



Low Carbon Target and Activity in Bangkok



Suwanna Jungrungrueng
Director of Policy and Planning Division
Department of Environment
Bangkok Metropolitan Administration



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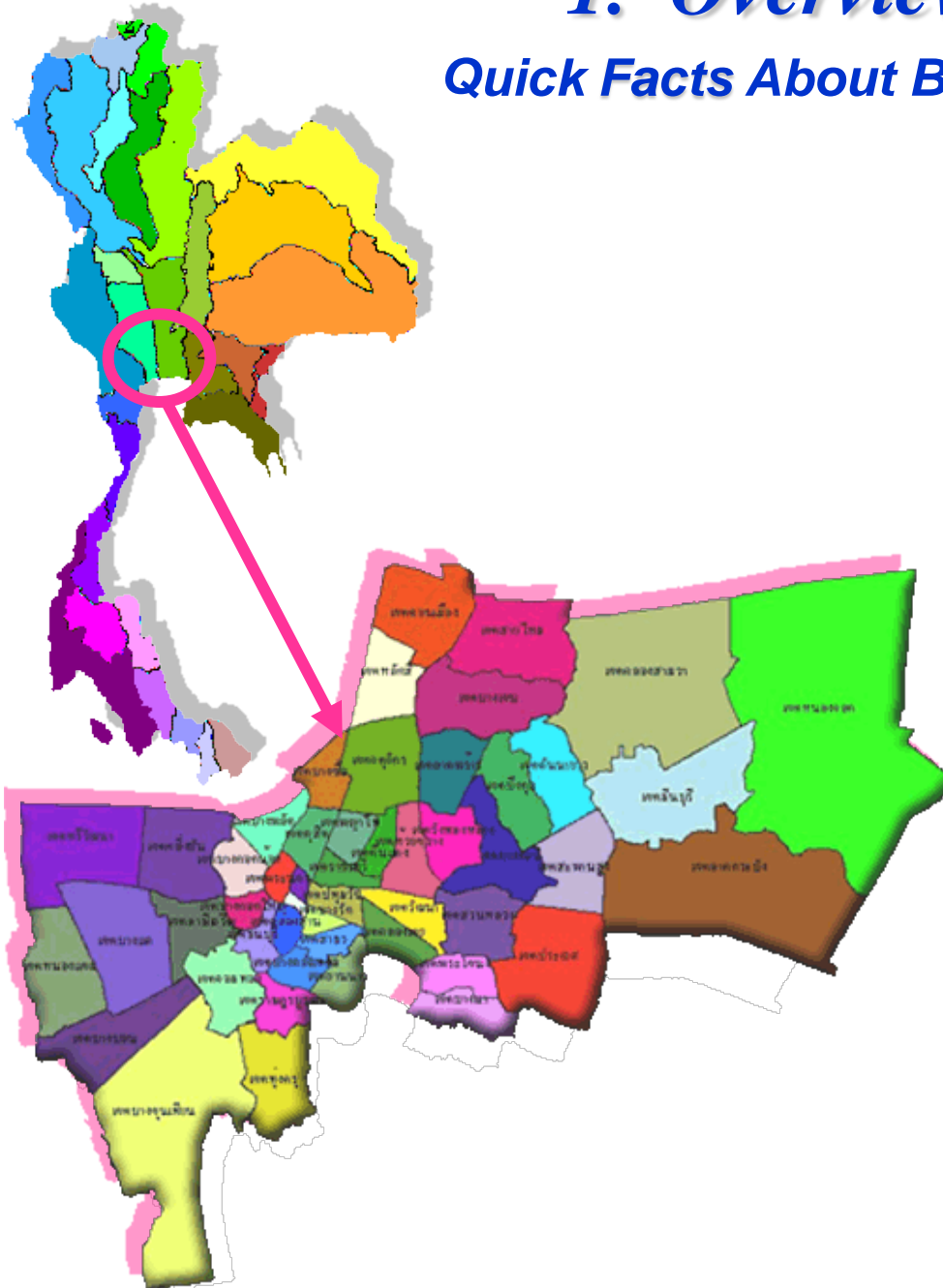
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- **Local Cooperation**
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1. Overview of Bangkok

Quick Facts About Bangkok



Area	1,568.737 sq. km.
Number of District	50 districts
Total Population	~ 9.7 million (2009)
* <i>Registered Population</i>	~ 5.7 million (2009)
* <i>Non Registered Population</i>	~4 million (2009)
Population density	3,640 persons/sq. km. (2008)
* <i>Inner areas</i>	15,270 persons/sq. km. (1978) 11,400 persons/sq. km. (2008)
* <i>outer areas</i>	770 persons/sq. km. (1978) 2,400 persons/sq. km. (2008)
Average Maximum Temp :	29 c° (2005) 38.8 c° (2009)
Average Minimum Temp:	26 c° (2005) 14.7 c° (2009)
Annual Rainfall:	1,482 mm.(2006) 1,600 mm. (2009)

2. Impacts of Climate Change in Bangkok

The vulnerability of the urban climate system of Bangkok will increase

- **Temperature**

The number of days exceeding 35 °C is rising

- **Rainfall**

The average annual rainfall in BMA is 1,500 mm./ year but in 2009, increasing to 1,600 mm.

- **Health**

Increasing risk factors to health such as

- Dengue fever : The morbidity rate per 100,000 people of Dengue fever increased from 134.39 in 2006 to 140.24 in 2009

- Influenza : The morbidity rate per 100,000 people of Influenza increased from 20.37 in 2006 to 237.42 in 2009

- **Sea level rise**

The relative average sea level rise is about 1.3 cm/year.





3. Toward a Low Carbon Society

- 1. Mitigation Policies and Measures**
- 2. General Adaptation Measures**
- 3. Local Cooperation**
- 4. International Cooperation**





1. Mitigation Policies and Measures

1) The Bangkok Declaration on the Cooperation of Alleviating the Global Warming



36 Organizations jointly signed the Bangkok Declaration on the Cooperation of Alleviating the Global Warming

on 9 May 2007 at the United Nations Conference Centre, Bangkok



2) The Bangkok Declaration



- 1. We will reduce energy uses and effectively use resources for production and consumption to make least impact to global warming.**
- 2. We will together support the role of youths, communities, businesses, government units and individuals to coordinately reduce greenhouse gases emission.**
- 3. We will together support the way of life based on the sufficient economy to prevent prepare and adapt to global warming.**
- 4. We will together participate, support and promote carbon sequestration through tree plantation extensively and sustainably.**
- 5. We will continuously support the global warming reduction and prevention activities by disseminating knowledge and information, to encourage practical action in everyday living.**

3) From Bangkok Declaration to the 5-Year Action Plan for Global Warming Alleviation (2007 – 2012)

Public Consultation Process



Expert and Government officials consultations



Resident consultations on BMA's website, seminars and survey in 5,750 people



4) Action Plan on Global Warming Mitigation (2007 – 2012) : *The 5 Initiatives*

Comparison of GHG Emission in the Future Under Different Scenarios Against Current GHG Emission Condition

Sector	Year 2007	Year 2012	
	Current GHG Emission *	Future GHG Emission Under BAU Scenario *	Future GHG Emission Under BMA Action Plan Implementation *
Transportation	21.18	25.30	19.77
Biofuels Energy (<i>reduced GHG</i>)			(-0.61)
Electricity	14.86	16	13.75
Waste / Wastewater	1.13	1.13	0.95
Waste Recycle (<i>reduced GHG</i>)			(-0.28)
Others (<i>estimate 15% of total GHG emission from other sectors</i>)	5.58	6.36	6.36
Green Area (<i>reduced GHG</i>)	(-0.10)	(-0.10)	(-1.00)
Total	42.65	48.69	38.94

* (CO₂ equivalent – million tons)



4) Action Plan on Global Warming Mitigation (2007 – 2012) : *The 5 Initiatives*

Comparison of GHG Emission in the Future Under Different Scenarios Against Current GHG Emission Condition

- GHG emissions 7.1 tons CO₂ equivalent / capita /year under business as usual (BAU)
- GHG emissions in future 5.5 tons CO₂ equivalent /capita /year under the implementation of activities in 5-year Action Plan

CO₂ Emission (million ton p.a.)

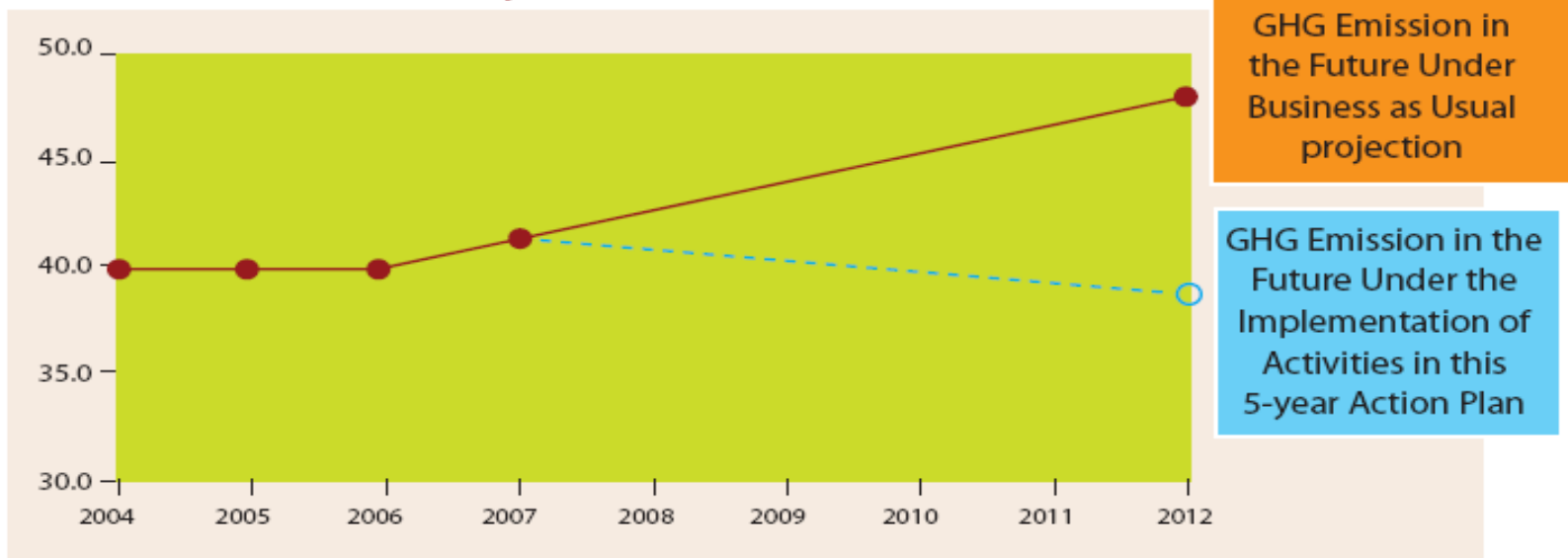


Figure 3: Reduction in Bangkok's future GHG Emission Under the 5-year Action Plan

* (CO₂ equivalent – million tons)

Targets for Reducing Greenhouse Gas Emissions

Target : *By 2012*

Ultimate Goal: 15% reduction of GHGs emission through the implementation of activities under the 5 initiatives

1. Expand Mass Transit and Improve Traffic Systems
2. Promotion the use of Renewable Energy
3. Improve Building Electricity Consumption Efficiency
4. Improve Solid Waste Management and Wastewater Treatment Efficiency
5. Expand Park Areas



Structure of Global Warming Committee

**Steering Committee
For
Action Plan on Global Warming
Mitigation 2007 - 2012**

**Working Group
For
Improvement of
Transportation System**

**Working Group
For
Promotion of Renewable
Energy**

**Working Group for
Energy Conservation
and Building Retrofit**

**Working Group for Solid Waste
and Wastewater Management**

**Working Group for Expansion of
Green Areas**



Expand Mass Transit and Improve Traffic Systems

❖ **Target CO₂ Emission Reduction 5.53 Million Tons in 2012**

Expand the Mass Transit Rail System within the Bangkok Metropolitan Area ; reduction CO₂ emitted 2.4 million ton



➤ **Support the implementation of mass transit rail systems in the Bangkok Metropolitan Area**



Improve Public Bus System ; reduction CO₂ emitted 1.43 million ton

➤ **Implement a Bus Rapid Transit System (BRT)**
➤ **Support improvements to the existing Public Bus System**



Improve Traffic System; reduction CO₂ emitted 1.7 million ton

➤ **Improve the road network**



Promotion the use of Renewable Energy

❖ **Target CO₂ Emission Reduction 0.61 Million Tons in 2012**

Promote the Use of Biofuels

➤ **Promote the Use of Gasohol** ; reduction CO₂ emitted 0.27 million ton

- Promote the use of gasohol in BMA organization (since 2008)
 - using gasohol (E10) in BMA vehicles
- Promote the use of gasohol for Bangkok residents (since 2005)
 - gasohol E10 E20 and E85 as alternative fuel



➤ **Promote the Use of Bio-Diesel** ; reduction CO₂ emitted 0.34 million ton

- The project of Biodiesel for Thai Society under Sufficiency Economy (since 2007)
 - collaborating with BPC
- Project of biodiesel production from used cooking oil (small scale) (since 2010)
 - Capacity 100 l/batch producing biodiesel by BMA
- Encourage the use of biodiesel (B5) in BMA organization (since 2008)
 - BMA vehicles
- Promote the use of biodiesel for Bangkok residents
 - Enforcement B2 in 2008 and B3 in 2010
 - B5 as alternative fuel



Improve Building Electricity Consumption Efficiency

❖ **Target CO₂ Emission Reduction 2.25 Million Tons in 2012**

Improve Building Energy Consumption Efficiency

- **Energy Efficiency in all BMA buildings ; reduction CO₂ emitted 0.01 million ton**
- **Promote and support the implementation of Energy Conservation Scheme in Privately Owned Buildings ; reduction CO₂ emitted 0.42 million ton**



Electricity Conservation Campaign for Bangkokians

- **Campaign for efficient use of electrical appliances ; reduction CO₂ emitted 0.7 million ton**
- **Campaign for reduced use of air conditioning systems ; reduction CO₂ emitted 0.41 million ton**
- **Support energy efficiency labeling of, and proper maintenance ; reduction CO₂ emitted 0.44 million ton**
- **Scheme for, electrical appliances promote the Use of energy-saving appliances ; reduction CO₂ emitted 0.14 million ton**
- **Promote the use of energy-saving light bulbs ; reduction CO₂ emitted 0.13 million ton**



Improve Solid Waste Management and Wastewater Treatment Efficiency

❖ **Target CO₂ emission reduction 1.0 Million Ton in 2012**

Increase Efficiency in Solid Waste Management

- **Improve efficiency in organic waste management ;** reduction CO₂ emitted 0.1 million tons
- **Support solid wastes reuse and recycling ;** reduction CO₂ emitted 0.28 million tons



Increase Efficiency in Wastewater Treatment

- **Increase wastewater treatment capacity ;** reduction CO₂ emitted 0.05 million tons
- **Reduce household wastewater ;** reduction CO₂ emitted 0.03 million tons



Expand Park Areas

❖ **Target CO₂ Absorption 1.0 Million Ton in 2012**

Plant Trees in the Bangkok Metropolitan Area

- **Plant trees in the area under the jurisdiction of the Bangkok Metropolitan Administration ; absorption CO₂ 0.14 million tons**
- **Campaign and Support tree planting on private land in Bangkok ; absorption CO₂ 0.32 million tons**



Plant Trees in the Neighboring Province Areas

- **Plant trees in neighboring province areas ; absorption CO₂ 0.54 million tons**





Concrete Actions to Achieve the Set Goal:

Launch of campaigns:

- ❖ Stop! Warming up Bangkok City
- ❖ Using of energy saving bulbs
- ❖ Car free day
- ❖ Tree planting
- ❖ Using cloth bags
- ❖ Waste reduction
- ❖ Renewable energy
- ❖ Building retrofit program
- ❖ Earth Hour
- ❖ Solar water heater system and solar cell system in BMA's schools
- ❖ Ride to Work, and etc.





2. General Adaptation Measures

Concrete Actions to Achieve the Set Goal:

1) Climate Change Impact and Adaptation study for Bangkok Metropolitan Region

The World Bank supported BMA for publication “*Climate Change Impact and Adaptation Study for Bangkok Metropolitan Region*” which found that

In the Upper Gulf of Thailand:

- The relative average sea level rise is about 1.3 cm/year.
- The land subsidence rate is about 1 cm/year.
- Therefore, the sea level rise is about 3 mm/year.

In 2050,

- The sea level rise would be about 12.3 cm (41 years).
- If the accumulated land subsidence to 2050 is 20 cm,
- The relative sea level rise would be about 32.3 cm



2. General Adaptation Measures

Concrete Actions to Achieve the Set Goal:

2) Flood Protection

❖ **Polder System** : to prevent overtop the riverbank and overland flow from surrounding area consist of :

- **Dikes** : BMA must construct 77 km. The dike can protect overflow up to 2.50 m.
- **Pumping Stations** : There are 369 stations total capacity 1,531 m³/sec.
- **Drainage Tunnels** : There are 7 drainage tunnels which 19 km. long and 155 m³/sec. of pumping capacity

❖ **The Monkey Cheek Project**

BMA provides the Monkey Cheek in 20 areas with total capacity of 12.7 million cubic meters for flood mitigating.





2. General Adaptation Measures

Concrete Actions to Achieve the Set Goal:

3) Coastal Erosion and Wave Protection

- Sea wave protection Bamboo Type
- The rehabilitation of mangrove forest along the shoreline
- Plans to construct rock-pile embankments along the shoreline





2. General Adaptation Measures

Concrete Actions to Achieve the Set Goal:

4) Create public awareness



-Raising Awareness through activity to provide knowledge and understanding about global warming for the public

- Promoting knowledge and awareness about disaster prevention and mitigation



2. General Adaptation Measures

Concrete Actions to Achieve the Set Goal:

5) Support capacity building activities to raise the capability of Bangkok City Officer

- Capacity Building on Climate Change Adaptation and Mitigation for Implementation in Bangkok related in 5 initiatives of Action plan



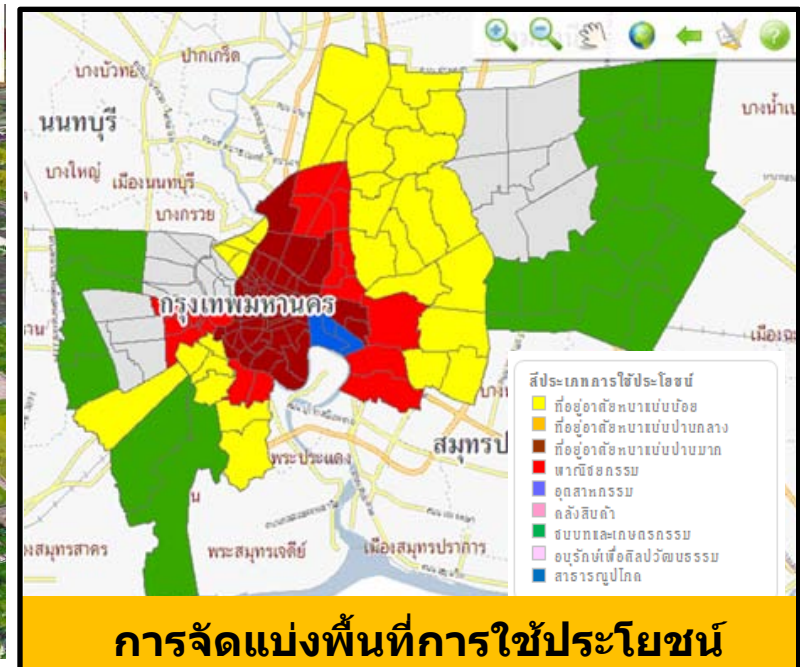


2. General Adaptation Measures

Concrete Actions to Achieve the Set Goal:

6) Technical Support

To develop Information System for City Management with 3 dimensions (360 degree) integrated with GIS map





3. Local Cooperation

Concrete Actions to Achieve the Set Goal:

1) Ministry of Energy

- Awareness raising on energy conservation for school children
- Anaerobic digestion system for organic waste at schools





3. Local Cooperation

Concrete Actions to Achieve the Set Goal:

2) The Federation of Thai Industries



- Waste recycling system in universities
- Drop Off Station in department stores and convenient stores
- Formalization of scavenger (Saleng) groups
- Recycling handicrafts competition and marketing
- Collection recyclable waste in village





3. Local Cooperation

Concrete Actions to Achieve the Set Goal:

3) Electricity Generating Authority of Thailand

- Signed a memorandum of cooperation, reduce global warming by promoting the use of thin tube number 5 (T5) size 28 W
- Targeting to replace 13,000 saving bulbs in 2 BMA's hospitals and extending cover 9 BMA's hospitals
- Support 10,000 energy saving bulbs for replacing in BMA's fresh markets



4) The Bangchak Petroleum Public Co.Ltd.

- Cooperation for biodiesel production from used cooking oil

Collected used cooking oil from Bangkok residents to produce Biodiesel

- ~ 203 tons during 2007 – June 2010.





3. Local Cooperation

Concrete Actions to Achieve the Set Goal:

5) The Energy Senate Committee

- Organized a training program for 870 BMA's teachers and students on Energy Conservation in 2010
- Organized the contest of the diary

Giving award to the winners on 17 Nov 2010, the awards were given to 12 schools and categorized to

- Overall
- Creative thinking
- Real utilization and reduction of using natural resources
- Building network and supporting participation



บันทึกความสำเร็จ



3. Local Cooperation

Concrete Actions to Achieve the Set Goal:

6) Ministry of Natural Resources and Environment

Projects and Activities in Reducing Waste

Singed MOU “ Promote Green Purchasing”



Campaign of using cloth bags instead of plastic bags

Launching the project “No Bag, No Baht”



3. Local Cooperation

Concrete Actions to Achieve the Set Goal:

7) Metropolitan Electric Authority

- Singning MoU with Metropolitan Electric Authority to implement an Energy Efficiency Building Retrofit Program on 14th September 2010
- Plan to set up Building Energy Management System (BEM) as a computer management center





3. Local Cooperation

Concrete Actions to Achieve the Set Goal:

8) Private Partnership

- Supporting in tree planting
- Waste separation
- Publication Guideline to reduce global warming
- Organizing a seminar on Energy Efficiency Building Retrofit Program. The target group are high building sector and business sectors



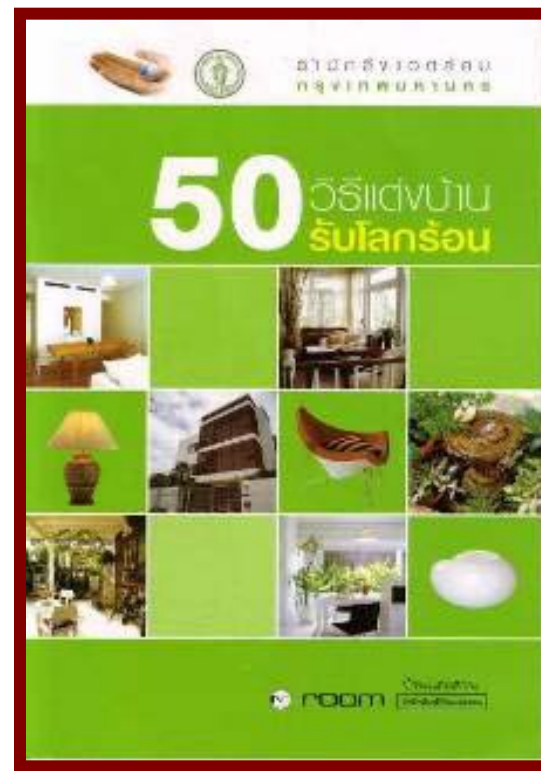


3. Local Cooperation

Concrete Actions to Achieve the Set Goal:

9) Raise Awareness Through Media Partnership

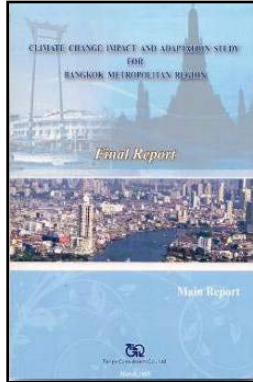
- Publication of “50 designs for home decoration to combat global warming”





4. International Cooperation

Concrete Actions to Achieve the Set Goal:



1) World Bank

- City Development Strategy and Municipal Capacity Building
- Sectoral Strategy Implementation; i.e. SWM, Climate Change Impact and Adaptation of Coastal Cities.
- Clean Technology Fund (CTF)
 - Support preliminary audit and assistance in the preparation of a feasibility study of Energy Efficiency Project
 - Technical support for BRT and Energy Efficiency Project
- Support Global Environmental Facility (GEF)



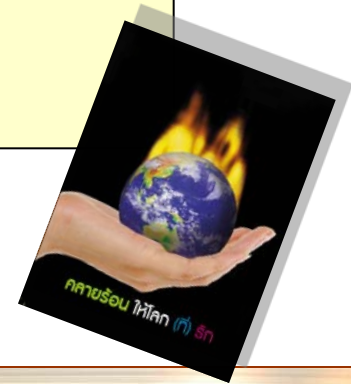


4. International Cooperation

Concrete Actions to Achieve the Set Goal:

2) JICA

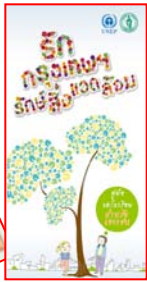
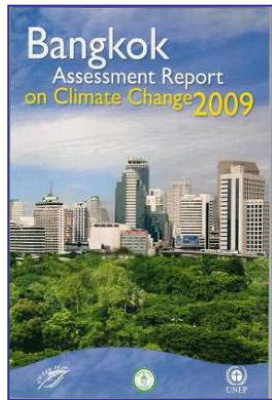
- Capacity Building on Climate Change Adaptation and Mitigation for Implementation in Bangkok, by providing training course in Japan for at least 30 BMA officials
- Publishing Global Warming Handbook 18,500 books





4. International Cooperation

Concrete Actions to Achieve the Set Goal:



3) UNEP

➤ BMA in cooperation with UNEP published

- Bangkok Assessment Report on Climate Change 2009

- Guideline to reduce global warming for youths, office and family

➤ Awareness Pilot Demonstration; Building Retrofit

➤ Promote Bangkok towards environmental capital of ASEAN



4. International Cooperation

Concrete Actions to Achieve the Set Goal:

4) C40 and Clinton Climate Initiatives

➤ Energy Efficiency Building Retrofit Program

- Jointly held seminar , targeting private sectors (Feb 9, 2008)
- 35 private building projects have already implemented





4. International Cooperation

Concrete Actions to Achieve the Set Goal:

5) Agence Française de Développement (AFD)

- BMA-AFD partnership on climate change
 - Organized seminar on BMA's Action Plan on Global Warming 2009
- BMA-AFD signed MOU on their cooperation on climate change on Dec 14, 2009 at BMA's City Hall.

6) Establishment of "Bangkok Institute of Urban Green Development"



สถาบันพัฒนาเมือง
Urban Green Development Institute



4. International Cooperation

Concrete Actions to Achieve the Set Goal:

7) WWF

- Earth hour ; Launch switching-off light every year on March to raise awareness on climate change .
- Earth hour road show.
- Parade campaign on 4 commercial roads Silom, Siam, Kao San road and Yowaraj.

Year	Result
2008	Save 73.34 megawatts Reduce CO ₂ 45.8 tons
2009	Save 73.34 megawatts Reduce CO ₂ 897 tons
2010	Save 73.34 megawatts Reduce CO ₂ 1,003 tons



Bringing the world together to fight Climate Change



4. International Cooperation

Concrete Actions to Achieve the Set Goal:

8) ASEAN + 6 City Forum on Climate Change on 25-27 June 2008



ASEAN+6 CITY FORUM
ON CLIMATE CHANGE
Bangkok, 2008

- Participating Cities : Albay, Beijing, Delhi, Fukuoka, Jakarta, Kuala Lumpur, Luang Prabang, Phnom Penh, including to sister cities Jakarta and Vientiane
- Bangkok Declaration for ASEAN+6 City Forum on Climate Change



9) Cool ASEAN, Green Capitals Initiative on 2 – 3 November 2009

- Participating Cities : Bangkok, Manila, Vientiane, and Jakarta.
- Implemented signing date of the Founding Declaration of the Cool ASEAN, Green Capitals in March 2010.



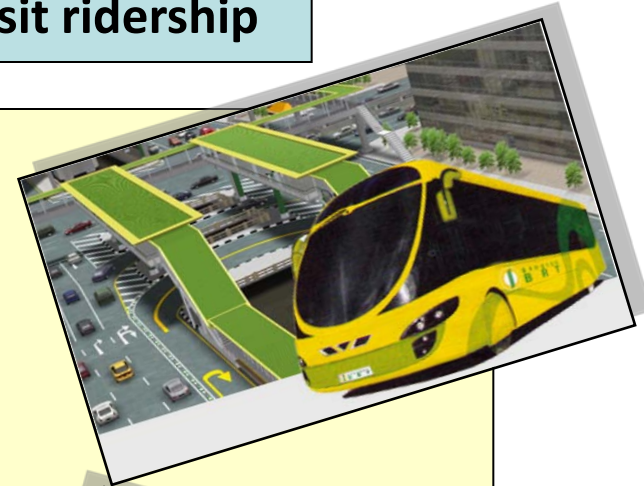


Future Plans for Sustainable Development

1. Transportation

Promote 60% mass transit ridership

- Extend the Mass Transit Network
- Initiative Monorail/Light Rail System
- Set New Street Privileges
- Extensive Canal Transport
- Bicycle Network Development
- Create Public Participation Network

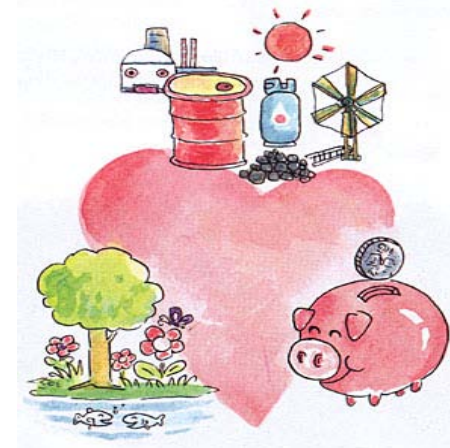




Future Plans for Sustainable Development

2. Renewable energy And Energy Efficiency

- Reduce energy consumption and enhance potential to utilize renewable energy of BMA organization .
- Enhance the role of youths, communities, businesses, government units and individuals to coordinately reduce greenhouse gases emission.
- Promote the global warming reduction and prevention activities by disseminating knowledge and information, to encourage practical action in everyday living.
- Encourage and utilize technology to conserve energy in the building.
- Enhance capability to operate the energy efficiency





Future Plans for Sustainable Development

3. Solid Waste

Waste Collection

1. Improve the efficiency of waste collection services.
2. Improve collection routes by using GPS (Global Positioning System)
3. Initiate guideline and applied in each step of work and published to people

Waste Disposal

1. Waste to Energy project (BOOT Scheme).
2. Upgrading sanitary landfills to meet international standards, applying for CDM (Landfill Gas to Energy).
3. Integrated solid waste disposal management.





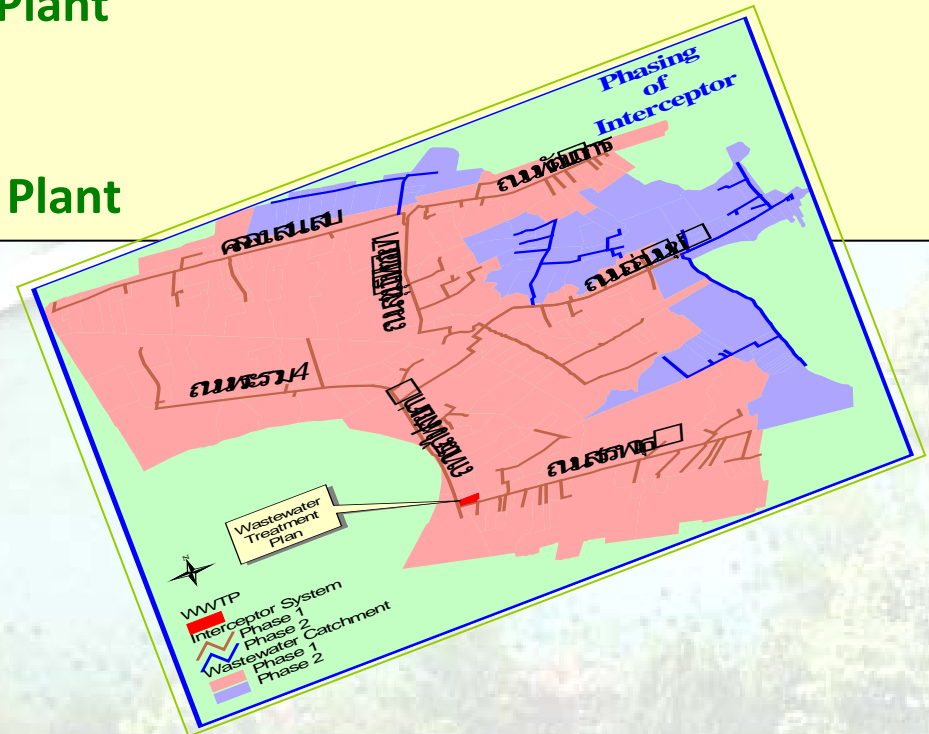
Future Plans for Sustainable Development

4. Wastewater

• Future BMA Wastewater Treatment Project

The capacity of all those five Wastewater Treatment Project is 773,00 m³/day

1. Bang Sue Wastewater Treatment Plant
2. Thonburi Wastewater Treatment Plant
3. Minburi Waste Treatment Plant
- 4 .Nongbon Waste Treatment Plant
5. Klong Toei Wastewater Treatment Plant





Future Plans for Sustainable Development

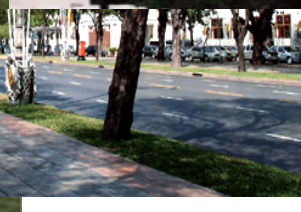
5. Green area

- Future projects to expand green areas in Bangkok increase green areas by establishing new 5 large parks and 5 mini parks with total areas of 373,118 m²
- Monitoring to promote green area
- Enhance roof-gardens





BANGKOK
METROPOLITAN ADMINISTRATION



**THANK YOU FOR YOUR
...ATTENTION...**