THE BANGKOK MASTER PLAN ON CLIMATE CHANGE 2013-2023

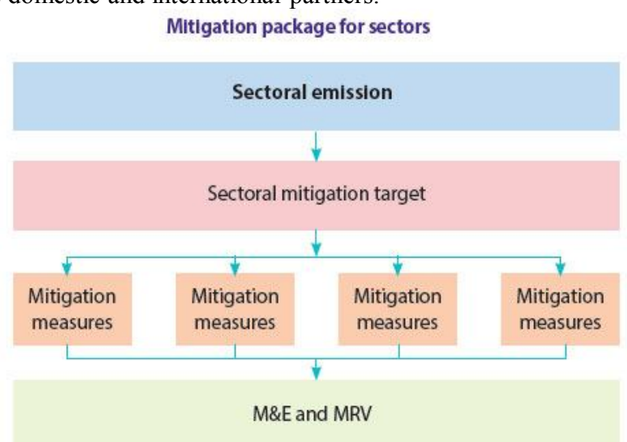
Bangkok Metropolitan Administration (BMA)

Bangkok and Climate Change

Climate change is one of the largest challenges to the current and future development of human society. To respond to the climate change in the kingdom of Thailand, tremendous effort have been made since its ratification to the United Nations Framework Convention on Climate Change (UNFCCC), and the establishment of the National Committee on Climate Change (NCCC) chaired by the Prime Minister. Since then the government adopted and implemented major policies related to climate change such as the Energy Efficiency Development Plan 2011-2030 and the Alternative Energy Development Plan etc. Most recently, the National Plan on Climate Change and Thailand nationally Appropriate Mitigation Actions (NAMAs) were adopted. The implementation targets to reduce the national GHG emission from energy and transportation sectors by 7% by 2020 based on Business as Usual (BAU) emission level. The reduction target may reach 20% with the support from international society as stated by the Minister of National Resource and Environment at the 20th Conference of the Parties to the UNFCCC.

For Bangkok climate change is also a big challenge. In 2011, Bangkok and areas along the Chao Phraya River were hit by a large scale flooding, and historically economic and social damages were recorded, which reveals that Bangkok is vulnerable to such extreme events that might be induced by climate change. At the same time, as the largest city in Thailand, as well as a major global city in the Southeast Asia and in the world, economic and social activities in Bangkok have caused large emission of greenhouse gases (GHGs). In addition, climate related damages in Bangkok affect not only Bangkok itself but also many other cities and countries.

In this regard, Bangkok Metropolitan Administration (BMA) needs to accelerate actions to respond to climate change. Further to the efforts made through the Bangkok Action Plan on Global Warming 2007-2012, BMA decided to elaborate measures for mitigation and adaptation to climate change, in cooperation with its domestic and international partners.



A future vision toward establishment of a low carbon and climate change resilient city

Toward establishment of a low carbon and climate change resilient city, the Master Plan sets 5 keys to future vision of Bangkok as follows.

- BMA, in partnership with the national government ministries and agencies, takes a major responsibility to mitigate and adapt to climate change.
- BMA endeavors to establish well balanced action to harness economic and social development and climate change concerns.
- BMA takes comprehensive approach to the low carbon and climate change-resilient urban development and action-oriented approach to the implementation of the Master Plan, as a vehicle in an evolving nature.
- BMA promotes actions by citizens the private sector, academia, as well as other key players to mitigate and adapt to climate change, which should involve a multi-channel communication platform, innovative ways of promotional schemes and low carbon technology leapfrogging.
- BMA, as a leading city of Southeast Asia and the world, takes proactive measures to mitigate and adapt to climate change in short, mid and long terms.

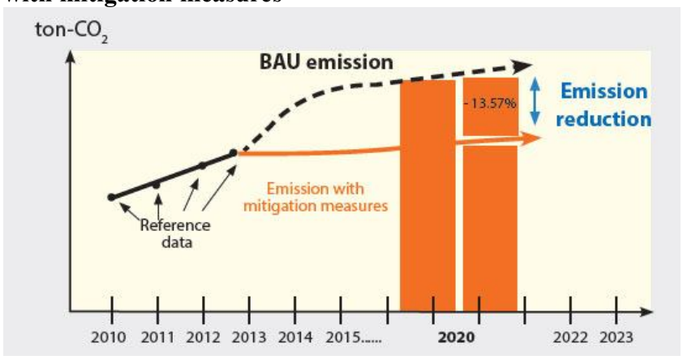
Scope of the Master Plan

The Bangkok Master Plan on Climate Change 2013-2023 covers the whole geographical area of BMA, in the following sectors:

(1) Environmentally sustainable transport;
(2) Energy efficiency and alternative energy;
(3) Efficient solid waste management and wastewater treatment;
(4) Green urban planning; and
(5) Adaption planning.

The main role of the Master Plan is to select mitigation and adaptation measures as practical projects based on the assessment of their priority, urgency and feasibility. In order to develop a comprehensive and action-oriented approach, the Master Plan includes assessment of the current and future situations, prioritizing possible interventions, proposing concrete implementation plans of feasible measures. Therefore, it contains a package of Business as Usual (BAU) setting, target setting, and actual mitigation and adaptation measures.

Concept diagram on GHG emission prospects in BAU and with mitigation measures



The GHGs emission prospects in BAU and mitigation targets in the respective sectors are shown in the following diagram and table. The assumption of these targets is full implementation of mitigation activities in alignment with the relevant national policies and aggregated efforts at the local level.

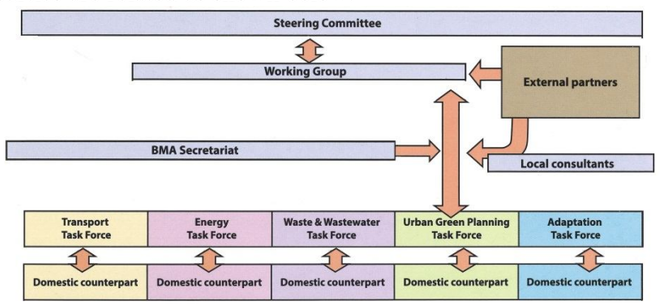
Table: Comparison of GHG emission in future in different scenarios in 2020

Unit million t- CO_2e

Sector	Year 2013	Year 2020		
	GHG emission	Future GHG emission in BAU Scenario	Future GHG emission with Bangkok Master Plan Implementation	Expected reduction/ absorption amount (reduction rate against BAU)
Transport	13.76	17.91	14.91	3.00 (-16.75%)
Energy	25.60	30.94	26.85	4.09 (-13.22%)
Waste and wastewater	4.55	4.93	4.73	0.20 (-4.06%)
Green urban planning	-0.045	-0.045	-0.049	-0.004 (+8.89%)
Total	43.87	53.74	46.44	7.29 (13.57%)

Institutional arrangement

The institutional arrangement to operate, follow up and assess the implementation of Bangkok Master Plan on Climate Change consists of (1) a steering committee, (2) a working group, (3) task forces, (4) the BMA secretariat, and (5) other partners. All parties are related as shown below.



Mitigation measures in the transport sector

GHG emission in the transport sector shares a large portion of he total emission and essentially related to the urbanization of Bangkok. Mitigation measures include development of environmentally sustainable transportation infrastructures and promotion of modal shifts, as well as public awareness-raising. To advance such measures, BMA will cooperate with the relevant national authorities, as well as the private sectors and citizens. By conducting such mitigation measures, it is also expected that the transportation modes will be upgraded and mobility and convenience are improved.

Comparison of GHG emission in future in different scenarios in 2020 in the transport sector.

Unit million t- CO_2e

Sector	Year 2013	Year 2020		
	GHG emission	Future GHG emission in BAU Scenario	Future GHG emission with Bangkok Master Plan Implementation	Expected reduction/ absorption amount (reduction rate against BAU)
Transport	13.76	17.91	14.91	3.00 (-16.75%)

Mitigation measures in the energy sector

GHG emission in the energy sector shares the largest part of the total emission. As the most GHG emissions in the energy in Bangkok are related to those from buildings, mitigation measures focuses on introducing energy efficiency and renewable energy.

Comparison of GHG emission in future in different scenarios in 2020 in the energy sector.

Unit million t- CO_2e

Sector	Year 2013	Year 2020		
	GHG emission	Future GHG emission in BAU Scenario	Future GHG emission with Bangkok Master Plan Implementation	Expected reduction/ absorption amount (reduction rate against BAU)
Energy	25.60	30.94	26.85	4.09 (-13.22%)

Mitigation measures in the waste and wastewater

Waste and wastewater are sources of methane and CO_2 emission as in landfills and waste transportation and reduction of GHGs require the reduction of waste and wastewater amount generated. In order to do so, BMA endeavors to introduce upgraded technologies and facilities for waste management and wastewater treatment, and at the same time, promote the reduction of generated amount by separation of waste etc.

Comparison of GHG emission in future in different scenarios in 2020 in the waste and wastewater sector.

Unit million t- CO_2e

Sector	Year 2013	Year 2020		
	GHG emission	Future GHG emission in BAU Scenario	Future GHG emission with Bangkok Master Plan Implementation	Expected reduction/absorption amount (reduction rate against BAU)
Waste and wastewater	4.55	4.93	4.73	0.20 (-4.06%)

Mitigation measures in the green urban development sector

Green urban development provides many co-benefits of mitigation actions. By expanding green areas, it increases the amenity and attractiveness of the city. Also, measures such as green roof tops have additional benefits of helping the reduction of energy use. For this sector, BMA will make efforts in its parks, but it is also important that private land owners should participate in such actions.

Comparison of GHG emission in future in different scenarios in 2020 in the green urban planning sector

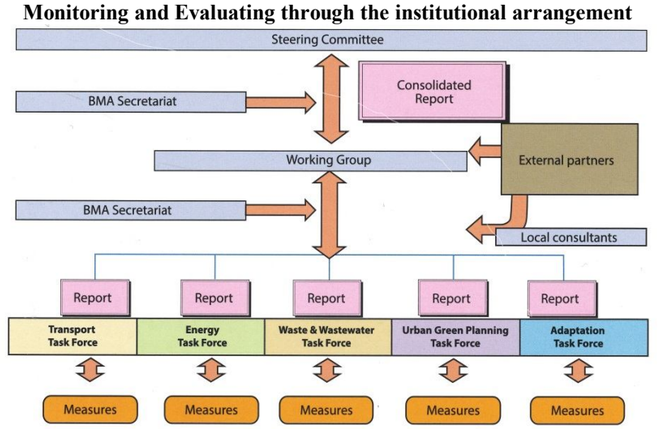
Unit million t- CO_2e

Sector	Year 2013	Year 2020		
	GHG emission	Future GHG emission in BAU Scenario	Future GHG emission with Bangkok Master Plan Implementation	Expected reduction/ absorption amount (reduction rate against BAU)
Green urban planning	-0.045	-0.045	-0.049	0.004 (+8.89%)

Adaptation measures

Bangkok is situated on the floodplains of the Chao Phraya River and subjected to the tides of the sea which results in trapped water from rainfall (flooding) and subjected to the tides of the sea. Together with land subsidence problem arise from withdrawal of groundwater, the area trapped water from rainfall which then causes the overflow from the river. In addition, withdrawal of groundwater is also a cause of land subsidence in the area. It is expected that with climate change the vulnerability of Bangkok will increase in future, which may cause large scale of economic and social losses. As one of the priority areas of adapation measures, BMA will take short term (1-3 years), midterm (3-5 years) and long term (5-10 years) of actions, to prevent, minimizing impacts, and change and construct infrastructures. Such includes expanding retention areas, developing flood management information system with link to other sectors such as road constructions.

Monitoring and Evaluating through the institutional arrangement



Upon the completion and approval of the Master Plan by the BMA Governor, the full implementation is expected to be completed by the end of the fiscal year 2023.