

# Challenge of megacity against climate change countermeasures

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*“Project for Strengthening Institutional Capacity for the Implementation of Bangkok Master Plan on Climate Change 2013-2023 in Thailand”*

## Key Words

- It is crucial for not only the central government but also the other parties such as local governments, private sectors, NPOs, NGOs, etc., to address climate change.
- Local governments of such large cities are required to reduce GHG emissions from local activities and projects by all means, such as the treatment of solid waste/wastewater and traffic improvement projects, and to take proactive action to reduce GHG emissions, together with the stakeholders, such as local communities and business enterprises.
- In order to explore sustainable development and continuously improve urban environments, the leaders of these large cities should adapt to become smart cities, based on the sustainable development goals (SDGs) and spirit of the Paris Agreement concerning urban planning.
- It is important for these large cities' authorities to take action from a diversified viewpoint, by building strong collaboration with the national government, sharing knowledge and experience with other large cities, and exploring cooperative international initiatives.

## 1. Objectives and Background

Due to the rise in sea temperature, disasters such as typhoons have tended to become worse every year. Countries have seen serious and extensive damage from such disasters, including Japan, which had also suffered from the direct impact of massive typhoons. Countries have been experiencing extreme rainfalls in recent years, and the impacts of climate change have affected the lives and properties of many people all over the world.

It is a significant role of local governments to protect the lives and properties of communities and to maintain urban functions away from the effect of various natural disasters. In the world's largest cities, local governments are diligently implementing various measures to deal with the natural disasters, including river basin improvement, development of river flood control plans, construction of underground retention basins for the temporary storage of rainwater, and the installation of rainwater storage pipes. The risk from more intense and record breaking rainfall, which could exceed the capacity of these facilities, is, however, increasing year by year. On the other hand, in cities, large amounts of resources and energy are consumed in the provision of both comfortable living environment and various urban activities, such as large commercial complexes. These have increased the negative impacts, such as the increase of energy consumption and heavier traffic.

Climate change is different from air, water, or other "conventional" pollution sources, whereby the relationship between victims and offenders is basically clear, namely; that pollution occurs due to the emission of substances harmful to human health and the environment. However, climate change is caused by GHG that inherently do not have adverse effects to human health and the environment (e.g. CO<sub>2</sub>).

Most people on Earth who seek a comfortable life consume fossil fuels, whereby they may be offenders in some places or for some periods of time, and victims in other places at other periods of time. This is why actions by the local governments, communities and major enterprises involved in large amounts of activities are delayed.

All parties are now required to take proactive actions against climate change for implementation by 2020 in line with the framework of the Paris Agreement, the UN's Sustainable Development Goals (SDGs), and the largest cities, especially, are expected to take the leading role.

This report summarizes how cities play an active role in climate change and introduces the situation of Yokohama City as a case example of Japanese cities and as a concrete example of intercity cooperation. It presents the situation where Japan International Cooperation Agency (JICA) and Yokohama City collaborate to promote cooperation in creating and

implementing the master plan of climate change adaptation in Bangkok, Thailand.

## 2. JICA's Support Activities in Dealing with Climate Change in Cities: Joint Project with the Bangkok Metropolitan Administration (BMA)

### (1) Support Initiatives for Climate Change

Climate change requires long-term and self-sustaining initiatives. However, it is more difficult for developing countries to build and implement these initiatives alone. JICA provides various support initiatives concerning climate change based on the local requirements.

For example, JICA's assistance in Vietnam includes technical evaluation, contributing to the implementation of GHG emission reduction measures under the "Nationally Determined Contributions" policy of the government, streamlining GHG inventories, measuring, reporting, and verifying GHG reduction actions in the energy, transportation, and industrial waste treatment sectors in Ho Chi Minh City.

In Bangkok, Thailand, JICA is providing assistance, with the help of the Yokohama City Government, to develop a master plan of effective measures against climate change.

### (2) Background of Collaboration with the Bangkok Metropolitan Administration (BMA)

Regarding the support policy between Japan and Thailand (2012), one of the key areas was "Sustainable economic growth and response to the mature society", which included measures against environmental issues/climate change and flood prevention. Under this policy, JICA implemented the "Project for Climate Change Reduction and Adaptation Capacity Building in Bangkok (2009-2012)" in the BMA, whereby the BMA's organizational capacity has been reinforced.

Since then, following the "Bangkok Action Plan on Global Warming Mitigation, 2007-2012", the BMA with the cooperation of JICA and Yokohama City, has been developing more comprehensive measures against climate change, the "Bangkok Master Plan on Climate Change 2013-2023". With the continued support from JICA and Yokohama City, it is currently promoting the "Capacity Building Project for the Bangkok Master Plan on Climate Change, 2013-2023", by organizing the Climate Change Strategy Office of the Environment Department.

### (3) Organization of a Dedicated Team

In order to apply sustainable measures against climate change, it is crucial to have a dedicated Team to implement a project from the policy-making perspective.

Climate change involves not only environmental issues but also various other aspects, including energy, transport/city traffic, urban planning and land use in terms of mitigation, and anti-disaster and sewerage systems/rivers. It is important to ensure consistency and alignment among all of them.

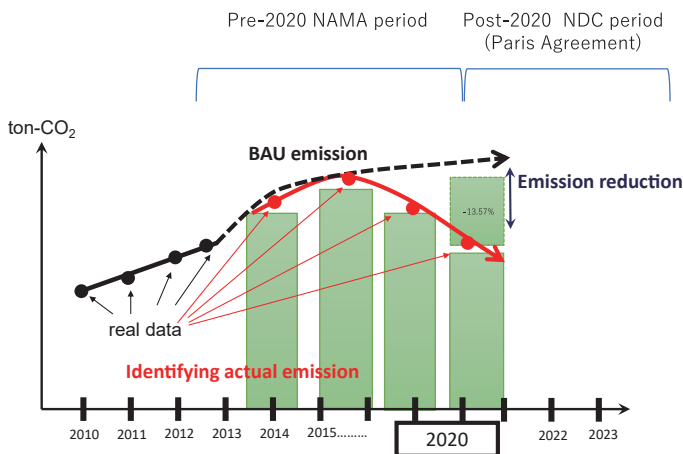
In this regard, the Team shall work to reinforce the functions and capabilities of the Climate Change Strategy Office of BMA's Environment Department, by referring to Yokohama City's experience including the role and organization of the unit dedicated to promote effective measures against climate change.



### (4) Reduction Targets and Initiatives in the Master Plan (MP)

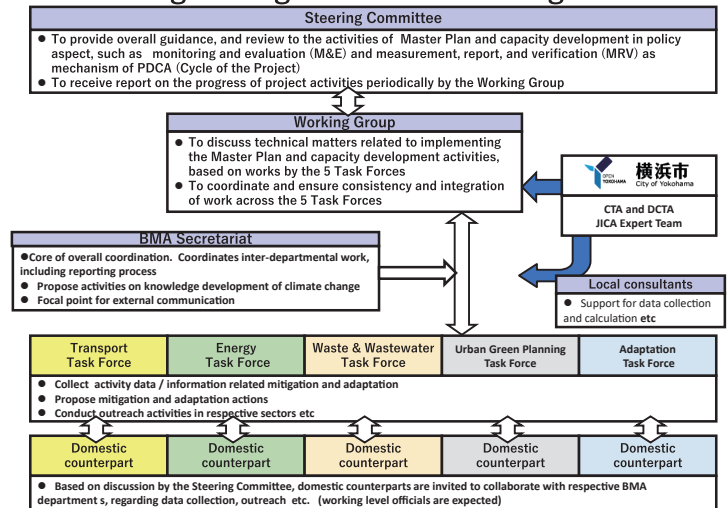
With the aim of reducing GHG emission by 13.75% from BAU by 2020, the Master Plan divides the projects to promote efficient measures against climate change into the five key areas: Transport; Energy; Waste and Waste Water Treatment; Urban Green Planning; and Adaptation.

GHG emission prospects in BAU and with mitigation actions



Sector	2013		2020		Expected reduction/absorption amount (reduction rate against BAU)
	GHG emission	Future GHG Emission in BAU Scenario	Future GHG emission with BKK MP implementation		
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%)	
<b>Total</b>	<b>43.87</b>	<b>53.74</b>	<b>46.44</b>	<b>7.29 (13.57%)</b>	

### Strengthening Institutional Arrangement



Heavy traffic jams is one of the most serious issues in Bangkok, and GHG and exhaust gas from vehicles are causing climate change and air pollution. To tackle this situation, the public transportation infrastructure is being developed quickly. Especially for the railway transport, ambitious investment plans for the construction of new routes and the extension of existing routes which have been highly anticipated by people living in Bangkok, were implemented.

In terms of traffic, this will not only mitigate traffic jams but also reduce energy consumption and GHG emissions, through measures to promote the shift from vehicle to public transport services, efficient operation of traffic signals with the assistance of JICA, and greater utilization of biomass fuel.

In terms of energy, given the increase in construction projects of large shopping centers, hotels, and condominiums, it will be difficult to reduce emissions, and therefore efficient energy use (e.g. reduction of emissions per unit area) is considered. It is also important to consider how the existing reporting requirements by large energy users can be used more

effectively. Assuming that it is very difficult to reduce energy consumption in the existing buildings, energy saving measures should be taken into account, especially concerning new construction and large-area development projects.

Pursuant to the Cancun Agreement signed at the 16th Session of the Conference of the Parties (COP 16), Thailand, as a Non Annex I Party or Developing Country under the United Nations Framework Convention on Climate Change (UNFCCC), had submitted and implemented its Nationally Appropriate Mitigation Action (NAMA) which targets the reduction of GHG emissions by the energy and transport sectors by 7% (or 20%, if adequate international support is available) compared to BAU by 2020. The NAMA has been prepared based on the country's alternative energy development plan (AEDP), the energy efficiency development plan (EEDP), and the Master Plan on Sustainable Transport, which focuses on the development of renewable energy sources, energy efficiency improvement by industry, buildings, and transportation, biofuel use for transportation and development of an environmentally sustainable transport system.

Given that a considerable portion of the overall GHG emission in Thailand and national measures are being undertaken by the local governments in the region, the Bangkok Master Plan on Climate Change has been developed, based on the target year and the estimated/targeted values in the NAMA, to make it consistent with the national plan in terms of GHG emission and MRV (measurement, reporting and verification). As for GHG mitigation measures, the BMA is playing a key role in projects under its control and, at the same time, supporting/promoting measures taken by the central government. For example, in the transport sector, the BMA has injected its own budget regarding extension projects for the Bangkok Mass Transit System (BTS Sky Train), and has constructed and maintained elevated walkways for the Metropolitan Rapid Transit or MRT to improve connectivity with the BTS system.

In its Nationally Determined Contribution (NDC) based on the Paris Agreement, Thailand intends to reduce GHG emissions by 20% (or 25%, if adequate international support is available) from BAU within the timeframe of 2021 to 2030, which is legally binding for international law purposes. As the next step, the BMA is required to set/implement mitigation measures in or after 2021, and apply quantitative targets in line with the national NDC.

### 3. Initiatives on Climate Change in Yokohama City and International Inter-City Collaboration

In Japan, more and more local governments are addressing climate change directly, not relying on the central government.

For example, in Yokohama City (population 3,740,000) where the measures against climate change have been led by the manager of a section of the Environment Division as a part of the drastic organizational change initiated by the Mayor in 2008, the "Climate Change Policy Division" is the dedicated unit organized to ensure comprehensive coordination by the City's administration, planning/coordination for important policies, and prompt decision-making and action on important and urgent issues. This new unit, as the coordinator of the relevant divisions, has promoted measures on global warming in partnership with the local communities and business enterprises. In May 2011, the "Climate Change Policy Division" was transferred to the "Climate Change Policy Headquarters", working independently from the other sections and divisions, and responsible for leading/promoting measures against global warming, making the city an economically active city by making the best potential of businesses in the city. As such, the mission of the new unit is not only to implement the measures against climate change, but also apply sustainable city planning with a careful balance of the environmental, community, and economic factors.

This new unit's function is to clarify the city's position regarding climate change, and implement diversified actions aiming at both mitigation and adaptation through a strong collaboration among the different divisions and departments. As such, organizing a new team is significant for policy purposes. It is also important to set clear goals for the city.

In the "Yokohama Action Plan on Global Warming", which is currently being revised, the city aims to reduce GHG emissions by 22% and 30% by 2020 and 2030, respectively. The long-term goal is at least 80% GHG emissions by 2050, for which different measures will be required. The City's ultimate goal is "Zero Carbon Yokohama", which means achieving decarbonization as soon as possible in the second half of the century.

Summary of the Revised Action Plan:

Year		Reference Year	GHG Emission Reduction Targets
Short to Medium-Term	2020	2013 (CO <sub>2</sub> : 21.59M tons)	22% (CO <sub>2</sub> : 16.83M tons)
	2030		30% (CO <sub>2</sub> : 15M tons)
Long-Term	2050		At least 80%

In the energy sector which contributes the major portion of emissions, advanced markets such as VPP (virtual power plant) which can instantaneously respond to the peak demand of electric power by installing smart grid and many lithium ion batteries at the schools and so on, managing it with IoT and promoting projects that incorporate technologies in collaboration with companies, further expansion and development by utilizing private facilities and EV in the future shall be initiated. More importantly, these initiatives are being

aggressively introduced with cutting edge technologies, such as micro grid in cooperation with a wide range of companies with high environmental awareness, such as energy companies and RE 100, not only through the support from the central government.

On the other hand, in addition to the national requirements, the city has introduced its own rules for large energy users under the “Act on the Rational Use of Energy” , including detailed reporting of energy consumption.

Yokohama City is also working with other cities in the world to solve different issues in such cities. Various social issues with which developing and emerging countries in Asia and Africa are now facing, such as heavy traffic jams and air and water pollution, are the same problems that many large cities in Japan have suffered and managed to overcome.

Yokohama City recognizes that its experience in tackling pollution issues through lengthy discussions and negotiations with business enterprises and the local communities, and by collaborating with the private sector on its recent measures against climate change, should be shared with other cities in the world through intercity collaboration.

Examples of such intercity collaboration include the collaborative project with the BMA in developing and implementing effective measures against climate change as mentioned earlier, and the waste treatment and water supply project in Metro Cebu in the Philippines.

## 4. Conclusion

Local governments are not only obligated to protect people’s lives and properties, but at the same time directly or indirectly generate a large amount of GHG through economic activities. Therefore, now is the time for cities to play a key role in dealing with climate change in terms of both mitigation and adaptation.

Especially, the largest cities, which are the most influential, should implement effective measures against climate change for the future well being of such cities. They have to develop a feasible and strategic master plan, combining conventional mitigation measures efficiently with effective adaptation measures (e.g. anti-flood or heavy rain measures).

The leaders of many large cities around the world have expressed their ambition to become smart cities. Despite the absence of a clear definition, a smart city needs to be based on the principle that it is attractive with permanently increasing quality values for all parties, including the residents, businesses, and visitors.

All buildings and infrastructures in a city will inevitably start to deteriorate upon completion. On the other hand, smart cities will not deteriorate over time, but will increase in quality and value through maturity, which is exactly the concept of a smart city.

Urban transport and energy issues are important elements

concerning smart city planning. These factors should be taken into account in large-scale developments as well. At the design phase, local municipalities should consider efficient energy use, public transport services, and sustainable urban designs.

A smart city, based on the principle of such city's administration under sustainable development goals (SDGs) and the Paris Agreement would achieve a number of advantages. For example, if the local government expresses its clear position to work together with the enterprises that seek for 100% alternative energy conversion or other environmental commitments, these environmentally-conscious companies would locate to that city.

Companies with high environmental awareness, in general, are expected to have excellent technological capabilities and potential, as well as clearly defined goals for the future. As such, in an area where many of these companies are located, various factors in such cities will have a good effect on each other, and thus contribute to the high-quality growth of such cities.

Cities in developing or emerging countries tend to lack human capital resources, sufficient budget, and the know-how necessary to take proactive action against climate change and SDGs. With reference to organizations working actively on climate change globally (e.g. JICA) as well as the collaboration project between Yokohama City and Bangkok, and with parties other than the central governments, such as local governments, private sectors, NPOs, and NGOs, the collaboration among all parties and the implementation of suitable methods should be encouraged to open the way to the future and further development.

## Disclaimer

This “Note of JICA expert” was prepared by Mr. Kimihiro Kuromizu, with comments and suggestions from Dr. Masato Kawanishi (JICA Senior Advisor).

The views and opinions expressed in this “Note of JICA expert” do not necessarily represent the official position of JICA.



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