



CDM Implementation in Thailand

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Thailand Greenhouse Gas Management Organization (Public Organization)

Vienna 24 Jan 2008

UK Embassy 28 Jan 2008

Baker & McKenzie 22 Feb 2008

T@W Bangkok 25-26 Feb 2008

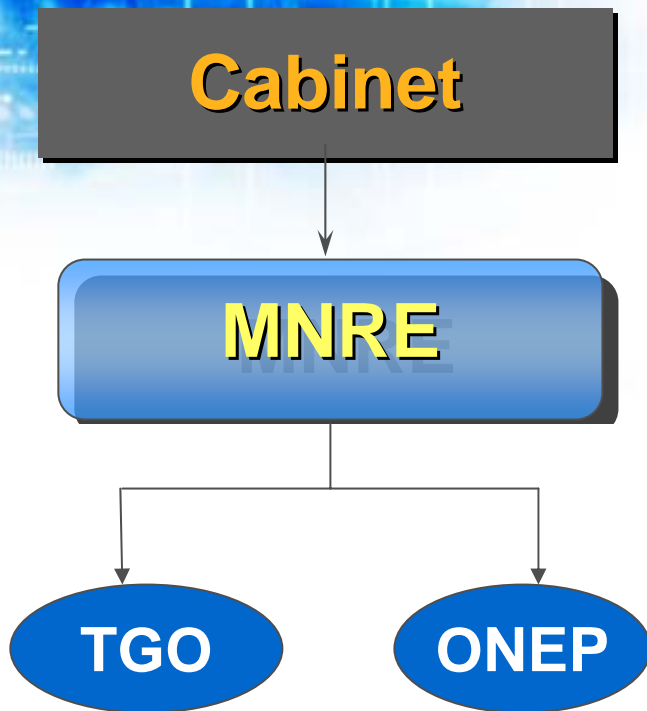
Thailand Status



Thailand ratified

- United Nations Framework Convention on Climate Change (UNFCCC) in December 1994
- Kyoto Protocol in August 2002

Institutional Framework

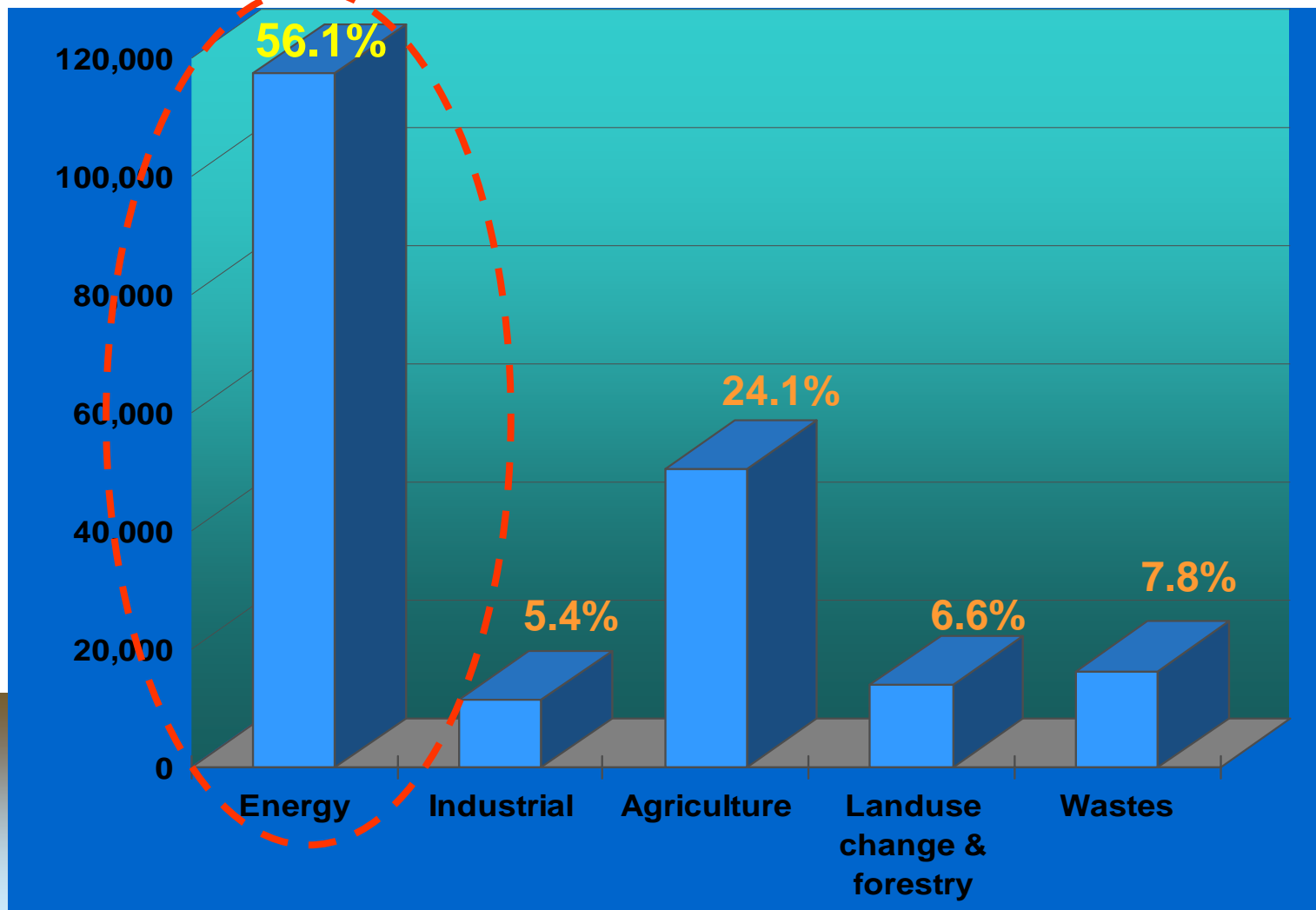


- Ministry of Natural Resources & Environment (MNRE) as DNA-CDM THAILAND in July 2003
- **TGO** is the DNA-CDM Office since July 7 2007
- Office of Natural Resources & Environmental Policy & Planning (ONEP) under MNRE as National focal point of UNFCCC , the secretariat of National Committee on CC

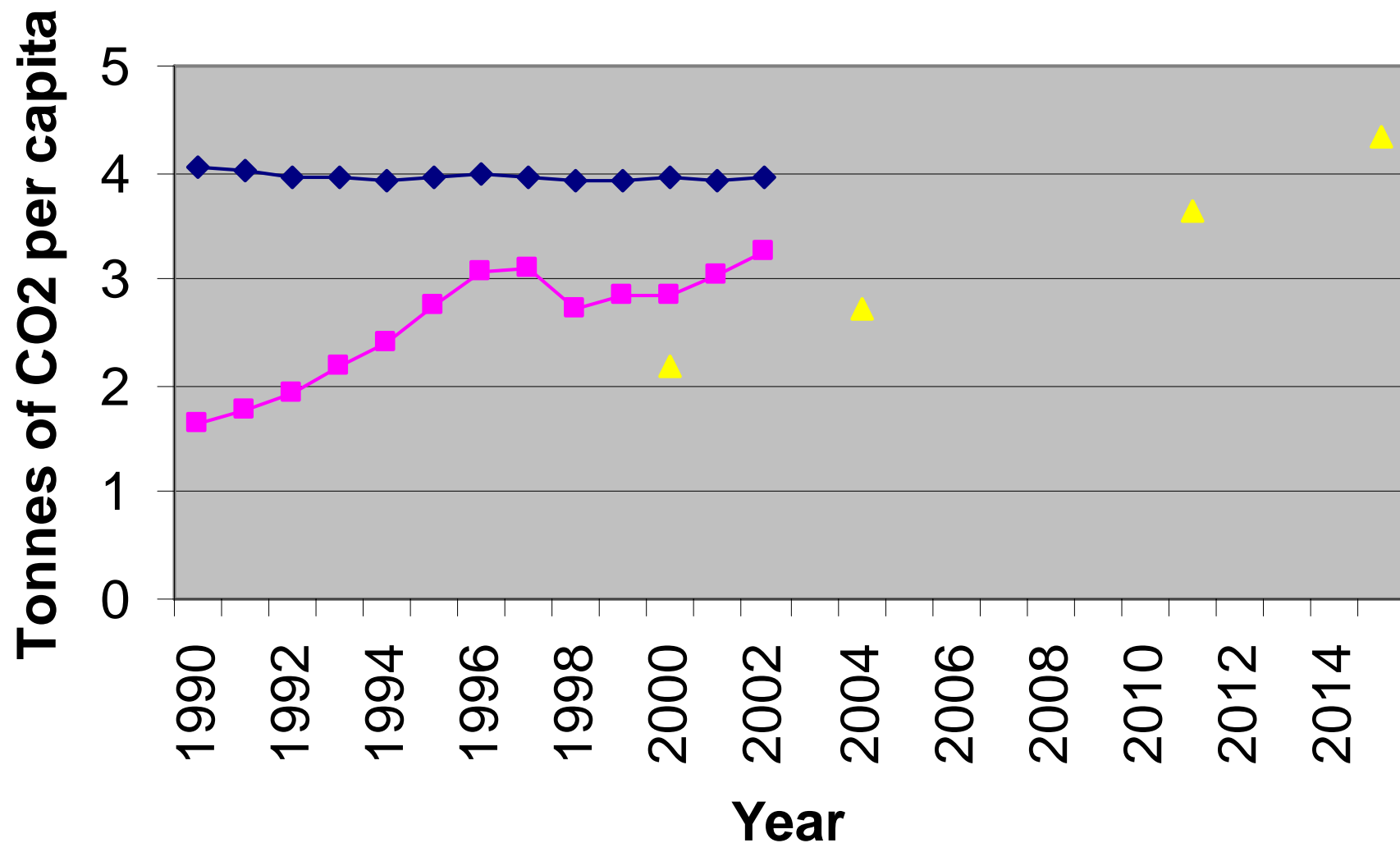
Emission Sources by sector of THAILAND A.D. 2003

Emission

(1000 tons)



World average emission and Thailand emission of CO₂ per capita

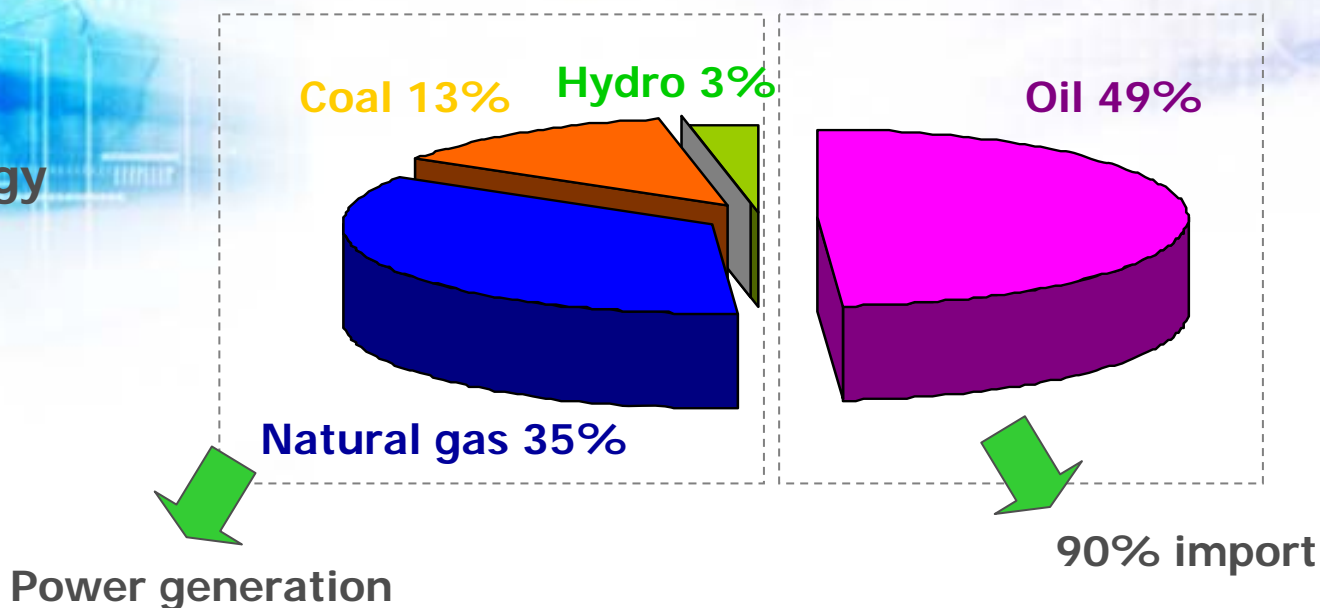


◆ world emission ■ Thailand ▲ Thailand this study

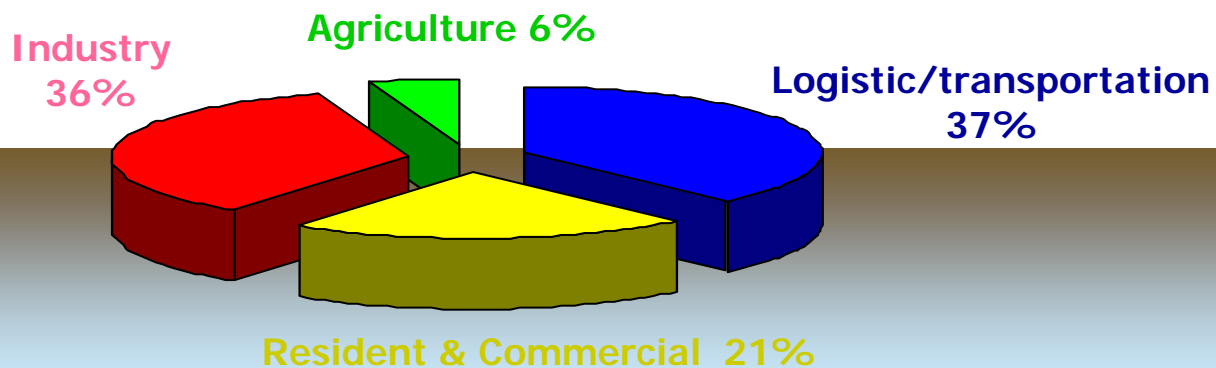
Energy Status in Thailand

Energy consumption : 51% Electricity, 49% Oil
2005 Thailand's energy cost 1,150 billion BTH, 15.7% of GDP

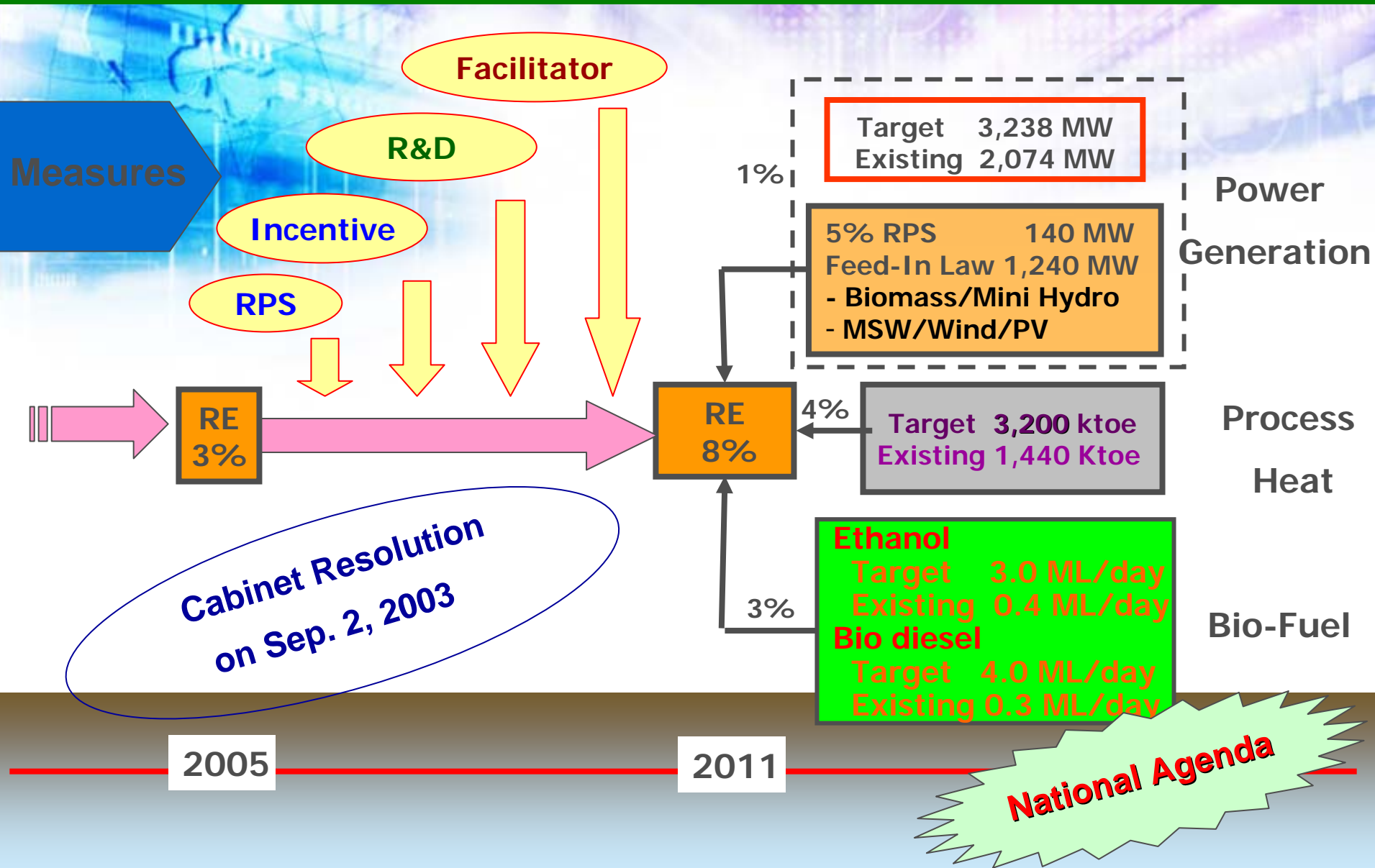
Primary energy supply



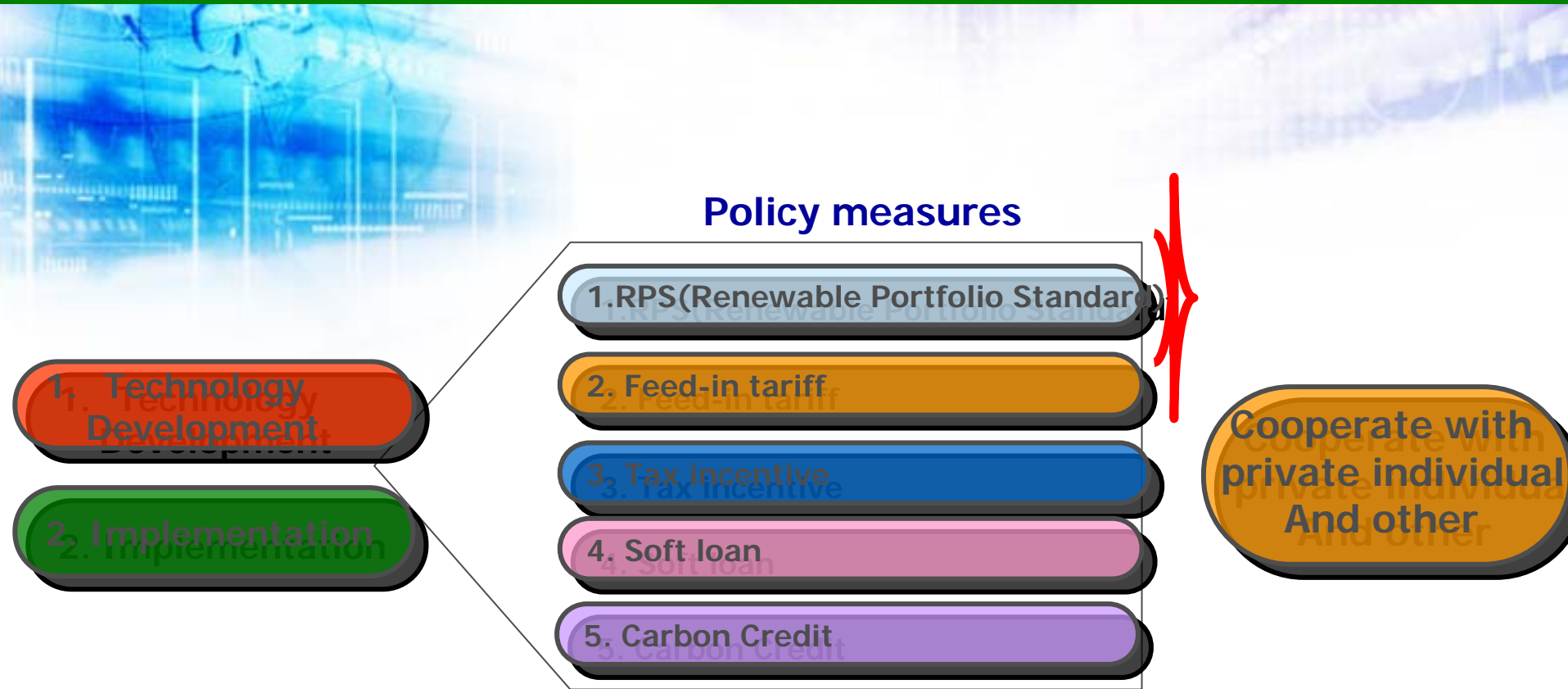
Consumption by Sector



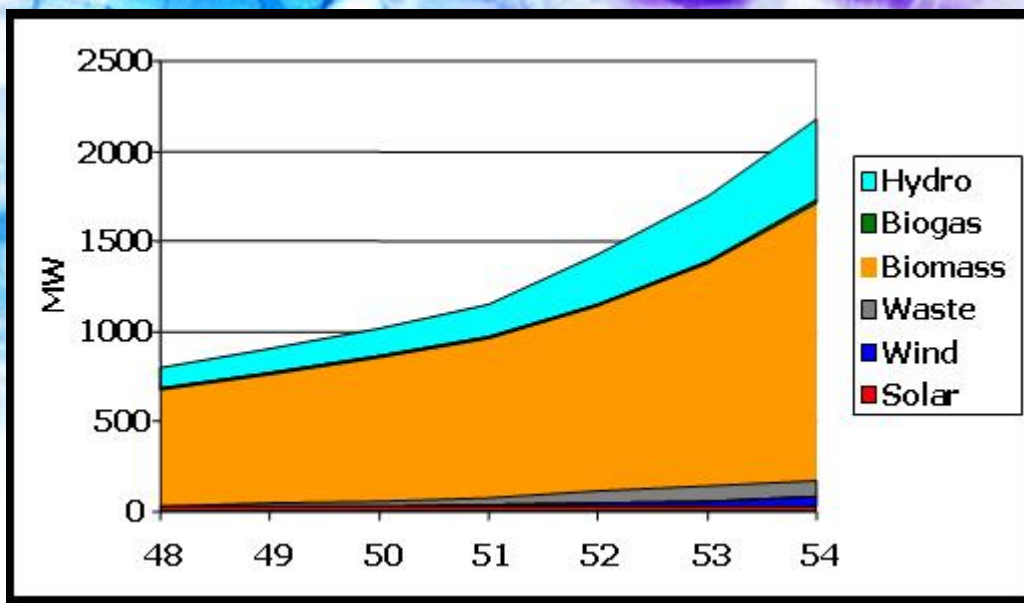
RE Development Policy and Target by 2011



Strategic Plan and Policy measure



Target for Electricity generation from renewable source in 2011




- 

Wind 45 MW
- 

Biogas 10 MW
- 

Waste 100 MW
- 

Hydro 350 MW
- 

Solar 85 MW

Target for heat generation from renewable source in 2011 (B.E. 2554)

Biomass

3,660 ktoe

- Sugar Industry
- Palm Oil Industry
- High Efficiency Boiler
- Gas generation



245 ktoe

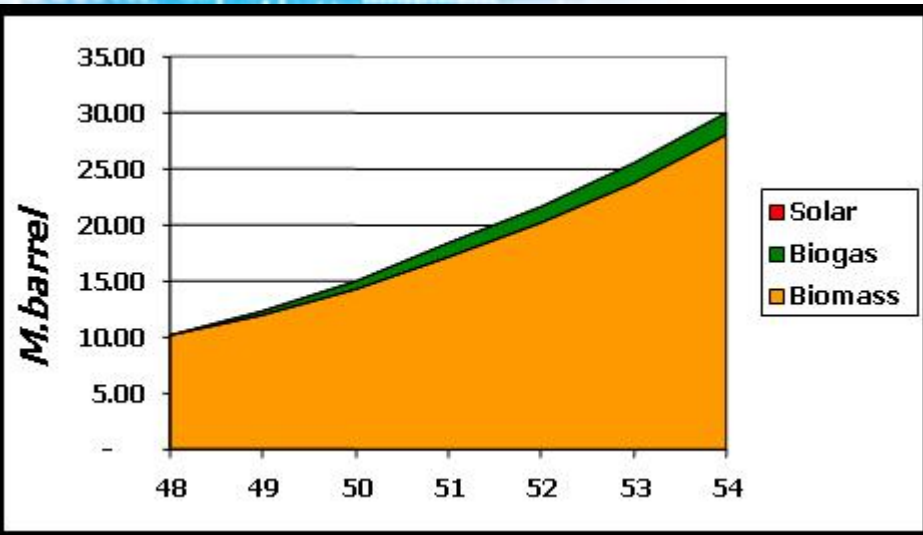
- Tapioca Starch Industry
- Food Industry
- Palm Industry
- Rubber Industry
- Paper Mills
- Ethanol Plant

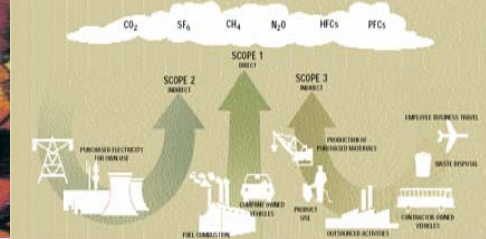


Solar

>0.1 ktoe

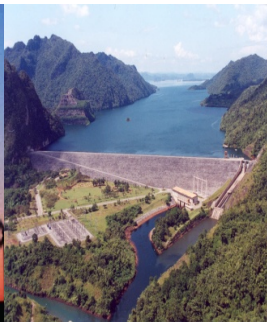
- Hot water

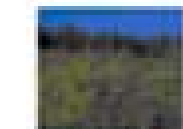




Opportunity to Develop CDM project in Biomass Sector

Status and Potential in Thailand





**FORESTRY
CROPS & RESIDUES**



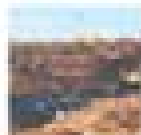
**AGRICULTURAL
CROPS & RESIDUES**



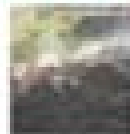
SEWAGE

**Prospect to develop CDM project
in Biomass Sector**

**INDUSTRIAL
RESIDUES**



**ANIMAL
RESIDUES**



**MUNICIPAL
SOLID
WASTE**



Biomass Potential

Sugarcane



Bagasse

[0 ton/year, 0 MW]



Cane leaves

[8,319,104 ton/year, 852 MW]

Tapioca



Tapioca Fiber

[982,636 ton/year, 97 MW]



Tapioca Root

[1,713,647 ton/year, 175 MW]

Palm Oil



Fruit Bunches

[243,036 ton/year, 25 MW]

Palm Fiber

[605,221 ton/year, 66 MW]

Palm Shell

[122,000 ton/year, 14 MW]



Empty Fruit Bunches [392,371 ton/year, 41 MW]

Rice



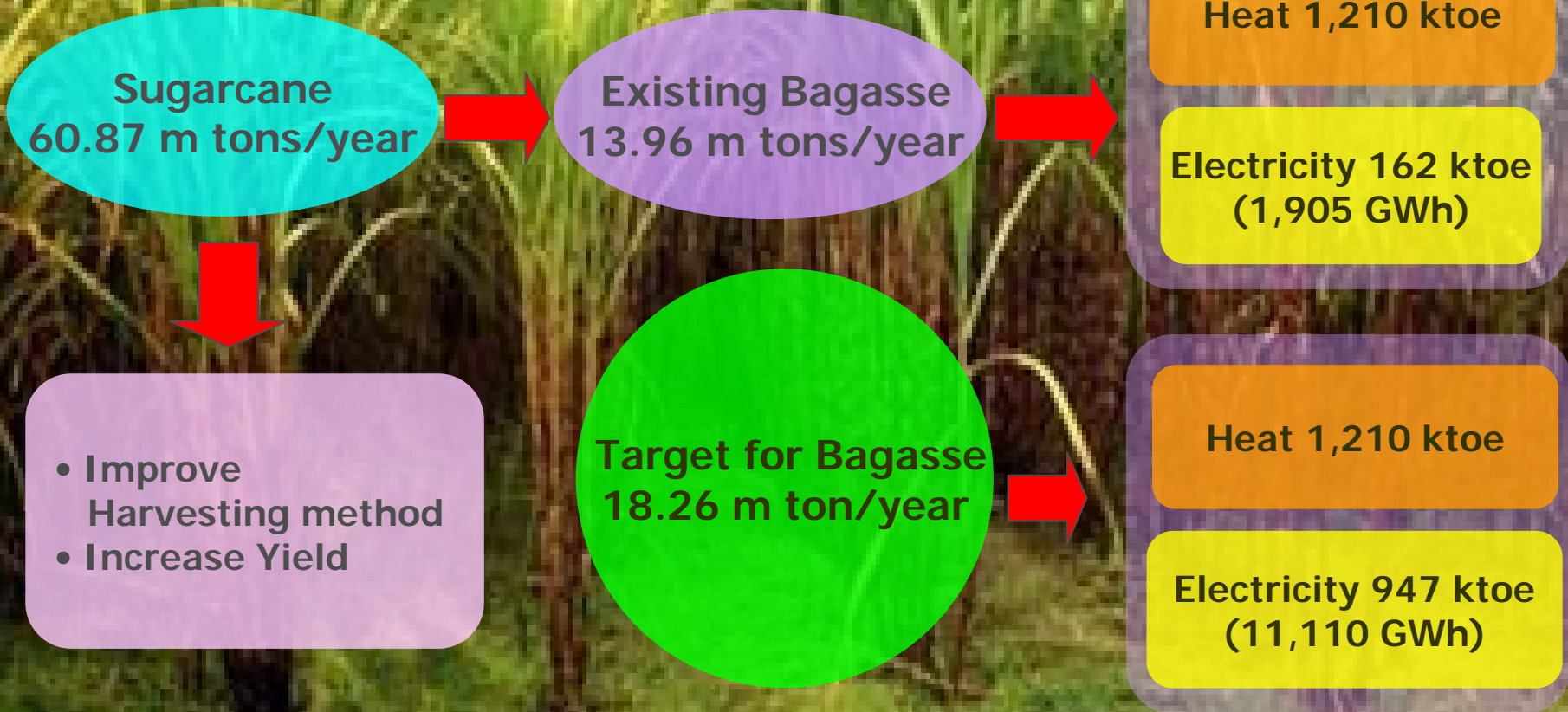
Husk

[561,461 ton/year, 86 MW]

Straw

[12,313,459 ton/year, 1,078 MW]

Biomass Potential - Sugarcane



Biomass Potential – Palm Oil

Fruit Bunches
4.13 m ton/year

Biomass
1.65 m ton/year

Heat 167 ktce

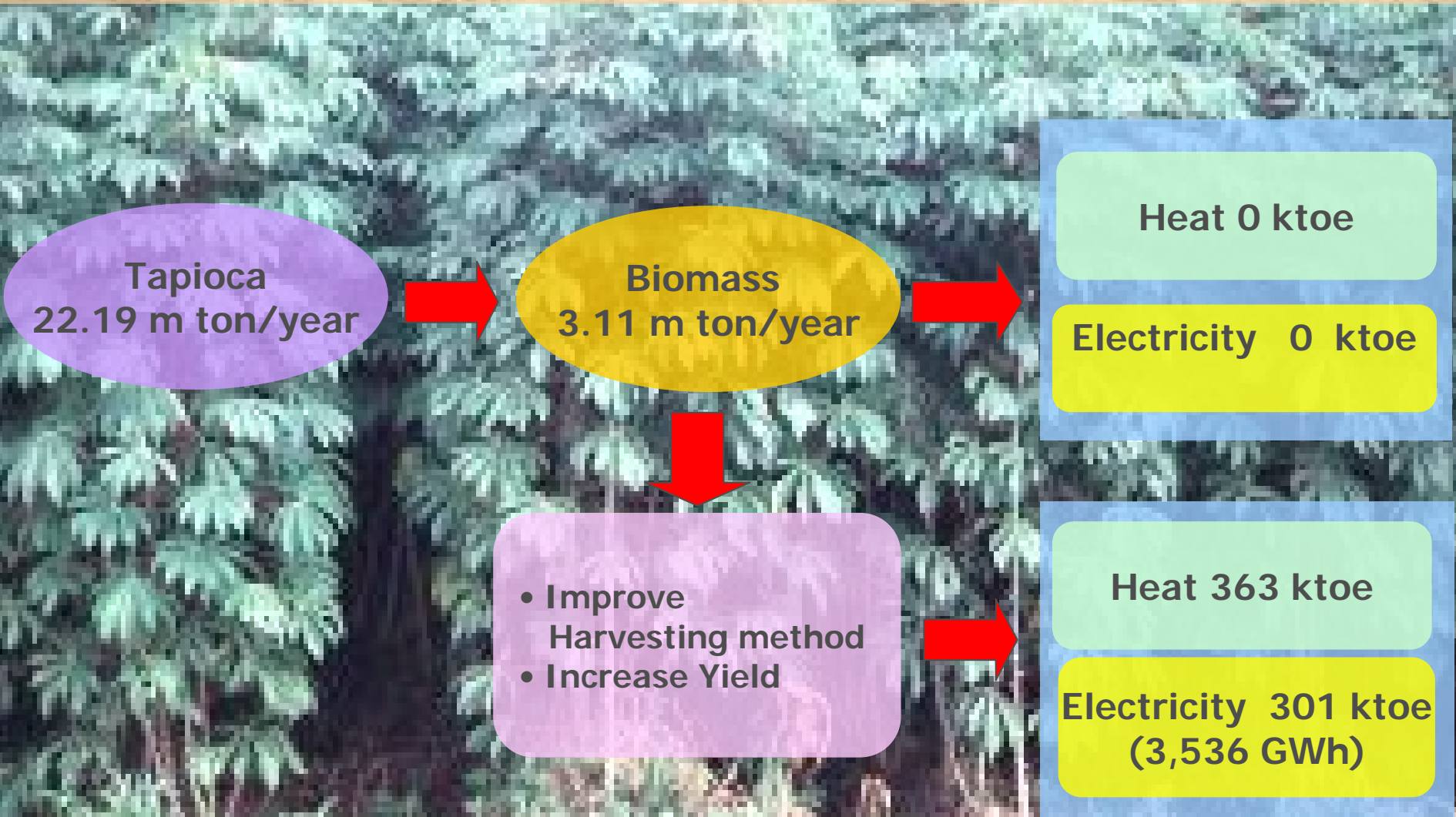
Electricity 57 ktce
(670 GWh)

- Improve Harvesting method
- Increase Yield

Heat 167 ktce

Electricity 72 ktce
(842 GWh)

Biomass Potential - Tapioca



CDM projects in priority are in ENERGY SECTOR, which includes

1. Energy generating & usage

- Biomass power generation
- Renewable energy
- Energy efficiency
- Energy conservation
- Fuel switching



2. Environment related to energy

- Waste-to-Energy i.e. waste, wastewater

3. Transportation related to energy

- Transportation efficiency improvement

4. Industrial related to energy

- Industrial process with GHG reduction

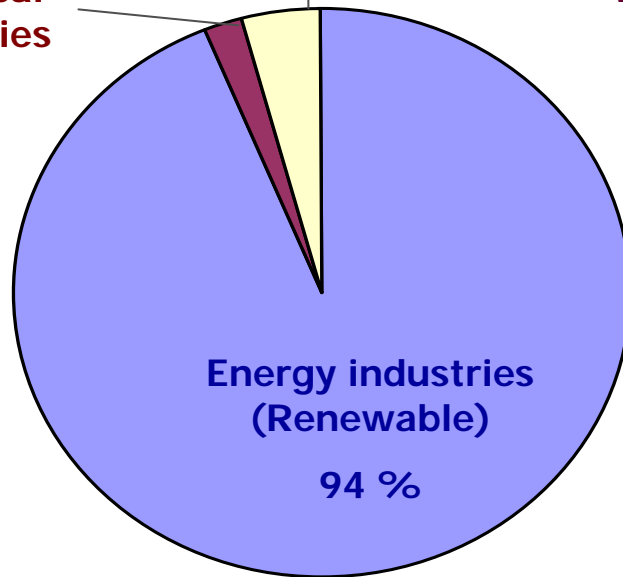
CDM Project Development in Thailand

Chemical industries

2 %

Waste handling and disposal

4 %

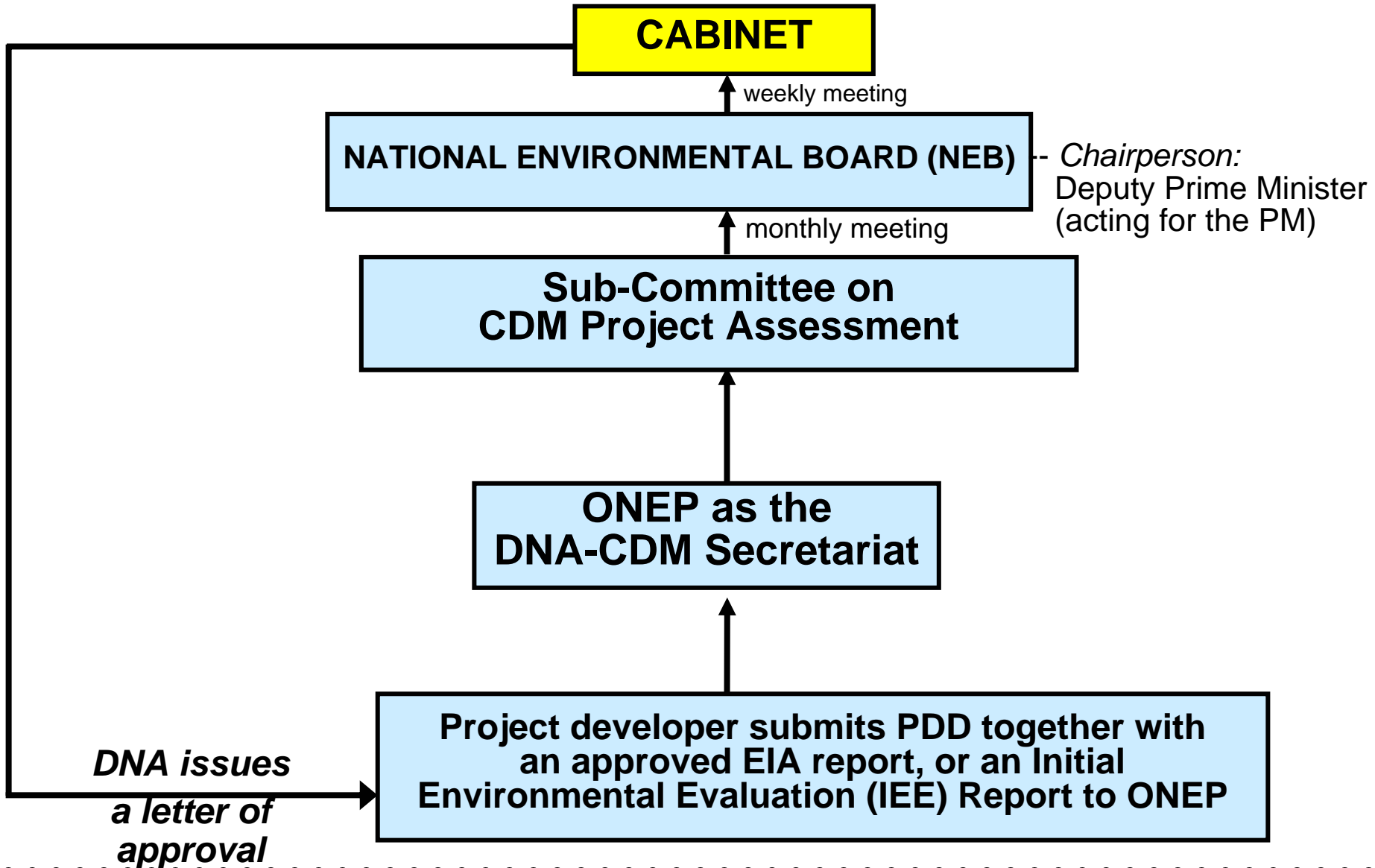


- Energy industries (Renewable)
- Chemical industries
- Waste handling and disposal

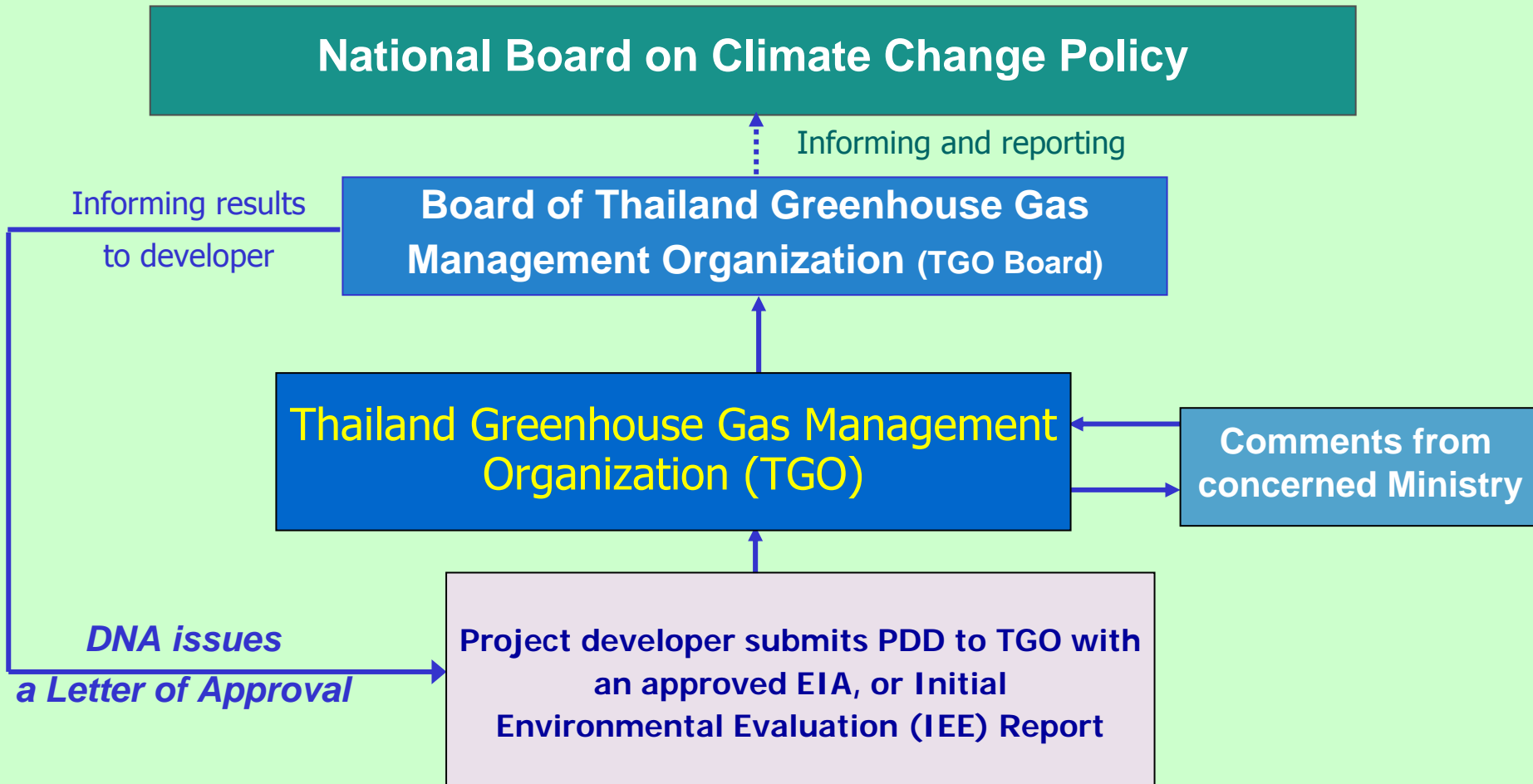
There are around 50 CDM projects development in Thailand.

(including the 17 approved projects) Feb 2008

Previous CDM Approval procedure – with the Cabinet approval



Current CDM approval procedure in Thailand – with the Thailand Greenhouse Gas Management Organization (Public Organization)



Thailand's institutional framework on climate change & GHG

National Committee on Climate Change Policy

Climate Change Coordinating Office (secretariat of the Committee) under the Office of Natural Resources and Environmental Policy and Planning (ONEP)

Policy on Vulnerability and Adaptation

Policy on Emission Sources

Policy on Carbon Sinks

Thailand Greenhouse Gas Organization (TGO) (as a DNA CDM office & technical body for GHG mitigation)

Policy & Strategy Office

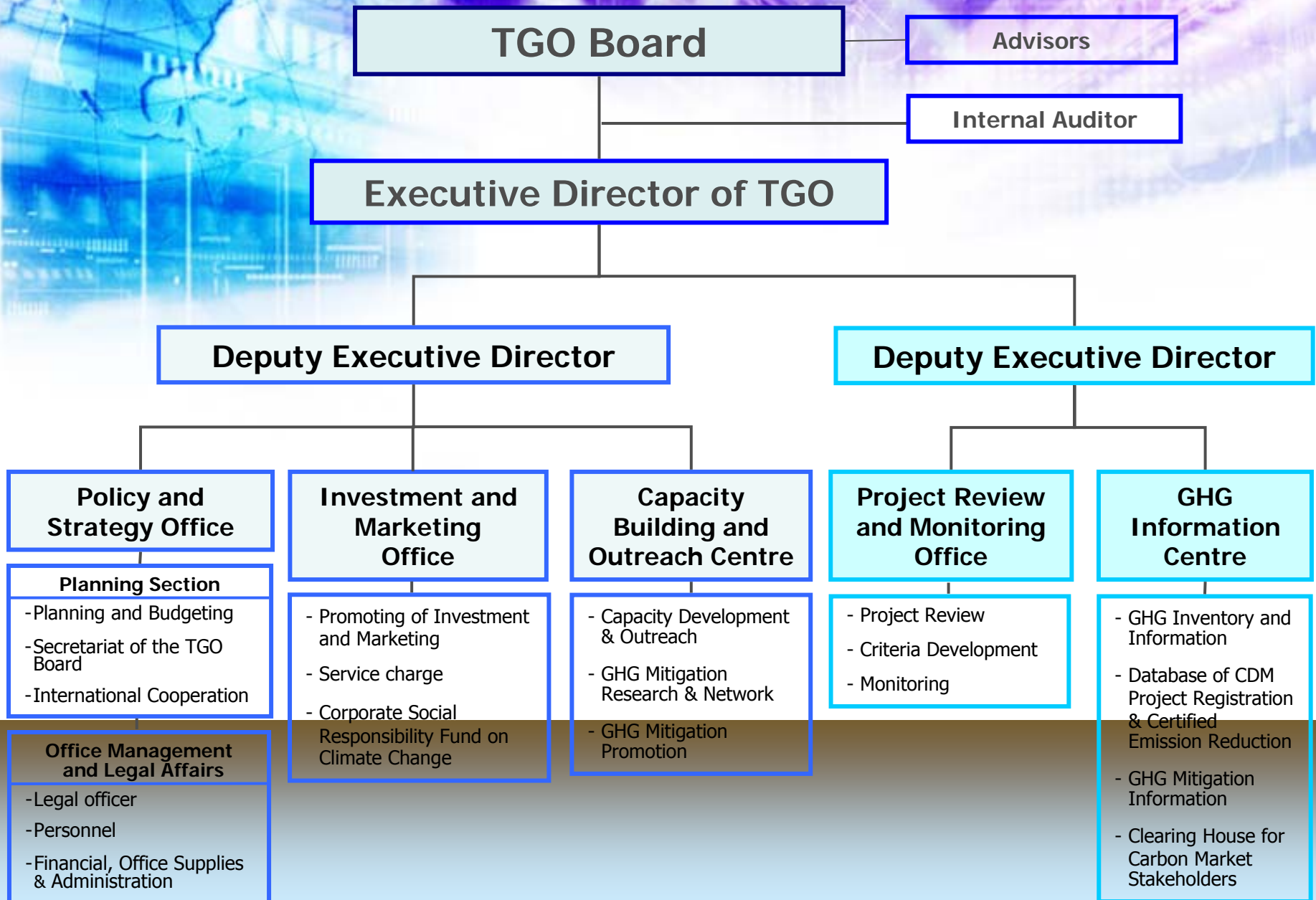
Investment & Marketing Office

Capacity Building & Outreach Centre

Project Review & Monitoring Office

GHG Inventory and Information Centre

Structure of Thailand Greenhouse Gas Organization (TGO)





Requirement for CDM Approval

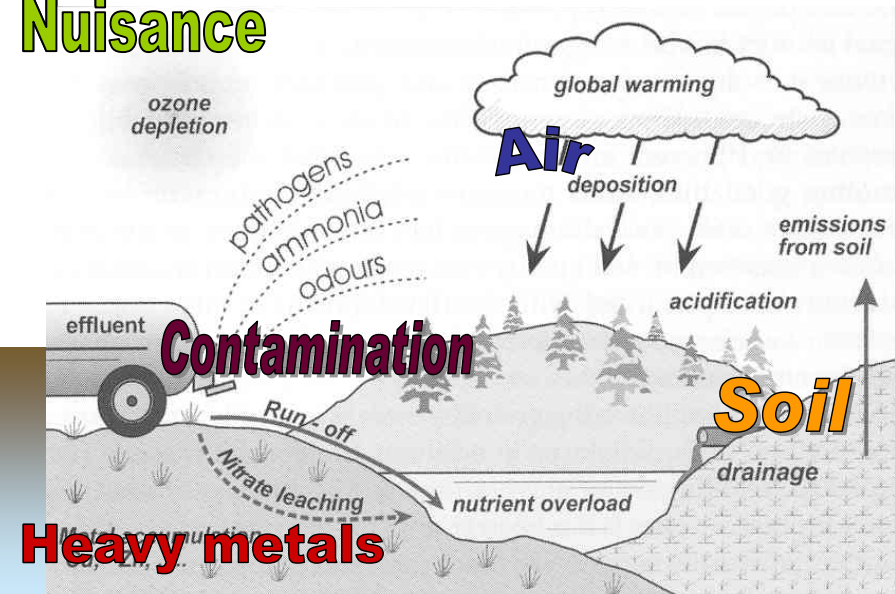
- **PDD**
- **IEE or EIA (if required by Environmental Law)**
- **Self Evaluation of Project Developer
by SD Criteria**
- **Other data, evidence (public participation)**

Sustainable Development Criteria – in principle

There are 4 major SD perspectives for project evaluation :

1. Natural resources and environment
2. Social
3. Technology
4. Economics

Nuisance



Sustainable Development Criteria – in principle

Scoring

- 1 , -2 , -3** indicates **Negative impact to the area**
- 0** indicates **no impact / equivalent to base case**
- +1 , +2 , +3** indicates **Positive impact to the area**

For the project to be considered as a CDM project, over score for each criteria and the total score should be positive.

Sustainable Development Criteria for CDM projects in Thailand

Environment & Natural Resources

- Greenhouse gas emission
- Air pollution
- Noise pollution
- Odour
- Wastewater
- Waste management
- Soil contamination
- Underground water contamination
- Hazardous waste
- Water requirement and efficiency
- Soil/ coastal erosion
- Green area
- Ecosystem and Biodiversity
- Species diversity
- Use/importation of alien species

Social

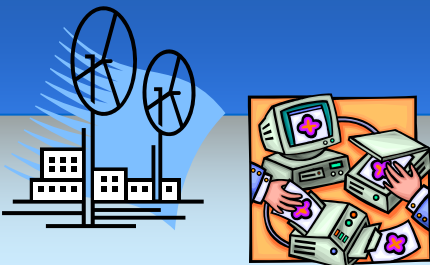
- Public participation
- Support for local community development activities
- Public health

Technology

- Technology development
- End of project life plan
- Training

Economic

- Stakeholders income
 - Labour income
 - Raw material supplier
- Energy
 - Renewable energy utilization
 - Energy efficiency
- Local content



Natural Resources & Environmental Dimension

Air pollution

- Greenhouse gas emission >> Emission of CO₂ e per production unit
- Air pollution >> Emission of other air pollutants (i.e. NO_x CO Dioxin)

Other types of pollution

- Noise pollution >> Level of noise pollution (compared with Thai official standards)
- Odour >> Level of odour pollution (Thai official standards)
- Wastewater >> Loading of wastewater (Thai official standards/ +3 for 'zero discharge')
- Waste management >> Waste management per input material
- Soil contamination >> Soil contamination (Thai official standards/ +1 for 'soil rehabilitation')
- Underground water contamination >> n/a for case 1; -1 for contamination for case 2
- Hazardous waste >> Volume of hazardous waste (Thai official standards)

Indicators



Natural Resources & Environmental Dimension

Natural resources

Indicators

- **Water needs & water use efficiency** >> Water needs & efficient use / abstraction
- **Soil/ coastal erosion** >> River bank or coastal erosion [n/a for case 1; -2 for erosion outside]
- **Green area** >> increasing of greenspace in project area compared with provincial greenspace
- **Ecosystem diversity** >> impact on ecosystem diversity
- **Species diversity** >> biodiversity indices
- **Invasive alien species introduction** >> use of genetically modified species organisms

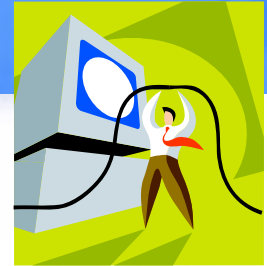
Social Dimension



- **Public participation** >> Level of public participation (i.e. informing, hearing, committee)
- **Support for local community development activities** >> support social activities, education, public health, religious and traditional activities, natural and cultural heritage, infrastructures & other facilities (i.e. 1-5 % of the project's net income from = +1)
- **Public health** >> arrangement for public and occupational health (n/a for case 1; -2 if workers were handicapped from work; -1 if more accidents occurred; 0 = comply with the Labour Act; +1 if less accidents applied within the first 5 years; +2 less accidents & provide workers health welfare; +3 if less accidents & provide workers health welfare more than 1% of the project's net income)



Technological Dimension



- **Technology development** >> Develop / import technology
- **End-of-project-life plan** >> Provide a plan for end of project life
- **Labour skill training** >> Number of skilled workers



Economic Dimension

■ Stakeholders income

- Labour income >> Labour income per year
- Raw material supplier income >> Raw material supplier income (i.e. farmers, merchants can sell their products)

■ Energy

- Renewable energy utilization >> Renewable energy usage (ton of oil equivalent)
- Energy efficiency >> Percentage of energy efficiency

■ Local content >> Proportion of local content



How we get co-benefit from CDM

Investor keeping in mind the concept of SD and should take into 4 factors leading to the approval of CDM project

1. Determination to reduce of **energy consumption and pollution** of all kinds
2. Search for most **updated and appropriate technology**
3. **Promote employees learning** and provide knowledge to the community on environmental management
4. Generate **additional values** to all stakeholders in the project including members of **nearby community**

All of the above must be carried out with **sincerity and transparency.**



CDM Administrative Fee

- **The Thai government is planning to charge:**
 - administrative fee for CDM project approval; and
 - annual fee for CDM project monitoring.
- **The objective of charging the admin fee:**
 - to cover the DNA admin expenses for approval
- **The objective of charging the annual fee:**
 - to cover regular sustainable development monitoring cost
- **Any additional income will be used for R&D in climate change area.**



VERs

Basic Introduction: VERs

Voluntary Emissions Reductions

- **VERs** can be from **CDM** Project which have **not yet Registered**, but already have Emissions Reductions. These are the most common, “**Pre-CDM VERs**”
- **VERs** can also come from **very small projects** where CDM is too expensive to pursue, or unapproved methodologies.
- Many **VERs Standard** in the market –
 - Gold Standard,
 - Voluntary Carbon Standard VCS,
 - VERs + by TUV SUD,
 - Voluntary Offset Standard VOS

Basic Introduction: VERs

Voluntary Emissions Reductions

- Unlike CERs, prices for VERs **depend on technology** and project contribution to **local sustainability**.
- So, Renewable VERs > Waste Heat Recovery VERs > Fuel Switch VERs or VERs from Methane Flaring
- Buyers buy for speculation, or to be “**carbon neutral**”

Carbon Credit Card



Carbon Foot Print

**We've reduced the
carbon footprint of
Botanics shampoo
by 20%**

You can help too. Using cooler water to wash your hair cuts CO₂ emissions, reduces your energy bills and is actually better for your hair.

Working with
the Carbon Trust



Trust



CDM project Approval in Thailand

Table 1 Cabinet Resolution approved Letters of Approval (LoA) for **17 Prompt Start CDM projects** as follows:

No.	Project	Project Developer	Project Detail	GHG reduce/year (ton CO ₂ e)
1.	Dan Chang Bio-Energy Cogeneration Project*	Dan Chang Bio-Energy Co., Ltd.	Biomass	92000
2.	Phu Khieo Bio-Energy Cogeneration Project*	Phu Khieo Bio-Energy Co., Ltd.	Biomass	99000
3.	Korat Waste to Energy Project, Thailand*	Korat Waste to Energy Co. Ltd.	Biogas	374000
4.	A.T. Biopower Rice Husk Power Project*	A.T. Biopower Co. Ltd.	Biomass	70924
5.	Rubber Wood Residue Power Plant in Yala, Thailand*	Gulf Electric Public Co., Ltd. (Gulf) Thailand	Biomass	60000
6.	Khon Kaen Sugar Power Plant*	Khon Kean Sugar Industry Public Co., Ltd	Biomass	45719
7.	Wastewater treatment with Biogas System in a Starch Plant for Energy and Environment Conservation in Nakorn Ratchasima*	Sima Interproduct Co.,Ltd.	Biogas	21500

Table 1 Cabinet Resolution approved Letters of Approval (LoA) for 17 Prompt Start CDM projects as follows: (con.)

No.	Project	Project Developer	Project Detail	GHG reduce/year (ton CO ₂ e)
8.	Wastewater Treatment with Biogas System in a Starch Plant for Energy and Environment Conservation in Chachoengsao*	Sima Interproduct Co.,Ltd.	Biogas	20300
9.	Surat Thani Biomass Power Generation Project in Thailand*	Surat Thani Green Energy Co. Ltd.	Biomass	171774
10.	Natural Palm Oil Company Limited – 1 MW Electricity Generation and Biogas Plant Project*	Natural Palm Oil Co., Ltd.	Biomass	14480
11.	Northeastern Starch (1987) CO.,Ltd. -- LPG Fuel Switching Project*	Northeastern Starch (1987) Co. Ltd	Biogas	35420
12.	Chumporn Applied Biogas Technology for Advanced Waste Water Management, Thailand*	Chumporn Palm Oil Industry Public Co. Ltd.	Biomass	30028
13.	Surin Electricity Company Limited	Surin Electric Co., Ltd.	Biomass	12584
14.	Jaroensompong Corporation Rachathewa Landfill Gas to Energy Project in Thailand	Jaroensompong Co. Ltd.	Landfill gas	991000

Table 1 Cabinet Resolution approved Letters of Approval (LoA) for **17 Prompt Start CDM projects** as follows: (con.)

No.	Project	Project Developer	Project Detail	GHG reduce/year (ton CO ₂ e)
15.	Ratchaburi Farms Biogas Project at Nongbua Farm*	Nong Bua Farm & Country Home Village Co.,Ltd	Biogas	31441
16.	Ratchaburi Farms Biogas Project at Veerachai Farm*	V.C.F. Group Co.,Ltd	Biogas	32027
17.	Ratchaburi Farms Biogas Project at SPM Farm*	SPM Feedmill Co.,Ltd	Biogas	32027

Table 2 Thailand Greenhouse Gas Management Organization approved 7 CDM projects

(22 Feb 2008) :

No.	Project	Project Developer	Project Detail	GHG reduce/year (ton CO ₂ e)
1.	Jiratpattana Biogas Energy Project	Jiratpattana Co.,Ltd	Biogas	24884
2.	Kitroongruang Biogas Energy Project	Thai Biogas Energy Company	Biogas	49488
3.	Chao Khun Agro Product Energy Project	Thai Biogas Energy Company	Biogas	46963
4.	Cassava Waste To Energy Project, Kalasin, Thailand	Cassava Waste To Energy Co.,Ltd	Biogas	86368
5.	Organic Waste Composting at Vichitbhan Plantation, Chumporn Province, Thailand	Vichitbhan Plantation Co.,Ltd	Waste Disposal	265000
6.	V.P. Farms Pig Manure Methanisation, Methane Recovery and Energy Production Project	Foxsys Co.,Ltdร่วมกับ V.P.F Group Co.,Ltd	Biogas	34673
7.	Catalytic N ₂ O Abatement Project in the Tail Gas of the Caprolactam production plant in Thailand	Thai Caprolactam Public Co.,Ltd	Chemical Industries	165000

Table 3 Thailand Greenhouse Gas Management Organization is approving 23 CDM projects:

No.	Project	Project Developer	Project Detail	GHG reduce/year (ton CO ₂ e)
1.	Khon Kaen Fuel Ethanol Project	Khon Kaen alcohol Co.,Ltd	Fuel Swith	45719
2.	Ratchasima Small Power Producer (SPP) Expansion Project	Wangkanai Group	Biomass	
3.	Utilization of Biogas and Power Generation on Wastewater from Ethanol Factory in the Kingdom of Thailand	Bio Natural energyCompany Limited	Fuel Swith	30236
4.	Power Prospect 9.9 MW Rice-Husk Power Plant	Power Prospect Company Limited	Biomass	41937
5.	Wastewater Treatment with Biogas Technology in a Tapioca processing plant at P.V.D. International Company Limited, Thailand	P.V.D International Co.,Ltd	Biogas	48481
6.	Wastewater Treatment with Biogas Technology in a Tapioca processing plant at Roi Et Flour Company Limited, Thailand	Roi-Et Flour Co.,Ltd	Biogas	38920
7.	Biomass thermal and electricity generation project for Thai Urethane Plastic	บริษัท ไทยยูรีเทน พลาสติก จำกัด และบริษัท ทียูพี เอ็นเนอร์ยี่ จำกัด	Biomass	18150

Table 3 Thailand Greenhouse Gas Management Organization is approving 23 CDM projects:
(con.)

No.	Project	Project Developer	Project Detail	GHG reduce/year (ton CO ₂ e)
8.	Siam Cement (Thung Song) Waste Heat Power Generation Project Thailand (TS5 Project)	บริษัท อนุรักษ์พลังงานซีเมนต์ไทย จำกัด	waste heat	25373
9.	Siam Cement (Ta Luang) Waste Heat Power Generation Project Thailand (TS5 Project)	บริษัท อนุรักษ์พลังงานซีเมนต์ไทย จำกัด	waste heat	44138
10.	Siam Cement (Kaeng Khoi) Waste Heat Power Generation Project Thailand (TS5 Project)	บริษัท อนุรักษ์พลังงานซีเมนต์ไทย จำกัด	waste heat	29301
11.	Wastewater Treatment with Biogas System in Palm Oil Mill at Sikao, Trang, Thailand	บริษัท โอทาโก้ จำกัด	Biomass	16446
12.	Wastewater Treatment with Biogas System in Palm Oil Mill at Saikhueng, Surat Thani, Thailand	บริษัท ไทยทาลัวร์ แอนด์ ออยล์ จำกัด	Biomass	18570
13.	Wastewater Treatment with Biogas System in Palm Oil Mill at Sinpun, Surat Thani, Thailand	บริษัท เอส.พี.โอ. อะโกร อินดัสตรีส์ จำกัด	Biomass	17083
14.	Wastewater Treatment with Biogas System in Palm Oil Mill at Bangsawan, Surat Thani, Thailand	บริษัท ไทยทาลัวร์ แอนด์ ออยล์ จำกัด	Biomass	14068

Table 3 Thailand Greenhouse Gas Management Organization is approving 23 CDM projects:
(con.)

No.	Project	Project Developer	Project Detail	GHG reduce/year (ton CO ₂ e)
15.	Wastewater Treatment with Biogas System in Palm Oil Mill at Kanjanadij, Surat Thani, Thailand	บริษัท แสงศิริ อุตสาหกรรมเกษตร จำกัด	Biomass	17083
16.	C.P.A.T tapioca processing wastewater biogas extraction and utilization project, Nakhonratchasima Province	บริษัท คอร์น โพร ดักส์ อามาดาศ (ประเทศไทย)	Biogas	149975
17.	Eiamburapa Campany Ltd. Tapioca starch wastewater biogas extraction and utilization project, Sakaeo Province	บริษัท เอี่ยมบุรพา จำกัด	Biogas	142262
18.	N.E. Biotech wastewater treatment and power production project		Biogas	
19.	Bangna Starch wastewater treatment and biogas utilization project		Biogas	
20.	CYY Biopower wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation project, Thailand		Biogas	
21.	Grid-connected Electricity Generation from Biomass at Advance Bio Power		Biomass	
22.	Green to Energy Wastewater Treatmant Project in Thailand (the project)	บริษัท กรีน ทุ เอ็น เนอयी จำกัด	Biomass	
23.	Univanich Lamthap POME Biogas Project in Krabi, Thailand	Univanich Palm Oil Public Co.Ltd	Biomass	48238



Thank you

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