Climate Change Management in Bangkok

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Bangkok Metropolitan Administration (BMA)
1. Introduction of Bangkok

- **Total Areas**: 1,568.737 km²
- **Average Ground Level**: +0.50 to +1.50 m MSL
- **Temperature**: 17.6 - 39.3°C
- **30-year Average Annual Rainfall**: 1,648 mm/year

**Populations**
- Registered: ~5.7 million persons
- Non Registered: ~4.0 million persons

**Density Populations**: 3,617 persons/ km²

**Houses**: 2,459,680 households

**Communities**
- Populations: 1,972,722 persons
- Households: 425,910 Households
Bangkok Urban Challenges

Internal Factors

Population Growth / Migration
Over Consumption
Economic Growth & Competition
Capitalization Trend
Technology Exchange
Globalization
Climate Change

External Factors

Air Pollution
Solid waste
Water Pollution
Lack of Green Area
Flooding & Coastal Erosion

Pressures

Problems

Environment
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

Bangkok located about +0.00 to +1.50 meters above mean sea level
Climate Change Situation

- Coastal Erosion
  - > 760 m of the Bang Khun Thian shoreline
  - Coastal erosion rate is 5-14 m/year

Big Flood Events

- 1944
- 1983
- 1995
- 2011
Climate Change Situation

Source: Bangkok Fire and Rescue Department, BMA
Climate Change Situation
Impact of Carbon emission

GHG Emission in Bangkok by Sectors (million ton p.a.)

- Transportation: 49%
- Electricity: 35%
- Other Sources: 13%
- Waste / Wastewater: 3%

The Challenges of Climate Change Implementation

BMA Action Plan on Global Warming Mitigation 2007 - 2012

5 Initiatives & 10 Action Plans

**Initiative 1:**
Expand Mass Transit and Improve Traffic System

- **Action Plan 1:**
  Expand the Mass Transit Rail System within the Bangkok Metropolitan Area
- **Action Plan 2:**
  Improve Public Bus System
- **Action Plan 3:**
  Improve Traffic System

**Initiative 2:**
Promote the Use of Renewable Energy

- **Action Plan 1:**
  Promote the Use of Biofuels

**Initiative 3:**
Improve Building Electricity Consumption Efficiency

- **Action Plan 1:**
  Improve Building Energy Consumption Efficiency
- **Action Plan 2:**
  Electricity Conservation Campaign for Bangkokians

**Initiative 4:**
Improve Solid Waste Management and Wastewater Treatment Efficiency

- **Action Plan 1:**
  Increase Efficiency in Solid Waste Management
- **Action Plan 2:**
  Increase Efficiency in Wastewater Treatment

**Initiative 5:**
Expand Park Area

- **Action Plan 1:**
  Plant trees in the Bangkok Metropolitan Area
- **Action Plan 2:**
  Plant trees in the Neighboring Province Areas
The Challenges of Climate Change Implementation

BMA Action Plan on Global Warming Mitigation 2007 - 2012

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

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<tbody>
<tr>
<td>Transportation</td>
<td>21.18</td>
<td>25.3</td>
<td>19.77</td>
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<tr>
<td>Biofuels Energy (reduced GHG)</td>
<td></td>
<td></td>
<td>(-0.61)</td>
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<tr>
<td>Electricity</td>
<td>14.86</td>
<td>16</td>
<td>13.75</td>
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<td>Waste / Wastewater</td>
<td>1.13</td>
<td>1.13</td>
<td>0.95</td>
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<tr>
<td>Waste Recycle (reduced GHG)</td>
<td></td>
<td></td>
<td>(-0.28)</td>
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<tr>
<td>Others (estimate 15% of total GHG emission from other sectors)</td>
<td>5.58</td>
<td>6.36</td>
<td>6.36</td>
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<tr>
<td>Green Area (reduced GHG)</td>
<td>(-0.10)</td>
<td>(-0.10)</td>
<td>(-1.00)</td>
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<tr>
<td>Total</td>
<td>42.65</td>
<td>48.69</td>
<td>38.94</td>
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### Results of Measures under BMA Action Plan on Global Warming Mitigation

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<tr>
<td>1. Expand Mass Transit and Improve Traffic System</td>
<td>5.53</td>
<td>1.01</td>
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<tr>
<td>2. Promote the Use of Renewable Energy</td>
<td>0.61</td>
<td>0.88</td>
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<tr>
<td>3. Improve Building Electricity Consumption Efficiency</td>
<td>2.25</td>
<td>2.70</td>
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<tr>
<td>4. Improve Solid Waste Management and Wastewater Treatment Efficiency</td>
<td>0.46</td>
<td>0.70</td>
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<tr>
<td>5. Expand Park Area</td>
<td>0.90</td>
<td>1.69</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9.75</strong></td>
<td><strong>6.98 (71.59%)</strong></td>
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(20% below BAU)

#### The Challenges of Climate Change Implementation

The table above summarizes the targets and achievements of the BMA Action Plan on Global Warming Mitigation from 2007 to 2012. The plan focuses on five key areas: expanding mass transit and improving traffic systems, promoting the use of renewable energy, improving building electricity consumption efficiency, improving solid waste management and wastewater treatment efficiency, and expanding park area. Each area has specific targets for reducing CO₂ emissions in 2012 and the total amount of CO₂ reduction achieved, with the overall reduction (20% below BAU) highlighted.

[Bar Chart: Target Reduce CO₂ in 2012 (million-tones) vs. Total amount of CO₂ Reduction (million-tones)]
1) 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 m$^3$/sec.
  - **Drainage Tunnels**: There are 7 drainage tunnels which 19 km. long and 155 m$^3$/sec. of pumping capacity

- **The Monkey Cheek Project**: BMA provides the Monkey Cheek capacity of 12.7 Million Cubic meters for flood mitigating.
2) 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
3) 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
4) 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
Signing Ceremony of the Record of Discussions on the Technical Cooperation Project for Bangkok Master Plan on Climate Change 2013 – 2023

Between Bangkok Metropolitan Administration (BMA) And Japan International Cooperation Agency (JICA) Wednesday, 7 November 2012, Bangkok City Hall
• Providing a Bangkok Master Plan on Climate Change 2013-2023
• Capacity development for the implementation of the Master Plan
  Sectors Covers
  – Environmental Sustainable Transport
  – Energy Efficiency and Alternative Energy
  – Efficient Solid Waste Management and Wastewater Treatment
  – Green Urban Planning
  – Adaptation planning
“Low Carbon School Network”

- BMA co-operated with the Foundation for Environmental Education for Sustainable Development Thailand (FEED) on a project of Low Carbon Emission School Network by motivating the students in participating schools to take environmentally friendly actions in their own daily activities.

  - **Target group:** BMA’s School
    - 9 Primary Schools
    - 7 Secondary Schools

This project will extend to **Low Carbon Bangkok City Project in 2013**, targeting the groups such as office buildings, schools, universities by creating Low Carbon Network with 60 organizations.
Climate Change Projects

Bangkok Master Plan on Climate Change 2013-2023

• BMA is formulating a 10-year Master Plan, 2013 - 2023, which covers adaptation and mitigation plan supported by JICA.

Creating Low Carbon Society in Bangkok

• BMA is going to launch more projects to additional target groups such as
  • Low Carbon School Networks in 2012
  • Low Carbon Bangkok City Project in 2013: target groups such as office buildings, schools, universities.

Improving Building Energy Consumption Efficiency

• The Establishment of BMA Building Energy Management Software to control of appliance utility in the building to work automatically and properly to curtail the electricity cost during peak load
  • Retrofitting of BMA Existing Building Towards Energy Saving Building

Disaster Risk Assessment

• BMA cooperates with the Global Change System for Analysis, Research and Training network (START) to implement the Coastal Cities at Risk (CCaR) Project (under the finance of International Research Initiative on Adaptation to Climate Change, IRACC).
  • BMA cooperates with UNISDR to enhance the capacity of BMA officers to assess the disaster risk of Bangkok posed by the impacts of Climate Change.
The participation of all stakeholders is required to overcome these urgent and critical problems under the slogan

“Together We Can”

Thank You for Your Attention