

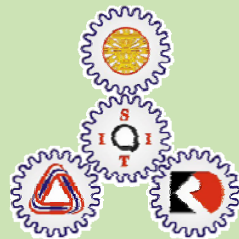
**Progress on National Policy Issues, and Policy
Contributions to Climate**

Thailand

**Symposium on Low Carbon Asia Research
Projects
July 4, 2011**

**Johor Bahru, MALAYSIA
Bundit Limmeechokchai**

Sirindhorn International Institute of Technology , Thammasat University



1st Thailand's LCS Scenario 2030 Brochure

Low-Carbon Society Vision 2030

Thailand



April, 2010



Srinthorn International Institute of Technology, Thammasat University
National Institute for Environmental Studies
Kyoto University
Mizuho Information & Research Institute
Asia-Pacific Integrated Model

Low-Carbon Society Vision 2030

Thailand



July, 2010



Srinthorn International Institute of Technology, Thammasat University
Asian Institute of Technology
National Institute for Environmental Studies
Kyoto University
Mizuho Information & Research Institute
Asia-Pacific Integrated Model

Low-Carbon Society Vision 2030

Thailand



November, 2010



Srinthorn International Institute of Technology, Thammasat University
Asian Institute of Technology
National Institute for Environmental Studies
Kyoto University
Mizuho Information & Research Institute
Asia-Pacific Integrated Model

1st Draft, Apr 2010
2010

2nd Draft, July
2010

**FINAL Thailand LCS
Brochure
November 2010**



**CTC2010 conference, organized by TGO during
19-21 August 2010.**



CLIMATE THAILAND CONFERENCE 2 0 1 0

"National Risks and Opportunities in Global Climate Change"

THAILAND GREENHOUSE GAS MANAGEMENT ORGANIZATION (PUBLIC ORGANIZATION)

Ministry of Natural Resources and Environment, The Royal Thai Government

**Thailand's LCS scenario development and other
related climate policy were presented in CTC2010**



Symposium on Asia LCS: Thailand

17-18 November, 2010

Bangkok, Thailand

**Dialogue between Policy-makers and
Researchers and Cross-sectoral Approach**

Organized by





Transition towards Low Carbon Societies in Thailand and Asia

**Dialogue between Policy-makers and Researchers and
Cross-sectoral Approach**

Synthesis Report

-Key findings from the dialogue-

**17-18 November 2010
Bangkok, Thailand**



**Asia LCS scenarios and actions:
How to achieve sustainable low-carbon society**

**Dissemination & ExSS Workshop in Thailand
Low-carbon society model capacity building workshop**

**Bridge simulation scenarios and sustainable LCS policy
implementation using AIM (Asia-Pacific Integrated Model)**

Organized by TGO, SIIT-TU, JGSEE, NIES

November 19, 2010. Pullman King Power Hotel, Bangkok



Low-Carbon Society Model Capacity Building Workshop



LCS methodology



LCS Thailand, SIIT-TU & AIT



Prof. Ho (UTM)



Mr. Boyd (IRDA)



Dr Savitri (KMUTT)
Komi



LCS India, Prof. Aashish



Chair, TGO Board



Dr Kainuma - Dr



ExSS Training



ExSS Training



ExSS Training



ExSS Training



Thailand's Low-Carbon Society Model Capacity Building Workshop

<http://2050.nies.go.jp/sympo/101119/>

Proceeding of LCS Workshop

Low-Carbon Society Scenarios towards 2050

[HOME](#)[Project](#)[News](#)[Report](#)[Symposium](#)[Member](#)[Link](#)[日本語](#)

Low-carbon society model capacity building workshop

-bridge simulation scenarios and sustainable LCS policy implementation using AIM (Asia-Pacific Integrated Model) -

November 19 (Fri) 2010

Pullman King Power Hotel, Bangkok

Organized by TGO, SIIT-TU, JGSEE, NIES



Low-Carbon Society Model Capacity Building Workshop - Bridge Simulation Scenarios and Sustainable LCS Policy Implementation using AIM (Asia-Pacific Integrated Model) -

Time	9:00-16:30, November 19 (Fri.), 2010
Venue	Pullman King Power Hotel, Bangkok, Thailand.
Language	English-Thai Simultaneous translation is available.
Organizer	TGO, SIIT-TU, JGSEE and NIES

Objectives

- 1) Introduce LCS scenario making process to stakeholders for better understanding how to use simulation studies for policy formulation and implementation
- 2) Learn to operate LCS simulation model (simple version) and assess the CO2 reduction possibilities effected by change of driving forces (population, GDP etc.) and countermeasures (energy savings in buildings and industries, modal shift in transportation etc.)
- 3) Communicate between policymakers, business, researchers to discuss how to develop feasible LCS scenarios and policy options

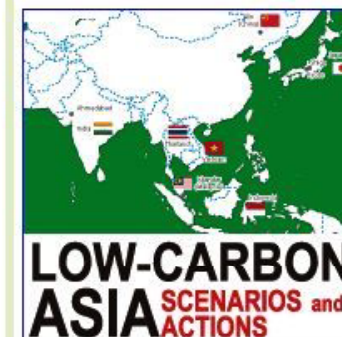
Workshop Proceedings

Presentations and discussions are summarized in a proceedings.

[Download the Proceedings](#) (PDF:17MB)



[Click to see original photo \(1.5MB\)](#)





AIM Workshop at NIES, Feb 2011





CO₂ Emissions

CO₂ emissions: Sectoral Approach

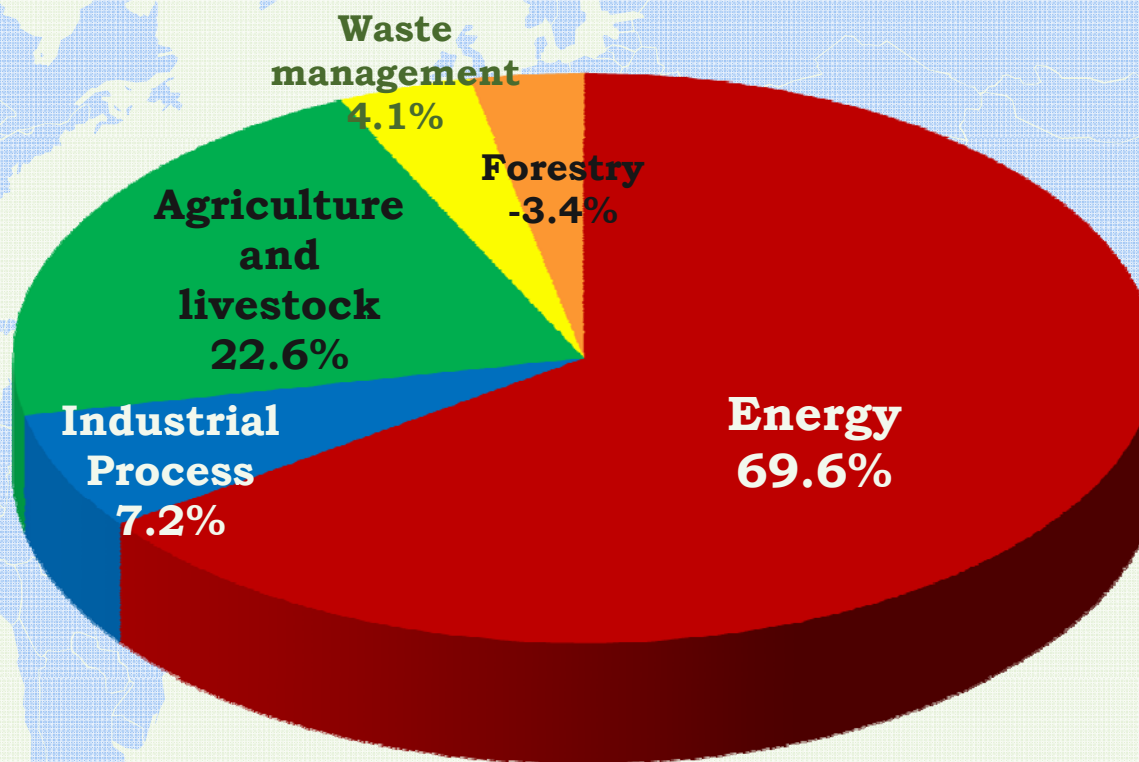
million tonnes of CO₂

	% change											
	1971	1975	1980	1985	1990	1995	2000	2005	2006	2007	2008	90-08
Australia	144.1	180.0	208.0	221.0	260.1	285.5	338.8	388.8	393.6	387.2	397.5	52.9%
Japan	758.8	856.3	880.7	878.1	1 064.4	1 147.9	1 184.0	1 220.7	1 205.0	1 242.3	1 151.1	8.2%
Korea	52.1	76.8	124.4	153.3	229.3	358.6	421.0	468.0	476.5	490.3	501.3	118.6%
New Zealand	13.7	17.1	16.4	19.6	22.0	24.9	29.8	33.5	33.9	32.5	33.3	51.5%
OECD Pacific	968.7	1 130.1	1 229.5	1 271.9	1 575.7	1 816.9	1 973.7	2 111.0	2 109.1	2 152.3	2 083.3	32.2%
Cambodia	..	..	..	..	..	1.4	2.4	3.7	4.1	4.4	4.6	..
Chinese Taipei	31.0	42.5	72.2	71.7	114.7	157.8	219.4	262.0	270.0	276.2	264.3	130.5%
India	199.4	240.3	292.7	420.2	591.0	785.0	981.3	1 159.5	1 249.9	1 337.9	1 427.6	141.6%
Indonesia	25.1	38.0	69.1	84.8	140.5	192.4	268.2	324.2	338.6	364.8	385.4	174.2%
DPR of Korea	67.5	76.7	105.6	126.4	114.0	74.9	68.8	74.3	75.4	62.3	69.4	-39.2%
Malaysia	12.7	16.1	24.2	33.4	48.9	78.5	111.1	152.8	158.1	169.9	180.9	269.7%
Mongolia	..	..	..	11.6	12.7	10.1	8.8	9.6	10.6	11.3	11.4	-9.9%
Myanmar	4.5	3.9	5.1	5.8	4.0	6.7	8.1	13.4	12.1	12.4	11.7	194.3%
Nepal	0.2	0.3	0.5	0.5	0.9	1.7	3.1	3.0	3.1	3.2	3.3	276.6%
Pakistan	16.6	20.9	26.4	39.5	59.1	80.1	97.8	118.9	127.6	139.7	133.8	126.5%
Philippines	23.1	29.0	33.1	27.7	39.5	59.0	69.9	72.1	67.7	71.8	72.3	82.9%
Singapore	6.0	8.4	12.7	16.3	28.8	37.9	42.7	44.6	44.0	44.1	44.3	53.9%
Sri Lanka	2.8	2.7	3.7	3.6	3.7	5.5	10.6	13.4	11.9	13.0	12.2	226.3%
Thailand	17.2	21.9	34.2	40.5	78.6	141.3	159.5	214.1	217.1	225.5	229.5	192.0%
Vietnam	16.1	16.7	14.8	17.2	17.3	28.0	44.5	81.6	86.1	94.0	103.0	495.7%
Other Asia	8.4	10.2	16.5	10.1	10.2	9.3	11.3	15.6	15.2	14.2	15.3	48.9%
Asia	434.1	533.7	720.4	921.0	1 280.8	1 694.9	2 137.5	2 604.5	2 738.5	2 893.8	3 022.8	136.0%

Source: EIA. 2010. CO₂ Emissions from fuel combustion.



Thailand's GHG emissions by sources in 2000



Source: Thailand's Second National Communication under UNFCCC, 2010.



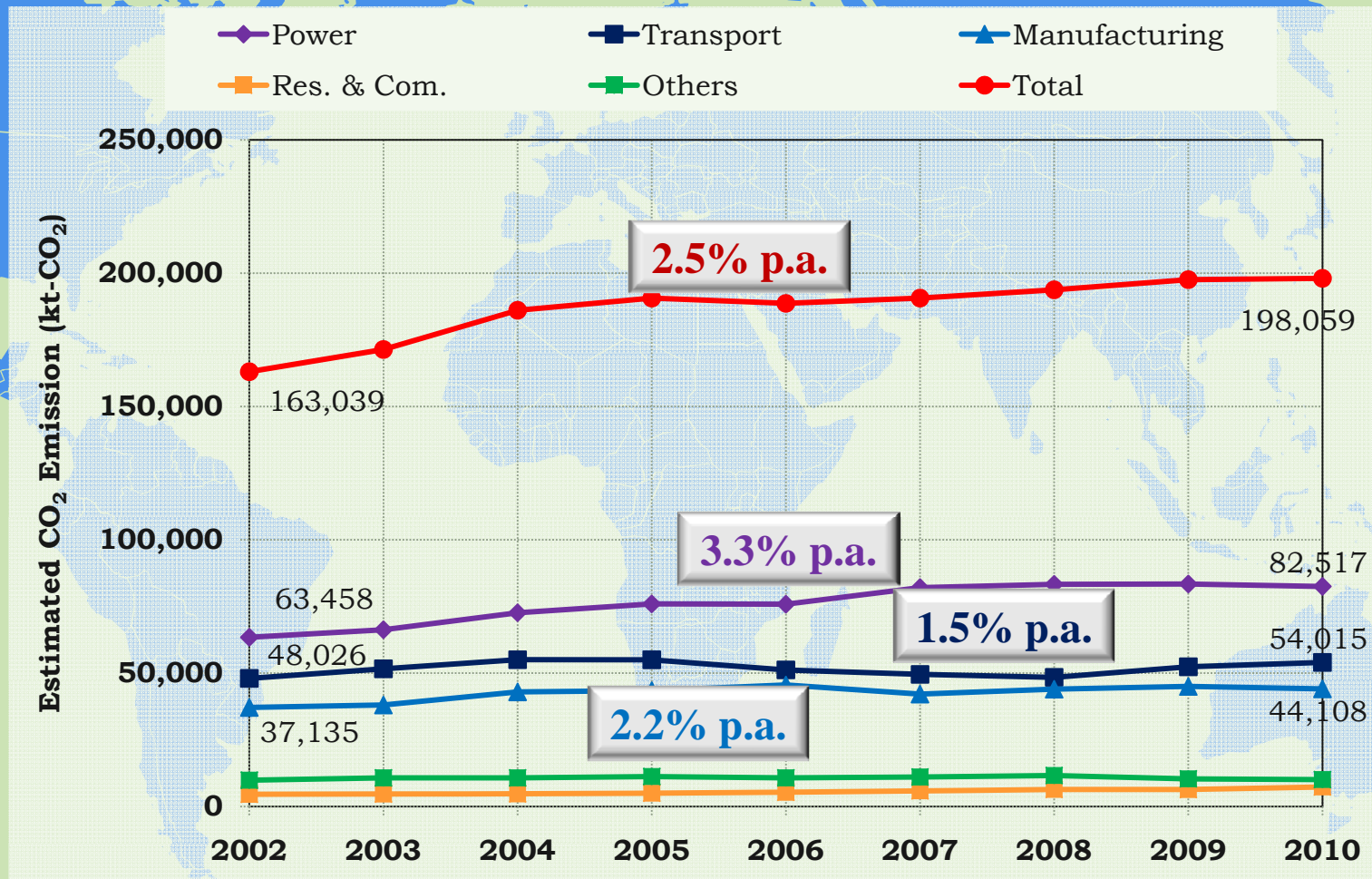
Thailand's GHG emissions by sources in 2000

Main Greenhouse Gas	CO ₂ emissions (Gg)	CO ₂ removals (Gg)	CH ₄ (Gg)	N ₂ O (Gg)
Total national emissions and removals	210,231.2	-52,374.0	2,801.5	40.0
1. Energy	149,914.6	0.0	413.9	2.5
2. Industrial processes	16,059.3	0.0	6.4	0.6
4. Agriculture			1,977.0	33.4
5. Land use change and forestry	44,234.1	-52,374.0	10.4	0.1
6. Waste	23.3		393.8	3.3

Source: Thailand's Second National Communication to UNFCCC, 2010.

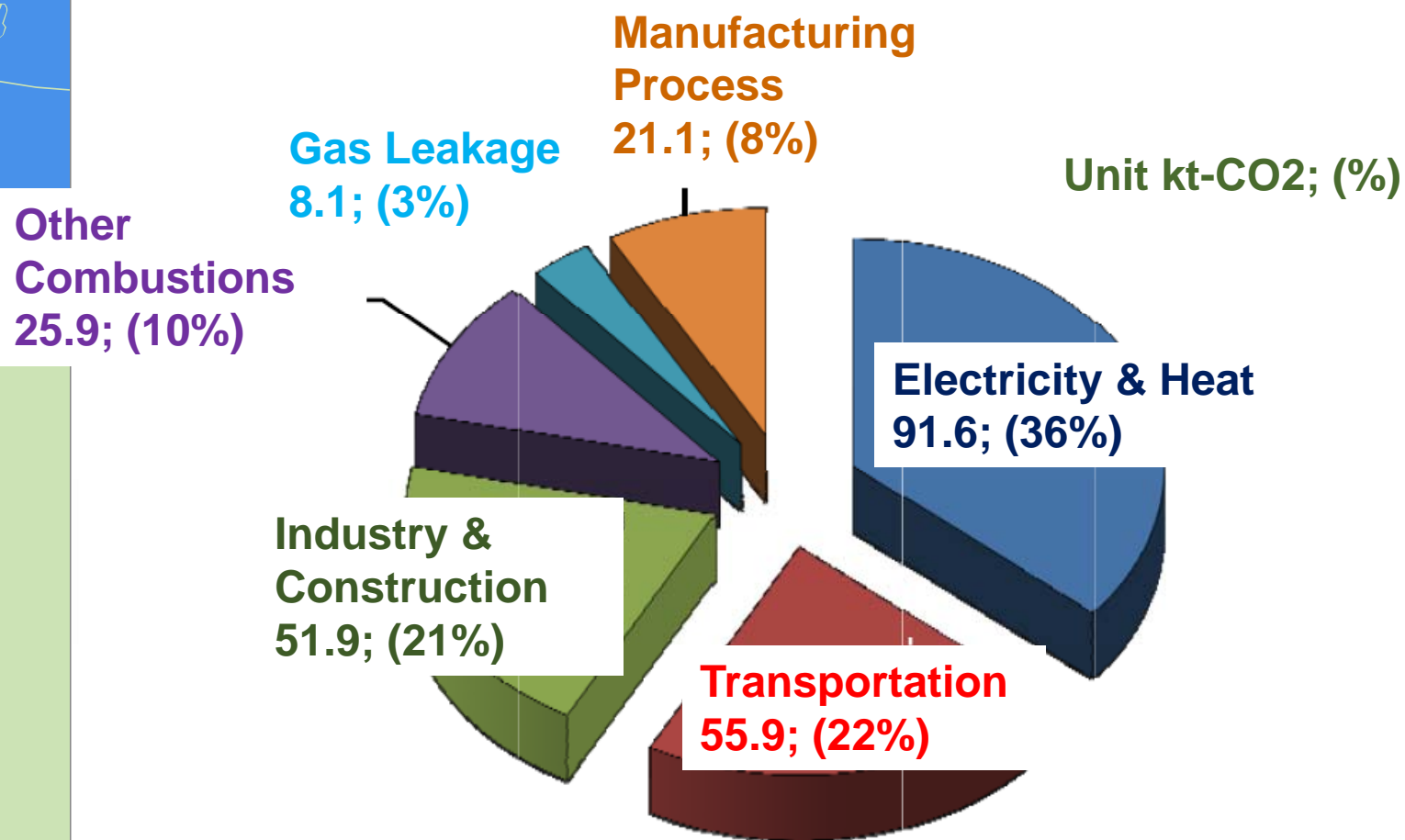


GHG Emissions in the Past





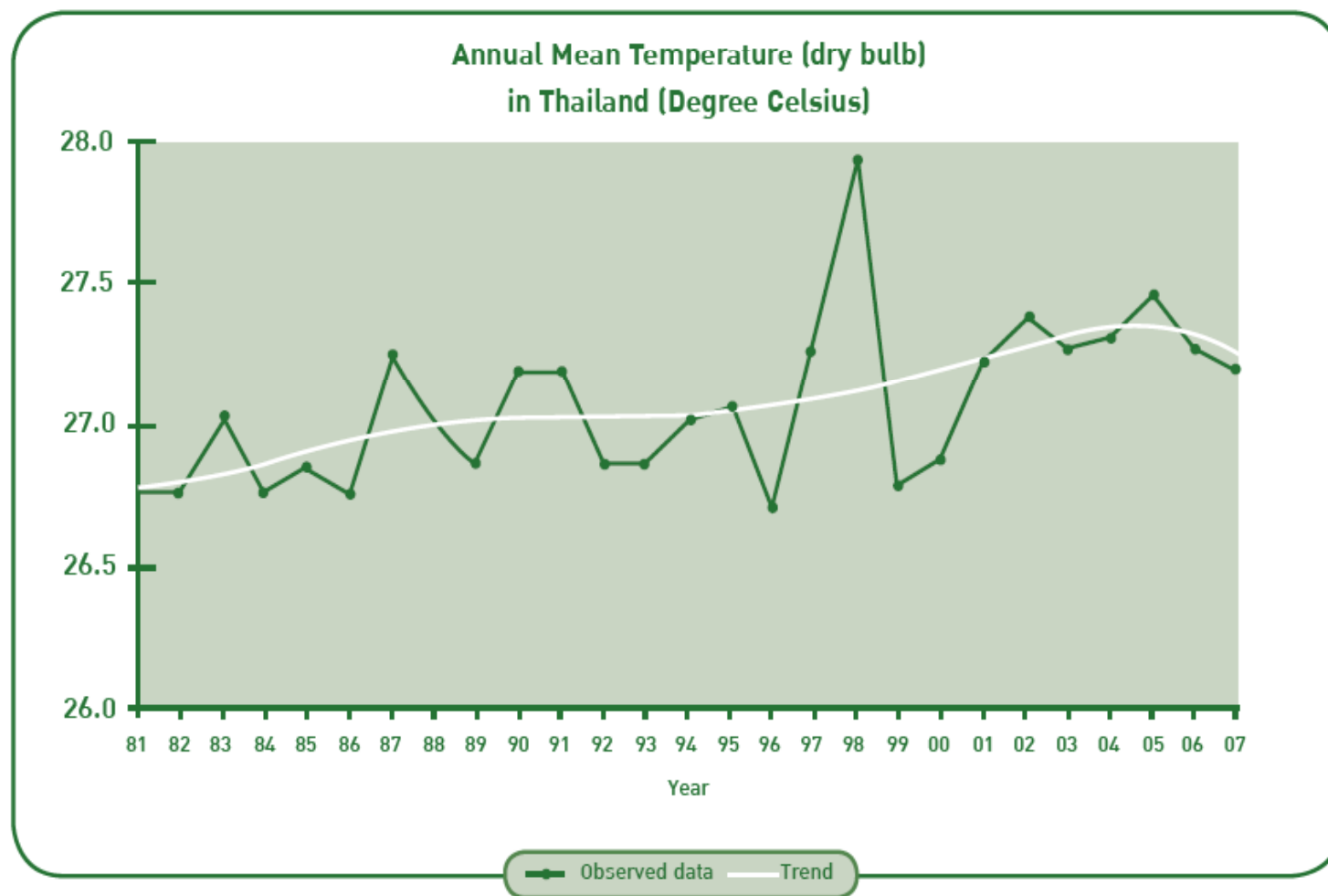
GHG Emissions in Energy Sector



Source: ONEP. 2010. National Master Plan on Climate Change 2010-2019.



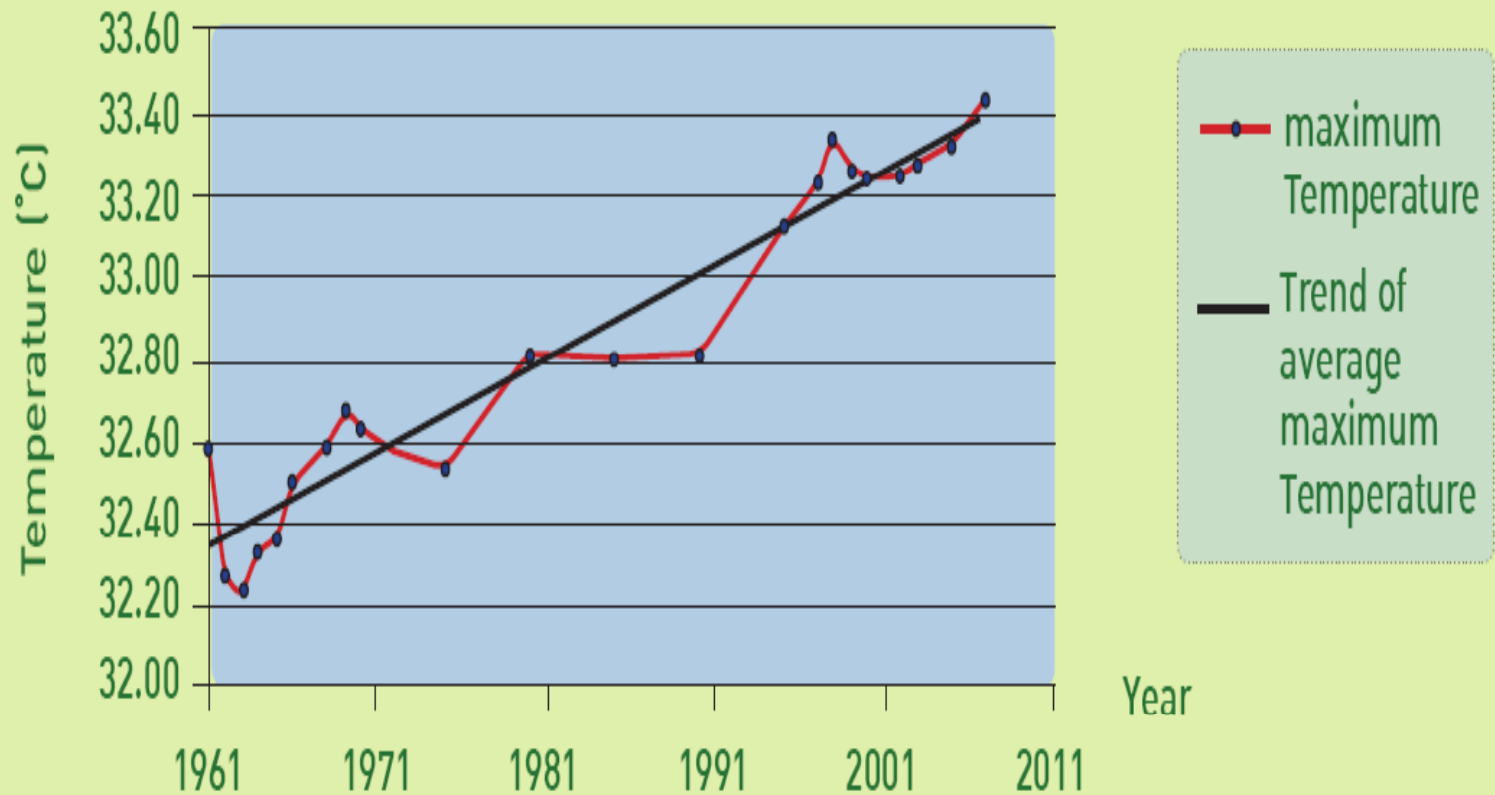
Annual Mean Temperature in THAILAND



Source: BMA, and UNEP. 2009. Bangkok Assessment Report on Climate Change.



Average Maximum Temp. in BKK



Source: BMA, and UNEP. 2009. Bangkok Assessment Report on Climate Change.



Sufficiency Economic

- ☺ ...is a philosophy bestowed by King Majesty.
 - ☼ Need of self-immunity for Sufficiency Economy.
- ☺ Energy Plan Strategy based on **“Sufficiency Economic”**
 - ☼ Promote energy savings
 - ☼ Promote the use of local fuel or domestic supply
 - ☼ Research & Development on local/city-based alternative energy.

Source: Energy Strategy, MOEN Thailand.



Thailand Energy Strategy

1. Energy Security

- ☐ Search for NEW domestic crude oil reserve.
- ☐ Search for More Options of natural gas supply in country.
- ☐ Develop & Implement national supply sources such as RE and Small hydro etc.
- ☐ R&D on new technologies: Clean Coal etc.

Source: Energy Strategy, MOEN Thailand.



Thailand Energy Strategy

2. Renewable Energy

- ☐ Promote RE T: *Biogas, Biomass, Biodiesel, and Wastes to Energy etc.*
- ☐ Increase vehicle share (fuel share?) for *Gasohol, Biodiesel, and NGV.*
- ☐ R & D on New & RET following **15-year REDP.**
- ☐ Develop *“Green House/Energy Saving Concept”*.
- ☐ Increase incentives on *“Adder”* for RE power generation.

Source: 2011 Energy Strategy, MOEN Thailand.

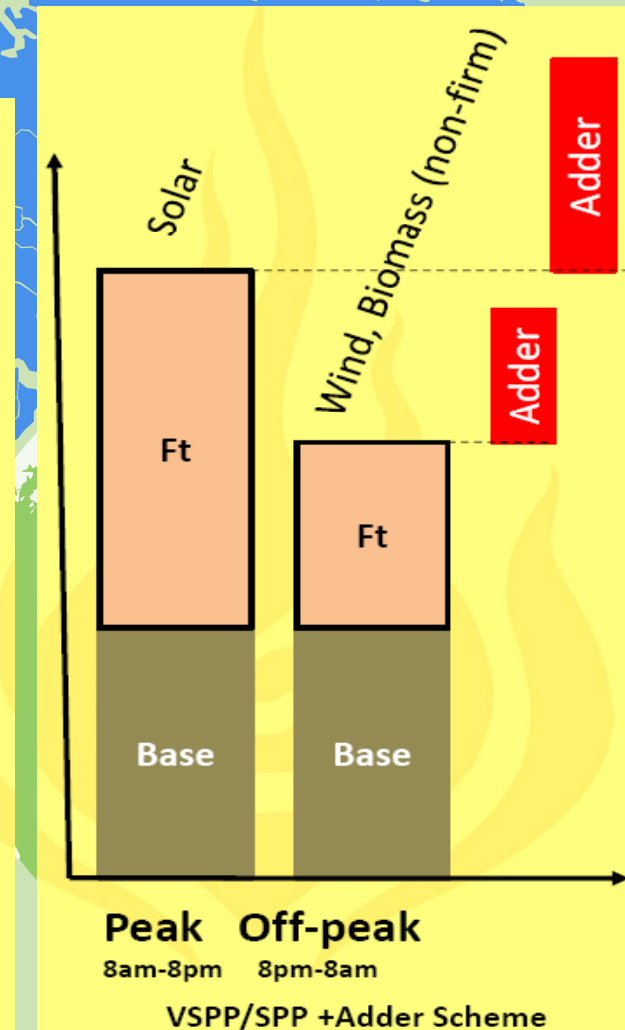
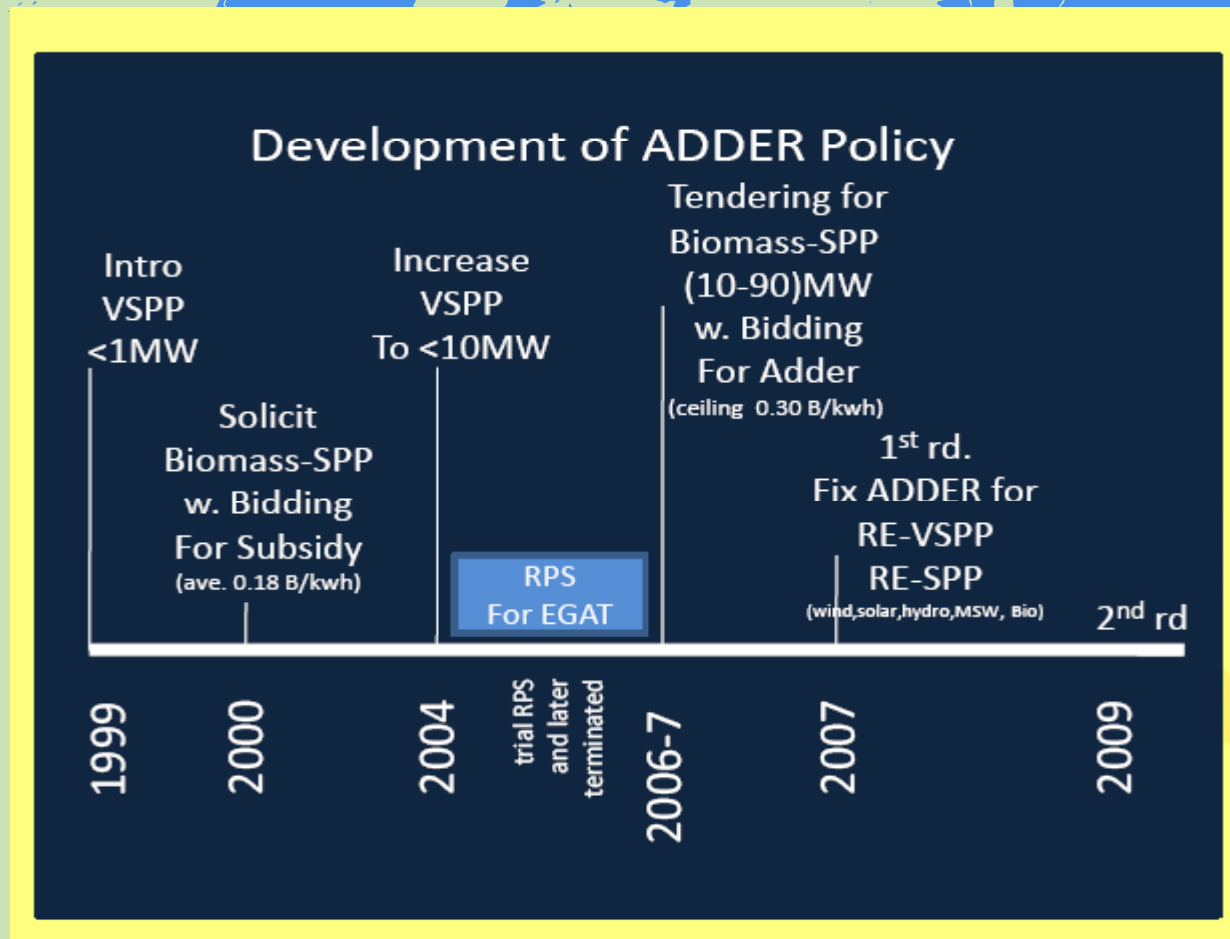
Electricity Production from RET: *Adder*

Sources	Target Installed Capacity (MW)		
	2008-2011	2012-2016	2017-2022
Solar	55	95	500
Wind	115	375	800
Municipal Solid Waste (MSW)	78	130	160
Biomass	2,600	3,220	3,700
Hydro	165	281	324
Biogas	60	90	120
<u>Financial Support (MBaht)</u>	<u>3,273</u>	<u>4,191</u>	<u>5,504</u>

Source: 2011 Energy Strategy, MOEN Thailand.

Electricity Production from RET: Adder

- More incentives for smaller projects



Source: DEDE-MOEN, 2010. Thailand's REDP.



Thailand Energy Strategy

3. Energy savings & Energy Efficiency

- ☐ Set EE equipment standard .
- ☐ Regulation for Equipment & Buildings
 - EI in Refrigerator & AC (-10%)
 - Standby Power 1-Watt in 2010 and save 4,000 MBaht/year
 - Energy saving in New Buildings by 10%
- ☐ Target to reduce EI (Energy intensity) by 20% in industry (?) in 2011 (Base year in 2006).
- ☐ R&D on New Technologies.

Source: 2011 Energy Strategy, MOEN Thailand.



Thailand Energy Strategy

4. Environment Effects

- ☐ Pilot Power Plant for the study of Emissions (1 NG, 1 Coal, 1 CCGT)
- ☐ Encourage CDM Projects
- ☐ Pilot Project for CCS

Ministry of Energy (MOE)

Source: 2011 Energy Strategy, MOEN Thailand.



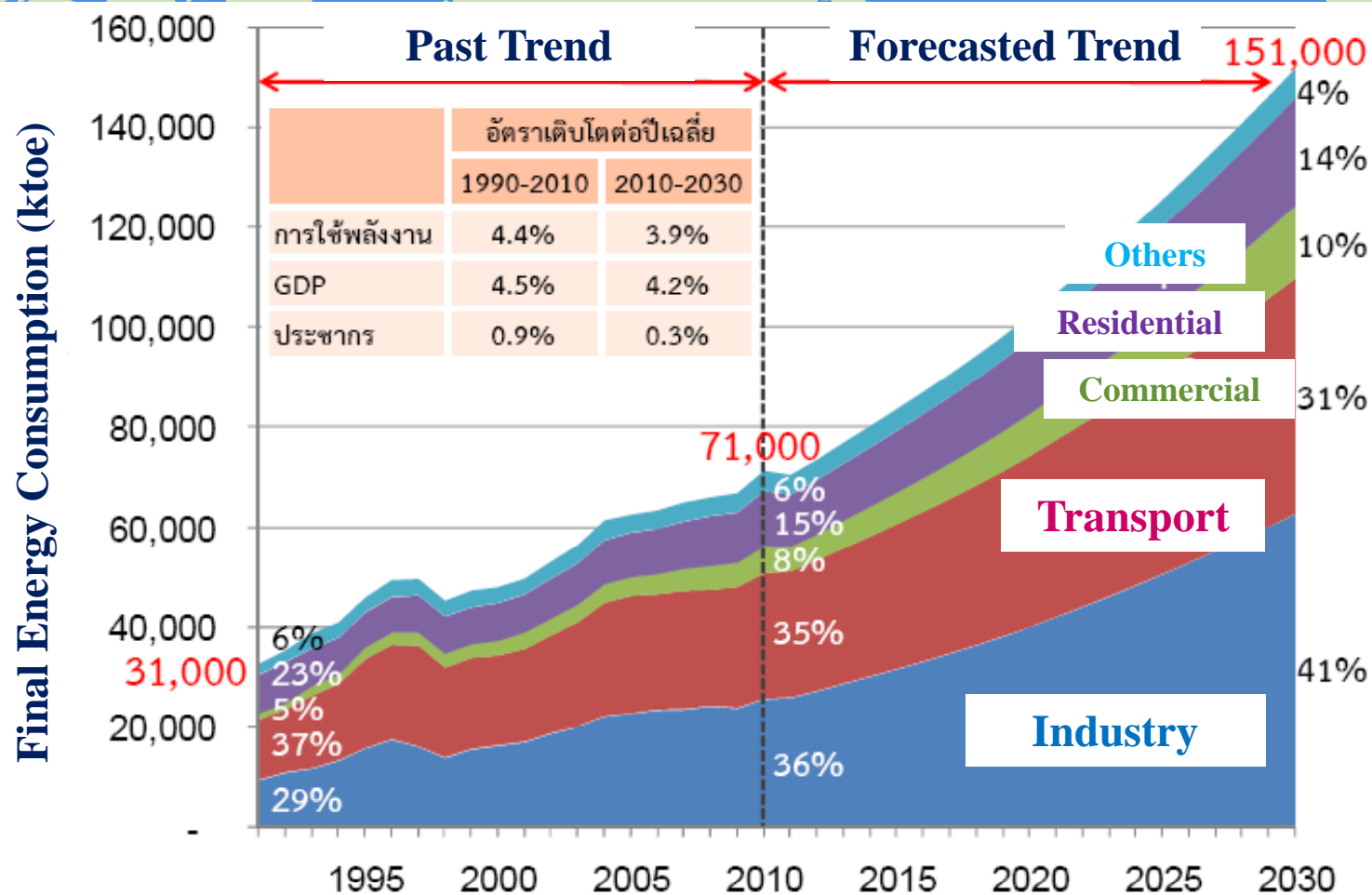
20-year Energy Conservation Plan (2011)

1. Target to decrease energy intensity by 25% in 2030 (base year 2005).
2. Target to reduce final energy consumption by 20% in 2030.
3. Labeling on Energy Efficient Equipment.
4. Energy efficiency resource standard (EERS) for supply side.
5. Promote high energy efficient vehicles such as Eco Cars and Electric Bike.

Source: MOEN. 2011. 20-year Energy Conservation Plan



20-year Energy Reduction Plan



Source: MOEN. 2011. 20-year Energy Conservation Plan



20-year Energy Conservation Plan

1. Energy Regulation & Standard

- ☐ Mandatory labeling
- ☐ Minimum energy performance standards (MEPS)
- ☐ Energy Efficiency Resources Standards

2. Energy Saving Strategy

- ☐ Voluntary Agreement
- ☐ Mass transit
- ☐ ESCO fund

3. Behavior by Low Carbon Society

4. Technology/Knowledge Improvement

5. Capacity building

Source: MOEN. 2011. 20-year Energy Conservation Plan



20-year Energy Conservation Plan

3. Behavior Adaptation

- ☐ Eco-driving
- ☐ Implement “Low Carbon Society”

4. Technology/Knowledge Improvement

- ☐ R&D

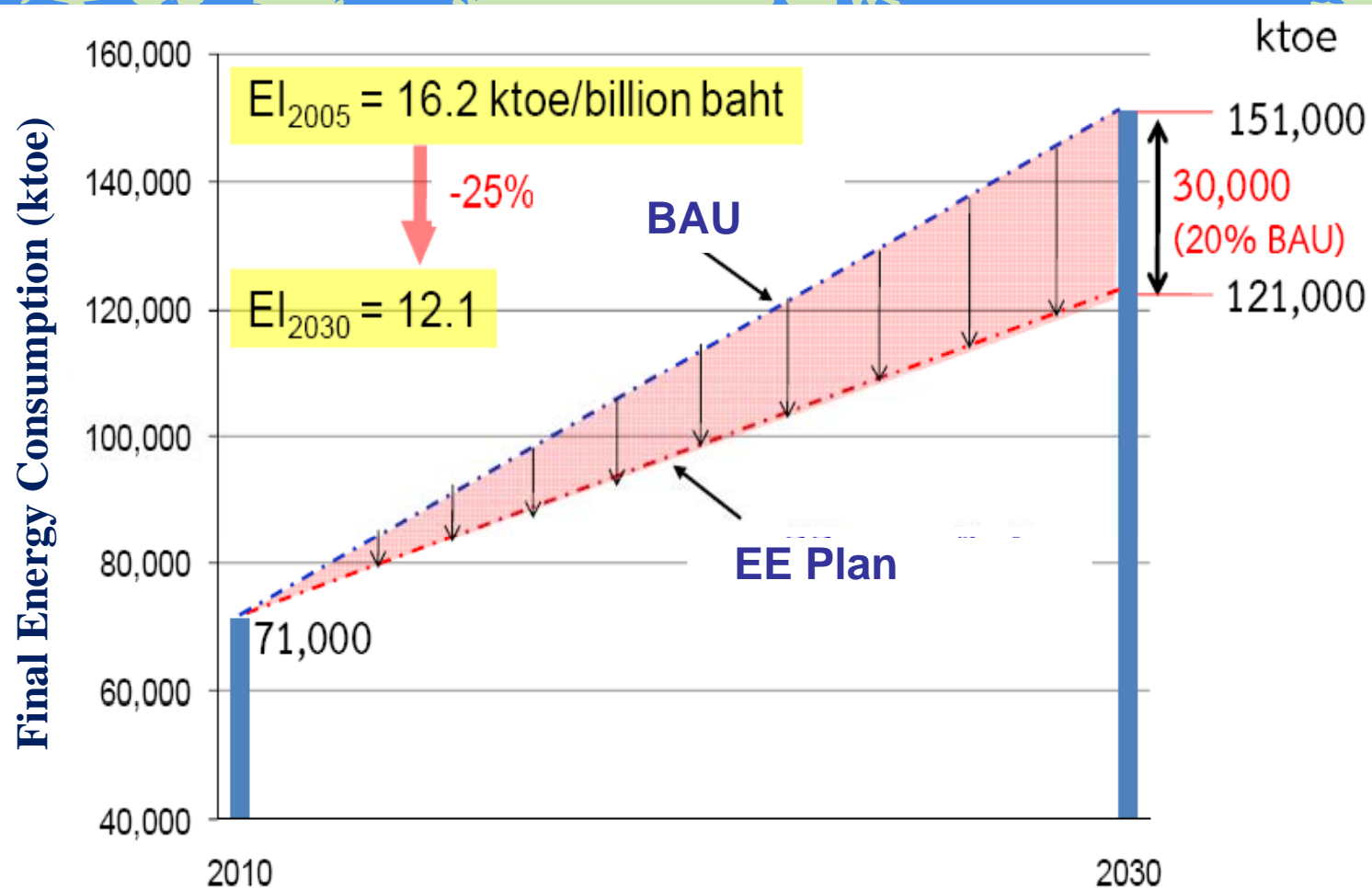
5. Capacity building

- ☐ Energy conservator
- ☐ Institutional frameworks

Source: MOE. 2011. 20-year Energy Conservation Plan



20-year Energy Reduction Plan



Source: MOEN. 2011. 20-year Energy Conservation Plan



15-year Thailand's Renewable Energy Development Plan (REDP)

1. Short Term (2008-2011)

- ☐ Implement RE Tech.: Biogas, Biomass, Biodiesel, and Wastes to Energy etc.
- ☐ R&D on Biodiesel & Ethanol from Algae, Cellulose, Jatropha, Hydrogenation, BTL.

2. Medium Term (2012-2016)

- ☐ Encourage RE Tech.: Biogas, Biomass, Biodiesel, and Wastes to Energy etc.
- ☐ Develop “Green City”.
- ☐ R & D Hydrogenation, BTL

Source: DEDE-MOEN.



15-year Thailand's Renewable Energy Development Plan (REDP)

3. Long Term (2017-2022)

- ☐ R & D on Hydrogenation, BTL, Cellulose.
- ☐ Expand "Green City".

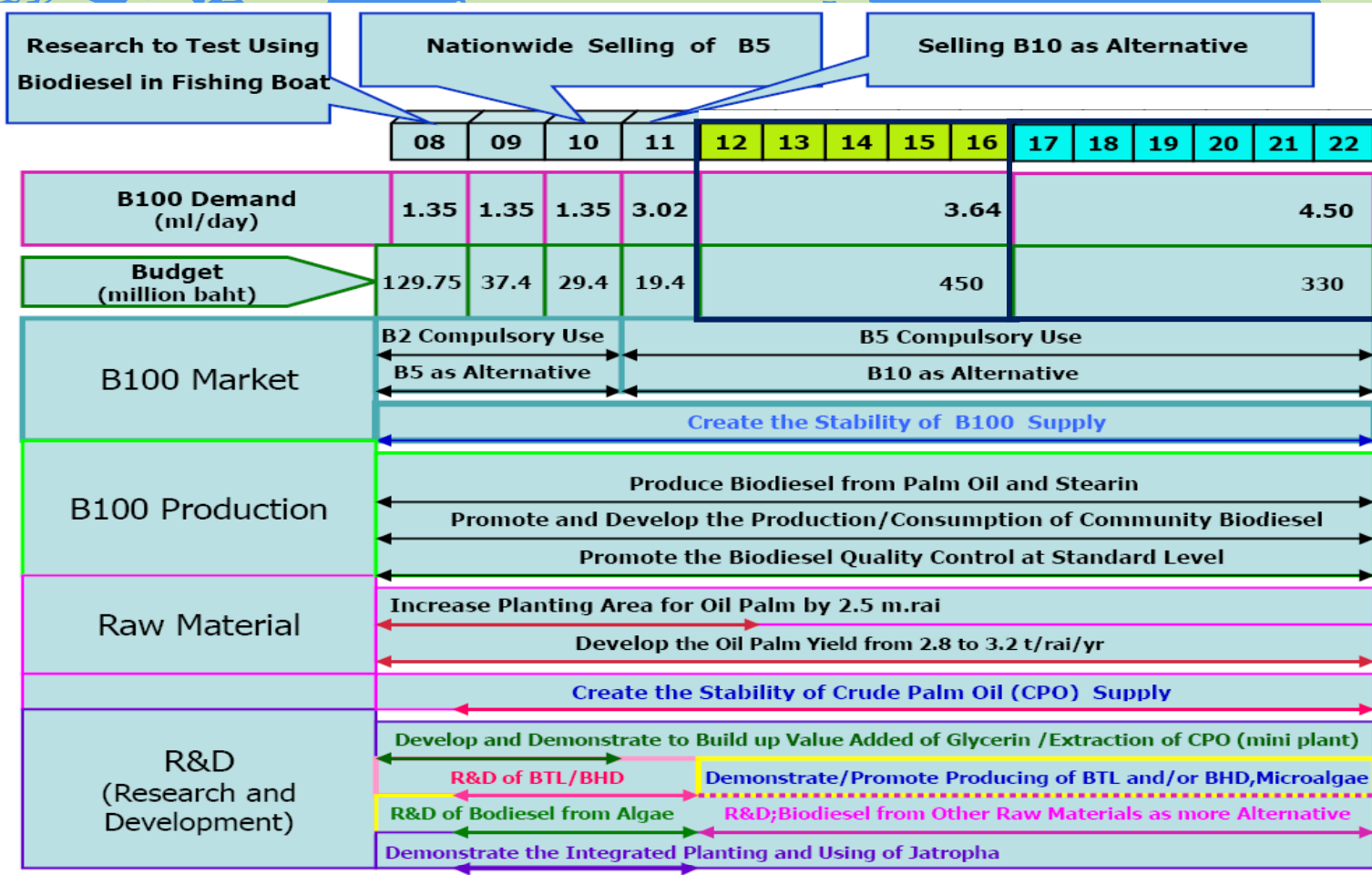
Department of alternative energy development and efficiency (DEDE)

Source: DEDE-MOEN.



Biodiesel Development Plan: 2008-2022

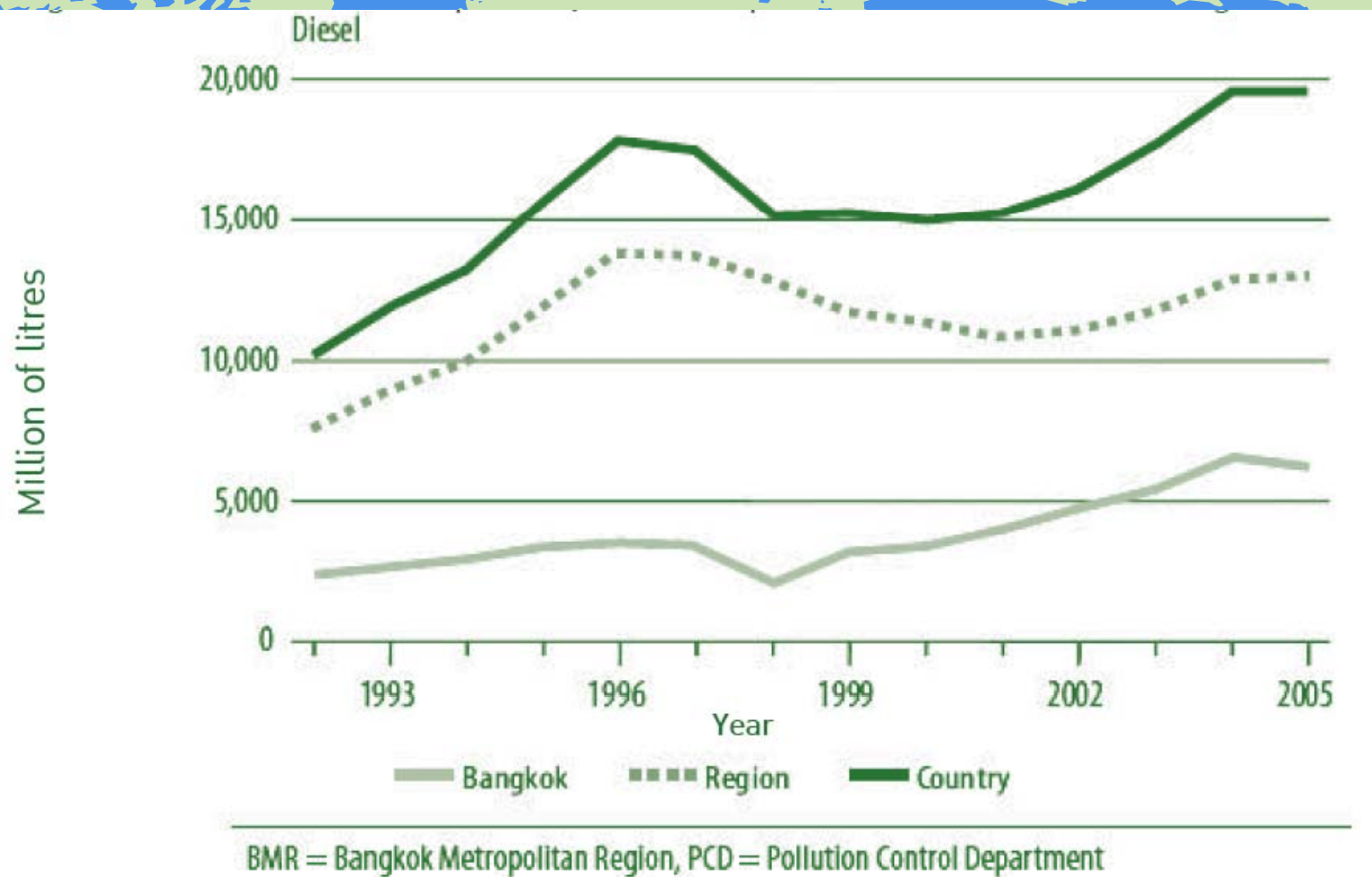
Department of alternative energy
development and efficiency (DEDE)



Source: DEDE-MOEN.



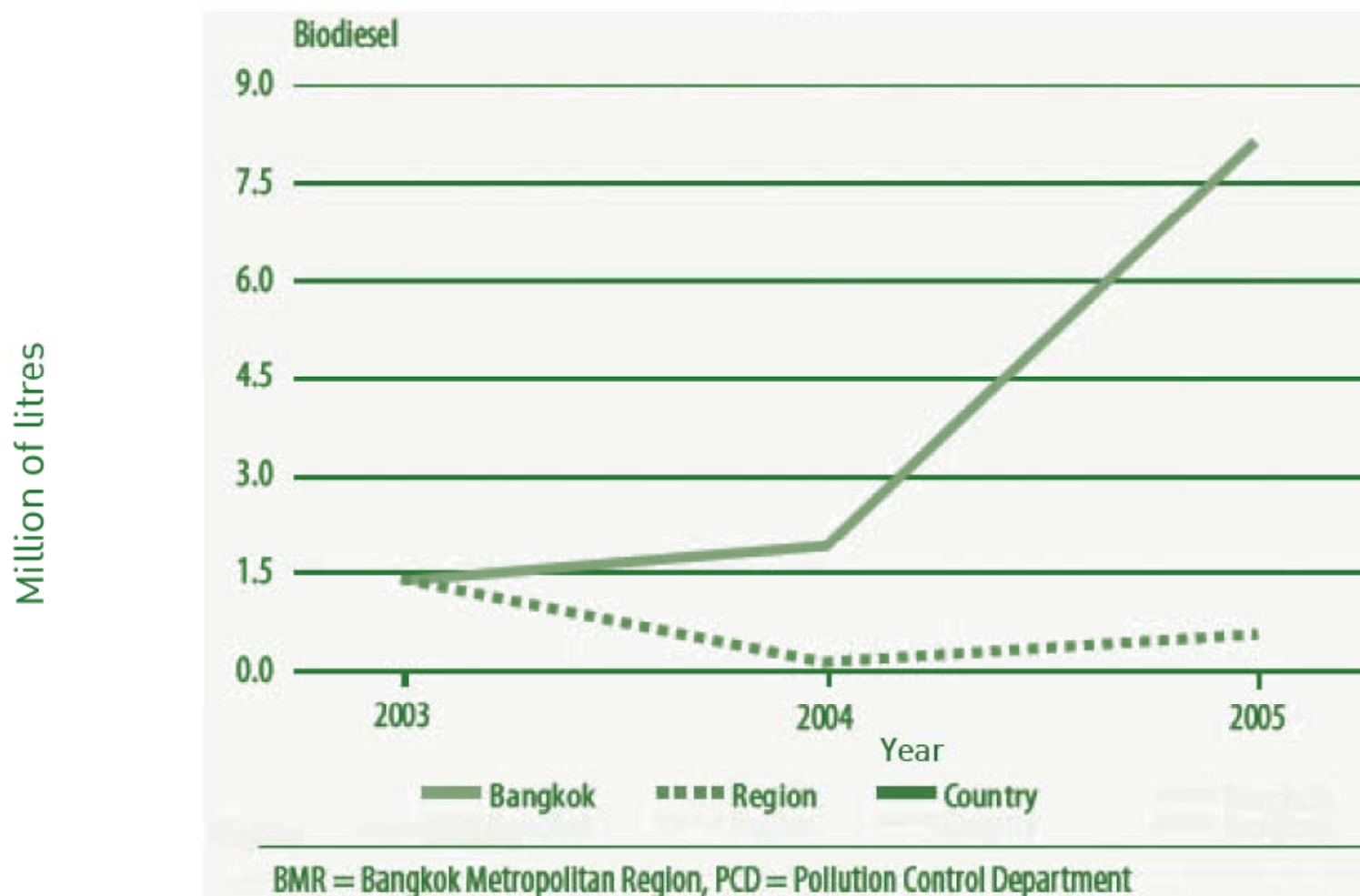
Diesel Consumption by the transport in BMR & BKK



Source: BMA, and UNEP. 2009. Bangkok Assessment Report on Climate Change.



Biodiesel Consumption by transport in BMR & BKK



Source: BMA, and UNEP. 2009. Bangkok Assessment Report on Climate Change.



Ethanol Development Plan: 2008-2022

Development Plan	Short Term (2008-2011)	Middle Term (2012-2016)	Long Term (2017-2022)
1. Feedstock/Raw Materials	* Research and develop for increasing the yields of cassava and sugarcane		
	* Research and develop for producing ethanol from other alternative crops		
2. Ethanol Industry	* Promote ethanol producing from molasses and cassava		
		* Promote ethanol producing from sugarcane /other alternative crops with economic cost-effectiveness	
	* Promote the Upstream and Downstream Industries of ethanol; e.g Acetic acid, Ethyl acetate, etc.		
	* Research and develop creating a value added to waste from ethanol production		
		* Develop an ethanol transport system for more efficiency	



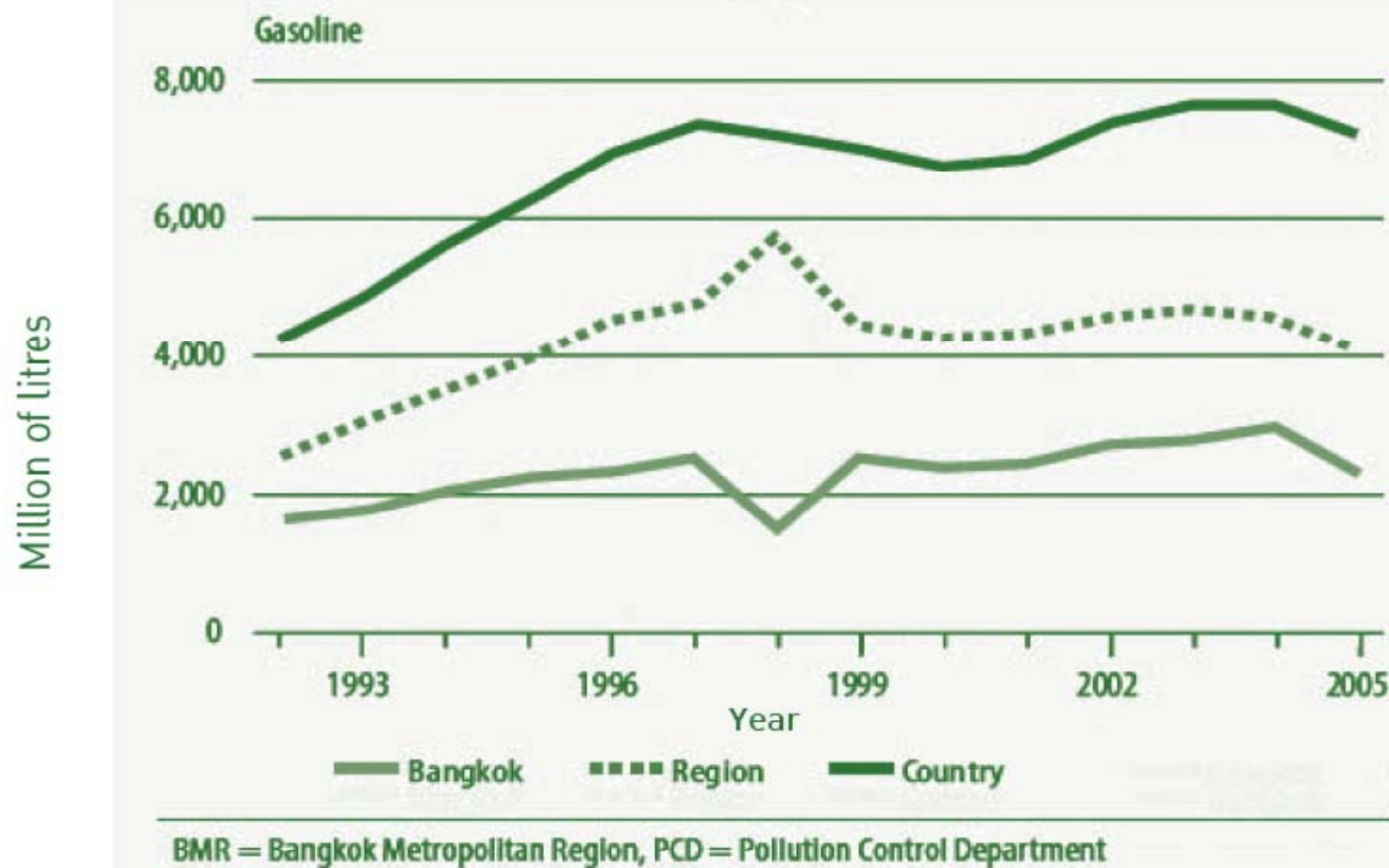
Ethanol Development Plan: 2008-2022

Development Plan	Short Term (2008-2011)	Middle Term (2012-2016)	Long Term (2017-2022)
3. Marketing/ Consumption/ Promotion	* Promote using all types of gasohol by incentive measures on pricing /tax measure		
	* Promote using the FFV		
	* Conduct public relations to educate people for building up confidence to consumers		
	* Set the Standard Requirements on the E85 oil and service stations/ Testing for E85 use		
	* Support ethanol export and promote using ethanol as raw materials in industry		
4. Integrated Ethanol Management	* Manage for creating the stability of ethanol industry from its upstream to downstream industries		
	* Collect and disseminate the data with correctness, clear and up to date		
5. Personnel Development	* Develop the government personnel for having special expertise		
	* Promote transferring/exchanging the knowledge base between the public and the private sectors		

Source: DEDE-MOEN.



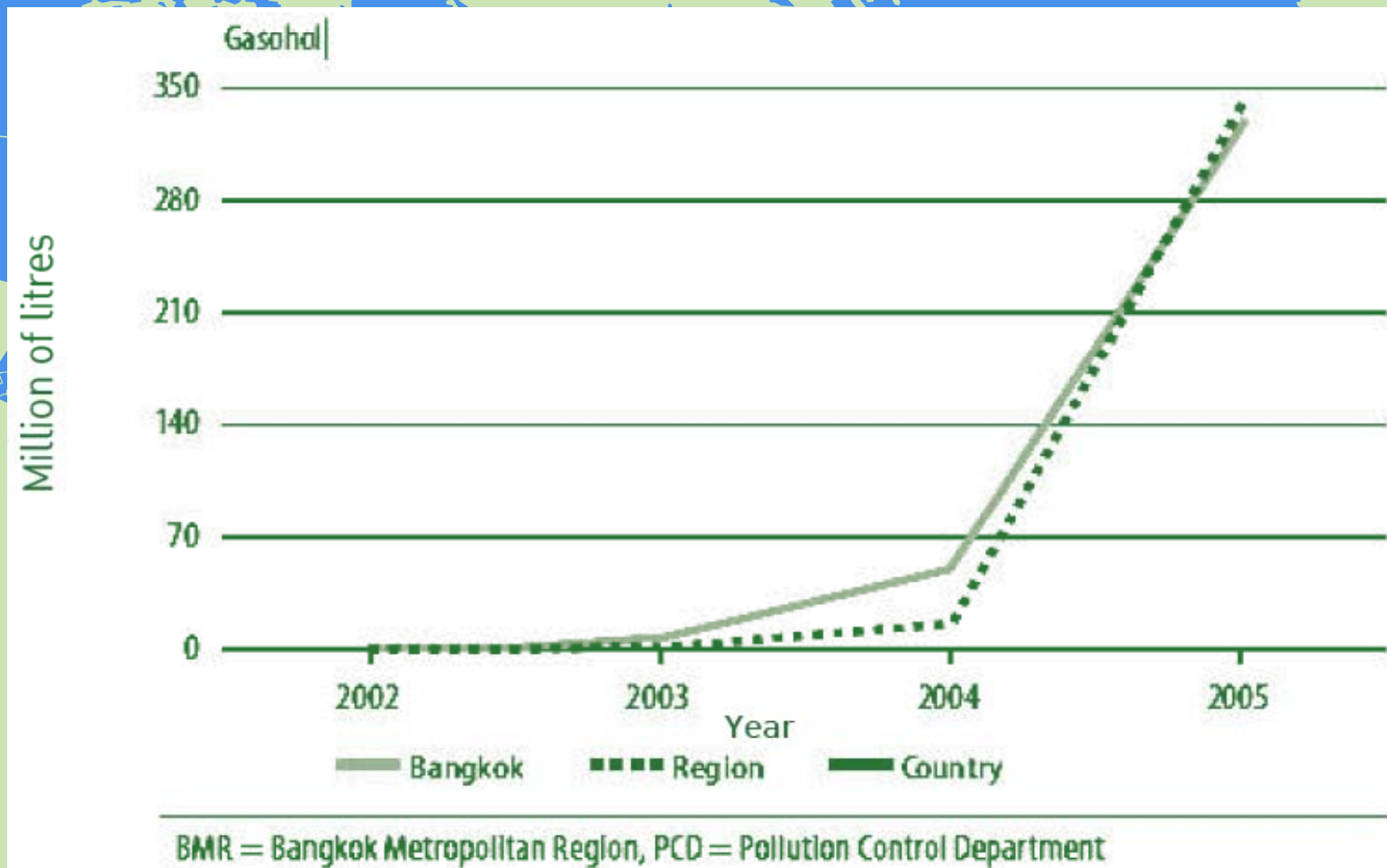
Gasoline Consumption in transport sector in BMR & BKK



Source: BMA, and UNEP. 2009. Bangkok Assessment Report on Climate Change.



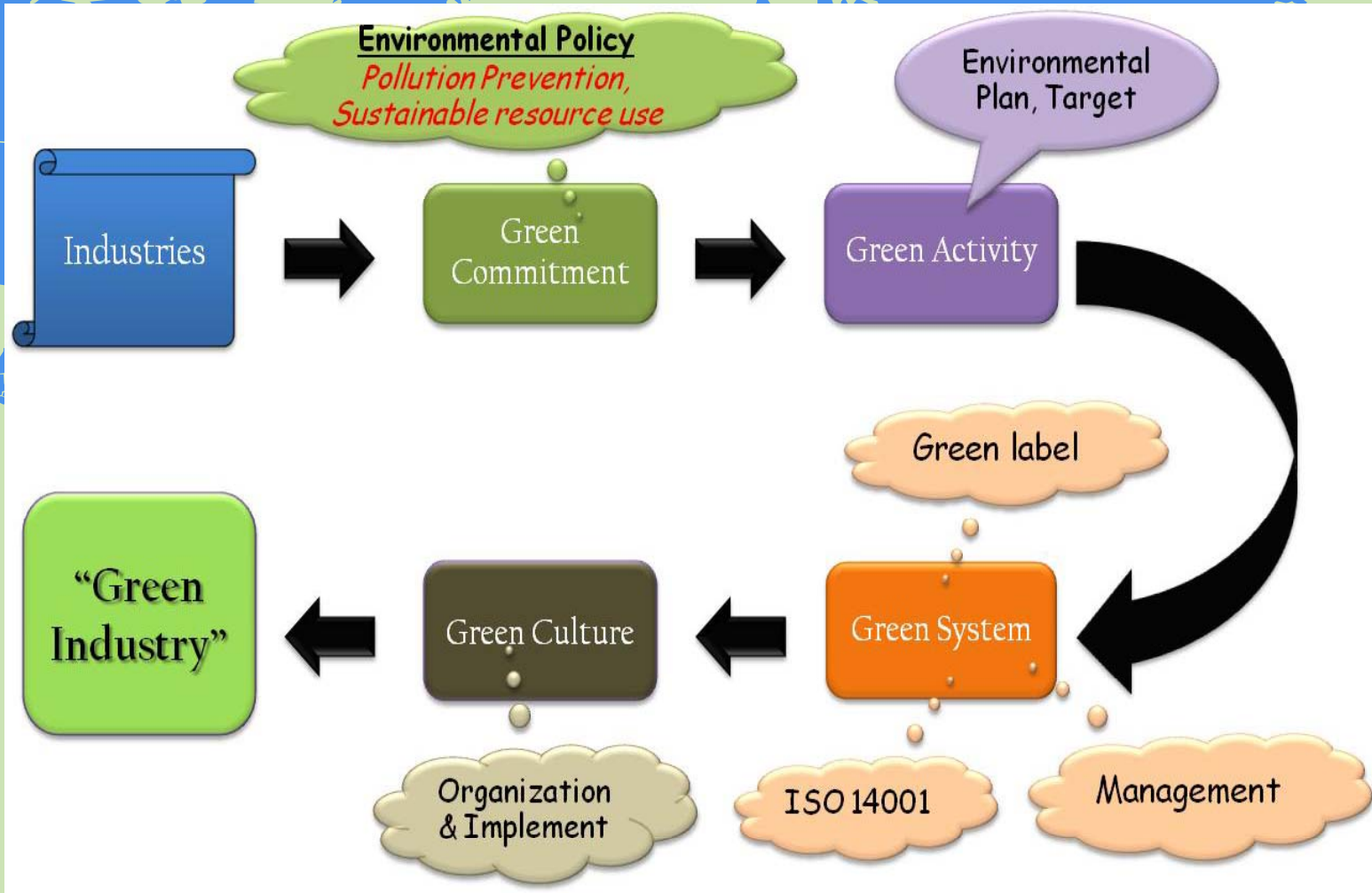
Gasohol Consumption in transport sector in BMR & BKK



Source: BMA, and UNEP. 2009. Bangkok Assessment Report on Climate Change.



Green Industry Plan



Source: Ministry of Industry (MOI).



Thailand DSM Programs



1. Residential Sector

☐ Market Transformation

- ☺ Stop producing T12 and switch to T8

☐ Energy Efficiency Labeling Program

- ☺ Rating scale 1-5 (1=Worst, 5=Best)



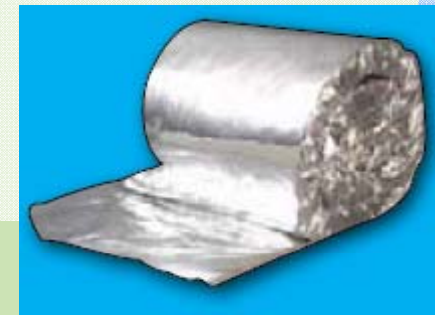
2. Commercial & Industrial Sectors

☐ Energy audit & load management

- ☺ Providing auditing, consulting and financial service for both sectors

☐ Market transformation

- ☺ Stop producing T12 switch to T8



Source: Electricity Generating Authority of Thailand (EGAT).



Thailand DSM Programs



3. Public Sector

- ❑ Attitude creation program
 - ☺ “Green Learning Rooms”
- ❑ Municipal Street Lighting
 - ☺ More than 270,000 street-lamp installed with subsidies
- ❑ Incandescent lamps phase-out
 - ☺ 800,000 CFLs give away
 - ☺ Phasing out 30 million incandescent in 2008-2010.
- ❑ T5 fluorescent lamps
 - ☺ Focusing on replacement of T8 lamps
 - ☺ Target 110 million lamps replacement in 2008-2013



Source: Electricity Generating Authority of Thailand (EGAT).



Thailand DSM Programs (1993-2008): The Success

Programs	Peak Demand Reduction (MW)		Energy Consumption Reduction (GWh/yr)		Carbon Dioxide Emission Reduction (Million tons)	
	Jun 2000	Mar 2008	Jun 2000	Mar 2008	Jun 2000	Mar 2008
1. 36 and 18 Watt Fluorescent Lamp	388	402	1,892	1,958	1.39	1.45
2. Energy Efficient Compact Fluorescent Lamp	9.8	10	56	57	0.04	0.04
3. Energy Efficient Refrigerator	84	314	849	2,626	0.63	1.86
4. Energy Efficient Air-conditioner	84	756	318	3,771	0.24	2.37
5. Energy Efficient Electric Fan	-	14.7	-	131	-	0.06
6. Street Light	-	-	17	17	0.01	0.01
7. Energy Efficient Ballast	1.3	16	5.8	77	0.04	0.04
8. High Efficiency Motor	-	0.2	-	1.2	-	-
9. Green Building	2.6	2.6	10	10	0.01	0.01
Total	569	1,514	3,150	8,649	2.32	5.86

Source: Electricity Generating Authority of Thailand (EGAT).



Management of Principal Environmental Concerns

1. Natural resource management:
 - ☐ Land-use planning
 - ☐ Deforestation
2. Water resources:
 - ☐ Waste water treatment
3. Solid waste management
4. Promotion of environmental knowledge
5. R&D on new technologies

Source: Climate Change Master Plan, [MONRE](#), 2011.



CONCLUSIONS

1. Thai government's national plan, an climate actions have been continuously developed.
2. Climate change plan (2008-2012) will be implemented and will support LCS.
3. In addition, financing mechanism on LCS needs to be developed.
4. However, Thailand's LCS needs collaboration among researchers, R&D, technology transfer etc.
5. In addition, public/local participation is needed.
6. However, those policies & actions are still fragmented, and in conflict.