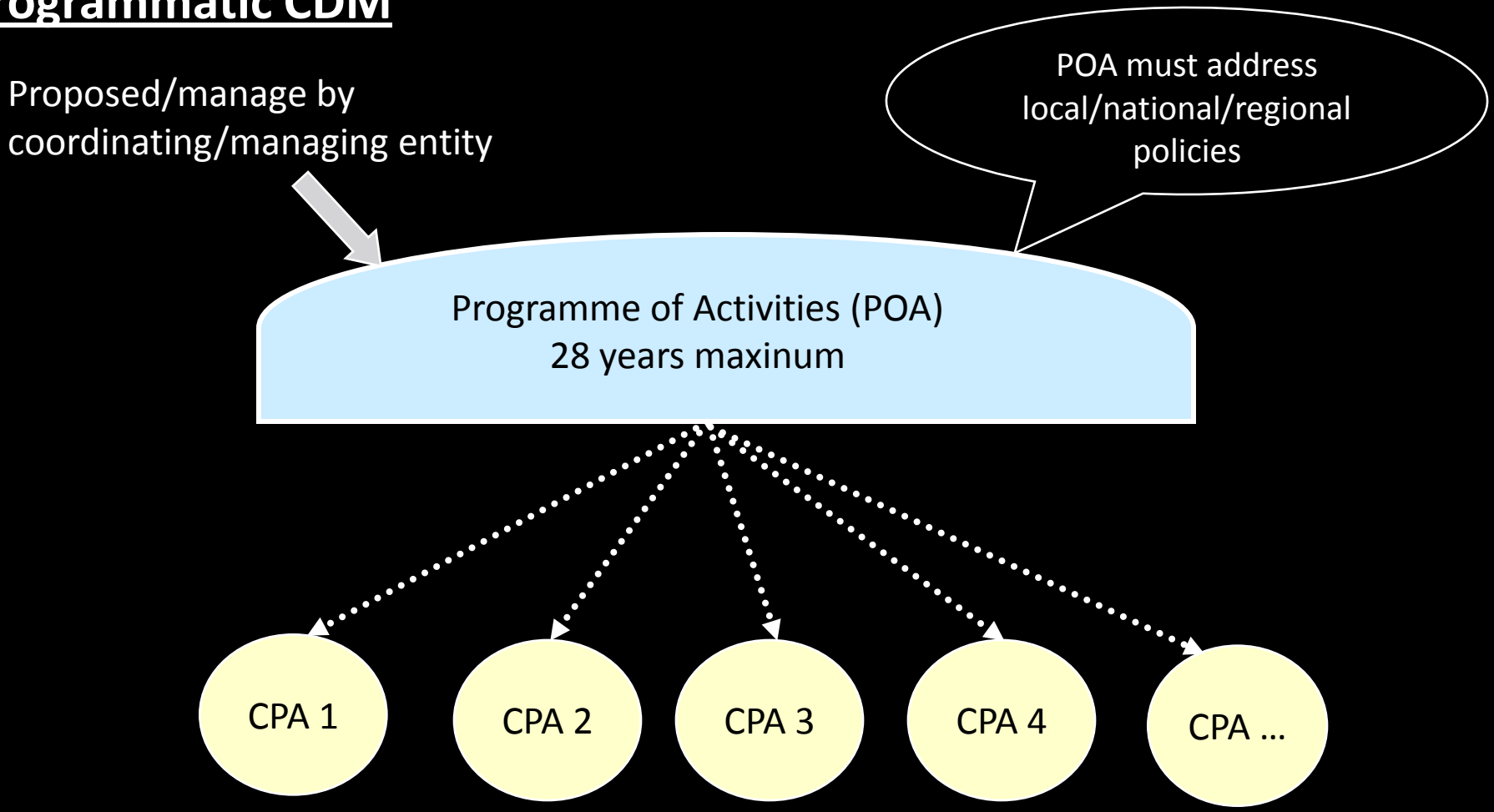


Community Benefit from CDCF

Moo 10 not only fell below the poverty threshold of 10,000 baht per year, but it lacked many essential economic infrastructure and social services that existed in other communities.

- Installing lighting on roads and small pathways for safety of traveling at night
- Improved access to safe drinking water
- Scholarship for poor students
- Mosquito spray
- Community cooperative shop

Programmatic CDM



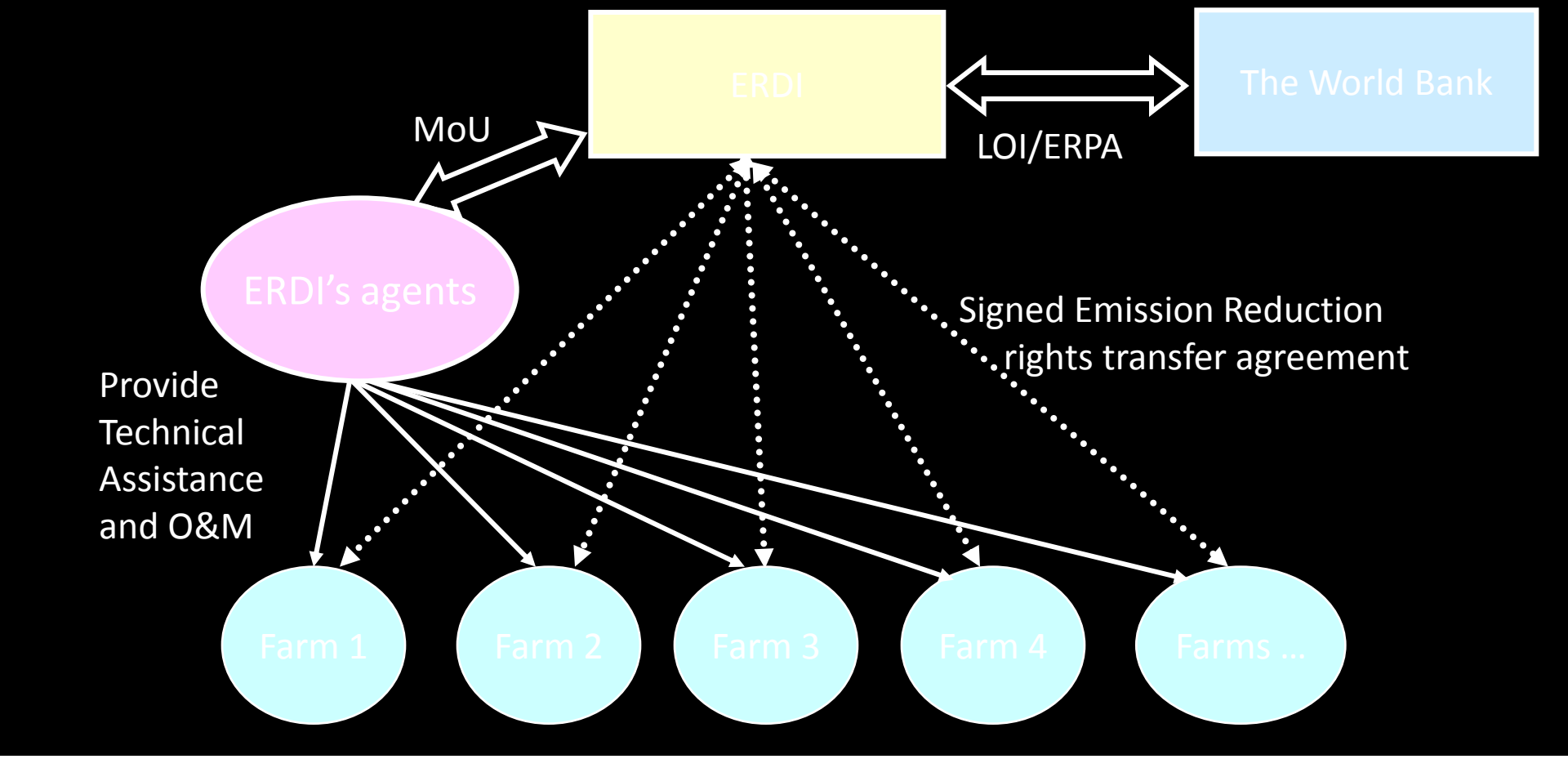
- All CDM Program of Activity (CPA) use the same technology as well as Baseline & Monitoring Methodology
- CPA may be added at anytime during the life of POA
- each CPA will have credit period of 7-10 years subject to the POA
- each CPA will comments by local stakeholders
- each CPA may consist a group of farms

Thailand Small Scale Livestock Waste Management Program

The program is expected to play an important role in demonstrating the use of market mechanisms such as the CDM to scale-up renewable energy projects through improved livestock waste management while reducing GHG emission as well as generating CERs. The program aims at small and medium size pig farms under ERDI sponsorship for their biogas program.




Institutional Arrangement for Thailand Small Scale Swine Waste Management Program



ERDI = Energy Research and Development Institute, Chiang Mai University
The World Bank = Assist in Project Development and Purchase Emission Reduction
MOU = Memorandum of Understanding
LOI = Letter of Intend
ERPA = Emission Reduction Purchase Agreement

Benefits for the farmers

- Subsidies from Energy Conservation Fund for Biogas system construction
- Long term revenue from Selling Carbon Credit
- ???

Role and Process of the Coordinating Agency

Programmatic CDM process

PIN prepared byERDI and WB

PIN : Project Ides Note

POA-DD & 1st CDM CPA-DD

WB prepared POA-DD and 1st CDM Programme of Activity Desgin Document

ERDI

-Prepare Initial Environmental Impact Examination Report

- Organise stakeholder meetings

ERDI 's agen and farm

- Prepare information for the project documents
- Keep monitoring record
- Build biogas system

ERDI submit documents to TGO

Request for Host country LoA from TGO

WB, ERDI and Farms prepare information/data for validator

Programme validation by DOE

Registration with UNFCCC CDM Executive Board

ERDI and WB

Programme development

Programme implementation

Farm keep record of monitoring information and maintenance of monitoring equipment **ERDI** prepare verification report

Operate the project and monitor project operation

ERDI

CPA verification by DOE

UNFCCC executive board issue CERs

Role of Coordinating Agency

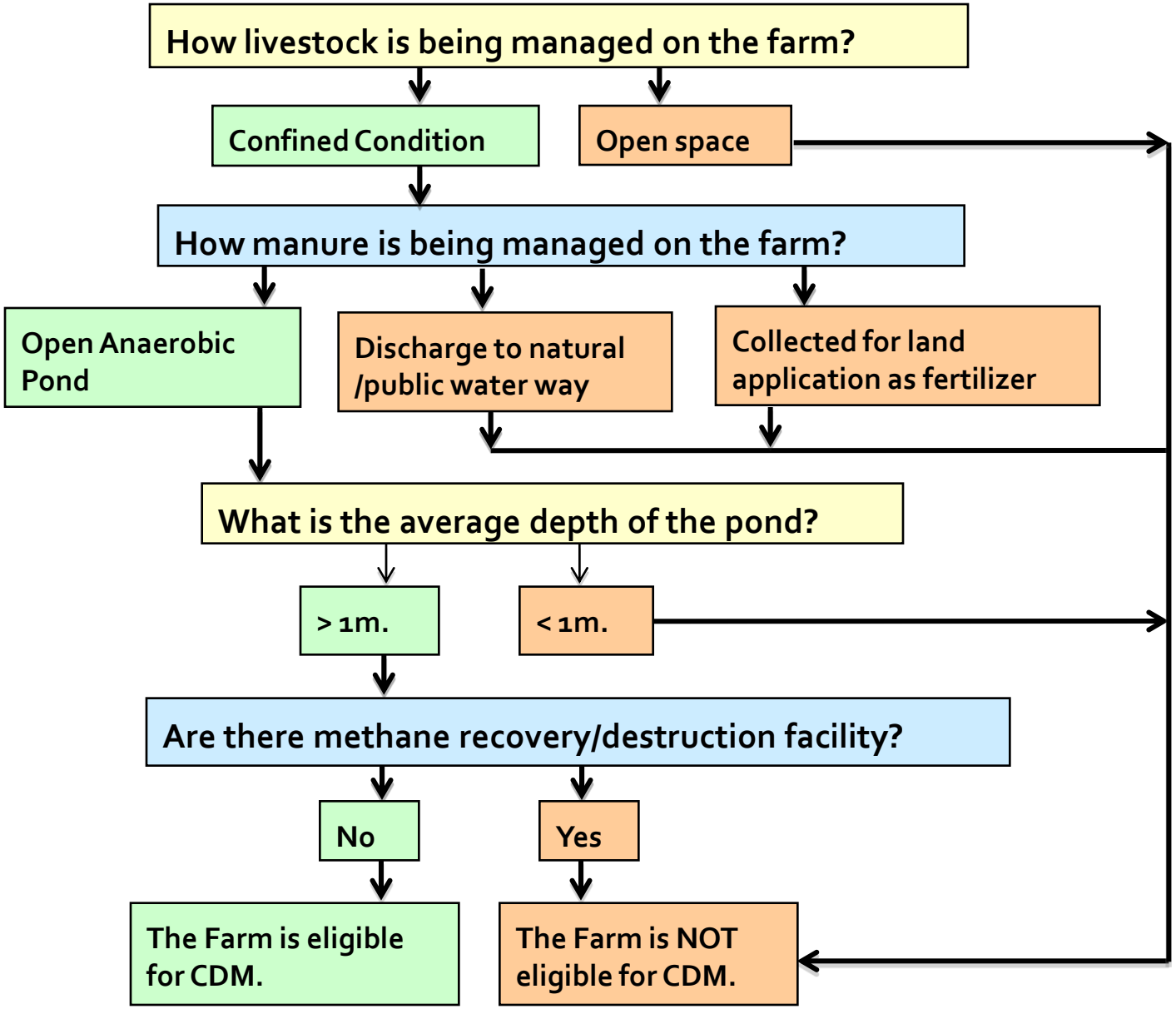
- Sign emission Reduction rights transfer with the participating farm;
- Review detail design and equipment quality control;
- Provide relevant training including safety aspect and good practices in waste treatment operation and maintenance for participating farms and its technician;
- Assist participating farm in procurement process of selection of contractor for waste treatment system and its related system and suppliers of monitoring devices;
- Supervise the construction of waste treatment system and farm monitoring requirement;
- CERs revenue distribution to participating farm;
- Prepare Initial Environmental and Social Evaluation Report (IESE);
- Obtaining letter of approval (LOA) from Thai Designated National Authority (DNA): Thailand Greenhouse gas Management Organization (TGO); and
- Prepare initial verification report;

Eligible Criteria and Farm Selection

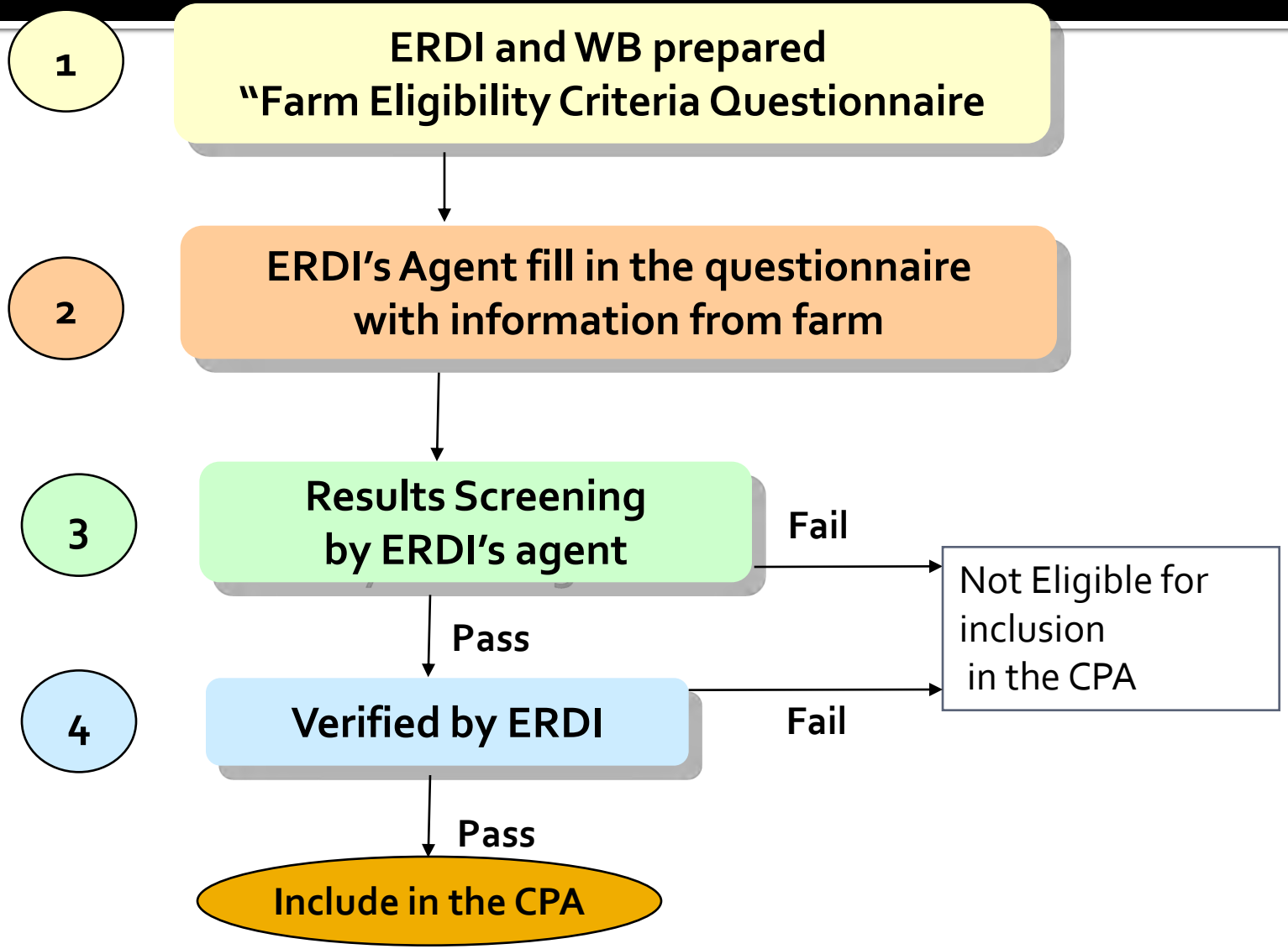
Eligibility Criteria

- The livestock population in the farm is managed under confined conditions;
- Waste generated are not discharged into natural/public water ways;
- In the baseline scenario the retention time of manure waste in open lagoon is at least 1 month;
- The depth of the open anaerobic lagoon is at least 1 meter;
- No methane recovery and destruction by flaring, combustion or gainful use takes place in the baseline scenario;
- The owner of the farm voluntarily participate in the programme and the agreement signing date is prior to the start of project activity;
- The project does not locate in protected area and/or disputed area;
- The owner of the project has rightful ownership of the land; and
- There are available spaces for the new treatment system available at existing land without involuntary resettlement and/or land acquisition.

Farm Selection

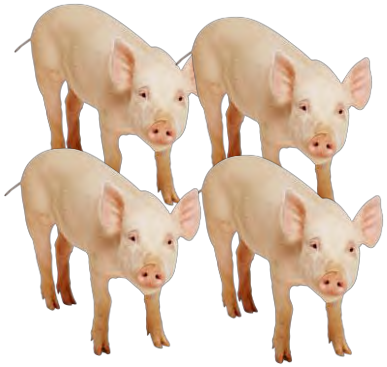


Eligibility Criteria Questionaire



Calculating Emission Reductions

Farm is eligible to be included in the CPA



X 0.3 = Emission Reduction

Calculate potential CO_2 emission reduction: 0.3 tCO2e/pig/year (a rough estimate for Thailand for a 60kg pig)

The farm use additional income from CDM to make the project more financial viable.

Questions and Answers

Contact us

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Webpage: www.worldbank.org
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www.carbonfinance.org

Thank you

Laguna de Bay Community Composting Project – *Bundling LGU sub-projects*

Lennie C. Santos-Borja
Chief, Research and Development Division
Head, Carbon Finance Unit

Laguna Lake Development Authority
Club Manila East Compound
Taytay, Rizal

Mitigating Greenhouse Gas Emissions from Livestock and Agro-industrial Waste

15-16 October 2009
Rigodon Ballroom, Peninsula Manila, PhilippineS

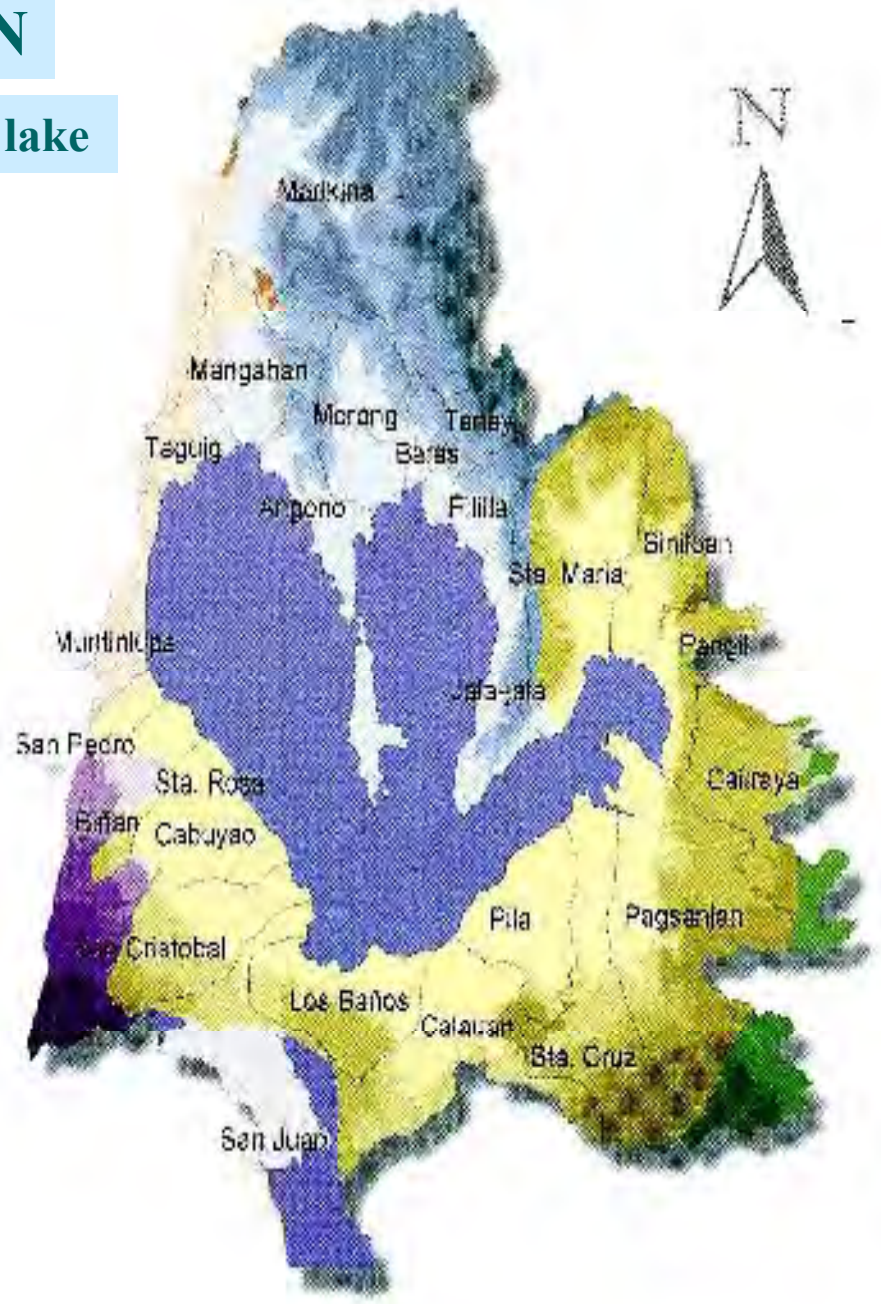
THE LAGUNA DE BAY REGION

Total Area: 3880 km² including the 900 km² lake

PROVINCES

Rizal	=	13 towns and 1 city
Metro Manila	=	2 towns and 7 cities
Cavite	=	3 towns and 1 city
Batangas	=	2 towns and 1 city
Laguna	=	27 towns and 3 cities
Quezon	=	1 town
Laguna de Bay		

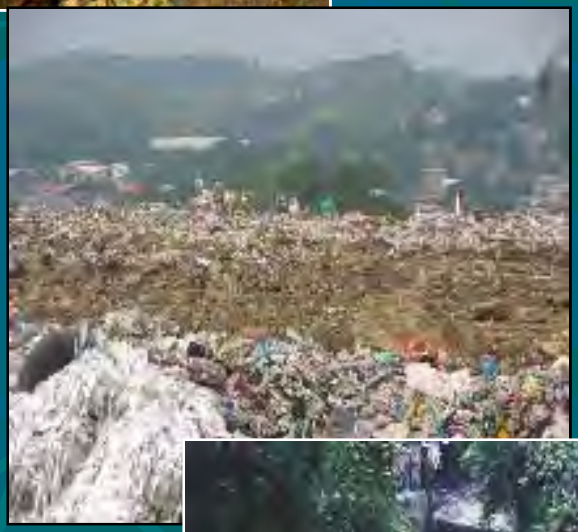
Total no. of cities	=	14
Lakeshore municipalities	=	25
Non-lakeshore municipalities	=	22
Total no. of barangays	=	2,655

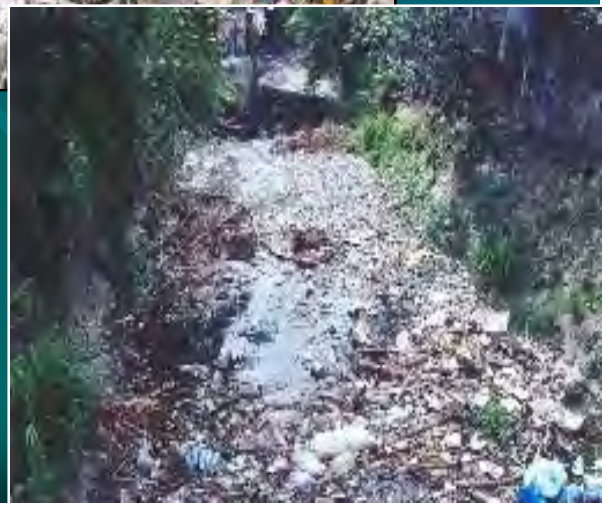


Human Population: about 6 million

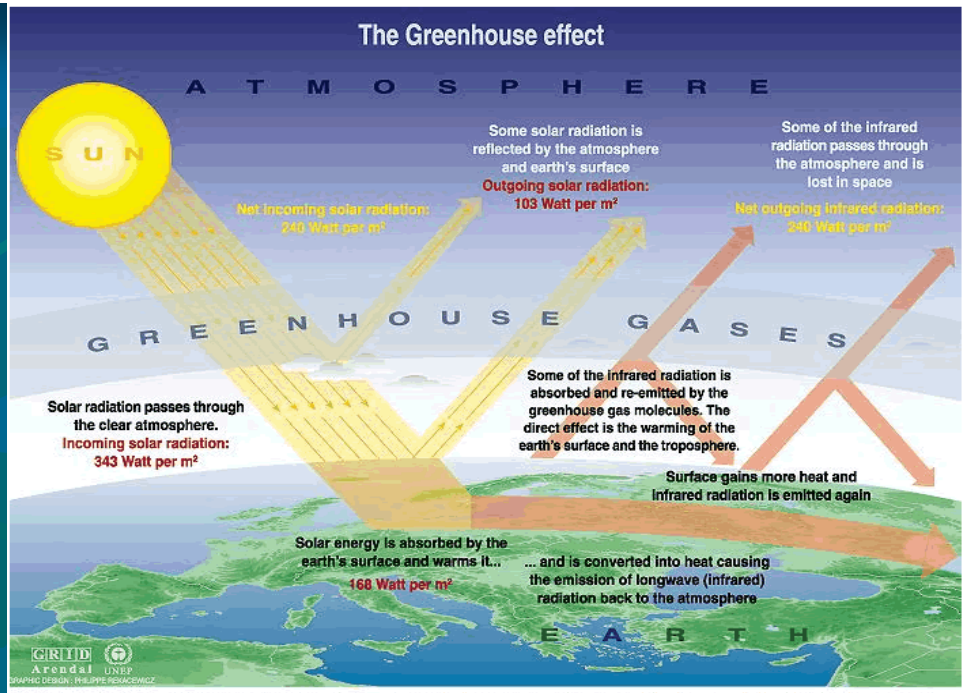
LLDA-CFU


Coca-Cola

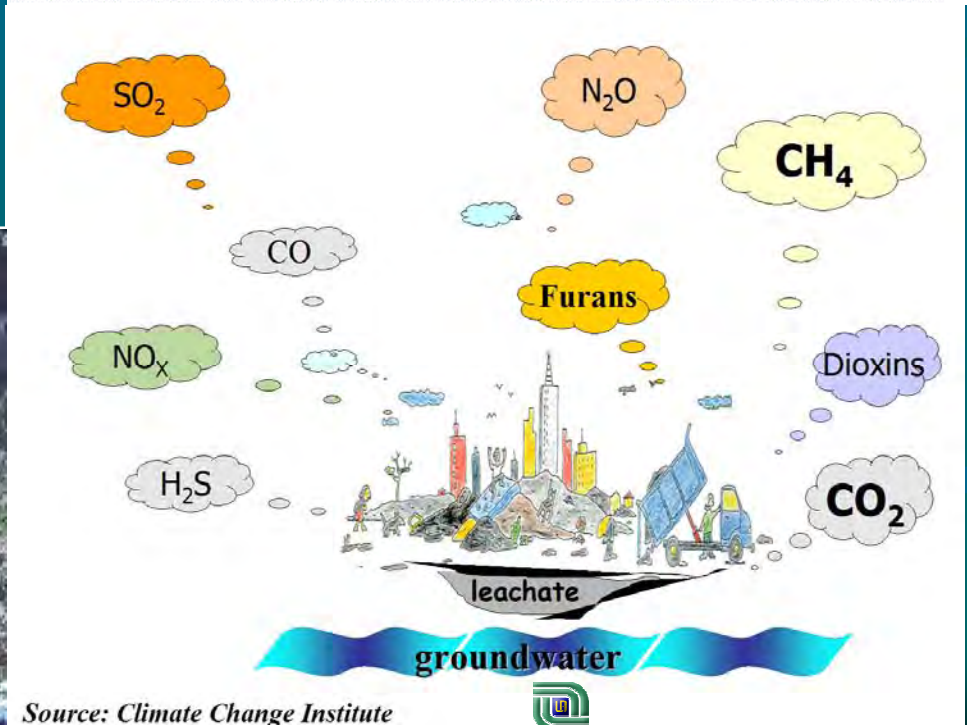




LLDA-CFU

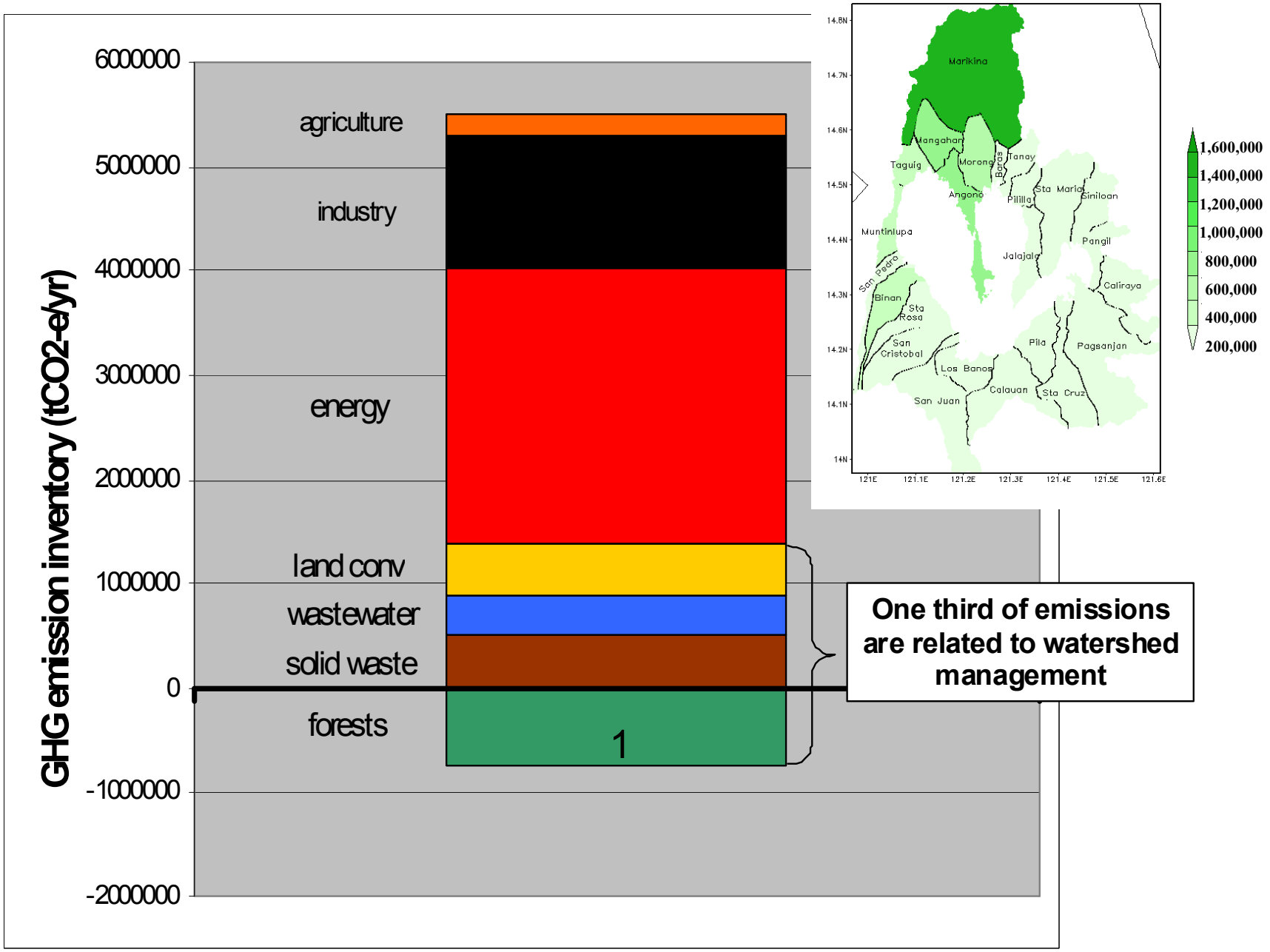


Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography; United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1996.



Source: Climate Change Institute

2003 Greenhouse Gas Emissions from Laguna de Bay Watershed



Laguna de Bay Community Carbon Finance Project (Carbonshed Project)

Main objectives: **1. Pilot the implementation of carbon emissions reducing interventions that address priority environmental issues such as waste management and erosion reduction;**

2. Build the capacity of the LLDA as an intermediary to enable small-scale environmental projects to result in verifiable emission reductions which could be purchased by the Community Development Carbon Fund (CDCF) and the BioCarbon Fund (BioCF).

- *Implemented through a grant from the Japan Trust Fund – Special Program on Climate Change Initiatives which the World Bank administers*

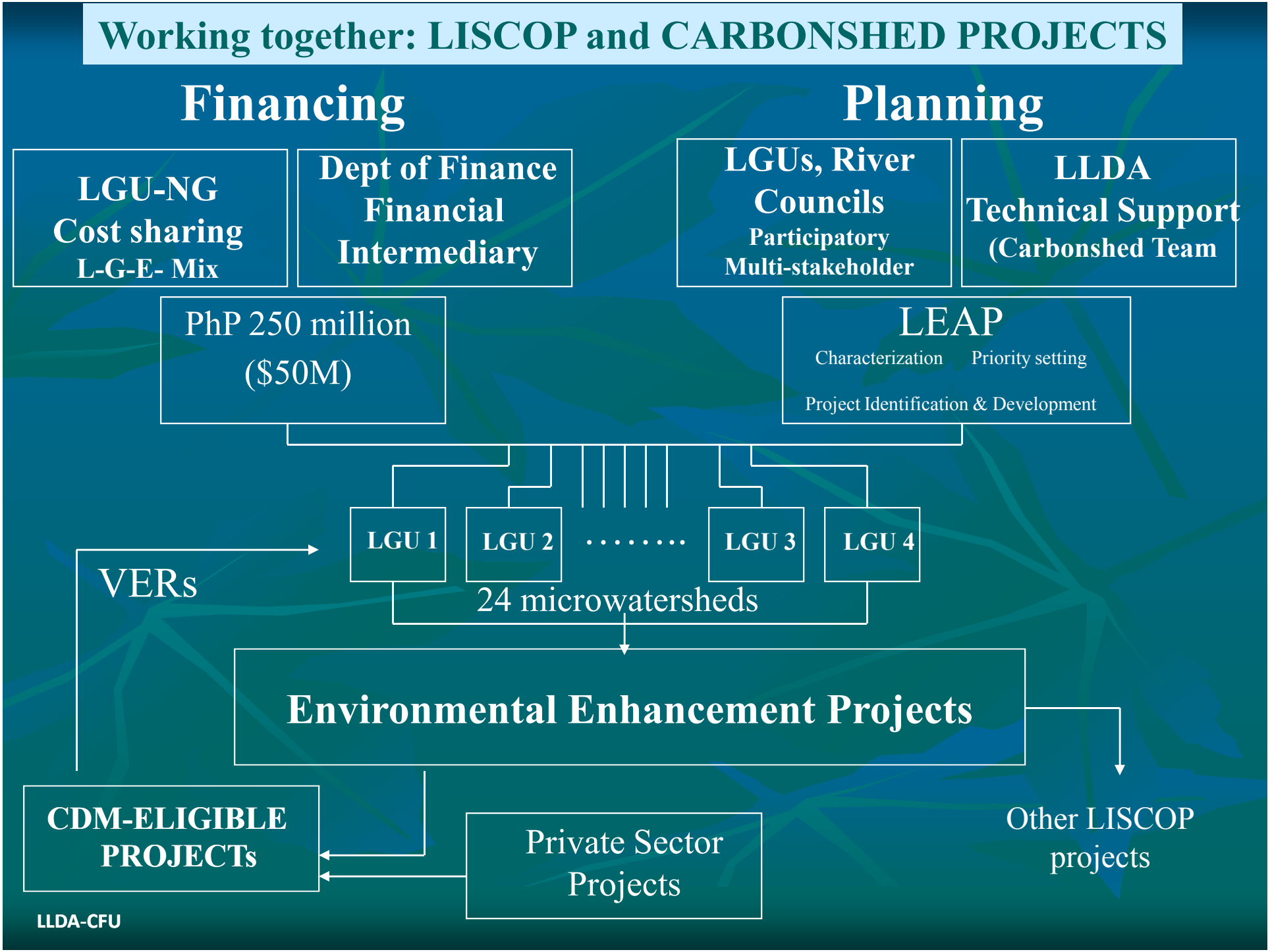
Laguna de Bay Institutional Strengthening and Community Participation Project (LISCOP)

Main objectives: **1. Improve the environmental quality in the Laguna de Bay basin by engaging Local Government Units (LGUs) and other stakeholders in implementing environmental sub-projects;**

2. Strengthening the capacity of institutions in environmental governance.

- *Implemented through a combination of loan (WB), grant (RDG) and equity (LLDA and LGU).*

Working together: LISCOP and CARBONSHED PROJECTS



SMALL-SCALE CDM PROJECTS IN LAGUNA DE BAY

1: Methane Avoidance through Composting

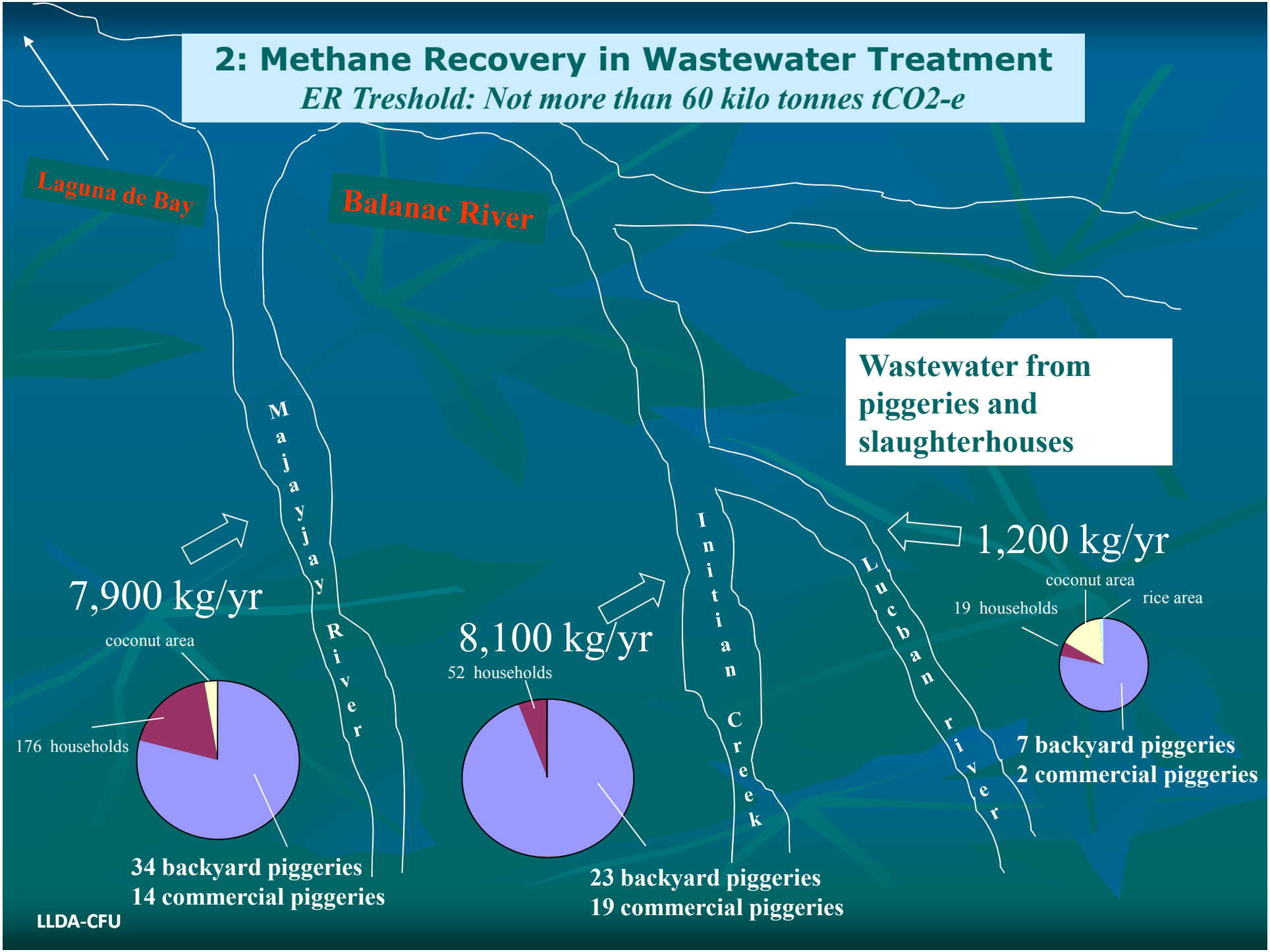
ER Treshold: Not more than 60 kilo tonnes tCO2-e

99 percent are from methane (source: degrading organic matter in disposal sites)

Amounted to 509,000 tCO2-e per year in 2003

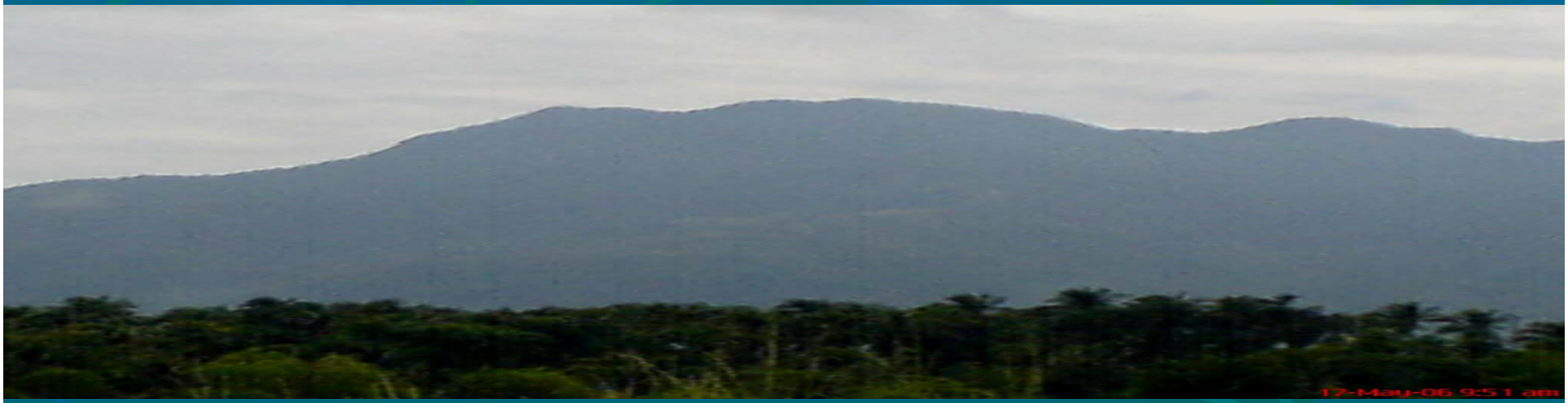
2: Methane Recovery in Wastewater Treatment

ER Treshold: Not more than 60 kilo tonnes tCO2-e



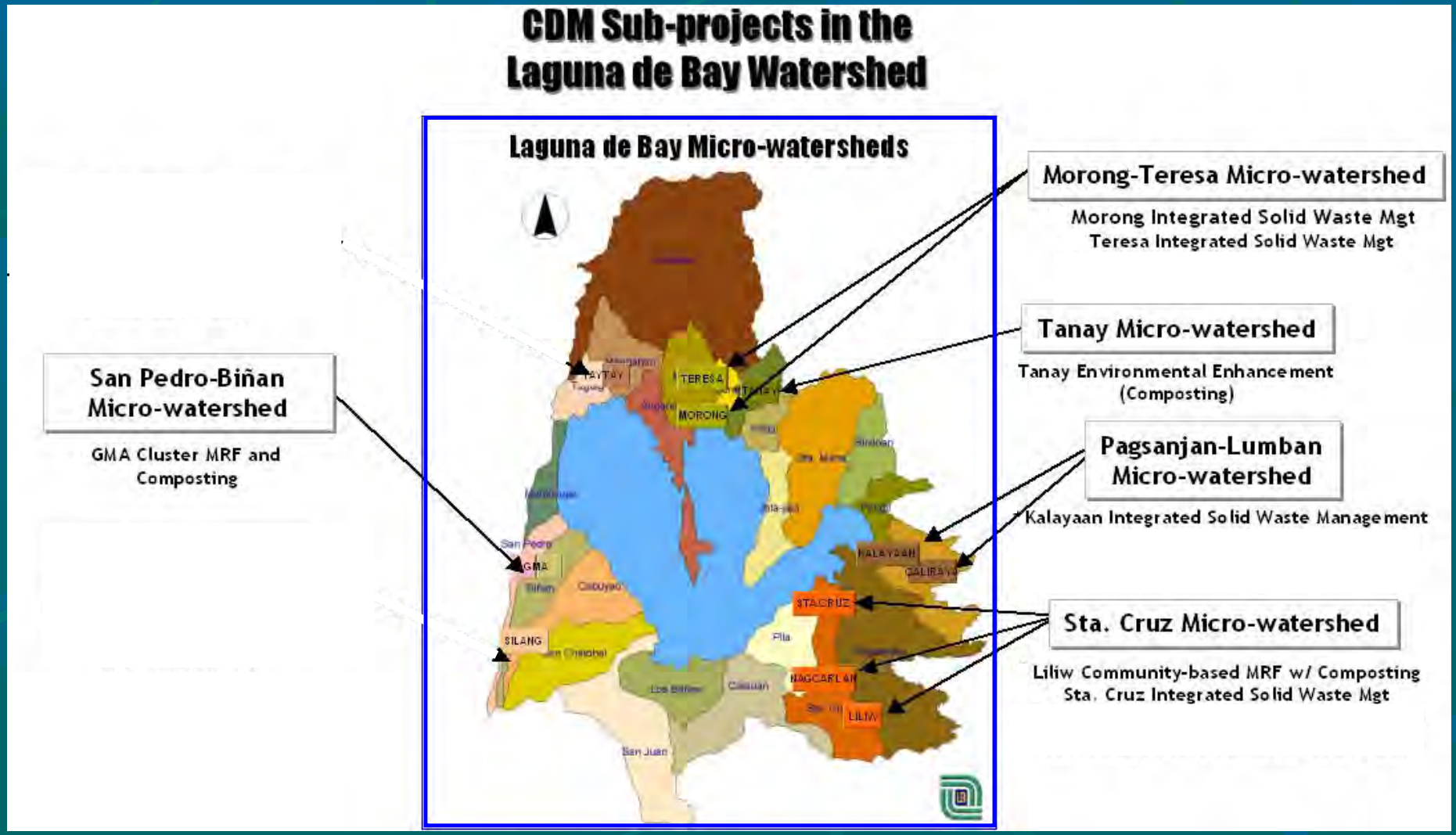
3: Watershed Rehabilitation Project

ER Treshold: Not more than 60 kilo tonnes tCO2-e



LLDA-CFU

Bundle 1 – Methane Avoidance
MRF with Composting



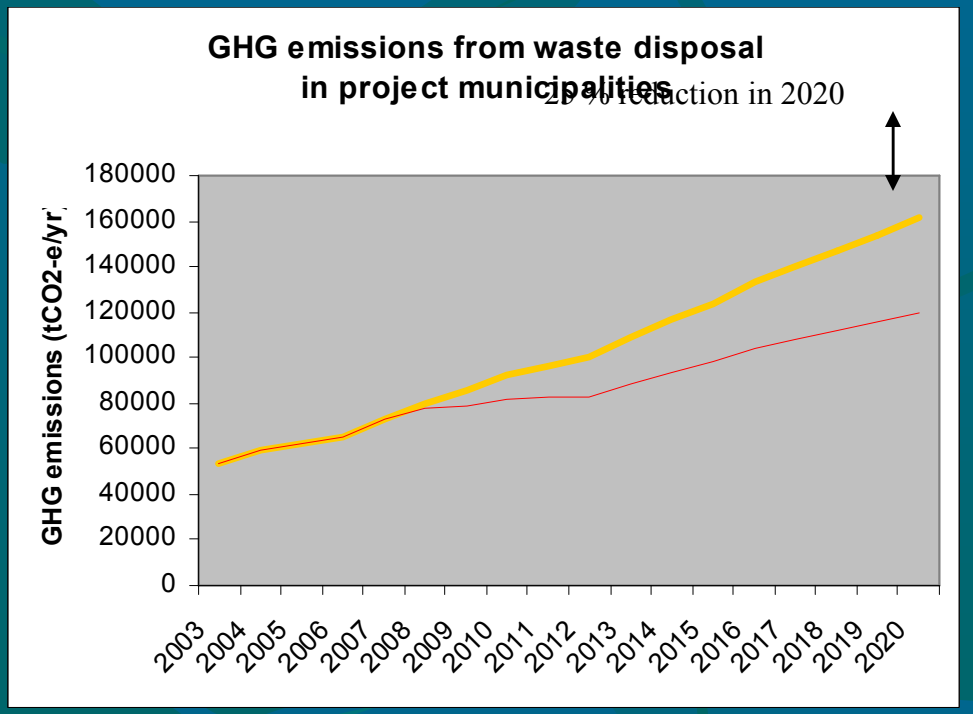
- Registered

This interface provides information on the last 15 CDM project activities that have been registered by the CDM Executive Board. CDM project activities registered earlier are accessible through the Project Search interface.

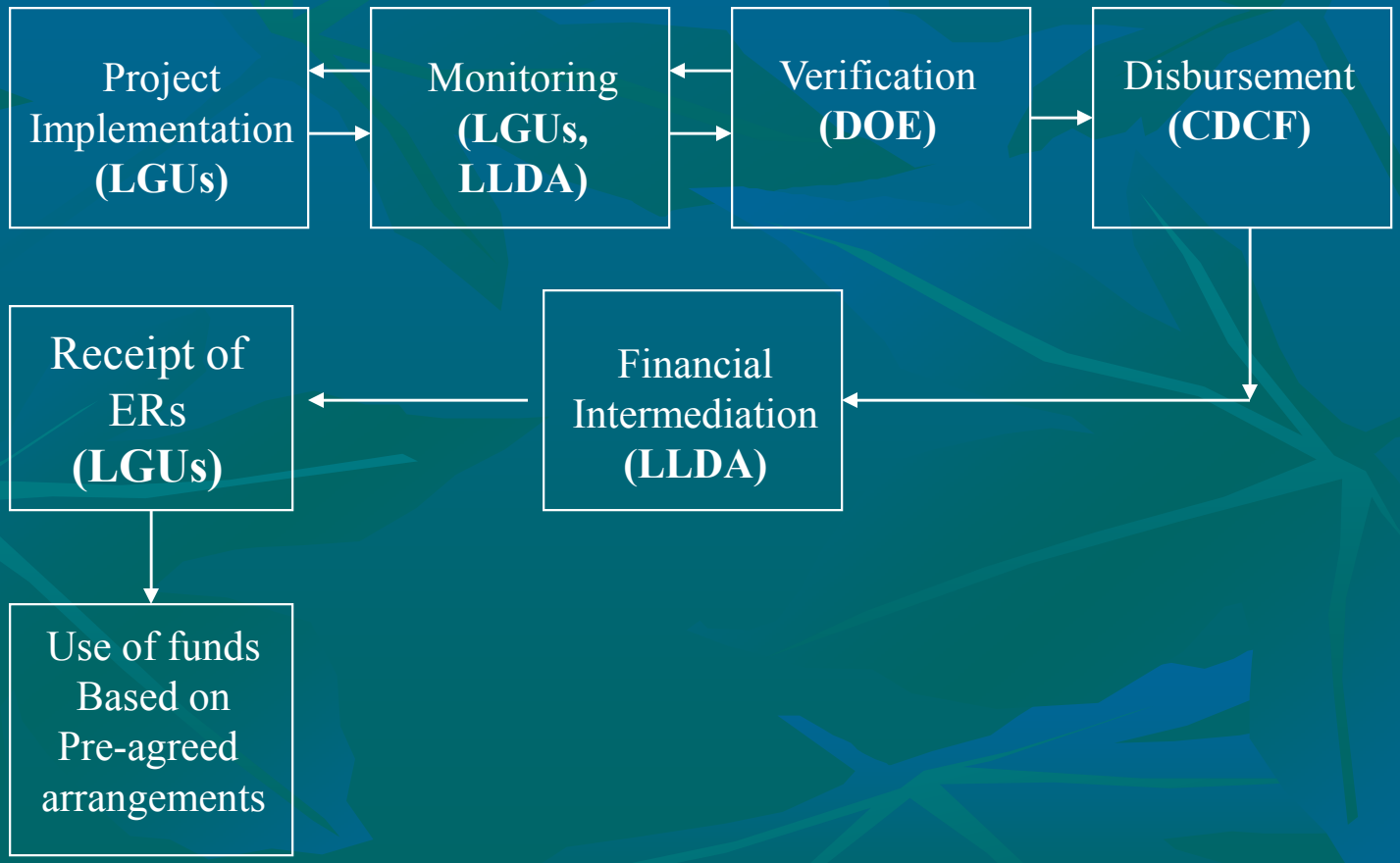
Registered	Title	Host Parties	Other Parties	Methodology *	Reductions **	Ref
17 Mar 08	Baotou Iron & Steel Blast Furnace Gas Combined Cycle Power Plant Project	China	United Kingdom of Great Britain and Northern Ireland	ACM0004 ver. 2	1871138	1416
17 Mar 08	La Virgen Hydroelectric Plant	Peru		ACM0002 ver. 6	220218	1445
17 Mar 08	AWMS Methane Recovery Project BR06-S-30, Mato Grosso and Mato Grosso do Sul, Brazil	Brazil		AMS-III.D. ver. 11	10342	1529
16 Mar 08	Energy efficiency improvement in power generation at Sajjan India Limited, Ankhleshwar, Gujarat	India		AMS-II.D. ver. 8	24947	1454
16 Mar 08	Laguna de Bay Community Waste Management Project: Avoidance of methane production from biomass decay through composting - 1	Philippines	Netherlands	AMS-III.F. ver. 3	6058	1547
14 Mar 08	Tianji Group Line 2 N2O Abatement Project	China	Switzerland United Kingdom of Great Britain and Northern Ireland	AM0034 ver. 2	659071	1437

Projected Emissions Reduction in Composting Bundles

Years	Annual emission reductions (tonnes of CO_2-e)	Cumulative emission reductions (tonnes of CO_2-e)
2008	2224	2,251
2009	6629	8,853
2010	10579	19,431
2011	14169	33,600
2012	17136	50,736
2013	20067	70,803
2014	22834	93,637
2015	26010	119,646
2016	29352	148,999
2017	32336	181,335



Implementation Arrangements



LEGAL AGREEMENTS

LLDA-CFU

Signing of cMOA

Carbonshed Project Signing of Memorandum of Agreement (cMoA) between the LLDA and Local Government Units on February 9, 2006 as witnessed by Dr. John Morton-World Bank (5th from left) and Cong. Baculio, Vice Chairman, Committee on Ecology (7th from left).

LLDA-CFU

Emission Reduction Purchase Agreement (ERPA) signed on July 13, 2006 by Mr. Von Amsberg of the World Bank and Mr. Ynares of the LLDA witnessed by Congressman Augusto H. Baculio, Vice Chair of the Committee of Ecology

LLDA-CFU

sERPA Signing with Mayor Tomas Ricardo A. Tanjuantco of Tanay Rizal

25 June 2007

- **CARBON FINANCE IS NOW MAINSTREAMED INTO THE LLDA OPERATION**

- **THE CARBON FINANCE TEAM WAS TRANSFORMED INTO A CARBON FINANCE UNIT**

The LLDA CARBON FINANCE UNIT continues to develop CDM projects with the LGUs. Private Sector participation is also encouraged.

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"Garbage Sunset"
Photo by ACSantos-Borja

Conference on Mitigating Greenhouse Gas Emissions from Livestock and Agro-Industrial Waste

The Peninsula Manila
October 15 -16, 2009

PIG WASTE AND LANDFILL PROGRAMS

JOSEFINA A. RAMOS

Unit Head, Environmental Program Management

OUTLINE

I. LANDBANK Profile

II. Financing of Piggery and Landfill Projects

III. Carbon Finance Support Facility (CFSF)

IV. The Way Forward

I. LANDBANK Profile

1. 100% government-owned bank focusing on countryside development and farmers & fisherfolk cooperatives
2. Single largest lender to :
   - *Small Farmers and Fisherfolk cooperatives*
   - *Rural Banks*
   - *Local Government Units*
3. Principal government depository

I. LANDBANK Profile

4. Most extensive branch network – presence in 79 out of 81 provinces of the country (323 branches and extension offices)
5. Among the top 4 Philippine commercial banks as of June 30, 2009 –
   - *Deposits – P362.2 B or US$ 8.05 B*
   - *Assets – P471 B or US$ 10.47 B*
   - *Loans – P168 B or US$ 3.73 B*
6. Total Workforce of 8,008 as of June 30, 2009

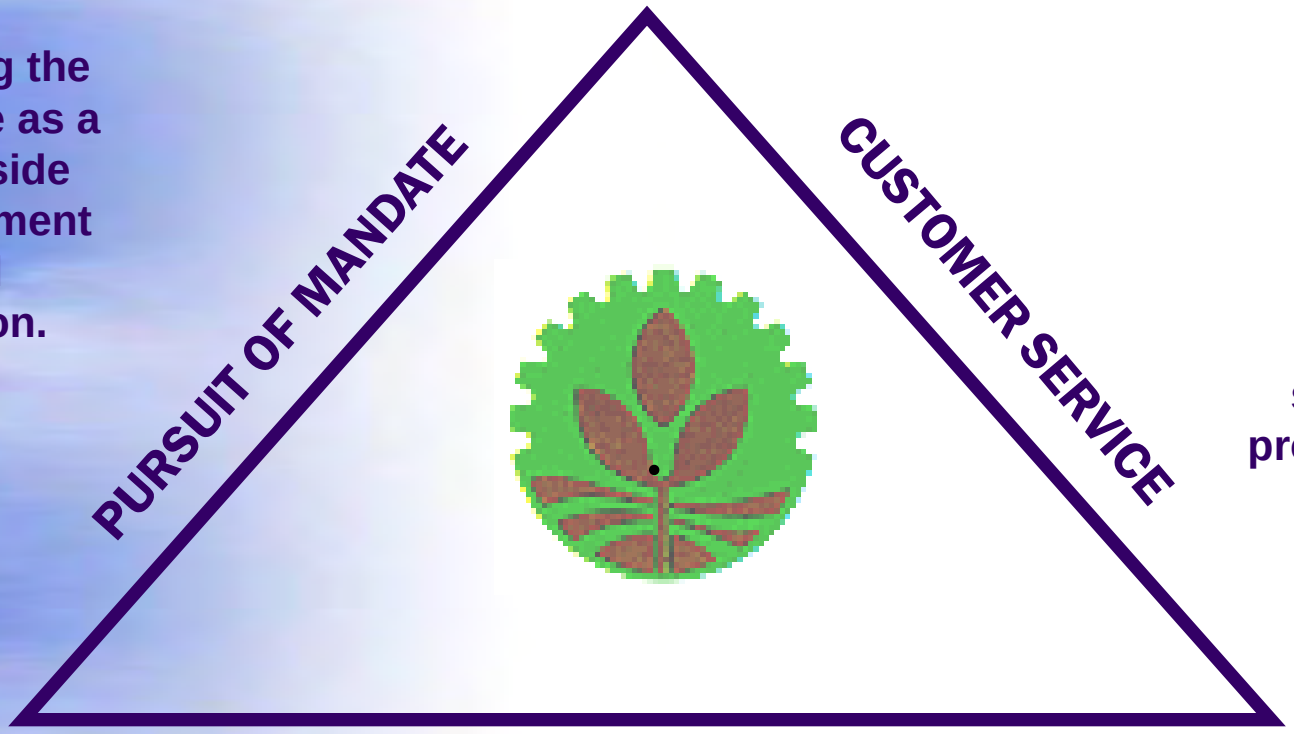
I. LANDBANK Profile

7. **Conferred with ISO 14001:2004 certification for its Environmental Management System**
   - ***Financed projects are subjected to Environmental Due Diligence***

I. LANDBANK Profile

BUSINESS GOALS

Pursuing the mandate as a countryside development financial institution.



Providing quality customer service and products as a financial service company.

INSTITUTIONAL VIABILITY

Ensuring long-term institutional stability and viability as a universal bank.

II. Financing Piggery and Landfill Projects

- Extended financial assistance to piggery farm owners with aggregate amount of P1.565 Billion as of August 2009
- Financed four (4) sanitary landfill projects of LGUs with total amount of P49.628 M as of August 2009
- P500 M loan assistance was granted to Montalban Methane Power Corporation, a landfill gas-to-energy CDM project.

II. Financing Piggery and Landfill Projects

Available Credit Facilities

- **Renewable Energy for Wiser and Accelerated Resources Development (REWARD)** – support the national government's call to develop renewable and alternative fuel/energy sources of renewable energy and provide financial assistance to entities that will engage in RE projects.
- **Support for Strategic Local Development and Investment Project (S2LDIP)** - provide local infrastructure services for Local Government Units and public utilities and private operators

II. Financing Piggery and Landfill Projects

Available Credit Facilities

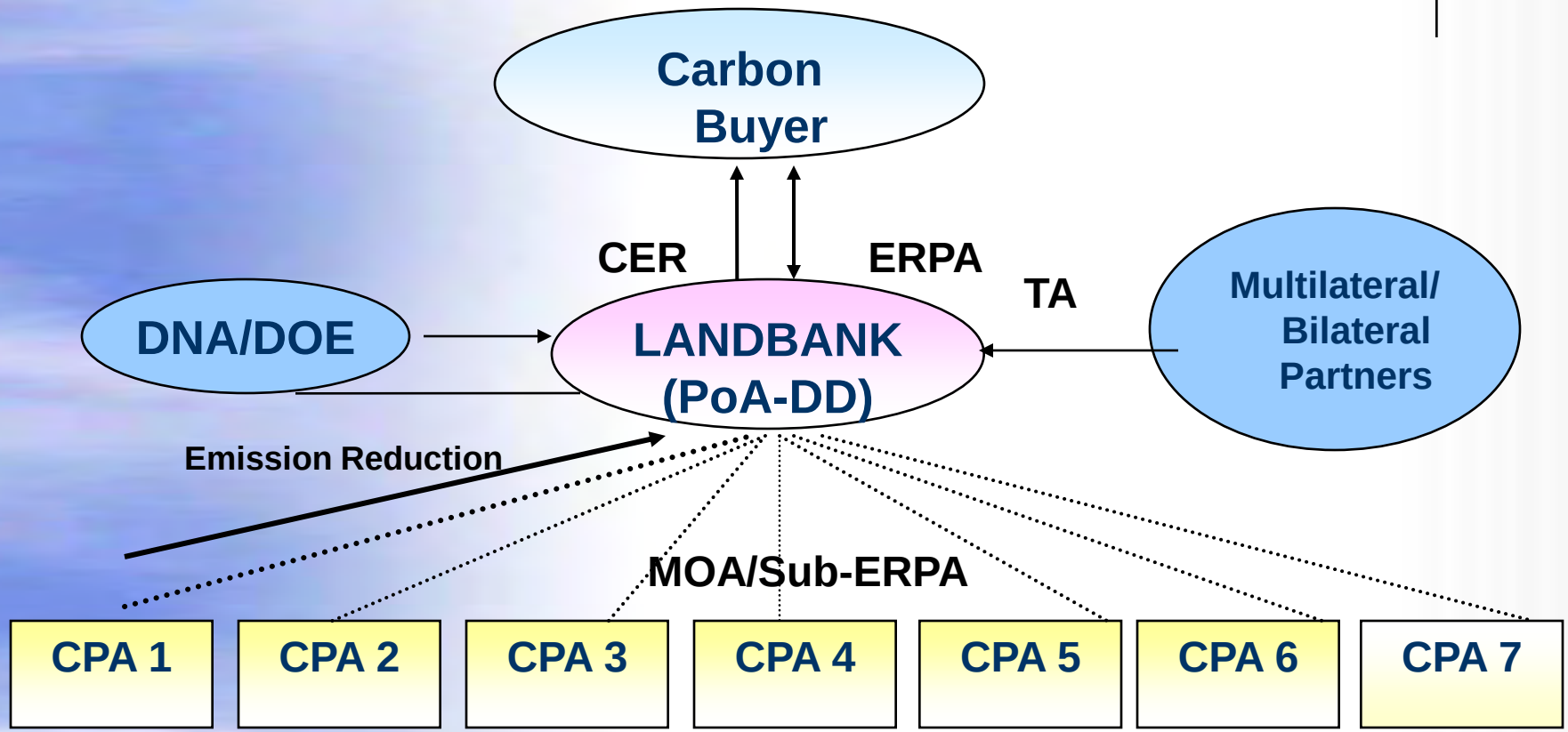
- **Credit Line for Energy Efficiency and Climate Protection (CLEECP)** – reduce the direct consumption of primary energy (e.g., diesel, coal, gas) and direct greenhouse gas emissions.
- **CBRED Project Preparation Fund (PPF) Program** – assist Renewable Energy project developers in paying for the high cost of project preparation activities
- **Internal funding Programs** for environment-related projects

III.Carbon Finance Support Facility (CFSF)

Objectives of the CFSF:

1. To promote climate change-mitigating activities in the business operations of Bank's clients;
2. To provide financial assistance to CDM-eligible projects;
3. To assist clients in every step of the CDM project cycle; and
4. To bring down or pass on the upfront CDM transaction costs

III.Carbon Finance Support Facility (CFSF)



LBP as CDM Intermediary/Coordinating Entity under the PoA

III.Carbon Finance Support Facility (CFSF)

- Signed a Letter of Intent (LOI) with the World Bank for the potential purchase of emission reductions from municipal waste management and livestock waste treatment projects.
- Prepared CDM design documents for piggery projects thru the assistance of World Bank

III.Carbon Finance Support Facility (CFSF)

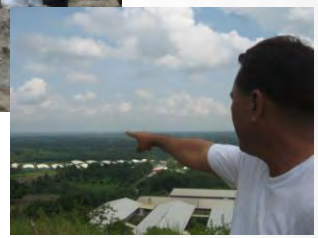
Marcela Farms

Location: Cortes, Bohol

No. of Heads: 36,000

Estimated ERs: 16,000 tCO_2e

III.Carbon Finance Support Facility (CFSF)



Biotech Farms

Location: Banga, South Cotabato

No. of Heads: 19,000

Estimated ERs: 11,000 tCO_2e

III.Carbon Finance Support Facility (CFSF)

Sanitary Landfill in Bulacan

Waste Receiving Rate: ~2,000 MTPD

Estimated ERs: 187,000 tCO_2e

III.Carbon Finance Support Facility (CFSF)

Montalban Methane Power Corp.

- financed the power generating portion

III.Carbon Finance Support Facility (CFSF)

- Barriers Encountered:
  - Limited appreciation of local financial institutions/ LANDBANK's account officers and clients on CDM and climate change-mitigation
  - Issue on clients willingness to invest vs. certainties of carbon credits to be generated from the project
  - Investment barriers such as high transaction and implementation costs of the small-scale CDM projects

III.Carbon Finance Support Facility (CFSF)

- Key Success Factors:
  - Strategic alliances with World Bank and other CDM partners
  - Working pilot project
  - Continuous capacity building for account officers and clients
  - Management support
  - Dedicated core team

IV. The Way Forward

- Focus effort for the successful implementation of CDM Programs of Activities for piggery and landfill projects
- Develop complete financing package/ assistance for CDM projects from project inception to issuance of CERs with the assistance of bilateral and multilateral agencies
- Strengthen capacity building program for Bank's account officers and clients; and
- Pilot landfill gas-to-energy project

THANK YOU!

Contact Person:

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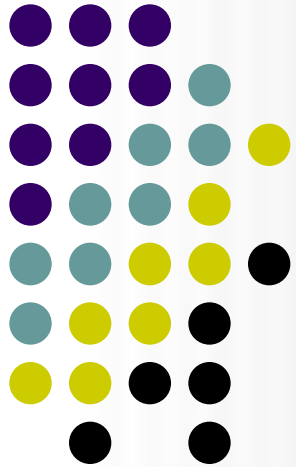
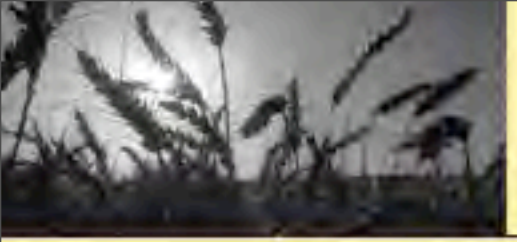
Fax No. +632 528-8484

E-mail Address: jramos@mail.landbank.com

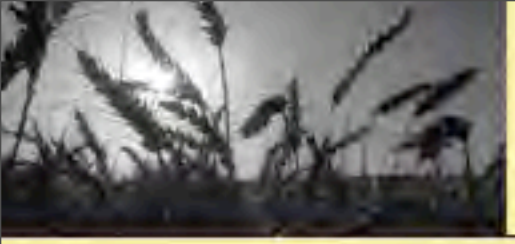



Biogas I
Biogas Technology:
Anaerobic Digestion
Poon Thiengburanathum, Ph.D.
Chiang Mai University



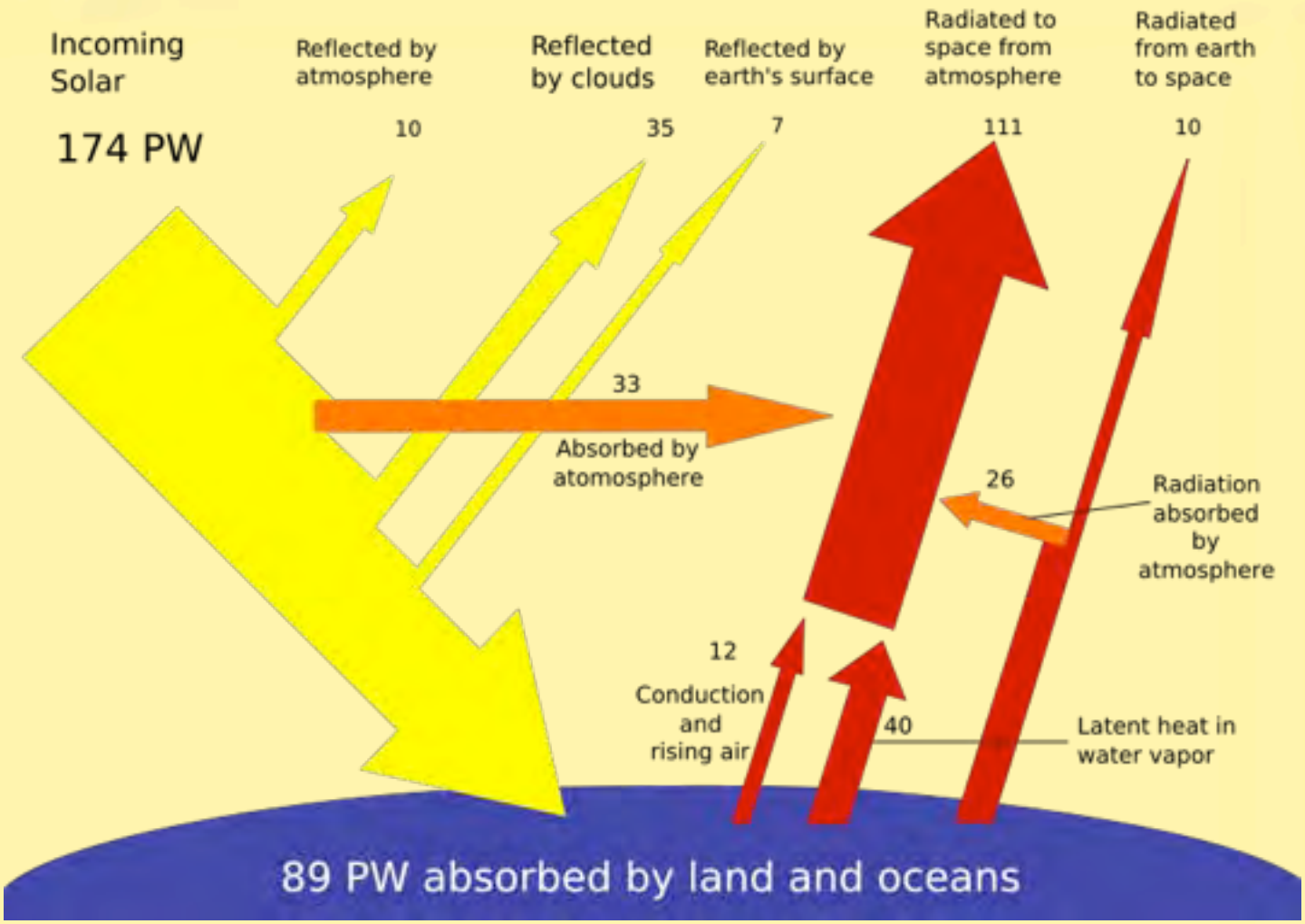
Agenda

- Introduction – Historical of Biogas Development in Thailand
- Overview – Biogas Technologies in Thailand
- Overview – Programatic CDM: The Hope
- Summary – The Next Era of Our Age



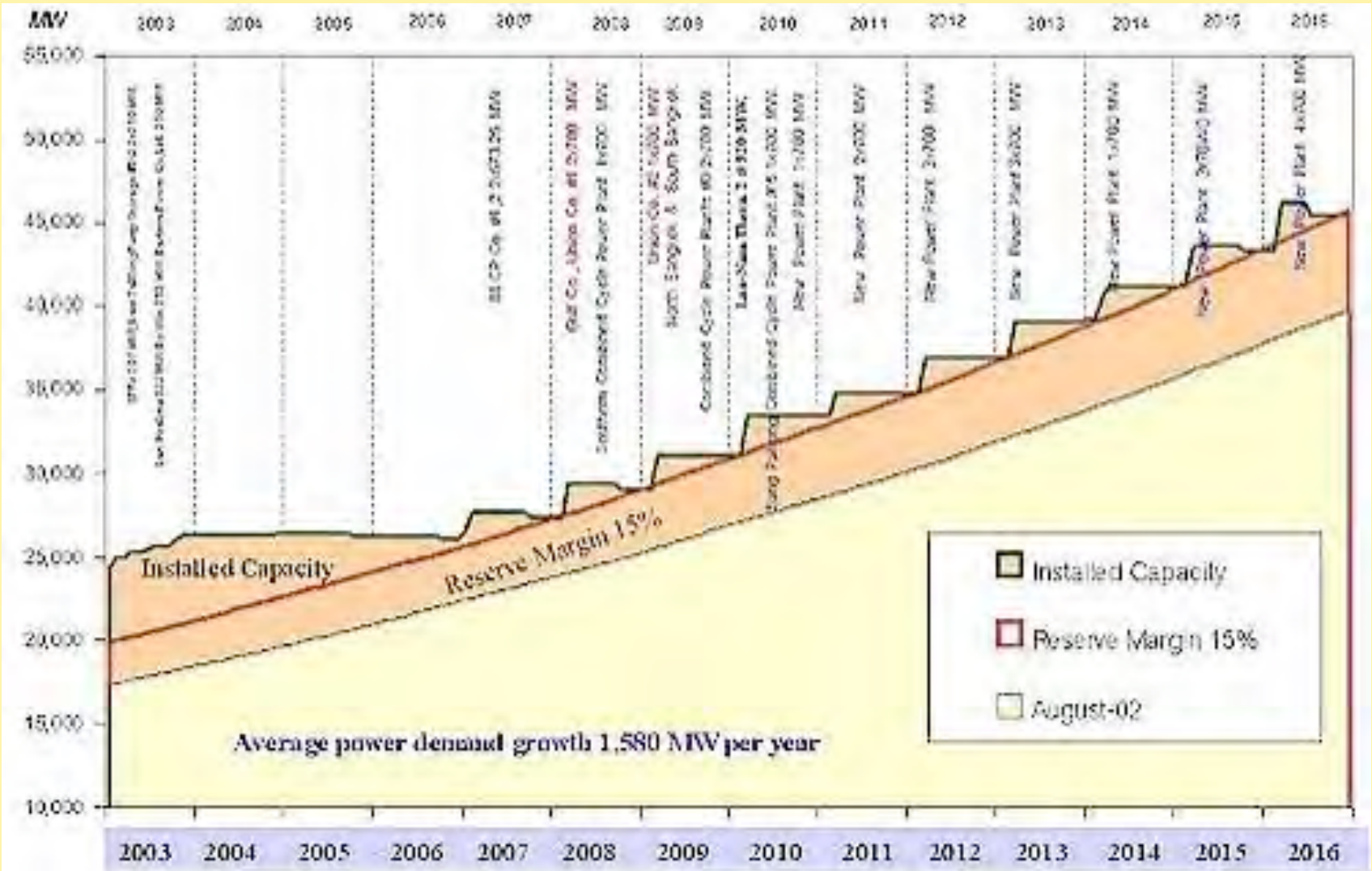
Solar energy to Earth

Solar energy as it is dispersed on the planet and radiated back to space. Values are in PW =1015 watt

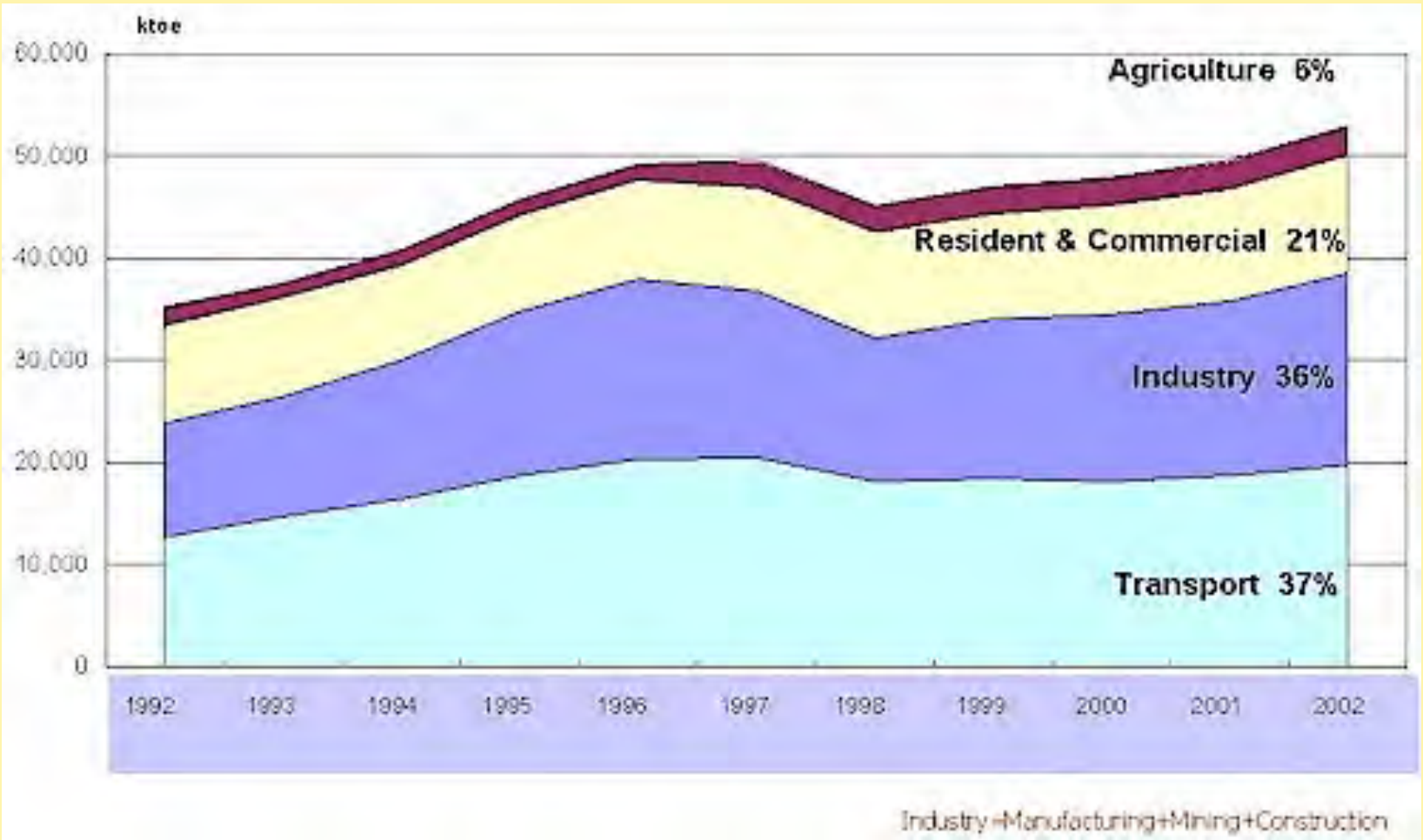


Data to produce this graphic was taken from a NASA publication.

Thailand Energy Status: General Picture



Energy Consumption by Sectors



Experiences of Biogas Development in Thailand

A Perspective of Biogas Incubation Processes

From BTC to ERDI

- 1988, Founded by Chiang Mai University with the support of GTZ
- 1992, supported by Thai government to promote and implement biogas technology in pig farm industry
- 2004, diversity the specify into other industries
- 2006, engage CDM develoepment
- 2008, Lunch Programatic CDM prgrams
-

Demonstration Site

Biogas Supply-Chain Management

Research and Development

Engineering Development

Construction

Monitoring

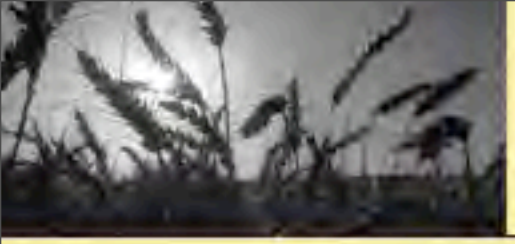
2005, Biogas Technology Center, Chiang Mai, Thailand

Key Experiences in CDM

Traditional CDM: (e.g. swine farms, ethanal biogas plants), project developer

Bundling CDM: (e.g. swine farms), technology provider.

Programatic CDM for Swine Farms in Thailand, project developer and CERs coordinator



Biogas System for Livestock:
Swine Farms Focus: ~300 projects for medium scale, ~40 projects for large scale (10 years)

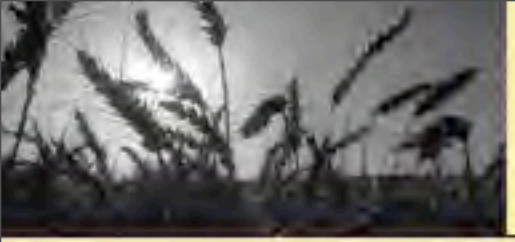
Biogas System for Argo-Industry Wastewater: 8 projects (4 years)

Biogas System for Community Waste: 2 projects (2 years)

Biogas System for Solid Waste/Co-digestion:On Going

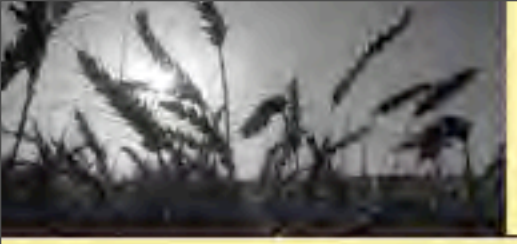
Background of Biogas

What is Biogas System ?



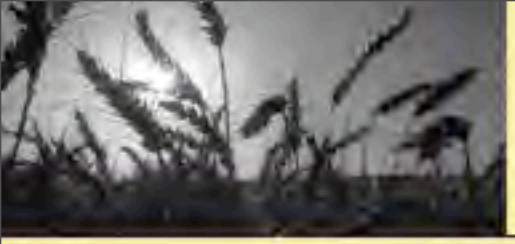
Key Biogas Technologies in Thailand

- Cover Lagoon Based Design
  - Modified Cover Lagoon
- Channel Digester Based Design
  - CMU-CD
- UASB Based Design
  - CMU-UF
- CSTR (Continuous-Flow Stirred tank Reactor) Based Design
  - Palm oil, solid waste, etc.



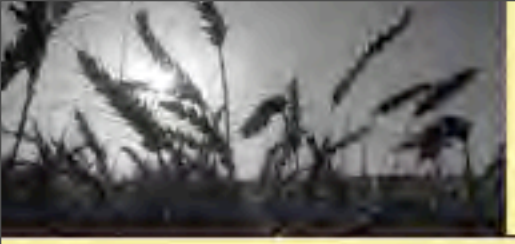
Biogas

- Composition
  - 60%-70% of Methane (CH_4),
  - 38%-28% of Carbon dioxide (CO_2)
  - 2% of Hydrogen (H_2)
  - Hydrogen Sulfide (H_2S)
- Anaerobic fermentation activities, consists of three different bacterial communities: fermentative, acetogenic, and methanogenic bacteria



Classification of Biogas Reactor

Classification Schemes	System Features
1) Input	• Batch system • Continuous/semi-continuous system
2) Mixing Intensity	• Completely mixed • Partially mixed /unmixed
3) Substrate Management	• Non accumulating • Accumulating anaerobic contact • Sludge blanket • Fluidized bed • Anaerobic filter
4) Biochemical Process Management	• Single-stage • Two stage



Piggery to Kwatt-hr

Piggery to Kwatt-hr

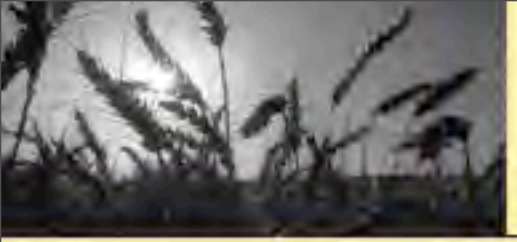
Piggery to Kwatt-hr

Piggery to Kwatt-hr

Farm's Environment

Problems

- > 6 millions in Thailand
  - Wastewater to natural streams
  - Odors
  - Fly



Open-Lagoon

- Furthermore
  - Close system
  - Remote area
  - Overflow problem
  - CH_4

Open-Lagoon

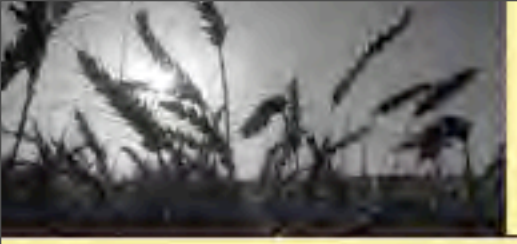
- Furthermore
  - Close system
  - Remote area
  - Overflow problem
  - CH_4

Biogas System is introduced

The System

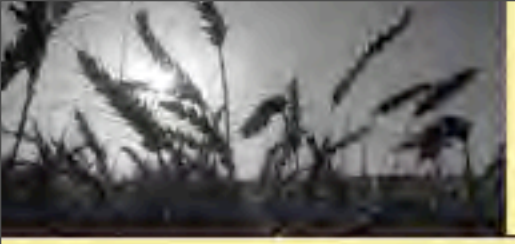
H-UASB

High suspension solids-Upflow
Anaerobic Sludge Blanket

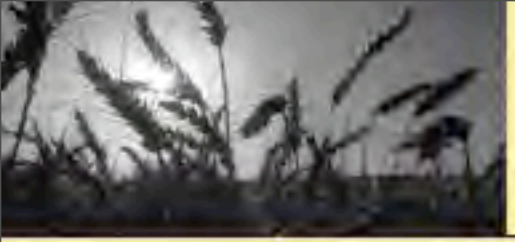


Facts

- 1 LU = 500 kg = Average 8.3 pigs
- 37-40 liters/day
  - 10-12 kg of solid waste
  - 25-27 liters of urine
  - 185-190 liters/day of water/farming activity
- 0.9 cu.m./day (@ 0.55 biodegradable rate)
- 1 cu.m. of Biogas
  - 0.46 kg LPG
  - 0.67 liters of gasoline
  - 1.2-1.4 kwh



- Pre-Treatment
- Bioreactor
- Post-Treatment
- Energy Utilization

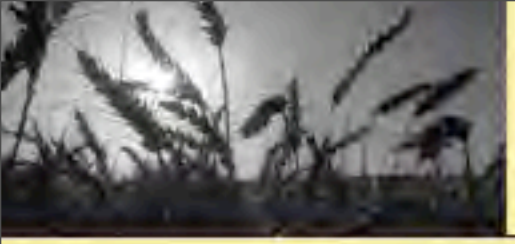


Pre-Treatment: CT

Pre-Treatment: CT

Pre-Treatment: CT

Pre-Treatment: ST



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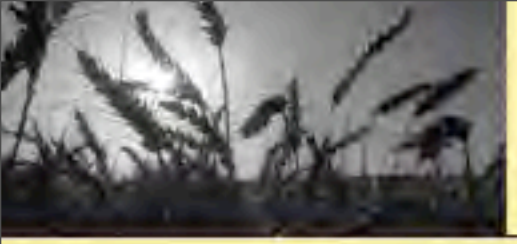
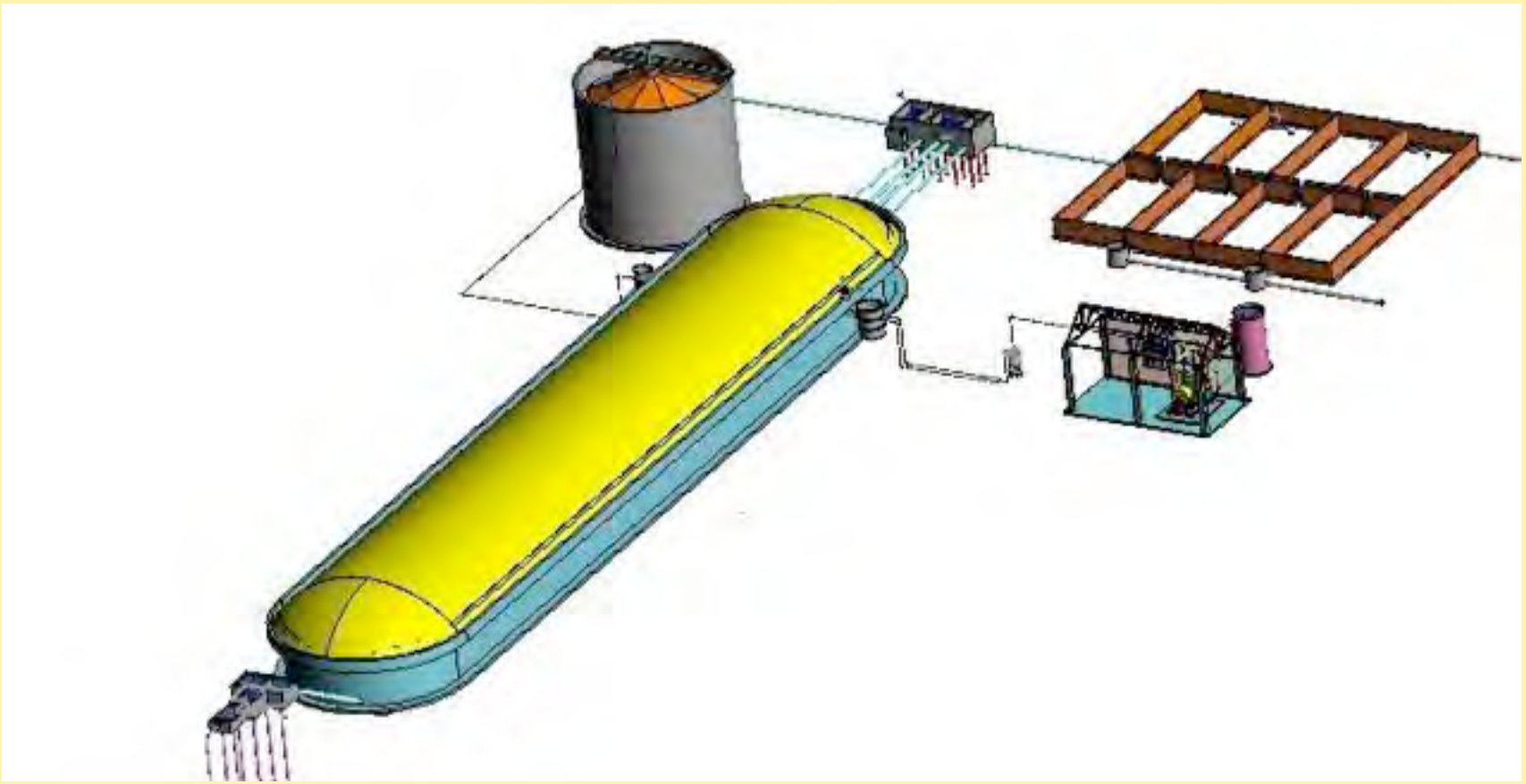
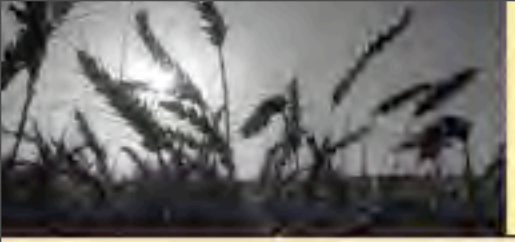


Examples of Rectors

- Biogas Reactor
  - UASB (Upflow Anaerobic Sludge Blanket)
  - H-UASB (High suspension solids-Upflow Anaerobic Sludge Blanket)
  - IC-UASB
  - Cannel Digester
  - Up and Down
  - Etc.

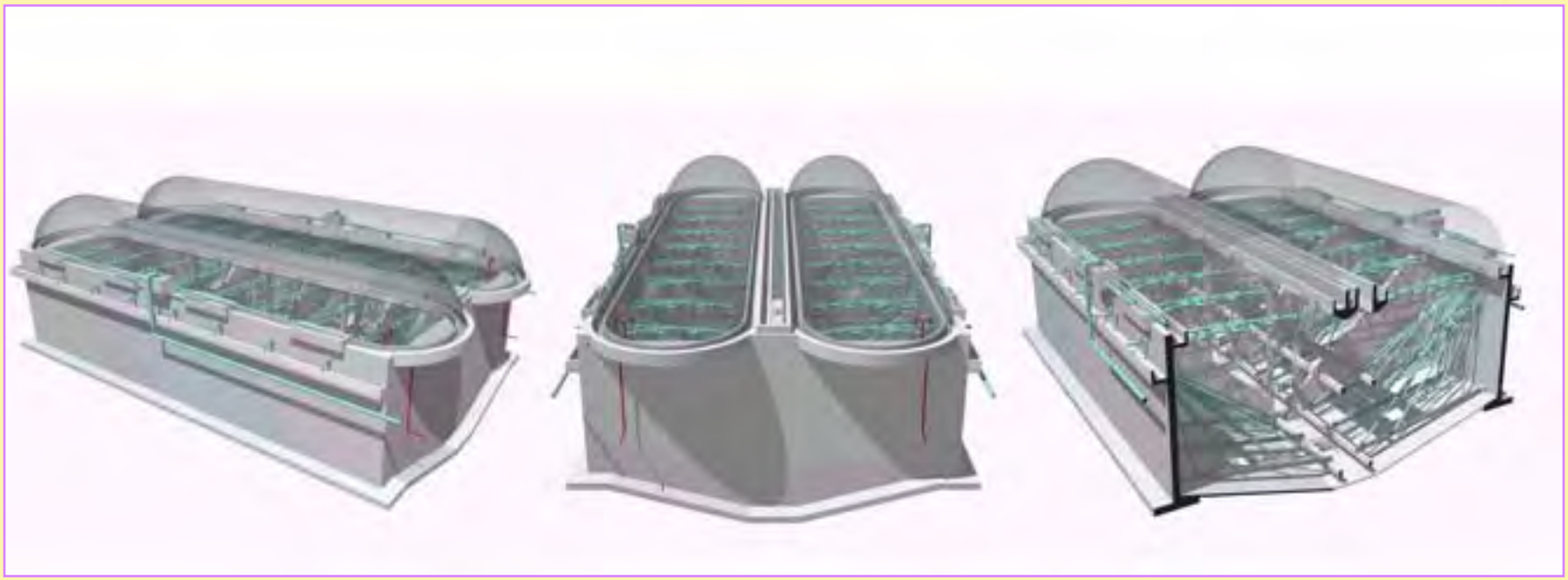
Cannel Digester



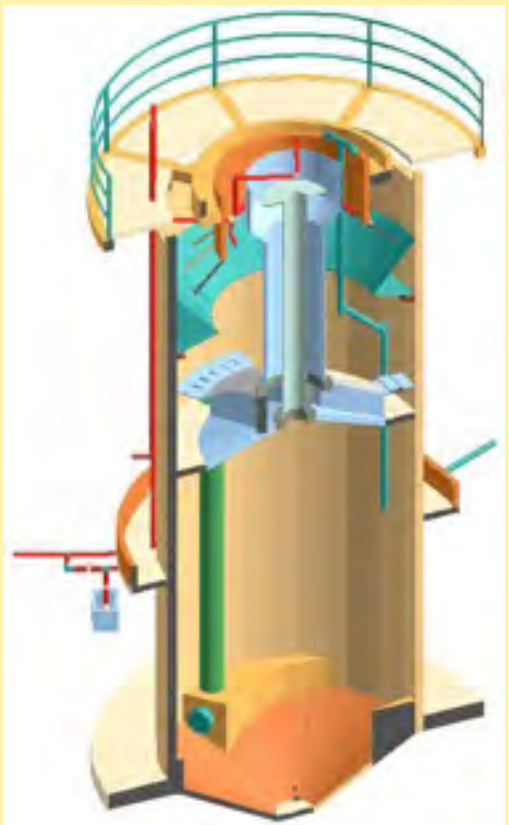


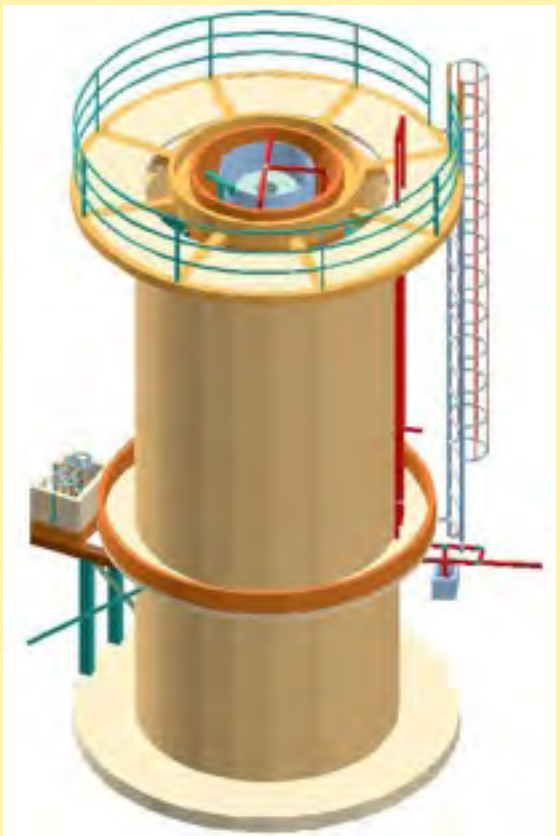
H-UASB

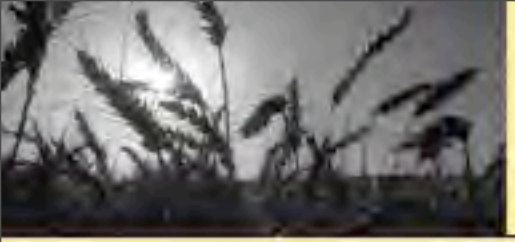
H-UASB



IC-UASB



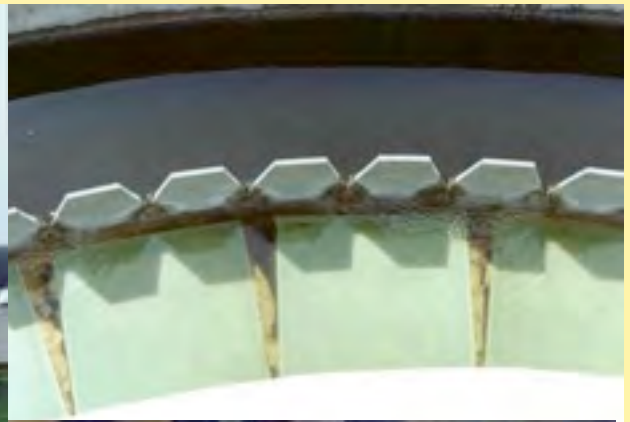




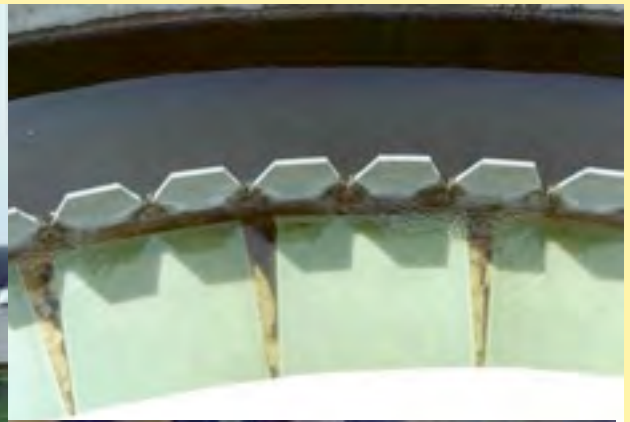
UASB

UASB

UASB

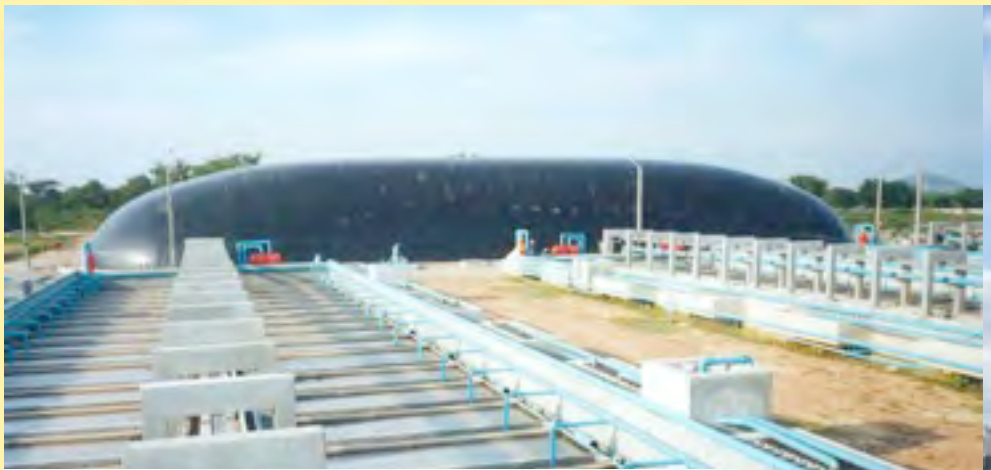


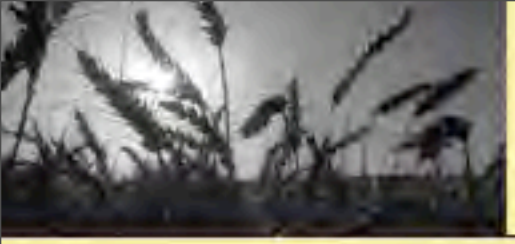
UASB



H-UASB

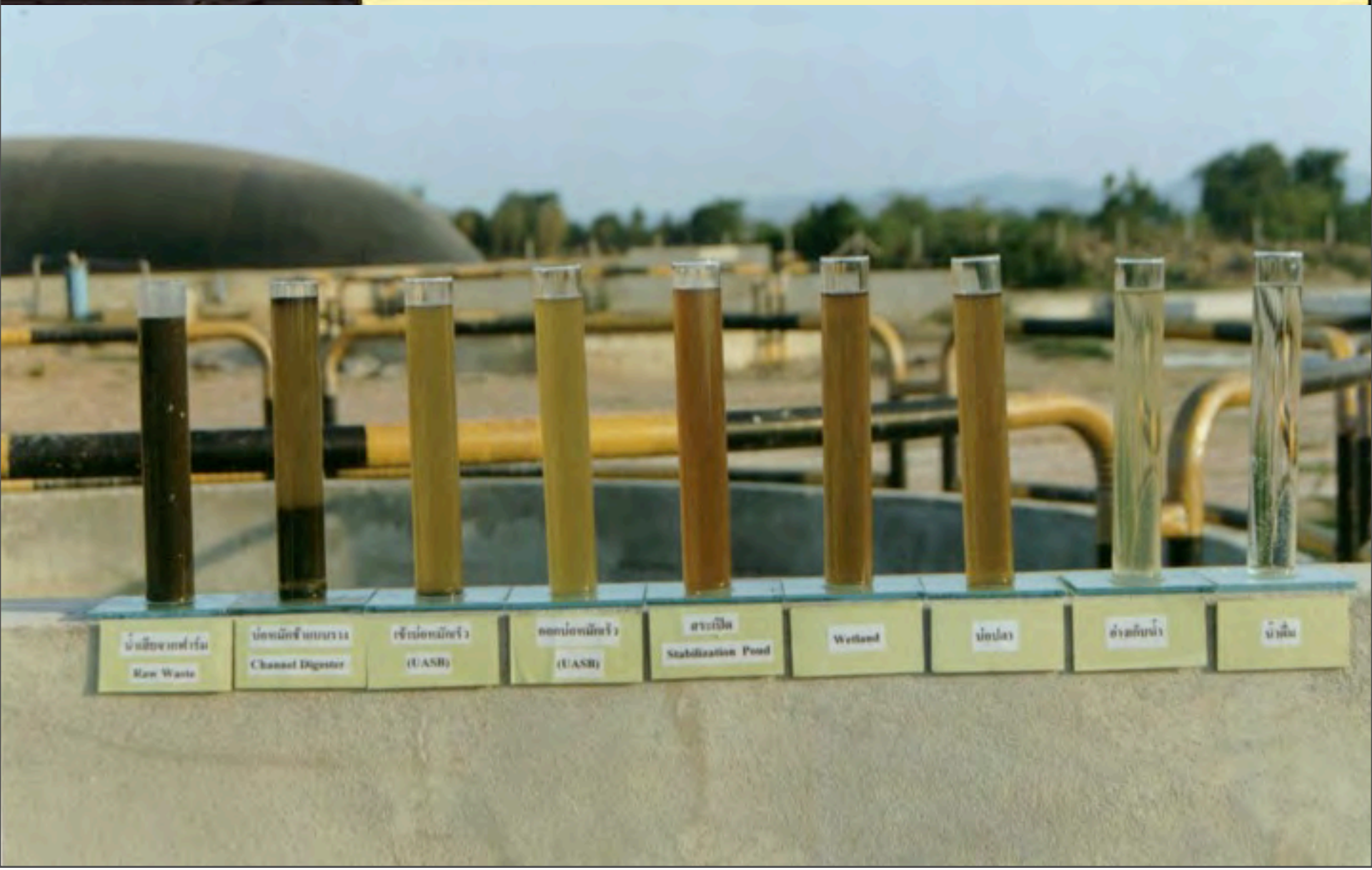
H-UASB

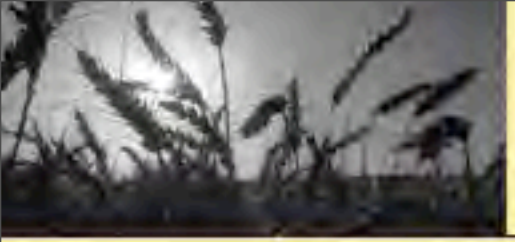




- Pre-Treatment
- Bioreactor
- Post-Treatment
- Energy Utilization

Waste Water


Raw Waste
Channel Digester
(UASB)
(UASB)
Stabilization Pond
Wetland



Post-Treatment: Solar Drying

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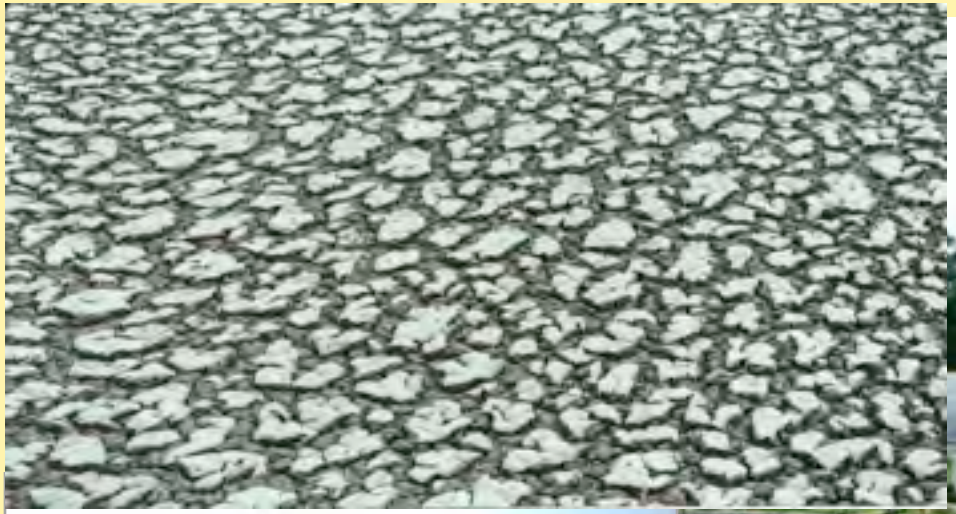
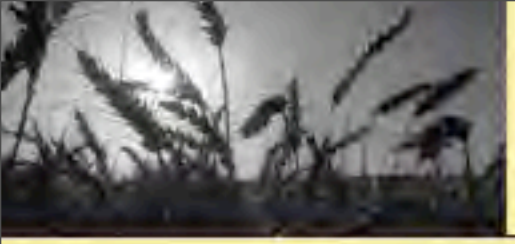




Post-Treatment: Liquid Fertilizer and Artificial Pond

Post-Treatment: Liquid Fertilizer and Artificial Pond

Post-Treatment: Liquid Fertilizer and Artificial Pond

Post-Treatment: Liquid Fertilizer and Artificial Pond

GAS Utilization: Heat

GAS Utilization: Heat

GAS Utilization: Electricity

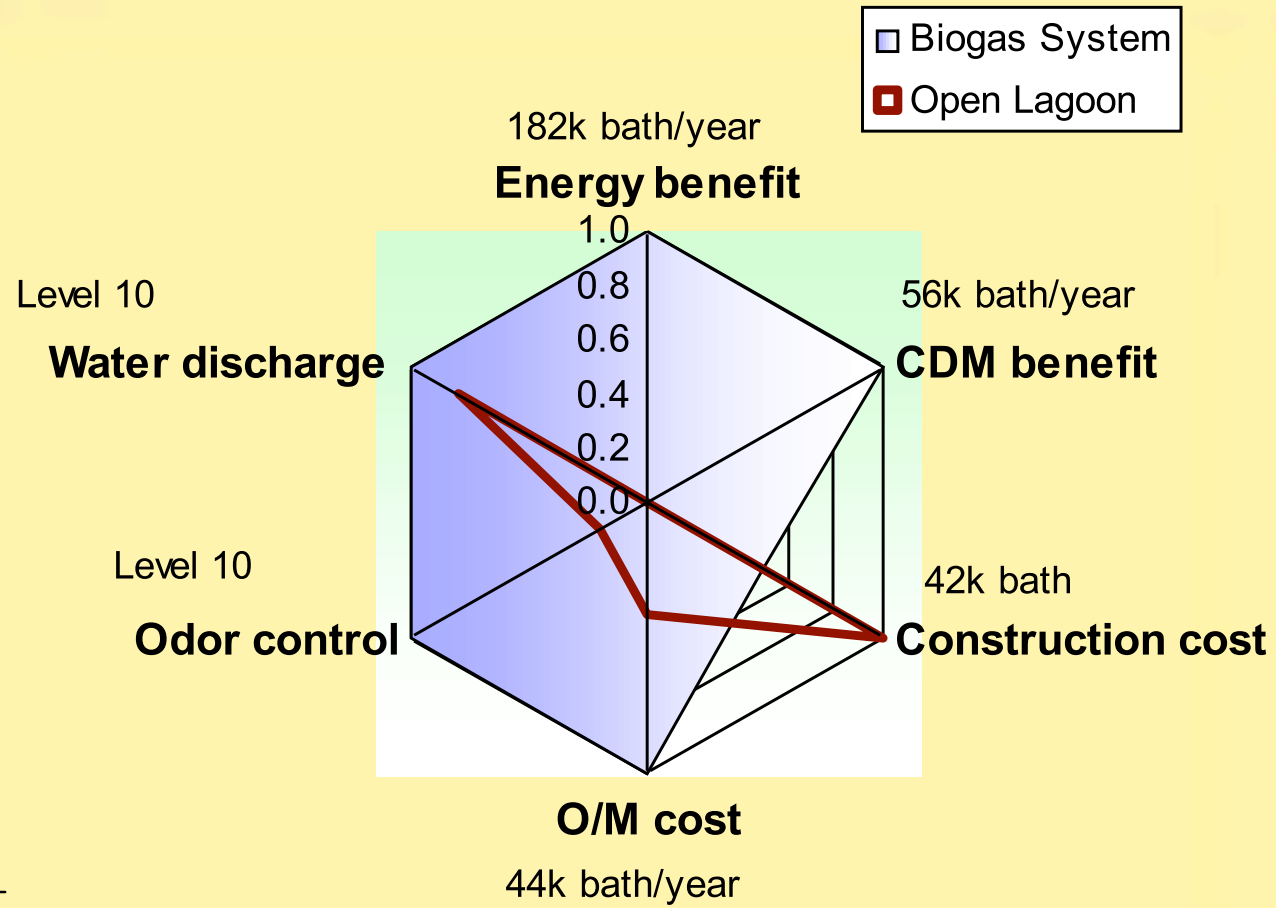
GAS Utilization: Electricity

GAS Utilization: Electricity

Technology Selection Process

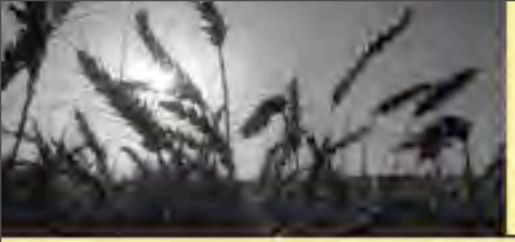
Open-Lagoon vs. H-UASB

Modified B/C



$$B/C = \frac{\sum_{i=1}^{n} B_i + \sum_{j=1}^{m} I_j}{\sum_{k=1}^{p} C_k}$$

biogas system = 5.51
open lagoon = 0.47

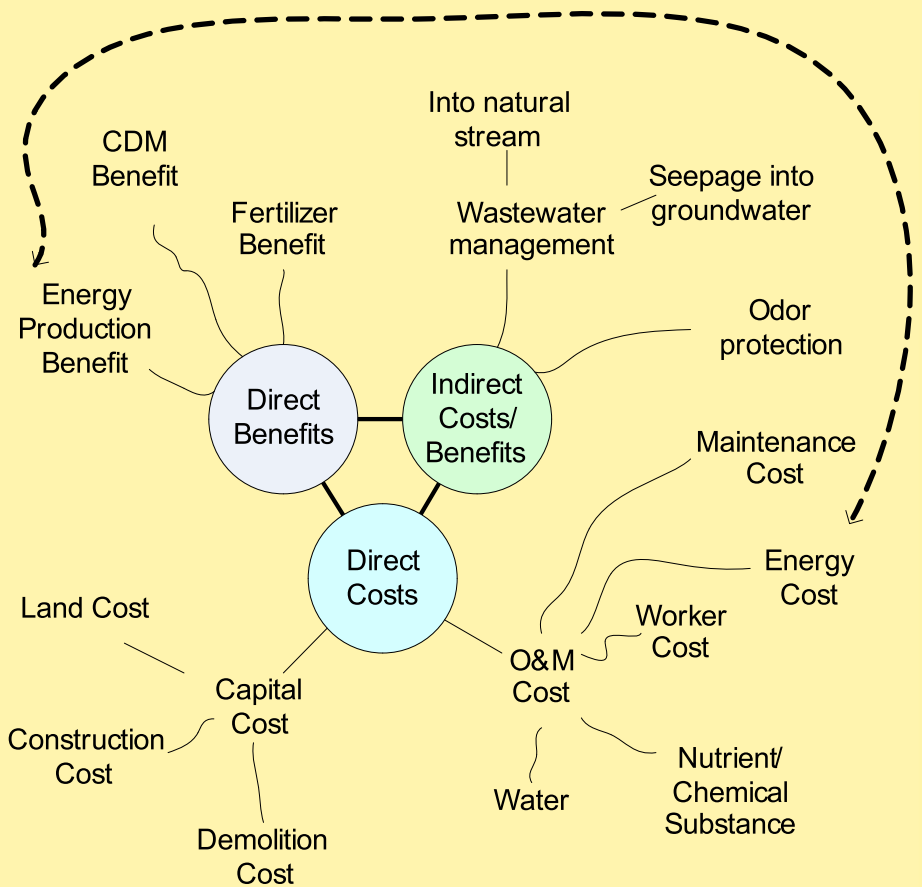


Dimensions of Evaluation

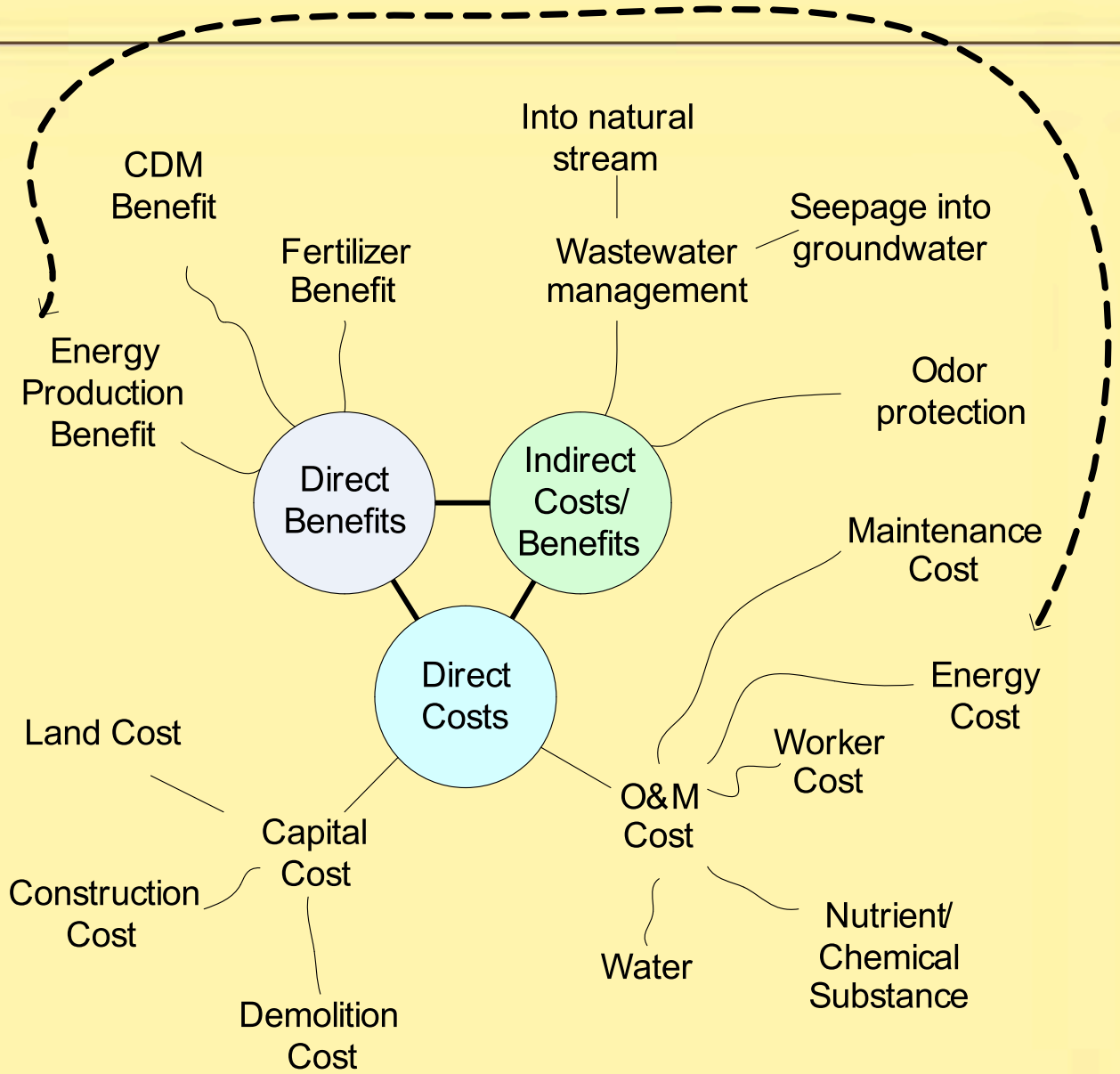
Dimensions of Evaluation	Biogas System	Open Lagoon
1) Energy benefit, baths/year	182,500	0
2) CDM benefit, baths/ year	56,423	0
3) Construction cost, baths	44330	429,000
4) O/M cost, bath/year	886,600	85,800
5) Odor control, Level	10	2
6) Water discharge, Level	10	8

LCA/LCC Framework

- Holistic View
- Simplified LCA
- Coping w/ Multiple Dimensions Problems



- Environment
- Energy
- Construction
- Fertilization
- Etc.

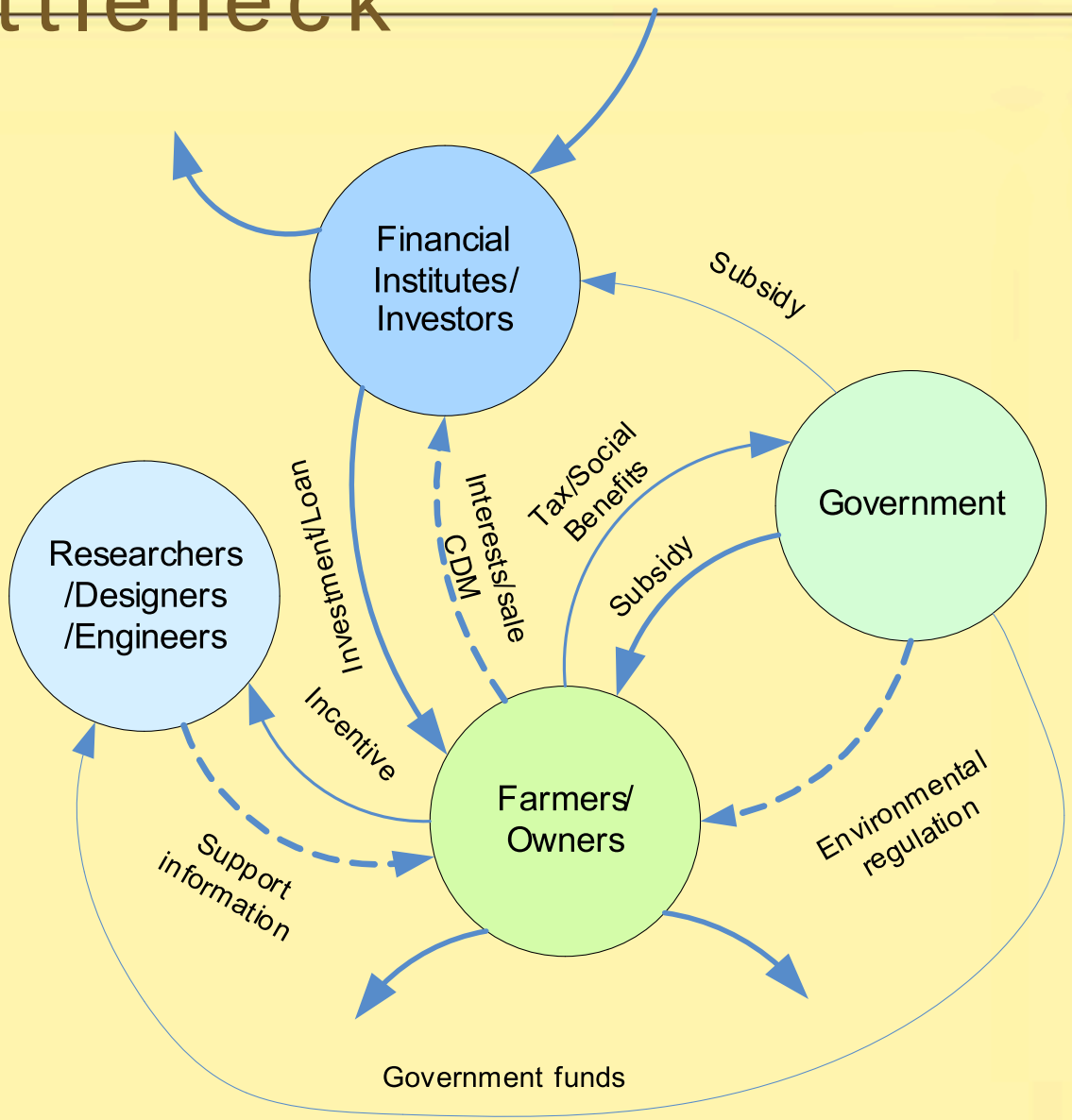


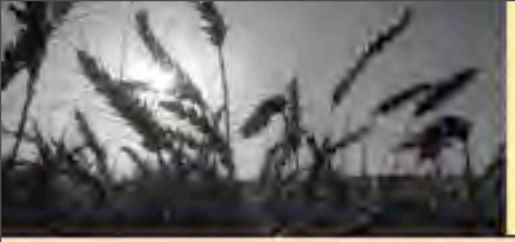
Results – Lesson & Learn

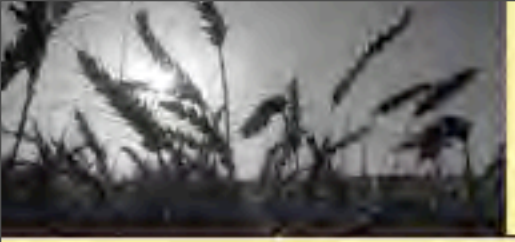
Current Biogas Market in Thailand

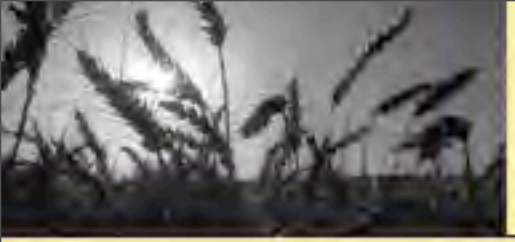
Technology is not Bottleneck

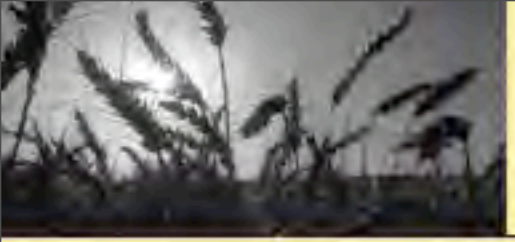
- Peculiarity











What's Next

The New Era of Our Age

Anaerobic Digestion in the Philippines

OPPORTUNIITES FOR SUSTAINABLE GROWTH

PAUL T. PUTHENPUREKAL

www.sure.com.ph

OVERVIEW OF AD SYSTEMS IN THE PHILIPPINES

- EARLIEST COMMERCIAL AD SYSTEMS WERE DEVELOPED FOR PIG FARM & DISTILLERY WASTE MANAGEMENT (1970's – POST OIL CRISIS)
- APPLICATION WAS FOR HEAT & POWER GENERATION.
- TECHNICAL DEVELOPMENT OF AD DESIGNS AND IMPLEMENATION OF PROJECTS MOSTLY AT THE NIST(DOST) DOE-ANEC LEVELS.
- CURRENTLY NO NATIONAL FRAMEWORK OR POLICY ON AD/BIOGAS DEVELOPMENT.

CURRENT DEVELOPMENTS IN AD

- MOSTLY INITIATED BY CDM LED FUNDING WITH PRIVATE COMPANIES INVESTING IN AD TECHNOLOGY SERVICES.
- MOST OF THE PROJECTS FOCUS ON PIG FARMS WITH FEW PROJECTS IN THE BREWERY/DISTILLERY SECTOR.
- SEVERAL PRIVATE FIRMS OFFERING AD TECHNOLOGY AND SERVICES (TURNKEY AND/OR BUILD-OPERATE-TRANSFER).
- BIOGAS PLANTS QUALIFY AS A RE PROJECT UNDER THE RE LAW PROVIDING INCENTIVES AND TAX BENEFITS.

EXAMPLES OF AD IN THE PHILIPPINES

- MOST COMMON – COVERED LAGOON DESIGN
  - OVER 50 INSTALLATIONS

PHOTO COURTESY – ECOSECURITIES – EXCEL FARM, BULACAN

EXAMPLES OF AD IN THE PHILIPPINES

- SMALL FARMS

CHINESE FIXED DOME DESIGN

EXAMPLES OF AD IN THE PHILIPPINES

- SLAUGTHER HOUSE

BAI, VALENZUELA CITY

BALAMBAN, CEBU

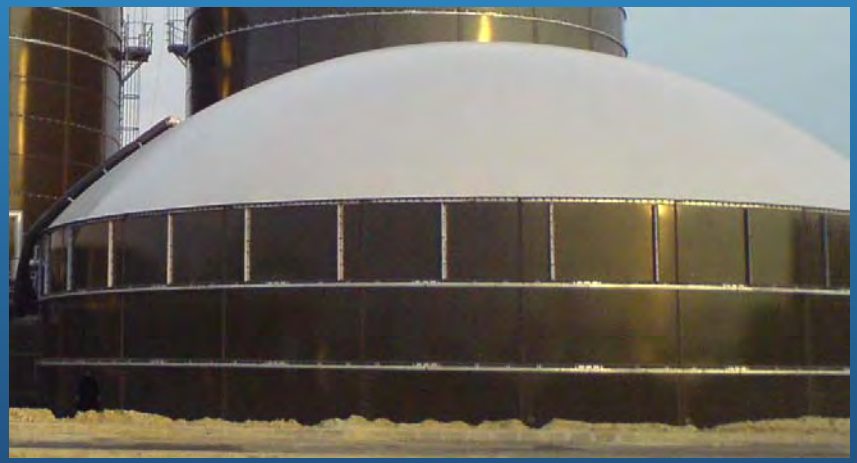
EXAMPLES OF AD IN THE PHILIPPINES

WELISSA FARMS, BANTAYAN IS. CEBU

EXAMPLES OF AD IN THE PHILIPPINES

- TANK DIGESTERS

600 CUM- DODRAM, BATANGAS



4000 CUM SUMILAO PIG FARM, BUKIDNON

EXAMPLES OF AD IN THE PHILIPPINES

- **TANK DIGESTERS**

IMI FARM, BULACAN

GNBF, NEUVA ECIJA

AREAS OF DEVELOPMENT

- BACKYARD PIGGERIES – HOUSEHOLD LEVEL
- CENTRALIZED DIGESTERS FOR FOOD/MARKET WASTES
- LANDFILL SITES
- SLAUGHTER HOUSE/FOOD PROCESSING
- AGRICULTURAL RESIDUE WASTES

MODES OF DEVELOPEMNT

- DEVELOPMENT BANK LENDING SCHEMES FOR SMALL SCALE PROJECTS
- JV WITH LGU FOR CENTRALIZED AD PROJECTS (MUNICIPALITY LEVELS)
- PRIVATE PARTNERSHIPS FOR B-O-T PROJECTS
- JV WITH LANDFILL OPERATORS

MODES OF DEVELOPEMNT

- DEVELOPMENT BANK LENDING SCHEMES FOR SMALL SCALE PROJECTS
  - TARGET MARKET – SMALL COMMUNITY, BACKYARD PIG FARMS
  - COST – 10,000 TO 1 M.
  - ECONOMIC USE – HEAT
  - OTHER BENEFITS – HEALTH & SANITATION

MODES OF DEVELOPEMNT

- JV WITH LGU FOR CENTRALIZED AD PROJECTS (MUNICIPALITY LEVELS)
  - CENTRALIZED PLANT HANDLING WASTES FROM SMALL ANIMAL FARMS, SLAUGHTER HOUSES, MARKET AND FOOD COURTS.
  - COST – USD 10 TO 15 M
  - ECONOMIC USE – POWER (2 TO 5 MW PLANT)
  - ENVIRONMENTAL GAINS – ORGANIC FERTILIZER, POLLUTION CONTROL
  - INCOME STREAM FOR LGU

MODES OF DEVELOPEMNT

- PRIVATE PARTNERSHIPS FOR B-O-T PROJECTS
  - TARGET MARKET – MULTINATIONAL COMPANIES, LARGE FARMS, REAL ESTATE DEVELOPERS
  - COST – USD 1 TO 10 M
  - ECONOMIC GAINS – POWER (100KW TO 5 MW)
  - ENVIRONMENT GAINS – COMPLIANCE, RISK MANAGEMENT, VALUE CREATION

ECONOMICS OF AD IN THE PHILIPPINES

- PIG POPULATION – 15 MILLION HEADS
- POTENTIAL FOR AD – 10 M TONS PER YEAR.
- LANDFILL SITES – > 20 CITIES
- AVERAGE ORGANIC WASTE – 50 TONS/DAY
- MUNICIPAL WASTEWATER TREATMENT PLANTS IN KEY CITIES

ECONOMICS - AD IN THE PHILIPPINES

- TARGET POWER PRICE – PHP 10 (20 US CENTS)
- POWER POTENTAIL - > 300 MW CAPACITY
- INVESTMENT POTENTIAL - > 800 M USD
- JOB CREATION POTENTIAL – 5,000 +
- REDUCTION IN GHG EMISSIONS – 6 TO 8 M t/a
- REDUCTION IN SURFACE & GWATER POLLUTION
- CER SALES POTENTIAL – USD 50 M/a

LGU led LOW CARBON Development MODEL

- PARTICIPATION & PREPARATION
- POLICY & FRAMEWORK
- PLANNING & IMPLEMENTAITON
- PARTNERSHIP & INVESTMENT

Calculate it;

reduce it;

offset it!