Kick-off Meeting of City-to-City Collaboration Programme in Davao City

Date: May 15th 2018 (Tuesday)
Time: 9:30～12:00
Venue: Function room at Grand Men Seng Hotel

No	Time	Programme	Presenter
1	9:30～9:35	Opening remarks	Atty. Tristan Dwight P. Domingo, Asst. City Administrator, Davao City
2	9:35～9:40	Opening remarks	Ms. Emiko Murakami Director, Kitakyushu Asian Center for Low Carbon Society, Environment Bureau, City of Kitakyushu
3	9:40～9:50	Photo session	
4	9:50～10:10	Background of a cooperation between Davao City and City of Kitakyushu	Ms. Emiko Murakami Director, Kitakyushu Asian Center for Low Carbon Society, Environment Bureau, City of Kitakyushu
5	10:10～10:30	Low-carbon policy of Davao City and the progress of Local Climate Change Action Plan (LCCAP) (tentative)	Ms. Marivic L. Reyes Officer-In-Charge, City Environment & Natural Resources Office (CENRO) of Davao City (t.b.c.)
6	10:30～10:50	A framework of City-to-City Collaboration Prorgamme between Davao City and City of Kitakyushu on low carbon development	Mr. Shiko Hayashi Programme Director, Kitakyushu Urban Centre, Institute for Global Environmental Strategies (IGES)
7	10:50～11:10	Support for a development of Local Climate Change Action Plan (LCCAP) of Davao City	Dr. Junko Akagi Research Manager, Kitakyushu Urban Centre, Institute for Global Environmental Strategies (IGES)
8	11:10～11:40	Q&A and discussions on possible low-carbon project applying to JCM fund	
9	11:40～11:50	Closing Remarks	Japan side
10	11:50～12:00	Closing Remarks	Atty. Tristan Dwight P. Domingo, Asst. City Administrator, Davao City

＊The kick-off meeting will be held in English (A consecutive translator between English and Japanese will be available)

Tentative list of participants

- Atty. Tristan Dwight P. Domingo, Asst. City Administrator, Davao City
- Ms. Marvic L. Reyes, Officer-In-Charge, City Environment & Natural Resources Office (CENRO) of Davao City
- Related departments and CENRO staffs
- Dr. Doris B. Montecastro, Chairperson, Environmental Science Department, Ateneo de Davao University
- Consular Office of Japan in Davao (t.b.c.)
- Ms. Emiko Murakami, Director, Kitakyushu Asian Center for Low Carbon Society, Environment Bureau, City of Kitakyushu
- Mr. Noboru Kawai, Project Development Manager (Waste to Energy) , Nippon Steel & Sumikin Engineering Co., Ltd. (NSENGI)
- Engr. Archelez G. Dumandan, Managing Director, PNS Construction, Inc.
- Ms. Lea-Chris Tan, Nippon Steel & Sumikin Engineering Co., Ltd. (NSENGI)
- Mr. Rudy Q. Corro Jr. VP for Business Development, Carbon Footprint Solutions Inc.
- Mr. Shiko Hayashi, Programme Director, Kitakyushu Urban Centre, Institute for Global Environmental Strategies (IGES)
- Ms. Junko Akagi, Research Manager, Kitakyushu Urban Centre, Institute for Global Environmental Strategies (IGES)
- An interpreter

- Fr. Daniel Mcnamara, SJ, University Research Council, Ateneo de Davao University
- Dr. Doris B. Montecastro, Chairperson, Environmental Science Department, Ateneo de Davao University
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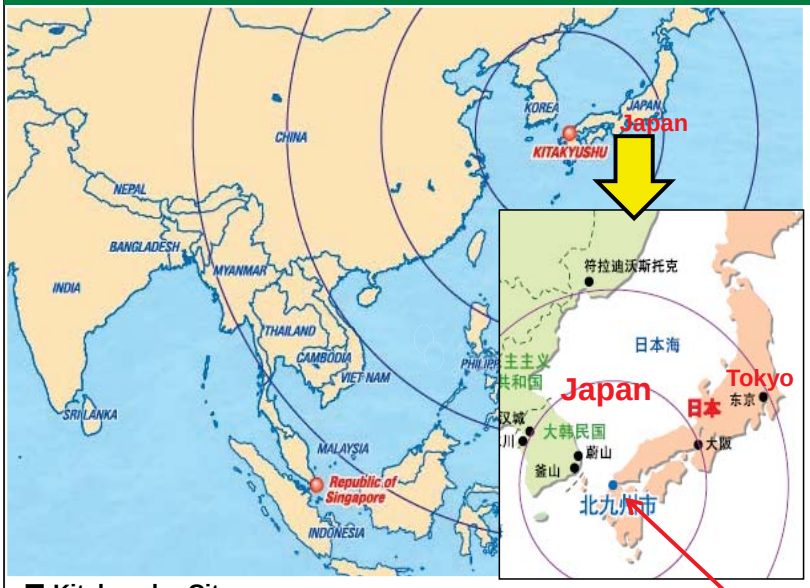
Background of a cooperation between City of Davao and City of Kitakyushu

Green Frontier
環境モデル都市 北九州市

Kitakyushu Asian Center for Low Carbon Society
Environment Bureau, City of Kitakyushu
Director, Emiko MURAKAMI

City located near to other Asian nations, rich in nature, and developed as a manufacturing area



■ **Kitakyushu City**
Population: 977,000 (2010) Area: 487.88 Km²
GDP: 3,430 billion yen (2010)

Rich nature and branded food materials


Karst Plateau Hiraodai


Wakamatsuhoku Beach


Ouma Bamboo Shoots


Kanmon Straits Octopuses


Kokura Beef


Buzen-Sea Oysters


Wakamatsu Special Tomatoes

Major companies in Kitakyushu area


Nippon Steel Corporation


Yaskawa Electric Corporation


TOTO Ltd.


Mitsubishi Chemical Corporation


Toyota Motor Corporation · Nissan Motor Co., Ltd.


Mitsubishi Materials Corporation

Overcoming Severe Pollution: Kitakyushu's Experience

1960s

Today

Key Factors: Partnerships among Multi-Stakeholders

Residents

Residents observing a private company

Study session on air pollution measures with university professors

Partnership

Environmental supervision & environmental infrastructure

Local Government

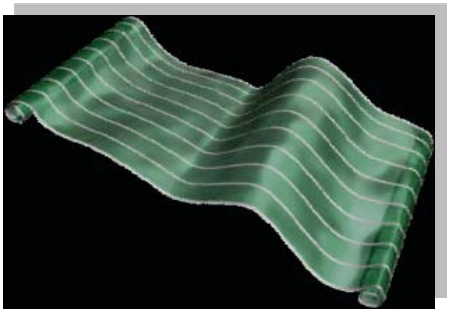
Cleaner Production & pollution control equipment

Private Enterprises

Low-Carbon Technologies in Kitakyushu

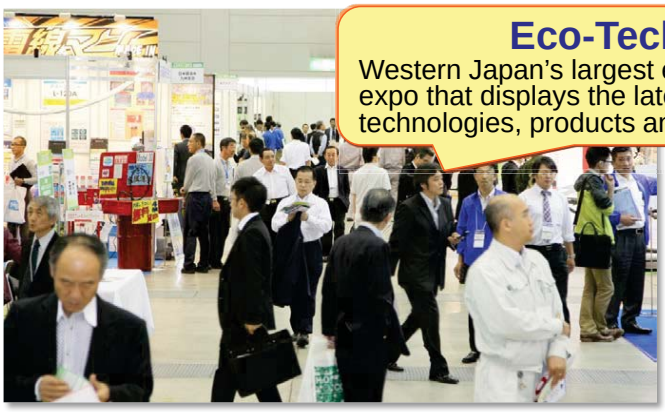
Mitsubishi Materials
15 types of waste treatment and recycling, such as metal waste and sludge

Nippon Coke & Engineering
CDQ (Coke Dry Quenching Process)
Supply power and steam to neighboring factories
Power generation capacity: 27,900kW



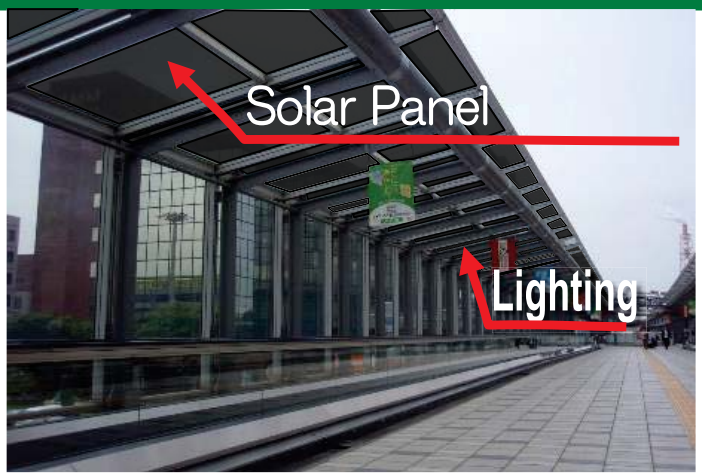
Mitsubishi Chemical
Processable organic photovoltaics
Next-generation flexible and lightweight photovoltaic modules

Yaskawa Electric
Energy saving, inverters



Eco-Techno
Western Japan's largest eco-technology expo that displays the latest eco-technologies, products and information

Low-Carbon Activities in Kitakyushu - 1



JR Kokura Station North Pedestrian Deck

Katsuyama Bridge Solar Powered Roof

Uomachi Eco-Roof

Low-Carbon Activities in Kitakyushu - 2

Bicycles in Use
(Front of City Hall)

Introduction of Eco-Cars
such as Electric Vehicles

Bicycle Station
(Kokura Kita-ku Ward Office)

Low-Carbon Activities in Kitakyushu - 3

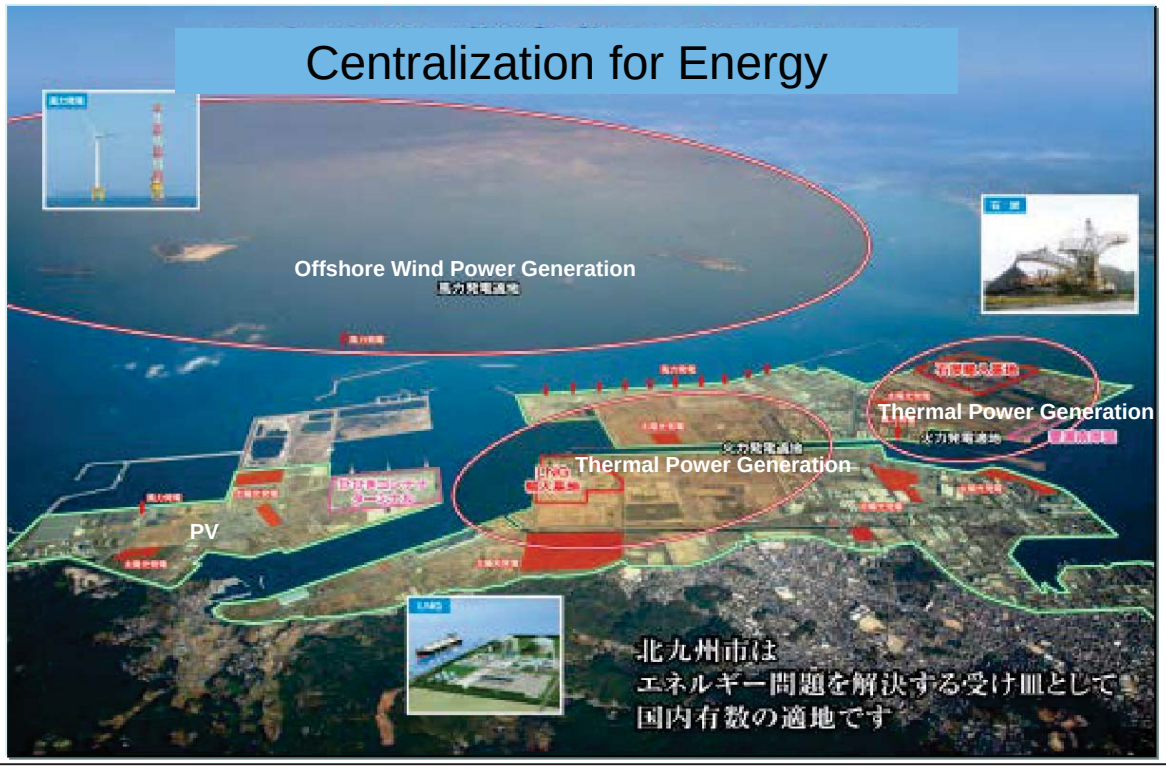
Peak cut activity of
electric power consumed

Water
Sprinkling

Turn off the light
during afternoon break

Energy Policy in Kitakyushu (Kitakyushu Power)-1

Make Hibikinada Area a Base for Energy
～Invitation of Solar Photovoltaics, Biomass Power Generation and Offshore Wind Power Generation

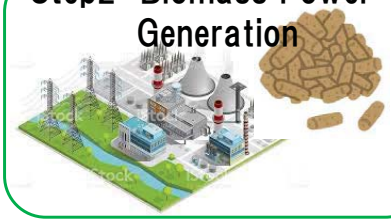


Energy Policy in Kitakyushu (Kitakyushu Power)-2

Utilizing local low-carbon power source starting in Waste-to-Energy. Expand procurement power supply in conjunction with status of inviting power generation facilities and expansion of supply scale.

Step1 Waste to Energy

Step2 Biomass Power Generation



Step3 Offshore Wind Power Generation and so on

Kitakyushu Power Co., Ltd.

Kitakyushu Asian Center for Low Carbon Society

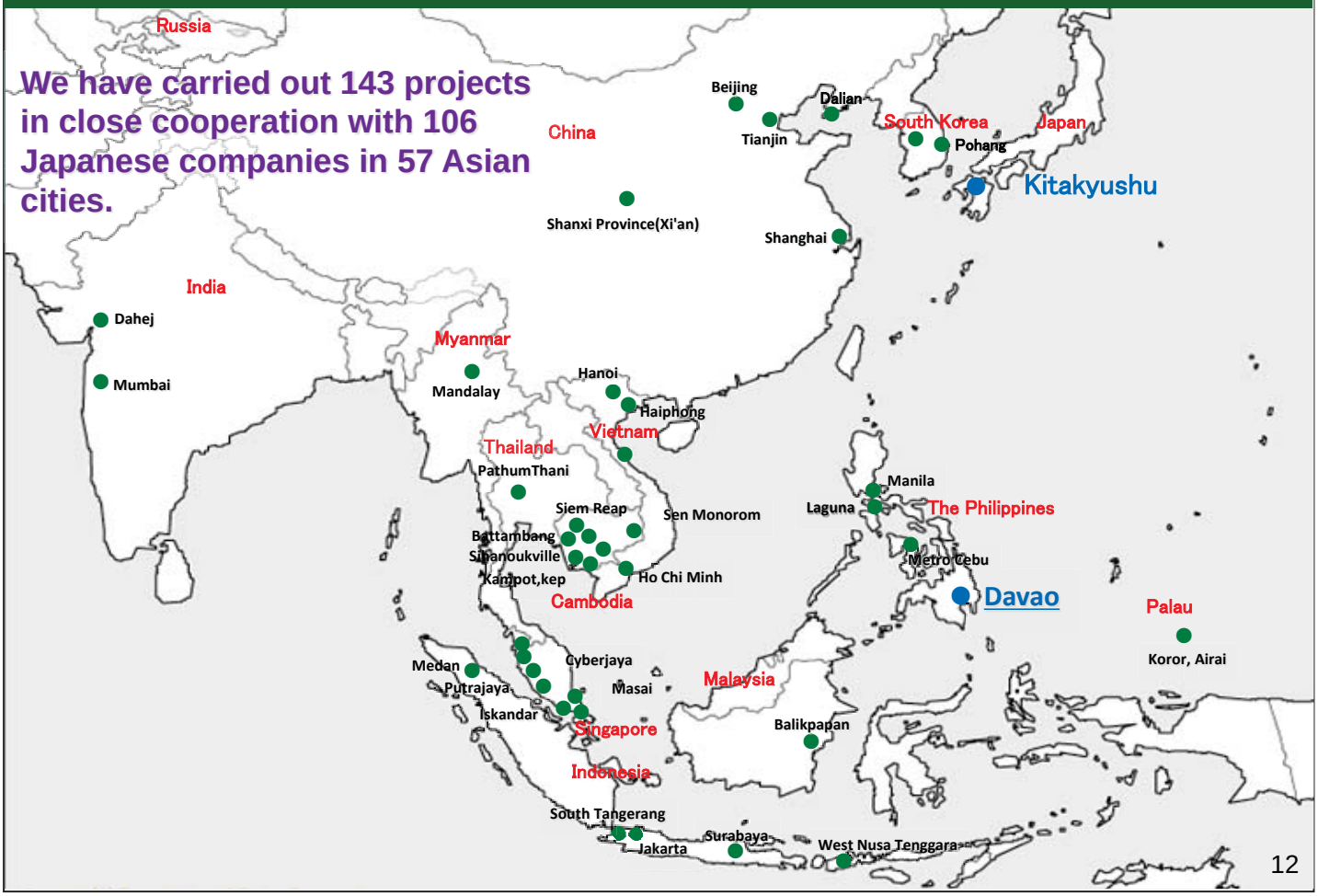
Kitakyushu Asian Center for Low Carbon Society opened in June 2010.

Utilization of the environmental technologies developed through the solution of pollution problems and manufacturing processes, and the inter-city network established by international cooperation in the past

Accumulating environmental technologies in Kitakyushu City and throughout Japan, for building low carbon societies in Asia through environmental business skills

Diverse Project Development Map

We have carried out 143 projects in close cooperation with 106 Japanese companies in 57 Asian cities.



Cooperation for E-Waste Recycling with Cebu City in the Philippines

Supporting Cebu City's Ordinance since 2014 (supported by METI, Japan)


Japan, Cebu ink e-waste research project MOA

Ordinance No. 2450

"AN ORDINANCE PROVIDING FOR THE MANAGEMENTO OF SPECIAL WASTES IN THE CITY OF CEBU, PROVIDING FEES AND IMPOSING PENALTIES FOR NON-COMPLIANCE THEROF" in 2016.

【Extract】

-This ordinance obligates household and commercial facilities must bring special wastes including E-waste to collection points designated by Barangay.

- All transporter and TSD facilities operating within the City must register with the Cebu City Solid Waste management Board with requirement of DENR-EMB accreditation, Business permit.

- Any person found guilty of violating any prohibited Acts should be imposed fine for first and second offence. For the third business license shall be suspended .

Memorandum of Understanding for Environmental Technical Cooperation in February 9th in 2017

Article1 Objective

The objective of this MoU is to establish an Environmental Technical Cooperation in order to promote and expand effective and mutually beneficial cooperation in the development of the two cities.

Article2 Scope

Promotion of resource recycling by proceeding with the management of special waste Development of a green economy and environment conservation with pollution control of water, air and soil.

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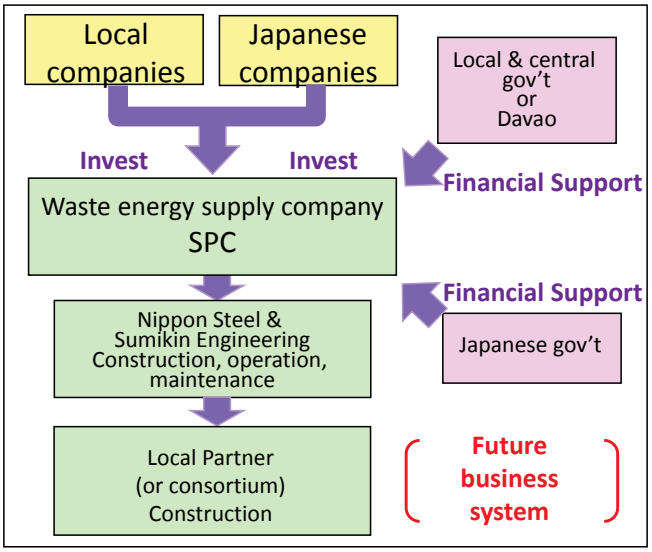
Investigation for Installation of Waste-to-Energy Facility in Davao City

JICA, MoEJ (FY 2015 - up to present)

<Project Overview>

Davao is the central city in the south section of the Philippines and is facing issues of increased waste generation due to the expansion of economic activities and reducing pressure on final disposal sites.
Therefore, this project aims to implement a "waste-to-power project" with the aims of both achieving significant reductions of waste and using this energy. Surveys will also be carried out on waste treatment situations and related legal systems.



<Project Implementation System and Main Role>

【Nippon Steel & Sumikin Engineering】
- Business Entity

【City of Kitakyushu】
- City to City Cooperation

【KITA】
- Technology Transfer of Solid Waste Management

【Kitakyushu Environmental Preservation Association 】
- Waste Analysis

【IGES】
- Hold the Public Consultation

Stoker-incineration furnace

・Can respond to large-scale waste treatment needs (minimization)
・Large-scale, high-efficiency power generation is possible with the use of waste.

Kogasaki Waste-to-Energy Plant in Kitakyushu

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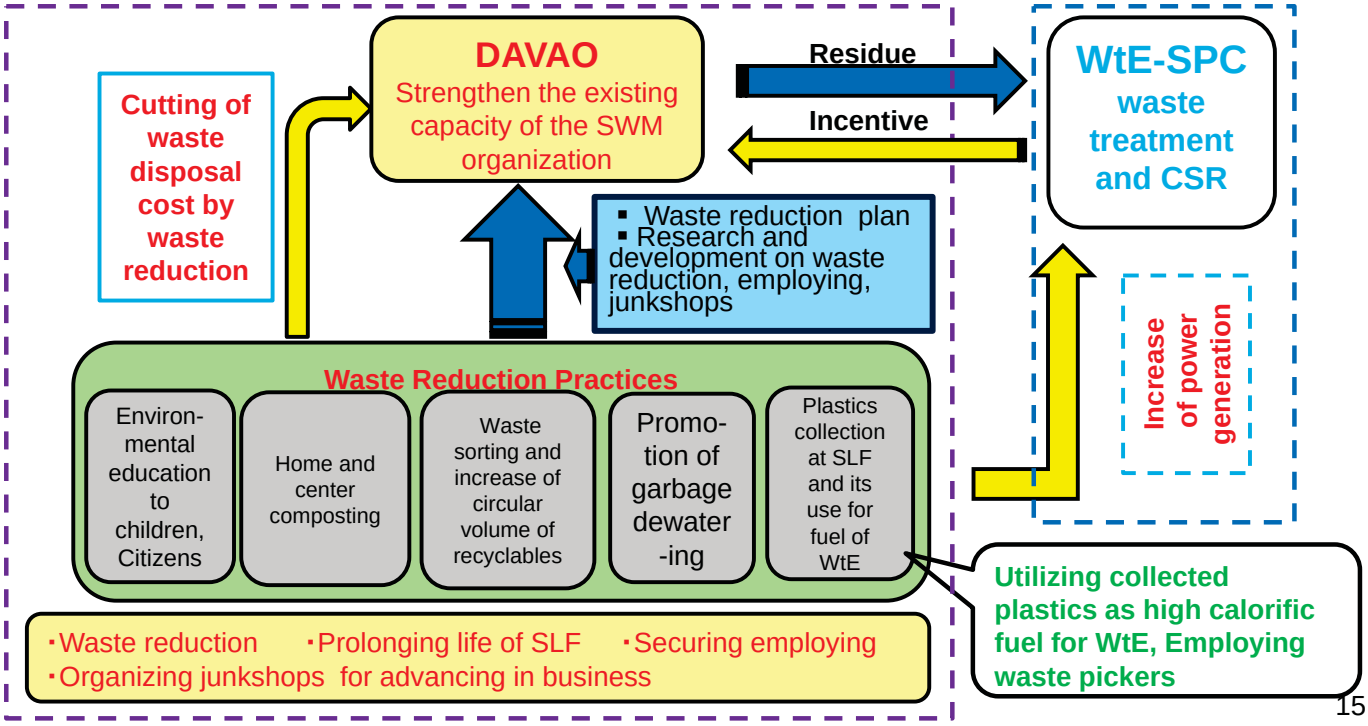
Solid Waste Management in Davao for JICA Grassroots Project

JICA「Grass Roots Project」(FY 2017–2020)

＜Project Output＞

1. **Establishing a system for waste analysis in CENRO**
2. **Setting up preparatory body to develop an organization to promote waste reduction**
3. **Pilot activities on waste reduction in business sector and barangay to be conducted**

Solid Waste Reduction Mechanism



JCM City-to-city Cooperation Project between City of Kitakyushu and Davao City

Project to realize low carbon society in Davao City through a support for a development of Local Climate Action Plan (MoEJ : FY 2018)

Support for a development of Local Climate Change Action Plan of Davao City

- ▪A development of GHG inventory (supported by IGES)
- ▪A development of mitigation measures (supported by Kitakyushu City and IGES)
- ▪A development of adaptation measures (supported by Ateneo De Davao Uni.)

An implementation of concrete mitigation measures

Study on a feasibility of renewable energy project (for JCM model project)

- Waste-to-Energy (WtE) project (Nippon Steel & Sumikin Engineering Co., Ltd.)
- Feasibility study on other low-carbon projects (renewable energy and energy saving projects)
- Coordination with related-stakeholders for an implementation, technical study, evaluation of the amount of CO_2 reduction, etc.
- Supporting for a preparation of applying JCM model project

Executives of Davao City Government Visit to Kitakyushu City

Atty. Domingo (March 2016)

Atty. Ropez (May 2017)

Mayor Sara (November 2017)

Atty. Bantiding (February 2018)

Signing of a Memorandum of Understanding for a Green Sister City Relationship with Davao, The Republic of the Philippines

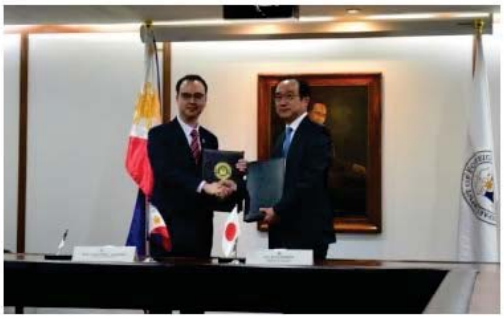
On November 28th, 2017, the City of Kitakyushu and the City of Davao, in the Republic of the Philippines, signed a Memorandum of Understanding creating a Green Sister City relationship between the cities that aims to create cooperative partnerships in the environmental field for the purpose of expanding mutual benefits and positively driving development through low-carbon societal initiatives, resource circulation projects, and development of local human resources.
The City of Davao is the City of Kitakyushu's second Green Sister City, and its first since Surabaya in the Republic of Indonesia, in November of 2012. Through the signing of a Memorandum of Understanding, cooperation between the public and private sectors can strongly support the export of city infrastructure systems, create a path for regional revitalization, and drive national growth strategies.

Map of the Philippines
Map data: Esri, HERE, DeLorme, FAO, NOAA, USGS

Signing of the Memorandum of Understanding:
Mayors Sara Duterte of Davao and Kenji Kitahashi of Kitakyushu

the Signing Ceremony of the Exchanges of Notes for the Waste-to-Energy Facilities in Davao City

On March 20th 2018, Ambassador Koji Haneda, with Department of Foreign Affairs Secretary Mr. Alan Peter Cayetano, attended the signing ceremony of Exchanges of Notes.
Exchange of Notes signed will provide a JPY 5.013 billion (PHP 2.5 billion) grant for the development of waste-to-energy facilities in Davao City. Japan's grant will be used to construct and manage waste-to-energy facilities to significantly reduce solid wastes and convert it into usable energy. This project is expected to serve as an innovative example of sustainable waste management to other cities in the Philippines.



Priority Fields in Technological Transfer

Energy management

Regional management of energy by placing city and regional electricity plants at the core

Yahata Higashida District, where an environmentally conscious town is under construction

Kitakyushu Smart Community

Water business

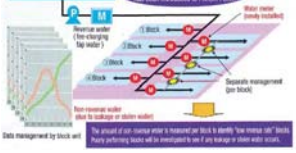
Water recycling demonstration plant combining sewage water membrane treatment and seawater desalination

Water Plaza

Water created from sewage: 1,000 m³/day
Water created from seawater: 400 m³/day

(Hiakari Sewage Treatment Plant)

How to maintain and manage a water distribution network



Non-revenue water rate is improved.
72% (1993) → 8% (2006)

Cooperation between government and the private sector

Transferring
a package on environmental technologies and social systems

Recycling and waste treatment

Kitakyushu Eco-Town

Economic effects (25 projects):
* Direct investment: approx. 60 billion yen
* Generated employment: approx. 1,300 jobs
CO_2 reduction: approx. 200,000 tons/year

Home appliance recycling

Bicycle recycling

Most advanced facilities for waste treatment
Shaft-gasification furnace

Shin-Moji Plant
Safe facilities that achieved recycling of waste and effective utilization of heat energy

Cleaner production and prevention of pollution

Introduction of cleaner production (CP)

* Evaluation and improvement of raw material and fuel use
* Improvement of manufacturing processes
* Thorough implementation of maintenance and management
* Human resources development, etc.

→ Achievement of energy saving and resource saving
Reduction of environmental loads
+ Higher productivity

End-of-Pipe (EOP) measures

Electric dust collector | Flue-gas desulfurization facilities | Waste water treatment facilities

Thank you for your attention

My name is **Teitan**.
I came from North Pole.
Global warming causes malting ice there, and we have less and less places to live every day.
So I came to Environmental model city, Kitakyushu to protect my family and North Pole.
I am hoping that we all learn the importance of Environmental and ecology more, so that we will be able to stop the global warming together!

Kitakyushu City Environmental Mascot Character

Teitan

低炭素 (**tei tan**so) = Low Carbon

Teitan

A framework of City-to-City Collaboration Prorgamme on low carbon development between Davao City and City of Kitakyushu

May 15th, 2018

Shiko Hayashi
Programme Director, Kitakyushu Urban Centre

IGES
Institute for Global Environmental Strategies

City-to-City Collaboration Programme on low carbon development

The Programme aims

- to conduct a feasibility study (FS) of possible introduction of low-carbon technologies as well as enhance the capacity of partner cities by drawing up a master plan and/or action plan and sharing expertise in project management in the cities in an effective and efficient manner **under the partnership of Japanese cities and partner cities.**

- Support to create low carbon project
- Support to design the local policies/plans to promote low carbon projects (ex: Local Climate Change Action Plan)
- Capacity building for the above mentioned activities

Source: Ministry of the Environment, Japan

JCM Model project

- When promising low-carbon projects are identified, the programme will move on to the project implementation stage with the submission of an application to the JCM Model Project.
- JCM Model Project is a financing programme provided by MOEJ.
- Normally, the open call for proposals to the JCM Model Project is made in late April and an application must be made within three months of the internal announcement of the adopted projects, which is in June.

Project to realize low carbon society in Davao City through a support for a development of Local Climate Action Plan

City of Kitakyushu — Green Sister City Agreement (November, 28th, 2017) Expanding the cooperation area to a development of low carbon society — Davao City

Agreement on cooperation

Focal point

Institute for Global Environmental Strategies (IGES) — Agreement on cooperation — Ateneo De Davao University

Support for a development of Local Climate Change Action Plan of Davao City

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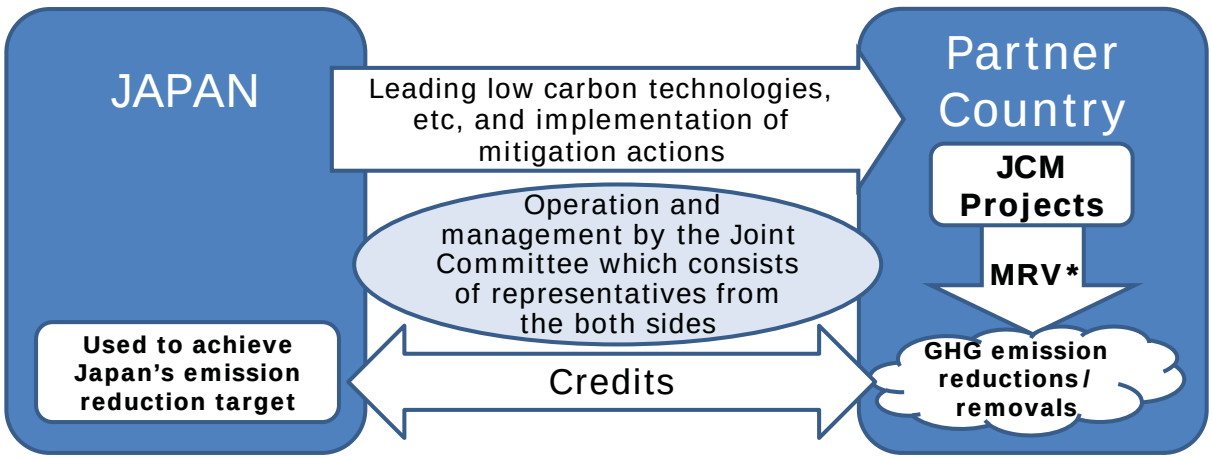
- Supporting for a preparation of applying JCM model project

Basic Concept of Joint Crediting Mechanism (JCM)

- Facilitating diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributing to sustainable development of developing countries.
- Appropriately evaluating contributions from Japan to GHG emission reductions or removals in a quantitative manner and use them to achieve Japan's emission reduction target.
- Contributing to the ultimate objective of the UNFCCC by facilitating global actions for GHG emission reductions or removals.



*measurement, reporting and verification

Source: Ministry of the Environment, Japan

Study on possible application of JCM Model Project

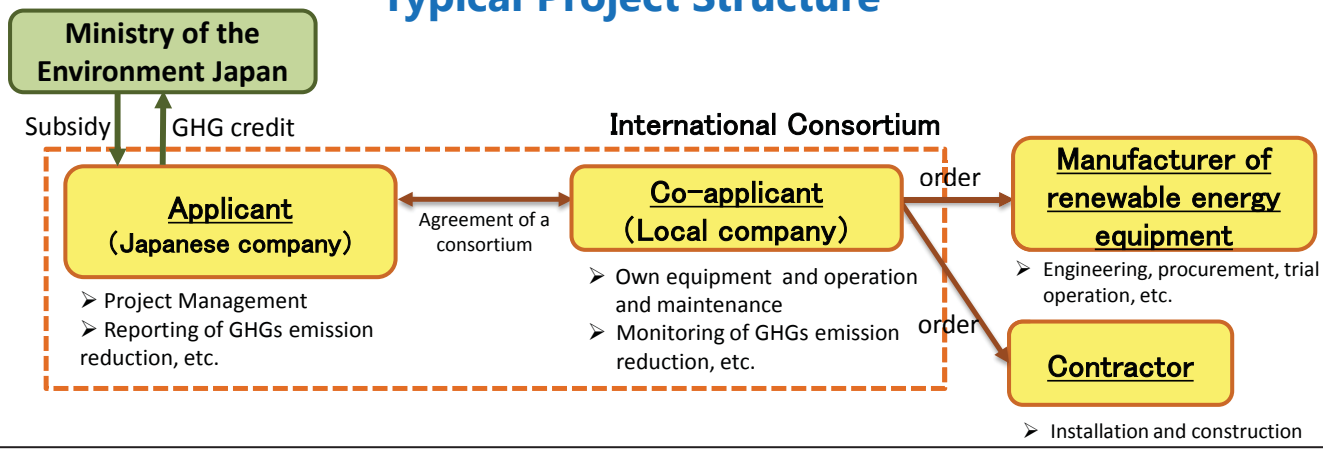
Possible low-carbon projects in Davao City:

1) Study on a possible application of the WtE project to JCM Model Project
2) Feasibility study on other low-carbon projects in Davao City

Components will be checked for a feasibility study on low-carbon projects:

- Forming an international consortium
- Coordination on a timing and condition of a procurement of a low-carbon project in Davao City with related organizations, etc.
- Coordination with manufacturers of renewable energy equipment as well as contractors
- Selection of equipment, calculate the amount CO2 reduction, support for a preparation to apply for JCM Model Project

Typical Project Structure



Possible ideas of low-carbon projects in Davao City

Possible **public** projects:

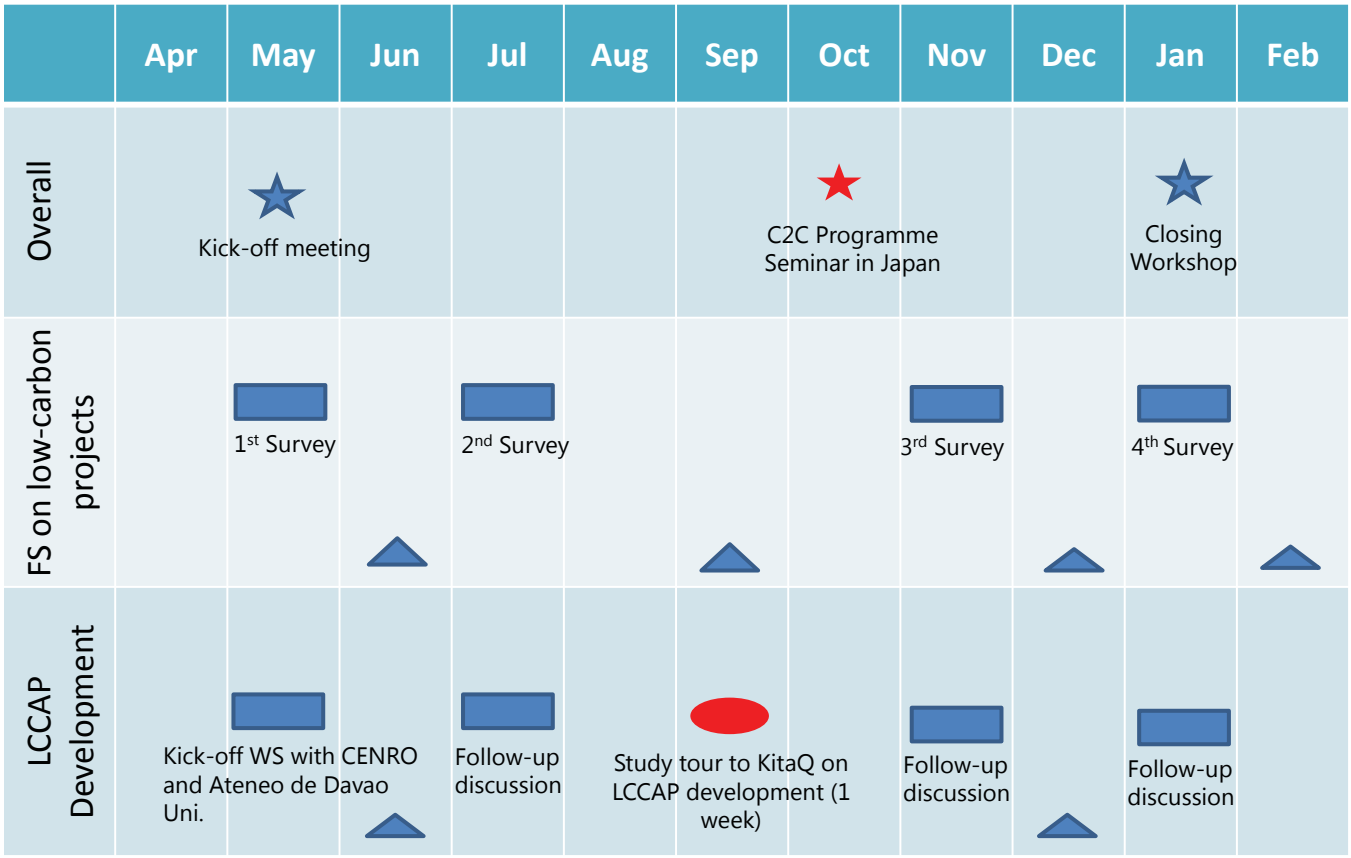
- Solar panel on a roof of a public market located in Toril, Davao City
  - ✓ need to consult with MOEJ if it is regarded as a leading low-carbon technologies
  - ✓ The rate of a subsidy on an installation costs provided from MOEJ would be less than 50% (30 projects approved (2 in the Philippines) among 106)
- Exchange of street lights to LED lights
  - ✓ need to further consult with Davao City and Davao lights
  - ✓ If it is a public project, need a open tender (matters of schedule & selection)
- Introduction of a few electronic buses for the High Priority Bus System
  - ✓ There is a case introduced an electronic bus and electronic charging station under a C2C Collaboration Programme under Kitakyushu and Hai Phong, VN.

Possible **private** projects:

- Waste heat recovery-system to a cement facility
- High-efficiency chiller for air-conditioning to hotel or shopping mall, etc.
- High-efficiency boiler system to factories, etc.

Note: You can check the past approved JCM Model Projects at http://gec.jp/jcm/projects/

Schedule for the City-to-City Collaboration Programme



Reference: Some conditions for JCM Model Project

- Finance rate will be determined based on the number of already selected JCM Model Projects using a similar technology in each country. The scope of the similar technology will be defined by MOEJ, as appropriately.
- Regardless of the finance rate, selected entities in JCM Model Project are expected to deliver at least half of JCM credits issued to Government of Japan.

Number of already selected projects using a similar technology in each partner country	None (0)	Up to 3 (≤3, except 0)	More than 3 (> 3)
Maximum finance rate	50%	40%	30%

Cost effectiveness (JPY/t-CO_2)

- Dividing "the amount of proposed subsidy" by "the accumulated emission reduction" achieved during "the legal durable years" (under Japanese tax law).
- **5,000 JPY/t-CO_2 if the subsidy is more than 500mJPY (5mUSD) and 10,000 JPY-t-CO2 if the subsidy is less than 500mJPY (5mUSD)**

Payback period (year)

$$\frac{\text{(Total initial cost)} - \text{(Amount of subsidy)}}{\text{(Reduction for annual operation cost)}}$$

- Payback period of a proposed project should be more than 3 years.

Source: Ministry of the Environment, Japan

Support for a Development of Local Climate Change Action Plan (LCCAP) of Davao City

Junko Akagi
Kitakyushu Urban Centre
Institute for Global Environmental Strategies (IGES)

15.05.2018, Davao City

Paris Agreement & SDGs

- Paris Agreement:
  - All Parties agreed to commit to suppress the temperature rise well below 2 °C and realize so-called “de-carbonized” society.
- INDCs of the Philippines:
  - 70% from the BAU scenario by 2030 (conditional) (Relative emission reduction)
  - Note that the Philippines government will declare NDCs by 2020.

National Policy for Local Climate Actions

- Section 14 of The Climate Change Act specifically recognizes the role that LGUs play in mainstreaming climate change efforts within the government and requires them to formulate and implement local climate change action plans (LCCAP) that is consistent with local and national policies and frameworks.
- Section 3.3.5 of the Guidelines for the Formulation of the LCCAP strongly suggests LGUs to identify mitigation options to help reduce their carbon footprints and contribute to efforts in addressing climate change.

Adaptation	**Mitigation**
Seeks to lower the risks posed by the consequences of climatic changes	Human intervention to reduce sources or enhance sinks of GHGs
Obligated	Encouraged

LGUs' Initiatives

- Large-scale cities are developing LCCAP with mitigation options:
  - Quezon
    - LCCAP was published in 2017.
    - GHG inventory is under improvement.
  - Davao
    - LCCAP with a focus on adaptation has been developed with Ateneo De Davao University.
    - GHG inventory and mitigation options will be incorporated in the LCCAP in collaboration with IGES and City of Kitakyushu.

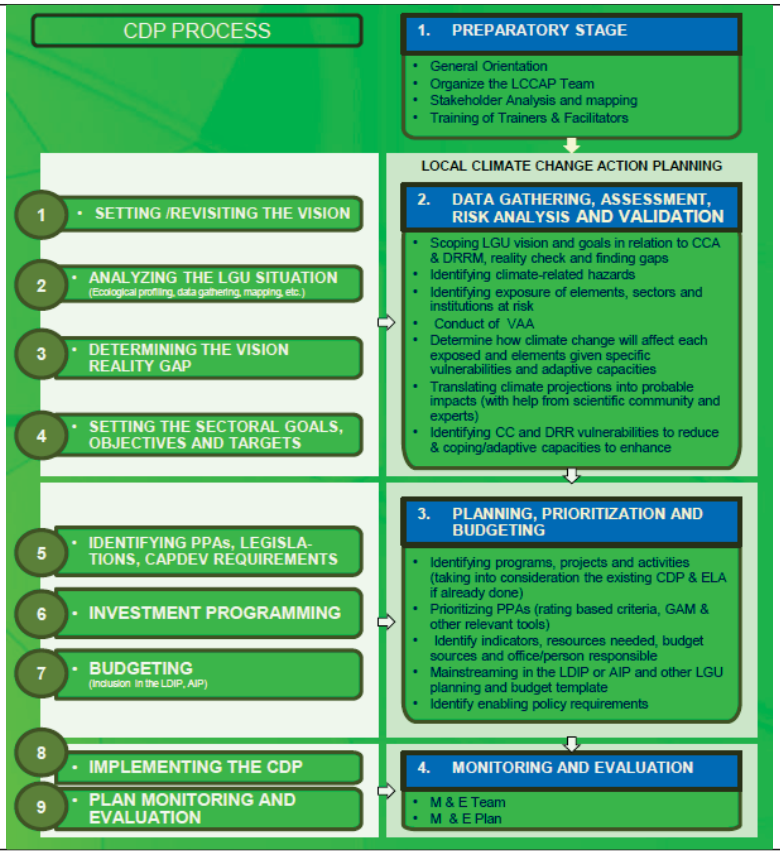
Scope of our project
(Collaboration among Davao City, Ateneo De Davao University, and IGES)

Source: Capili J. Presentation by Quezon city at the Seminar on City-to-City Collaboration for Creating Low-Carbon Society. Jan 2018.


Pilot Training Workshop: "Climate Change Strategies for Local Governments: Low-Carbon City Policy Development and Implementation" (2017)

Steps for the LCCAP Development

With a focus on adaptation

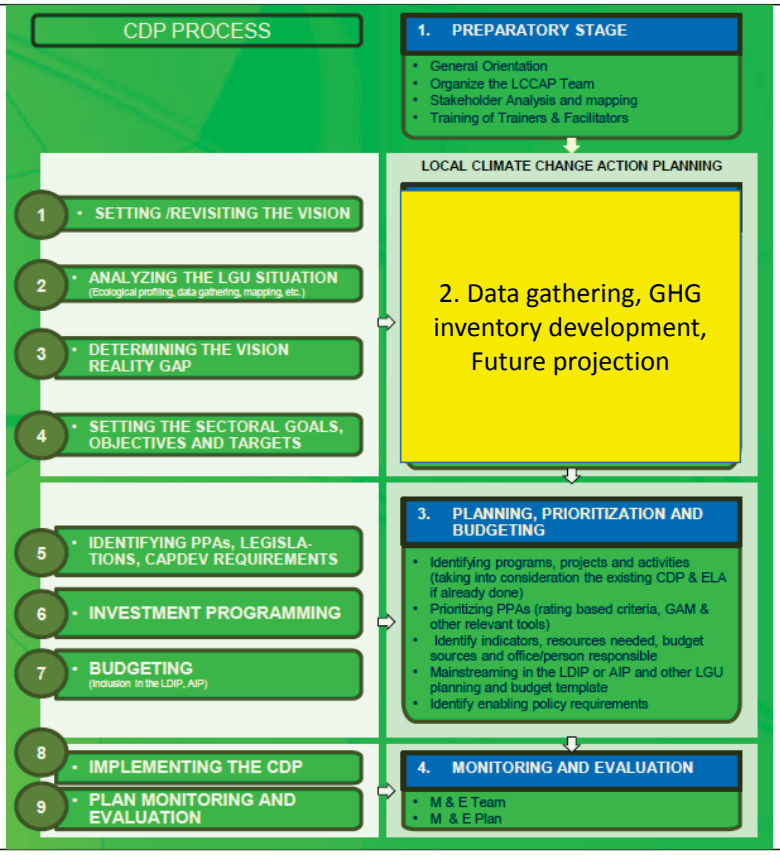


Source: Guidelines on the Formulation of Local Climate Change Action Plan (LCCAP) A LGA-DILG Presentation for Communities for Resilience (CORE) Convergence Forum for the Buayan-Malungon, Cagayan de Oro, Davao & Tagoloan River Basins, June 8-9, 2016, Cagayan de Oro City

Steps for the LCCAP Development

With a focus on mitigation

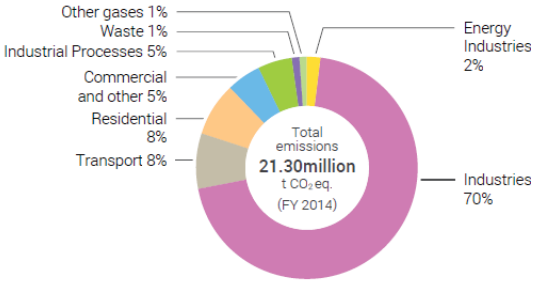
In order to set a target and reduce GHG emissions, we need to know how much GHGs are released from where.



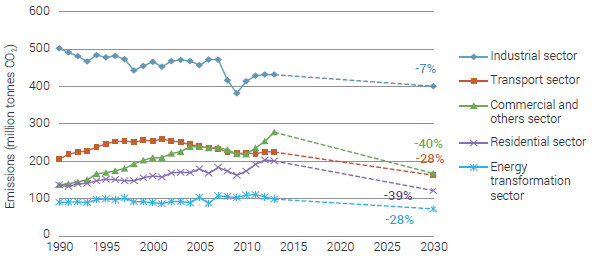
GHG Inventory

GHG inventory is developed …

- To know current emission status of the city
- To serve as a basis for future projection
- To consider appropriate mitigation options
- To prioritize mitigation options by recognizing key emission sources
- To monitor the progress of low-carbonization



Emission profile of Kitakyushu



Time-series data of Japan

Assessment Boundaries

Any anthropogenic activities are the subject of estimation.

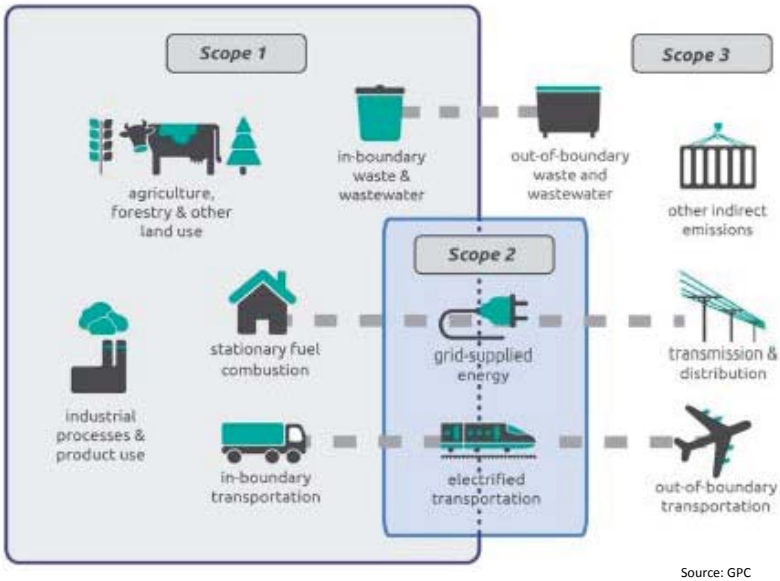
Example of assessment boundaries

<Time period>
- One year

<Greenhouse gases>
- CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3

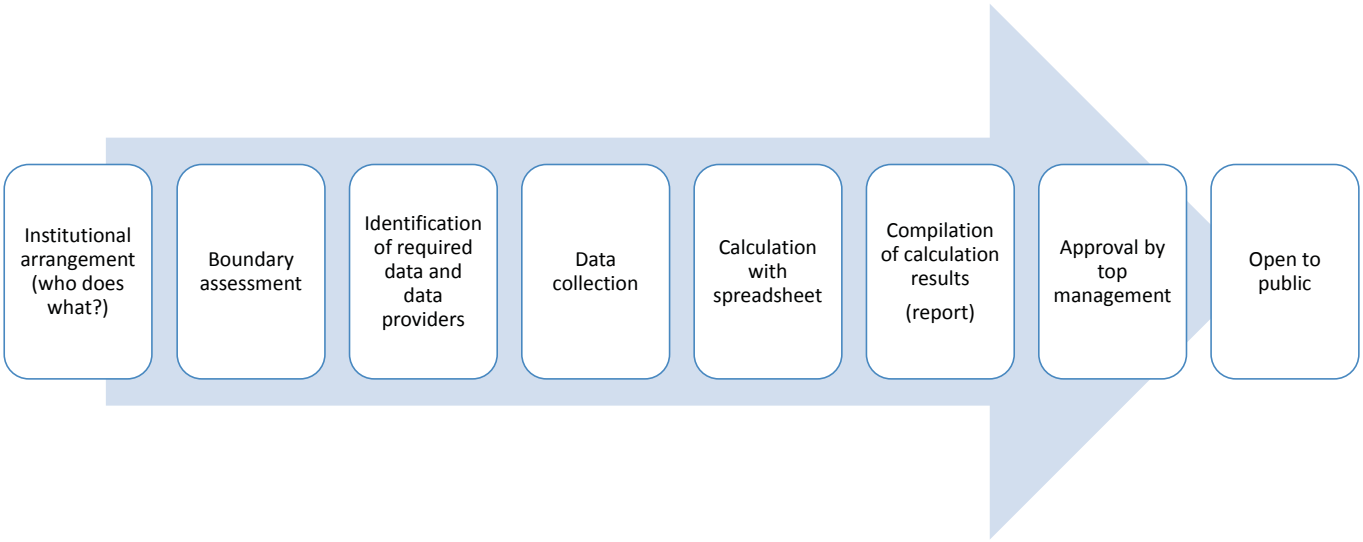
<Geographical boundaries>
- City's jurisdiction

<Emission sources>
- Stationary Energy Sources, Transportation, IPPU, Waste, AFOLU



Source: GPC

Development Procedure of GHG Inventory

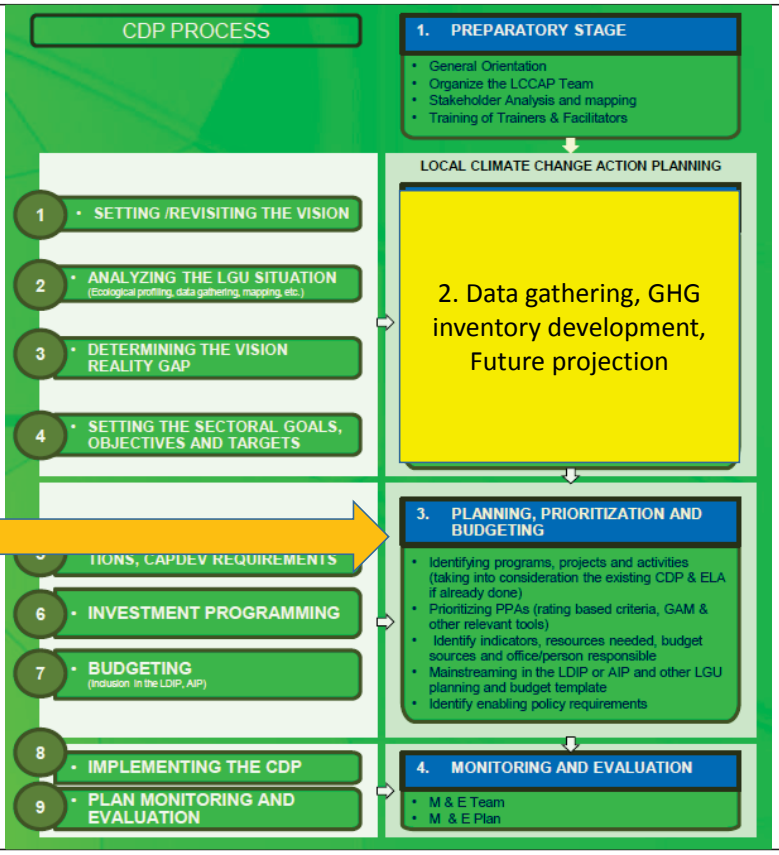


Steps for the LCCAP Development

With a focus on mitigation

Identifying mitigation options

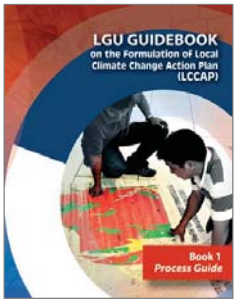
Measures implemented for different purposes can often be regarded as mitigation options.

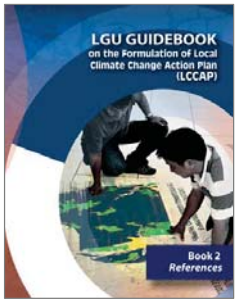


Guidebooks in the Philippines

- LGU Guidebook 1 & 2
  (Developed by Local Government Academy (LGA)
  Department of Interior and Local Government)

- GHG Inventory Manual
  (Developed by Climate Change Commission (CCC)
  with support from USAID)

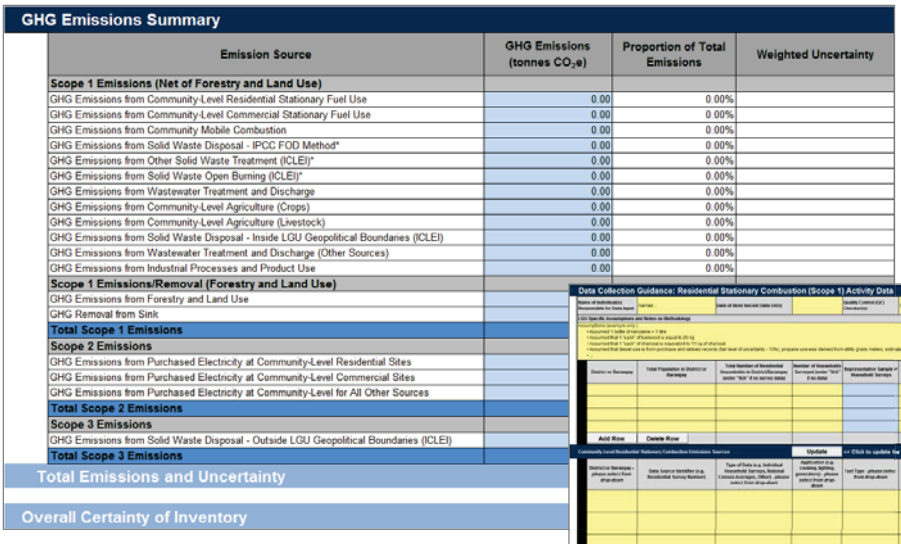




- Supplementary documents (where applicable):
  - Philippines National Communications,
  - Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC),
  - IPCC 2006 Guidelines,
  - Guidelines for developing local action plans in Japan,
  - Kitakyushu case study (New Green Frontier Plan, etc.)

Spreadsheets for Calculation

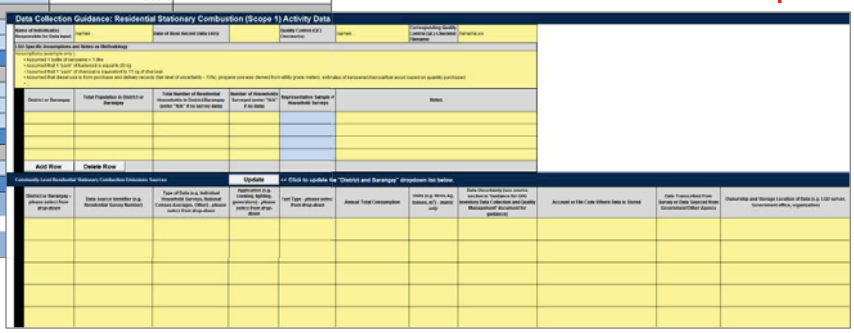
For data input



GHG Emissions Summary

Emission Source	GHG Emissions (tonnes CO_2e)	Proportion of Total Emissions	Weighted Uncertainty
Scope 1 Emissions (Net of Forestry and Land Use)			
GHG Emissions from Community-Level Residential Stationary Fuel Use	0.00	0.00%	
GHG Emissions from Community-Level Commercial Stationary Fuel Use	0.00	0.00%	
GHG Emissions from Community Mobile Combustion	0.00	0.00%	
GHG Emissions from Solid Waste Disposal - IPCC FOD Method*	0.00	0.00%	
GHG Emissions from Other Solid Waste Treatment (ICLEI)*	0.00	0.00%	
GHG Emissions from Solid Waste Open Burning (ICLEI)*	0.00	0.00%	
GHG Emissions from Wastewater Treatment and Discharge	0.00	0.00%	
GHG Emissions from Community-Level Agriculture (Crops)	0.00	0.00%	
GHG Emissions from Community-Level Agriculture (Livestock)	0.00	0.00%	
GHG Emissions from Solid Waste Disposal - Inside LGU Geopolitical Boundaries (ICLEI)	0.00	0.00%	
GHG Emissions from Wastewater Treatment and Discharge (Other Sources)	0.00	0.00%	
GHG Emissions from Industrial Processes and Product Use	0.00	0.00%	
Scope 1 Emissions/Removal (Forestry and Land Use)			
GHG Emissions from Forestry and Land Use			
GHG Removal from Sink			
Total Scope 1 Emissions			
Scope 2 Emissions			
GHG Emissions from Purchased Electricity at Community-Level Residential Sites			
GHG Emissions from Purchased Electricity at Community-Level Commercial Sites			
GHG Emissions from Purchased Electricity at Community-Level for All Other Sources			
Total Scope 2 Emissions			
Scope 3 Emissions			
GHG Emissions from Solid Waste Disposal - Outside LGU Geopolitical Boundaries (ICLEI)			
Total Scope 3 Emissions			
Total Emissions and Uncertainty			
Overall Certainty of Inventory			

Summary



Goal of our Project

Three components are incorporated into the LCCAP of Davao City.

GHG Inventory

- ✓ Davao City gov. determines the assessment boundaries and collect necessary information and data for accounting.
- ✓ IGES provides technical assistance for developing a GHG inventory.

Assessment boundaries
- Time period
- Greenhouse gases
- Geographic boundaries
- Emission sources

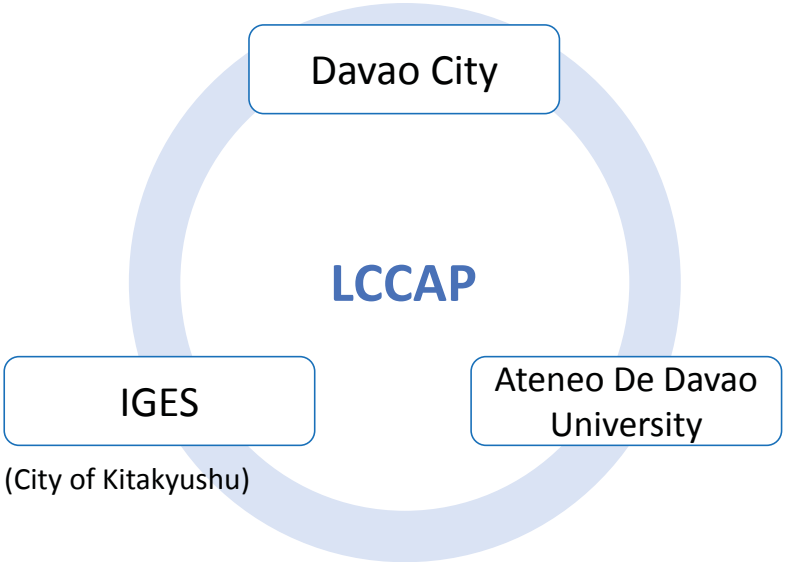
Mitigation Options

- ✓ Davao City gov. collects information on mitigation options which are being or to be implemented for a different purpose.
- ✓ IGES and Kitakyushu City share ideas of potential mitigation options for Davao City (e.g., JCM projects).
- ✓ Know-how on implementation and management is shared between two cities.

Adaptation Measures

- ✓ Davao City gov., Ateneo De Davao University and IGES work together on the adaptation measures.

Collaboration among Three Entities



Expected Outputs & Outcome of the Project

- LCCAP, which includes the information on GHG inventory, mitigation options and adaptation measures, is published.
- Mitigation measures of climate change are mainstreamed into local policies and measures in Davao City in addition to adaptation measures.
- Institutional arrangement is established for sustainable development and implementation of the LCCAP.
- Low-carbon city is created through the implementation of mitigation actions placed in the LCCAP.
- Achievements can be appealed in and outside of the Philippines. (City branding)

Proposed Schedule

Subject of change upon discussion with Davao City government

	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Kick-off MTG (Today)										
Internal discussion 1										
Data collection 1										
Progress check										
Data collection 2										
Hands-on training in Japan										
Emission estimation										
Internal discussion 2										
GHG inventory finalization										
Consider mitigation options										
Documentation as LCCAP										
LCCAP finalization										

Training Workshop in Japan

Scenes from workshop held last year

Thank you for your attention!

Required data for GHG inventory

Note: One method should be selected out of two options for mobile combustion and solid waste disposal.

Sector	Subsector					
Stationary combustion	Tab	Application	Fuel type	Annual Total Consumption	Units	Data Uncertainty
	Residential Stationary Combustion (Scope 1) Activity Data	Cooking	Biodiesels (International)		tonnes	
	Stat Comb-Residential Data	Cooking/Heating	Blended Diesel Industrial (Philippines)		litres	
		Generator(s)	Blended Diesel Residential/Commercial (Philippines)		litres	
	City Planning Dept.	HVAC	Blended Gasoline Residential/Commercial (Philippines)		litres	
		Lighting	Charcoal (Biomass, International)		tonnes	
		Other	Diesel (International)		litres	
			Kerosene (International)		litres	
			Motor Gasoline (International)		litres	
			Natural Gas (International)		m3	
			Propane or Liquified Petroleum Gases (International)		kg	
			Residual Fuel Oil (International)		litres	
			Wood or Wood Waste (Biomass, International)		tonnes	
	Commercial Stationary Combustion (Scope 1) Activity	Cooking	Biodiesels (International)		tonnes	
	Stat Comb-Commercial Data	Cooking/Heating	Blended Diesel Industrial (Philippines)		litres	
		Generator(s)	Blended Diesel Residential/Commercial (Philippines)		litres	
	City Planning Dept. (List of business numbers)	HVAC	Blended Gasoline Residential/Commercial (Philippines)		litres	
		Lighting	Charcoal (Biomass, International)		tonnes	
		Other	Diesel (International)		litres	
			Kerosene (International)		litres	
			Motor Gasoline (International)		litres	
			Natural Gas (International)		m3	
			Propane or Liquified Petroleum Gases (International)		kg	
			Residual Fuel Oil (International)		litres	
			Wood or Wood Waste (Biomass, International)		tonnes	
Mobile combustion	Tab	Application (Vehicle Type) if Using Distance-Based Method		Annual Distance Travelled	Units	Data Uncertainty
Option 1 (Distance)	Community-Level Mobile Combustion (Scope 1) Activity Data	Bus - Diesel			km	
	Mobile Comb-Community-All Data	Bus - Ethanol			km	
		Bus - Gasoline			km	
		Heavy Duty Vehicle - Articulated - CNG			km	
	Potential data source: CTTMO (City Traffic Transportation Manageme	Heavy Duty Vehicle - Articulated - Diesel - Year 1960-present			km	
		Heavy Duty Vehicle - Articulated - Ethanol			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 1985-1986			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 1987			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 1988-1989			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 1990-1995			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 1996			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 1997			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 1998			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 1999			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 2000			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 2001			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 2002			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 2003			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 2004			km	
		Heavy Duty Vehicle - Articulated - Gasoline - Year 2005-present			km	
		Heavy Duty Vehicle - Articulated - LNG			km	
		Heavy Duty Vehicle - Articulated - LPG			km	
		Heavy Duty Vehicle - Rigid - Diesel - Year 1960-present			km	
		Heavy Duty Vehicle - Rigid - Ethanol			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 1985-1986			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 1987			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 1988-1989			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 1990-1995			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 1996			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 1997			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 1998			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 1999			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 2000			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 2001			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 2002			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 2003			km	

		Heavy Duty Vehicle - Rigid - Gasoline - Year 2004			km	
		Heavy Duty Vehicle - Rigid - Gasoline - Year 2005-present			km	
		Heavy Duty Vehicle - Rigid - LNG			km	
		Heavy Duty Vehicle - Rigid - LPG			km	
		Light Goods Vehicle - Diesel - Year 1960-1982			km	
		Light Goods Vehicle - Diesel - Year 1983-1995			km	
		Light Goods Vehicle - Diesel - Year 1996-present			km	
		Light Goods Vehicle - Ethanol			km	
		Light Goods Vehicle - Gasoline - Year 1987-1993			km	
		Light Goods Vehicle - Gasoline - Year 1994			km	
		Light Goods Vehicle - Gasoline - Year 1995			km	
		Light Goods Vehicle - Gasoline - Year 1996			km	
		Light Goods Vehicle - Gasoline - Year 1997			km	
		Light Goods Vehicle - Gasoline - Year 1998			km	
		Light Goods Vehicle - Gasoline - Year 1999			km	
		Light Goods Vehicle - Gasoline - Year 2000			km	
		Light Goods Vehicle - Gasoline - Year 2001			km	
		Light Goods Vehicle - Gasoline - Year 2002			km	
		Light Goods Vehicle - Gasoline - Year 2003			km	
		Light Goods Vehicle - Gasoline - Year 2004			km	
		Light Goods Vehicle - Gasoline - Year 2005-present			km	
		Light Goods Vehicle - LPG			km	
		Motorbike - Control Unknown			km	
		Motorbike - Non-Catalyst Control			km	
		Motorbike - Uncontrolled			km	
		Passenger Car - Diesel - Year 1960-1982			km	
		Passenger Car - Diesel - Year 1983-present			km	
		Passenger Car - Gasoline - Year 1984-1993			km	
		Passenger Car - Gasoline - Year 1994			km	
		Passenger Car - Gasoline - Year 1995			km	
		Passenger Car - Gasoline - Year 1996			km	
		Passenger Car - Gasoline - Year 1997			km	
		Passenger Car - Gasoline - Year 1998			km	
		Passenger Car - Gasoline - Year 1999			km	
		Passenger Car - Gasoline - Year 2000			km	
		Passenger Car - Gasoline - Year 2001			km	
		Passenger Car - Gasoline - Year 2002			km	
		Passenger Car - Gasoline - Year 2003			km	
		Passenger Car - Gasoline - Year 2004			km	
		Passenger Car - Gasoline - Year 2005-present			km	
Option 2 (Fuel consumption)	Tab		Application if Using Fuel Consumption-Based Method	Annual Fuel Consumption or Fuel Sold by Fuel Supplier	Units	Data Uncertainty
	Community-Level Mobile Combustion (Scope 1) Activity Data *Mobile Comb-Community-All Data*	Mobile combustion - all applications	100% Biodiesel		litres	
			Aviation Gasoline		litres	
			B20 Biodiesel/Diesel		litres	
			CNG		m3	
			E85 Ethanol/Gasoline		litres	
			Ethanol		litres	
			Gasoline/Petrol		litres	
			Jet Fuel		litres	
			LNG		m3	
			LPG		kg	
			On-Road Diesel Fuel		litres	
			Residual Fuel Oil (3s 5 and 6)		litres	
Electricity	Tab			Actual Annual Electricity Consumption	Units	Data Uncertainty
City Planning Dept.	Residential Electricity Consumption (Scope 2) Activity Data *Elec-Residential Data* Commercial Electricity Consumption (Scope 2) Activity Data *Elec-Commercial Data* All Other (Scope 2) Activity Data (e.g. MRT, Streetlights, etc.) *Elec-Other*		Actual Annual Electricity Consumption		kWh	
Agriculture	Tab			Total Hectares Under Production	Units	Data Uncertainty
	Agriculture (Crops) Activity Data *Agriculture-Crops Data*		Rice (Dry Season, Irrigated)		ha	
			Rice (Dry Season, Rainfed)		ha	

City Planning Dept.			Rice (Wet Season, Irrigated)		ha	
			Rice (Wet Season, Rainfed)		ha	
			Other Crop Type		ha	
	Tab			Total Heacount	Units	Data Uncertainty
	Agriculture (Livestock) Activity Data		Buffalo		head	
	Agriculture-Livestock Data		Cattle		head	
			Goat		head	
			Horse		head	
			Other		head	
			Poultry		head	
			Swine		head	
Solid waste	Tab			Paramter	Units	Data Uncertainty
Option 1 (IPCC FOD)	Solid Waste Disposal Parameters (IPCC FOD Method, Scope 1)		Starting year of SWDS		-	
	Solid Waste-Parameters-IPCC FOD					
CENRO	Solid Waste Disposal Methane Correction Factor (MCF) Calculation (IF	Distribution of Waste by Waste Management Type - Annex A1.1	Unmanaged, shallow		%	
	Solid Waste-MCF-IPCC FOD		Unmanaged, deep		%	
			Managed		%	
			Managed, semi-aerobic		%	
			Uncategorised		%	
	MSW Activity Data Input (IPCC FOD Method)		Population (LGU)		inhabitants	
	Solid Waste-Activity-IPCC FOD		Waste per capita (tonnes/capita/yr)		tonnes/capita/yr	
		Waste Diversion (Destination) Rates (%) and Amounts (tonnes)	% to Solid Waste Disposal Site (SWDS)		%	
			% MSW Composted		%	
			% MSW Sent to Anaerobic Digestion		%	
			% MSW Open Burned		%	
			% Total MSW Other/Unspecified		%	
Option 2 (ICLEI)	Tab		Application if Using Fuel Consumption-Based Method	Activitiy data & Parameter	Units	Data Uncertainty
	Solid Waste Disposal (Landfill)		Total Solid Waste (Actual) for District/Barangay		t	
	Solid Waste-Landfill-ICLEI		Fraction of Total Waste Sent to Specific Landfill Type		%	
	Other Solid Waste Disposal (Composting, Anerobic Digestion, Other/Unspecified) - Scope 1		Total Population		inhabitants	
	Solid Waste-Other Methods-ICLEI		Total Solid Waste (Actual) for District/Barangay		t	
			Fraction of Total Solid Waste Sent for Anaerobic Digestion		%	
			Fraction of Total Solid Waste Sent for Open Burning		%	
	Solid Waste Disposal (Open Burning) (Solid Waste, Scope 1)	General Soild Waste Open Burning Activity Data	Total Population		inhabitants	
	Solid Waste-Open Burning-ICLEI	- Aggregated to the LGU (Community) Level	Total Solid Waste (Actual) for District/Barangay		t	
			Amount of Total Solid Waste Open Burned		t	
	Wastewater (Scope 1)	Total population in LGU			inhabitants	
	Wastewater-Data-Scope1	% population using the system			%	
	Wastewater (Scope 3)	Total population in LGU			inhabitants	
	Wastewater-Data-Scope3	% population using the system			%	
Forestry	Tab			Annual Total Consumption	Units	Data Uncertainty
	Forestry Emission Activity Data	Wood and Wood Products Harvesting	Fuelwood		t	
	Forestry Emission Data		Charcoal		t	
		City Plannning Dept.	Construction		t	
			Novelties		t	
		Changes in the Use of the Forestlands	Used for Agriculture		ha	
		City Plannning Dept. (in CLUP)	Used as Grasslands		ha	
			Left as Barren Areas		ha	
	Tab			Annual Total Removal	Units	Data Uncertainty
	Forestry Removal Activity Data	Remaining Forestland	Protection Forest/Old Growth/Mossy/Pine/Submarginal Mangrove		ha	
	Forestry Removal Data		Secondary Growth		ha	
		DENR-CENRO National Unit (through CENRO)	Brushland - for wood		ha	
		City Planning Dept. (in CLUP) Note: Double check	Grassland		ha	
			Tree Plantation - S. macrophylla		ha	
		Land Use Change	Barren to Forestland		ha	
			Grassland to Forestland		ha	
		DENR-CENRO National Unit (through CENRO)	Wetlands to Forestland		ha	
		City Planning Dept. (in CLUP) Note: Double check	Settlement to Forestland		ha	
			Cropland to Forestland		ha	
Industrial processes	Tab			Annual Total Production	Units	Data Uncertainty
	Industrial Processes Emission Activity Data	Mineral Industry - Yes	Cement Production - Portland		t	
	Industrial Processes Data		Cement Production - Blended		t	
			Lime Production		t	
	DENR-EMB? Mayors Office? (Permits given by ??)		Glass Production		t	
	Coordination with an association?	Chemical Industry - Almost no	Ammonia Production	NO	t	

	City Planning Dept.		Soda Ash Production		t
			Petrochemical and Carbon Black Production - Methanol		t
			Petrochemical and Carbon Black Production - Ethylene		t
			Petrochemical and Carbon Black Production - Ethylene Dichloride and Vinyl Chloride Monomer		t
			Petrochemical and Carbon Black Production - Ethylene Oxide		t
			Petrochemical and Carbon Black Production - Acrylonitrile		t
			Petrochemical and Carbon Black Production - Carbon Black		t
		Metal Industry - Yes	Iron and Steel Production from Integrated Facilities		t
			Iron and Steel Production from Non-integrated Facilities		t
		Electronics Industry	Integrated Circuit or Semiconductor		t
			TFT Flat Panel Display		t
			Photovoltaics		t
			Heat Transfer Fluid		t
		Others	Pulp and Paper Industry		t
			Food and Beverages Industry		t
			Other		t

Project to realize low carbon society in Davao City through a support for a development of Local Climate Action Plan

Program for the Training Workshop on Local GHG Inventory

Date: 6 (Tue) – 8 (Thu) November 2018

Place: Station Hotel Kokura (1-1-1, Asano, Kokura-kita-ku, Kitakyushu City, Japan)

Invitees: 5 representatives from Davao City government and relevant stakeholders

Objectives: To learn Kitakyushu's practice on the LCCAP development;
To visit the sites where Kitakyushu's mitigation measures are implemented.

Date	Actions	Venue
11/5 (Mon)	Fly from Davao to Fukuoka Move from Fukuoka to Station Hotel Kokura	
11/6 (Tue)	09:30 Opening remarks (IGES) 09:35 Explanation of the overview of training course (IGES) 09:50 Self-introduction by participants 10:00 **Lecture: Low-carbon city development – Kitakyushu's energy strategy – (City of Kitakyushu)** 12:00 Lunch 14:00 **Lecture: LCCAP development including GHGI (City of Kitakyushu)** 15:30 Break 15:40 **Presentation: Overview of master plan & LCCAP (Davao)** 16:40 Discussion 17:00 End of the day 17:30 Reception (Agura)	Hotel 5F Kazashi Kajimachi 1-2-3
11/7 (Wed)	09:30 **Lecture: How to estimate GHG emissions (IGES)** 11:00 **Hands-on training: Calculation by participants** 12:00 Lunch 13:30 **Hands-on training: Calculation by participants (Cont.) & presentations on the results of GHG emissions by participants** 15:00 Break 15:20 **Discussion: Future development of JCM projects in Davao (IGES)** 17:00 End of the day	Hotel 5F Kazashi
11/8 (Thu)	09:30 **Site visit: Kogasaki waste-to-energy facility, Honjo can and bottle recycling center** 12:30 Lunch 13:30 **Overall discussions** 15:00 Closing remarks (Asian Center for Low Carbon Society)	Kogasaki, Honjo Hotel 4F Katsuyama
11/9 (Fri)	Move from Station Hotel Kokura to Fukuoka Fly from Fukuoka to Davao	

Project to realize low carbon society in Davao City through a support for a development of Local Climate Action Plan

Training Workshop on Local GHG Inventory - List of Participants

6 (Tue) – 8 (Thu) November 2018, Station Hotel Kokura

Davao City				
		Name	Job title	Affiliation
1	Ms	Bing Dela Victoria	Economist IV	City Planning Development Office (CPDO)
2	Ms	Jo Ann Esguerra	Project Evaluation Officer III	City Planning Development Office (CPDO)
3	Ms	Melody Samuya Dapusala	Engineer II	Davao City Environment and Resources Office (CENRO)
4	Mr	Rodrigo Camarista Bustillo	Local DRRM Officer III	Disaster Risk Reduction Management Office (DRRMO)
5	Mr	Lyndon Leovic Leal Ancajas	Local DRRM Officer II	Disaster Risk Reduction Management Office (DRRMO)

City of Kitakyushu (International Environmental Economic Affairs Department, Environment Bureau)				
		Name	Job title	Affiliation
1	Mr	Michiya Hirayama	Assistant Manager	Regional Energy Promotion Division
2	Mr	Yosuke Mitoma	Assistant Manager	Global Warming Prevention Division
3	Mr	Yasuhiko Takatsuka	Manager	Kitakyushu Asian Center for Low Carbon Society

Institute for Global Environmental Strategies (IGES)				
		Name	Job title	Affiliation
1	Mr	Shiko Hayashi	Programme Director	Kitakyushu Urban Centre
2	Ms	Junko Akagi	Research Manager	Kitakyushu Urban Centre
3	Ms	Shino Horizono	Programme Coordinator	Kitakyushu Urban Centre
4	Ms	Larissa de Miranda Alem	Intern	Kitakyushu Urban Centre

Training Workshop on Local GHG Inventory



Orientation

Junko Akagi
Research Manager
Kitakyushu Urban Centre

06-08 Nov. 2018

IGES
Institute for Global Environmental Strategies

ORGANIZERS

ORGANIZER

- Institute for Global Environmental Strategies (IGES)

MAIN COLLABORATOR

- Kitakyushu City Government

SPONSERSHIP

- Ministry of the Environment, Japan (MOEJ)

IGES　北九州市 CITY OF KITAKYUSHU　環境省 Ministry of the Environment

Project to realize low carbon society in Davao City through a support for a development of Local Climate Action Plan

City of Kitakyushu ⇔ Davao City

Green Sister City Agreement
(November, 28th, 2017)
Expanding the cooperation area to
a development of low carbon society

Focal point

Institute for Global Environmental Strategies (IGES) ⇔ Ateneo De Davao University

Agreement on cooperation

Support for a development of Local Climate Change Action Plan of Davao City

- A development of GHG inventory（supported by IGES）
- A development of mitigation measures（supported by Kitakyushu City and IGES）
- A development of adaptation measures (supported by Ateneo De Davao Uni.)

An implementation of concrete mitigation measures

Study on a feasibility of renewable energy project (for JCM model project)

- Waste-to-Energy (WtE) project (Nippon Steel & Sumikin Engineering Co., Ltd.)
- Feasibility study on other low-carbon projects (renewable energy and energy saving projects)
- Coordination with related-stakeholders for an implementation, technical study, evaluation of the amount of CO2 reduction, etc.
- Supporting for a preparation of applying JCM model project

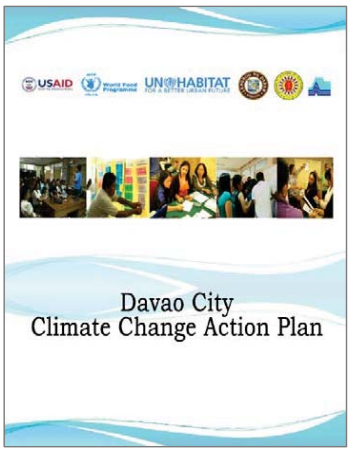
Project to realize low carbon society in Davao City through a support for a development of Local Climate Action Plan

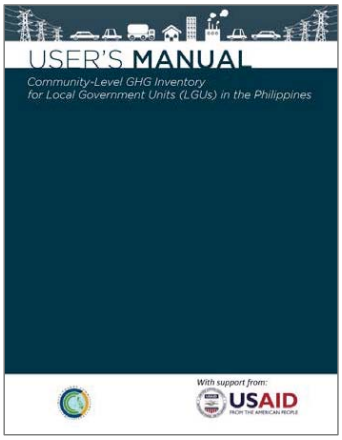
1. Kick-off meeting

- 15 May 2018, 9:30~12:00
- Participation from Davao City government:
  Mr. Domingo, Assistant City Administrator ,
  Mr. Ivan Cortez, head of CPDO,
  Ms. Marvic Reyes, head of CENRO, and others
- Participation from Japan side:
  Mr. Yoshiaki Miwa, Counsellor & Director of Consular Office in Davao Embassy of Japan
- Meeting with Vice Mayor Bernie Al-ag followed by the kick-off meeting.
- Prof. Doris Montecastro from Ateneo de Davao University
- In the afternoon, a workshop was held for CENRO staffs on the data collection for a GHG inventory.

2. Support for a LCCAP development

- Current LCCAP of Davao covers mainly adaptation aspect supported by UN-HABITAT.
- GHG inventory will be produced in line with the Community-Level GHG Inventory for Local Government Units (LGUs) in the Philippines (USAID)
- In Davao, CPDO, CENRO and other relevant departments are involved in the data collection process.
- Ateneo de Davao University supports Davao City government.





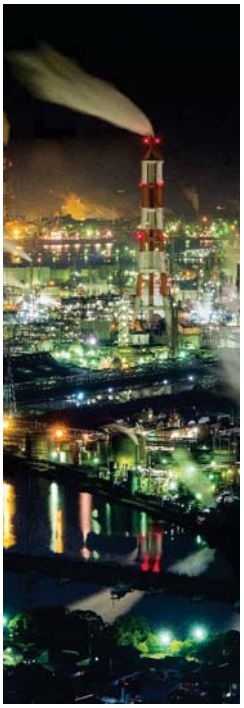
**Project to realize low carbon society in Davao City
through a support for a development of Local Climate Action Plan**

Schedule for the project

- Schedule?

	2018 May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2019 Jan	Feb
Kick-off MTG (Today)	☆									
Internal discussion 1										
Data collection 1		☆								
Progress check					☆			MTG in Japan		
Data collection 2										
Hands-on training in Japan							○			
Emission estimation										
Internal discussion 2										
GHG inventory finalization										
Consider mitigation options										
Documentation as LCCAP									☆	
LCCAP finalization										

OBJECTIVES



http://free-images.gatag.net/

The training workshop aims to:

- learn Kitakyushu's practice on the LCCAP development;
- learn how to estimate GHG emissions & emission reduction potential (MRV);
- learn overview of JCM scheme;
- visit the sites where Kitakyushu's mitigation measures are implemented; and
- promote city-to-city collaboration for low-carbon, resilient and sustainable cities.

OUTLINE OF THE WORKSHOP

DAY 1 6 Nov.	**Opening and introduction** **Lecture: Low-carbon city development – Kitakyushu's energy strategy –** **Lecture: LCCAP development including GHGI** **Presentation by Davao City: Overview of master plan & LCCAP** ** Social event: Reception*
DAY 2 7 Nov.	**Lecture: How to estimate GHG emissions & emission reduction potential** **Discussion: Future development of JCM projects in Davao**
DAY 3 8 Nov.	**Site visit: Kogasaki WtE facility, Honjo can and bottle recycling center** **Overall discussion, wrap-up and closing**

WELCOME TO KITAKYUSHU!

Name	Affiliation
Ms. Bing Dela Victoria	City Planning Development Office (CPDO)
Ms. Jo Ann Esguerra	City Planning Development Office (CPDO)
Ms. Melody Samuya Dapusala	Davao City Environment and Resources Office (CENRO)
Mr. Rodrigo Camarista Bustillo	Disaster Risk Reduction Management Office (DRRMO)
Mr. Lyndon Leovic Leal Ancajas	Disaster Risk Reduction Management Office (DRRMO)

LOCAL CLIMATE CHANGE ACTION PLAN

Order of Presentation

I. Vulnerability Assessment
   - Exposure
   - Sensitivity
   - Adaptive Capacity

II. Key Adaptive Options
   - Social Sector
   - Economic Sector
   - Environment Sector
   - Infrastructure
   - Land Use

III. GHG Inventory: Davao City Experience

IV. Institutional Arrangement

V. Availability of GHG Indicators

VI. Issues and Concerns

V&AA: Determinants of Vulnerability

Vulnerability = ƒ (Exposure, Sensitivity, Adaptive Capacity)

CITY-WIDE EXPOSURE ANALYSIS

Climate Change Drivers and Biophysical Effects (Hazards)

Davao City is experiencing climate changes

Changes in ***Average****/means*

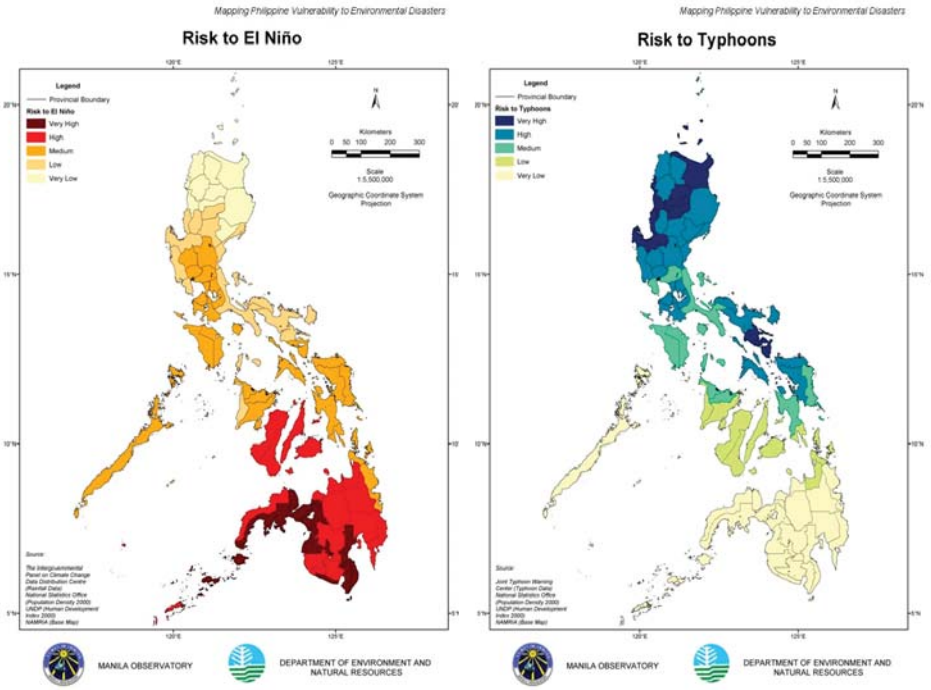
- Increasing Temperature
- Increase & Decrease in average rainfall

Occurrence of ***Extreme*** *Events*

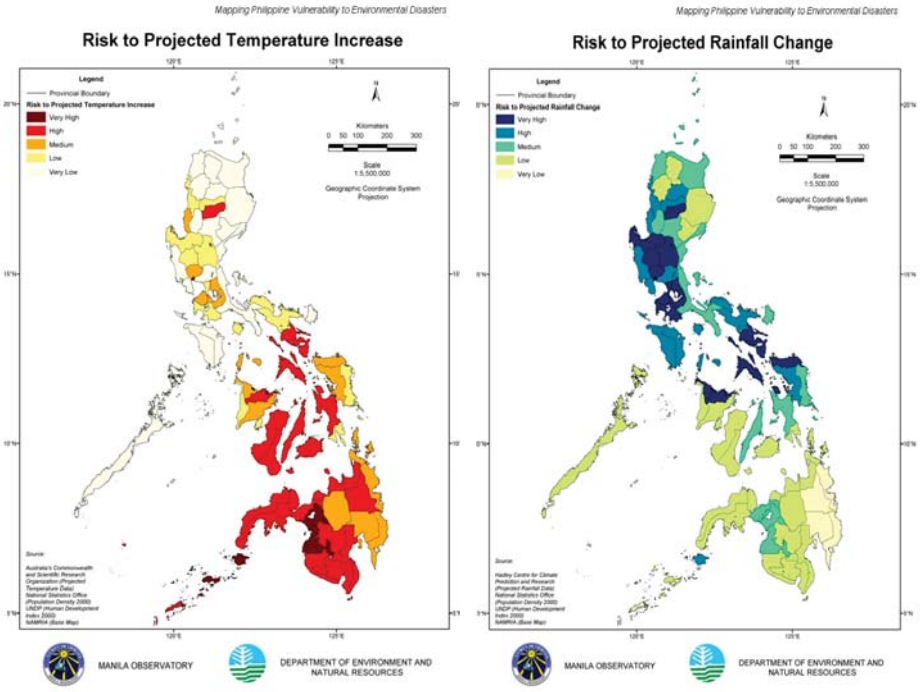
- Increase in Temp. higher than 35°C
- Episodes of El Nino and La Nina
- Increase in Days without rain (dry days)
- Increase in Rainfall more than 150 mm

Source: PAGASA

EXPOSURE



EXPOSURE



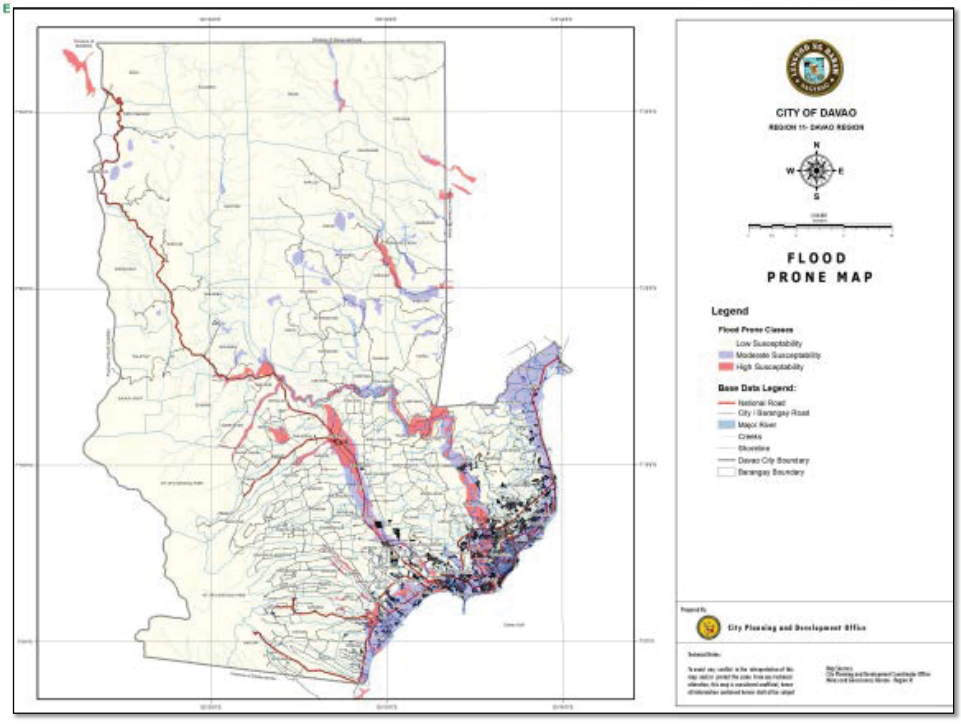
EXPOSURE

Climate Change-Induced Hazards in Davao City

EXPOSURE

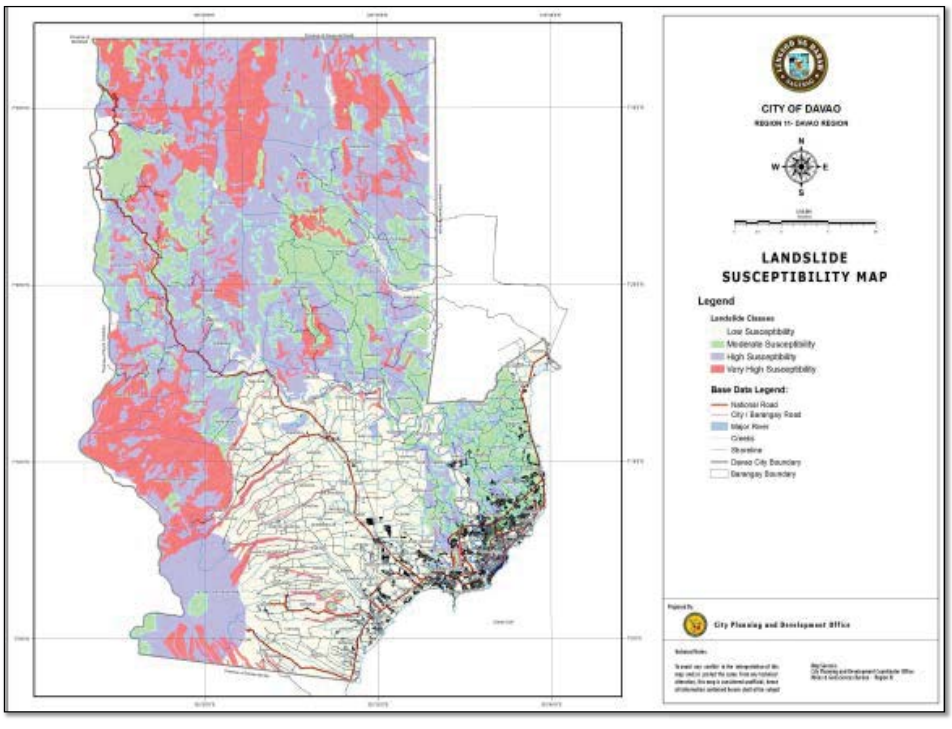
Flooding

EXPOSURE



Rain Induced Landslide

EXPOSURE



Monsoon Waves

EXPOSURE

Strong Wind

EXPOSURE

Drought

EXPOSURE

Sea level Rise

EXPOSURE

SENSITIVITY ANALYSIS

Five (5) Development Sectors

(a) Social

(b) Economic

(c) Environment

(d) Infrastructure

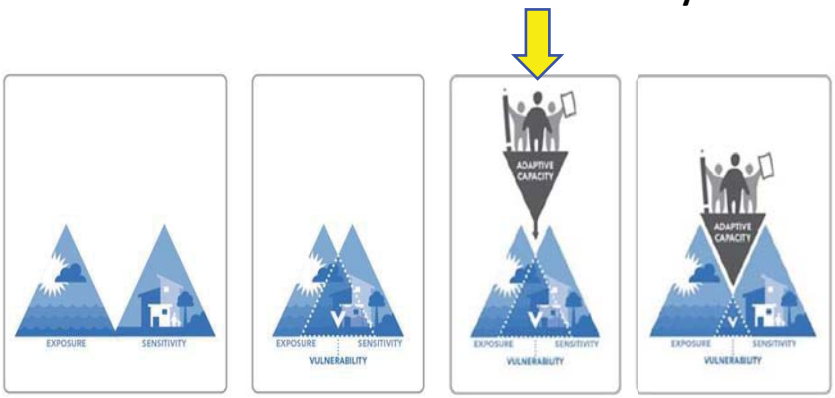
(e) Land Use

Sectoral SENSITIVITIES to Climate Change Exposure

Social ❑Settlements in areas that are highly susceptible to hazards ❑Informal settlers in danger zones ❑Under privileged (PWD, children, senior citizens) ❑Social/health/educational facilities in hazard areas Economic ❑Agricultural crops/livestock ❑Businesses/industries ❑Tourism sites/attractions		Infrastructure ❑ Roads and bridges ❑ Water ,power & Telecommunication facilities ❑ Irrigation system ❑ Transportation system (ports, terminals, etc.) ❑ Drainage system ❑ Public buildings (city hall, Market, etc.) Environment ❑ Coastal /marine resources ❑ Flora and fauna habitat ❑ Water bodies
Land Use ❑ Residential ❑ Commercial	❑ Industrial ❑ Institutional ❑ Agricultural	

SENSITIVITY

V&AA: Determinants of Vulnerability



Vulnerability = f (Exposure, Sensitivity, Adaptive Capacity)

ADAPTIVE CAPACITY ANALYSIS

- Wealth
- Information
- Technology
- Institution and Governance
- Social Capital
- Infrastructure

ADAPTIVE CAPACITY ANALYSIS

Wealth

- **Level of Education**
  - ✓literacy rate of 98.30% in 2012
- **Employment Opportunities**
  - ✓employment rate is at 92.54%of for 2010
- **Investments for Health**

Information

- **DRRM Plan** (Davao City Risk Reduction Management Plan)
- **CIPH** (City-wide Investment Plan for Health)

Technology

- **182 barangays** have access to internet connection
- Established **Central 911** in similar to U.S and Canada, services are free 24 hours a day, 7 days a week.

ADAPTIVE CAPACITY

Institution and Governance

A. Functional Committees:

- Local Health Board (LHB),
- Local School Board (LSB),
- Brgy. Risk Reduction & Management Council (BDRRMC)
- Davao City Disaster Risk Reduction & Management Council (DCDRRMC)
- Peace & Order Council

B. Programs

- Cash for Work
- Food for Work Programs
- Emergency Assistance Program was specially created to assist disaster victims in the city benefitting 16,674 families
- Collaboration between the DSWD & CSSDO
- Lingap sa Mahirap
- NGAs, NGOs, Sectoral Groups such as Women Federation, PWD Federation, Youth Federation, Solo Parents Federation, Religious Sector and other Civil Society Organization (CSOs)
- Shelter Code

ADAPTIVE CAPACITY

Social Capital

- CSOs and POs
- Gawad Kalinga
- TUPAD or Tulong Pangkabuhayan
- Cooperatives and Banks
- Lending Institutions
- labor pool has grown dramatically over the last 15 years
  - ✓ Unemployment rates in the city have dropped from 8.3%in 1995 to 6% in 2009.

Infrastructure

- 33 hospitals
- 538 Day Care Centers, 106 Home-Base, 1 Child-Minding Center for the children of government employees and 2 mobile ECCDs for the far-flung barangays and disaster affected areas.
- 428 Elementary schools 286 of these are public while 142 are private.
- A total of 151 Secondary schools (70 public and 81 are privately owned.
- 97% of 270,638 households have access to safe drinking water (2010)
- 82.69% have access to sanitary toilet.
- Identified Evacuation Centers :
  - ✓ 72 covered courts/ gyms
  - ✓ 14 Brgy. Hall/ Multi-Purpose Hall
  - ✓ 5 chapels/ churches
  - ✓ 3 Day Care Centers
  - ✓ 9 Government-owned infrastructures.

ADAPTIVE CAPACITY

KEY ADAPTATION OPTIONS

Intro to: Key Issues Identified, Objective Setting, Options ID

Social Sector

OBJECTIVES	ADAPTATION OPTIONS		
	PROGRAMS	PROJECTS	LEGISLATIONS
1. To ensure a safer, adaptive and resilient shelter to families living in high risk areas.	1. Local Shelter Plan	1. Updating/validating of families in high risk areas. 2. Assessment of appropriate new relocation sites 3. Provision of sustainable livelihood program for relocatees 4. Introduce architecturally appropriate design of houses resilient to climate change(e.g. houses on stilt)	1. Comprehensive Shelter Code 2. DILG-MC2011-17
2. To promote awareness among families on climate change adaptation(CCA)	1. Barangay based information dissemination	1. Customize Information and Education Campaign (IEC) at all levels 2. Continuous advocacy and awareness raising on their adaptive capacity on the impact of climate change	1. RA 10121
3. To increase social protection on families living in high risk areas.	1. Community Organization	1. Capacity building to empower HHS in relocation sites 2. Mobilized volunteers in various disaster prevention and mitigation 3. Provision of EWS and establishment of community-based disaster volunteers or responders 4. Sustained Livelihood Program	1. No habitation policy

ADAPTIVE CAPACITY

Economic Sector

Objectives	Adaptation Options		
	Program	Projects	Legislations
To improve economic governance that support entrepreneurship, business and industry promotions	1.Financial assistance to open opportunities that will give access to wealth and credit 2.Make available technologies that will improve their capabilities in adapting to climate change	1.Credit facilitation programs 2. Trainings on new technologies on adaptation	1.Adoption of the MSMED Plan thru an ordinance
To strengthen institutional support structures for the development of start up and existing MSMEs	1.Infrastructure support systems that are resilient to climate change	1.Upgrading of existing infrastructure to support marketing of MSMEs	
To strengthen agricultural support to farmers	1.Increase awareness of farmers to climate change adaptation thru establishing alternative farming system as a new technology	1.Establish nurseries to reinforce production	1.Establishment of Barangay Disaster Risk Reduction Management Councils 2.Drafting of IRR for the implementation of the Organic Farming ordinance

ADAPTIVE CAPACITY

Environment Sector

Objectives	Adaptation Options		
	Programs	Projects	Legislations
Sea-level Rise			
Install / Enhance capacity to monitor sea-level rise in the city as part of an island-wide network	Climate-Change Monitoring Program	1. Procurement/ Installation of monitoring equipment 2. Technical / Skills Training for equipment 3. Community Training	Climate Change Adaptation Ordinance
Establish protection zone **Minimize saltwater intrusion**	Environment Management Program	1. Set-back zone / buffer zone Delineation 2. Beach Reforestation Project	Coastal Zoning Ordinance
Increase / Enhance recharge rate of aquifers / Minimize extraction rate	Water Conservation / Management Program	1. Surface water development 2. River easement protection 3. Strict implementation of rain-harvesting ordinance	Surface / Ground water use Ordinance
Drought			
Enhance / increase vegetation or forest cover for wildlife (flora and fauna)	Environment Management Program	1. Biodiversity inventory project 2. Reforestation project	Declaration of Environmentally Critical Areas
General			
Minimize green-house gas emissions	Environment Management Program	1. Intensify implementation of Anti-Smoke Belching Ordinance	Air Quality Management Ordinance
Increase use of renewable energy in the city	Clean Energy Program	1. Renewable Energy IEC 2. Formulate Renewable Energy Plan 3. Investment Promotion (for renewable energy providers)	Carbon Sink Ordinance

ADAPTIVE CAPACITY

Infrastructure Sector

Objectives	Adaptation Options		
	Programs	Projects	Legislations
Flooding			
1. To provide climate change resilient flood protection infrastructures without compromising the natural water flow system.	– Formulation of an Updated DRAINAGE MASTERPLAN – Implementation of the required buffer/easement zones for rivers, creeks and coastlines – Development of drainage system's engineering design to manage risks from natural hazards and climate change	– Inventory of storm drainage system on engineering design vis a vis holding capacity of runoff water. – Construction of Concrete Revetment Bank Protection – Rehabilitate and improve all existing drainage structures – Maintenance of drainage canals by desilting & declogging.	– All development structures should be assessed to ensure flow alterations are acceptable in relation to flood risk and environmental flows. – Non-buildable areas to slope and areas with geo-hazards
2. To provide adequate, safe and potable water supply to all Davao City residents (both rural and urban).	– Management of the development of projects and activities that pose danger to the city's water resources. – Strict implementation of Rain Water Harvesting Ordinance which will provide additional water resources and easing the pressure of groundwater extraction	– Monitoring of Level II water system from spring, rivers and deep wells sources that were installed to rural barangays. – Provision of Level II Water System to all outlying district or barangays short of such utility. – Conservation undertakings for all watershed areas	– Establishment of Wastes Water treatment Facility – Augmentation of Ground Water Sources through Surface Water Development to supply the future generations

ADAPTIVE CAPACITY

Infrastructure Sector

Objectives	Adaptation Options		
	Programs	Projects	Legislations
Flooding			
3. To ensure adequate power supply	– Engage a sustainable approach to rural household electrification	– Promote Barangay Associations for Renewable Power Supply Management – Partnership with existing Renewable Energy provider	– Identify and prioritize additional electricity transmission lines, substations and auxiliary Infrastructure required supporting the preferred pattern of development. – Prioritize grid infrastructure development and reinforcement to ensure the massive uptake of Renewable energy technologies.
Sea-level Rise/Monsoon Waves			
1. To provide protective infrastructure facilities that are resistant to potential climate change hazards and pursues to maintain the natural flow of the city's drainage system.	– Crafting of a Sea- Level-Rise profile of Davao City – Updating of 1998 Drainage Master plan	– Installation of equipment/tool to monitor sea level rise – Rehabilitate and improve existing sea walls – Construction of additional sea walls – Fastract the implementation of the Sasa Port Upgrading master plan – Improve outfall structures, and provide flap gates – Realign outfall in higher elevated areas to other waterways in the low lying parts (overflow weirs)	- Restoration/Re-opening/Re-establishment of natural waterways/creeks traversing private properties - Strict implementation of the required buffer zones on the rivers, creeks and beaches

ADAPTIVE CAPACITY

Land Use Sector

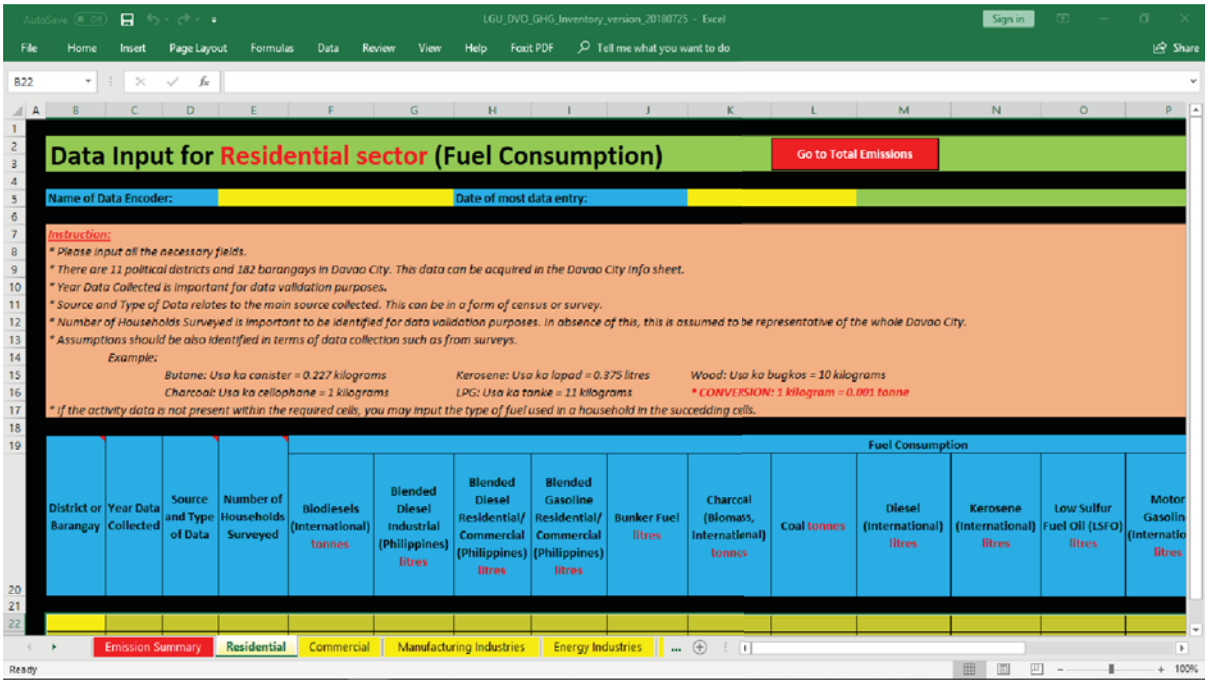
Objectives	Adaptation Options		
	Programs	Projects	Legislations
Sea-level Rise			
Establish protection zone **Minimize saltwater intrusion**	Environment Management Program	1. Set-back zone / buffer zone Delineation 2. Beach Reforestation Project	Coastal Zoning Ordinance
Drought			
Enhance / increase vegetation or forest cover for wildlife (flora and fauna)	Environment Management Program	1. Biodiversity inventory project 2. Reforestation project	Declaration of Environmentally Critical Areas
General			
Enhance adaptation plan (to be adaptive)		1. Review adaptation plan (every 5 years)	

ADAPTIVE CAPACITY

GHG Inventory

- Estimates of all emissions and removals of greenhouse gases (GHG) from given sources or sinks from a defined region in a specific period of time (IPCC, 2015).
- Help identify the major source of air pollution so that mitigation measures can be made

Reference: US EPA. (2016). Climate and Energy Resources for State, Local and Tribal Governments



Data Input for Residential sector (Fuel Consumption)

Go to Total Emissions

Name of Data Encoder: | Date of most data entry:

Instruction:

* Please input all the necessary fields.
* There are 11 political districts and 182 barangays in Davao City. This data can be acquired in the Davao City Info sheet.
* Year Data Collected is important for data validation purposes.
* Source and Type of Data relates to the main source collected. This can be in a form of census or survey.
* Number of Households Surveyed is important to be identified for data validation purposes. In absence of this, this is assumed to be representative of the whole Davao City.
* Assumptions should be also identified in terms of data collection such as from surveys.

Example:

Butane: Usa ka canister = 0.227 kilograms | Kerosene: Usa ka lapad = 0.375 litres | Wood: Usa ka bugkos = 10 kilograms

Charcoal: Usa ka cellophane = 1 kilograms | LPG: Usa ka tanke = 11 kilograms | * CONVERSION: 1 kilogram = 0.001 tonne

* If the activity data is not present within the required cells, you may input the type of fuel used in a household in the succedding cells.

District or Barangay	Year Data Collected	Source and Type of Data	Number of Households Surveyed	Fuel Consumption										
				Biodiesels (International) tonnes	Blended Diesel Industrial (Philippines) litres	Blended Diesel Residential/ Commercial (Philippines) litres	Blended Gasoline Residential/ Commercial (Philippines) litres	Bunker Fuel litres	Charcoal (Biomass, International) tonnes	Coal tonnes	Diesel (International) litres	Kerosene (International) litres	Low Sulfur Fuel Oil (LSFO) litres	Motor Gasolin (Internatio litres

Emission Summary | Residential | Commercial | Manufacturing Industries | Energy Industries

Ready

EMISSION SOURCES

Area Sources	Point Sources	Mobile Sources
Commercial Cooking	Coal	Jeepney
Generator Sets	Bunker	Motorcycle
Landfill	Low Sulphur Fuel Oil	Tricycle
Residential Cooking	Wood	Taxi
Residential Lighting	Power plant	Utility Vehicles (UV)
Agricultural Lands	Cement	Sports Utility Vehicles (SUV)
		Car
		Light Duty Vehicles (LDV)
		Truck, Trailer

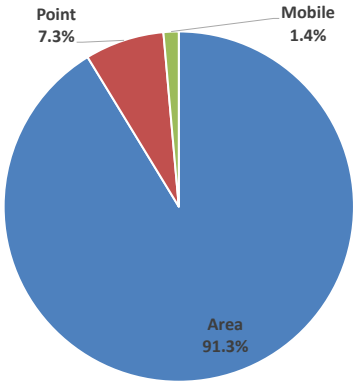
SUMMARY OF ACTIVITY DATA

Area Sources	Value	Unit
From Landfill, Commercial & Residential Cooking	214,056	metric tons/year
Generator Sets	17,724,574	liters/year
Agricultural Lands	91,082	hectares
Forest Cover	134,380	hectares

Point Sources	Value	Unit
Coal & Wood	1,117,011	metric tons/year
LSFO & Bunker	17,247,459	liters/year

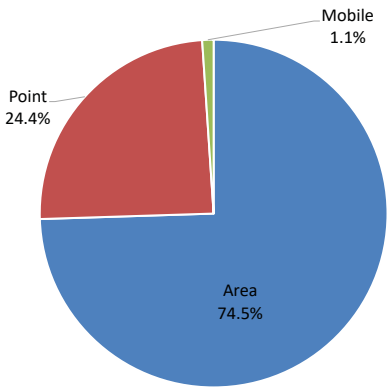
Mobile Sources	Value	Unit
Vehicle Kilometers Travelled (VKT)	2,859,368,067	kilometers
Total Idling Time	57,762,702	hours

GHG Emissions



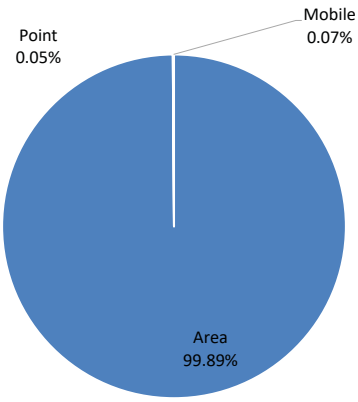
CO2

25,829,211 metric tonnes



N2O

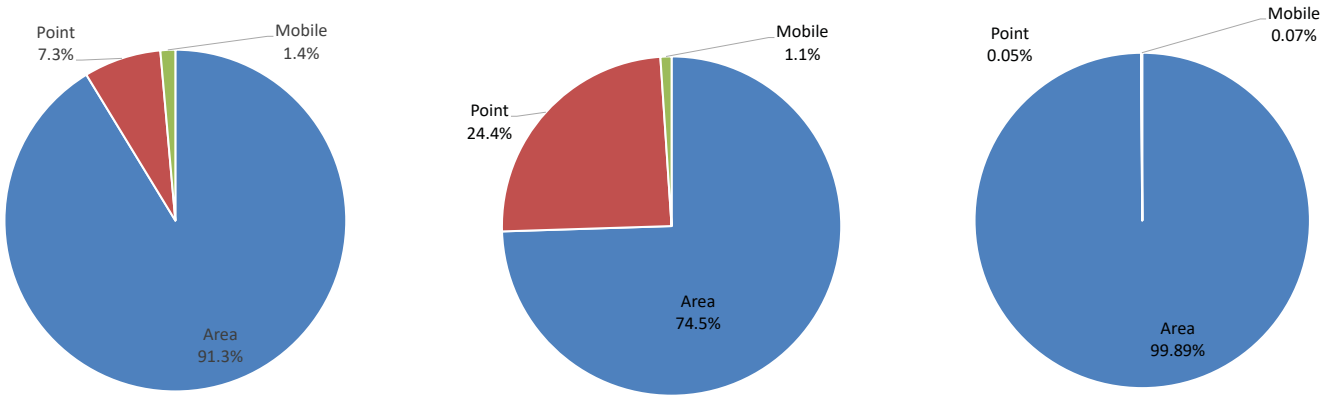
709 metric tonnes



CH4

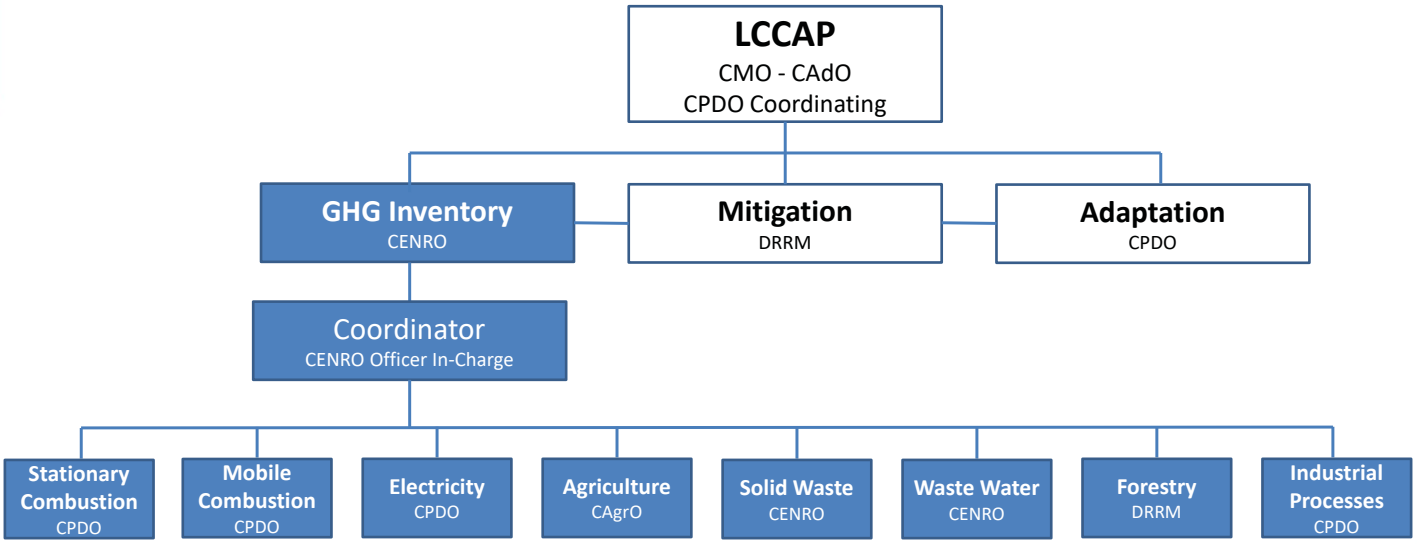
125,071 metric tonnes

GHG Emissions



TOTAL CO2 EMISSIONS = **28,675,586 metric tonnes**

DAVAO CITY CORE TEAM



INVENTORY OF DATA

SECTOR/SUB-SECTOR	APPLICATIONS	AVAILABLE DATA	SOURCE OF DATA
STATIONARY COMBUSTION			
• Residential	Cooking	No. of HHs by type of cooking , 2010	PRA-CPDO
• Commercial		No. of commercial establishments/business lines	PRA-CPDO
	Generators	No. of HHs using generator for energy, 2015	PRA-CPDO
	Lighting	No data available	
	HVAC	No data available	
MOBILE COMBUSTION			
• Option I – Distance (Community Mobile Combustion)	Buses	Registered public & private vehicles, by type 2017	CPDO, LTO, LTFRB
	Heavy Duty Vehicles		
	Light Goods Vehicle		
	Motorbike		
	Passenger Car		

SECTOR/SUB-SECTOR	APPLICATIONS	AVAILABLE DATA	SOURCE OF DATA
• Option II – Fuel Consumption (Community Mobile Combustion)	All applications	No data available	
ELECTRICITY			
• Residential Electricity Consumption		Annual energy production, 2017	CPDO
• Commercial Electricity Consumption		Annual energy consumption per category, 2017	CPDO
AGRICULTURE			
• Crops		All types of crop production, in hectare, 2017	CPDO, CAgrO
• Livestock		No. of heads, 2017	CPDO, CAgrO
SOLID WASTE			
Option 1 • Solid Waste Disposal Parameters (IPCC-Intergovernmetal Panel on Climate Change FOD Method) • Solid Waste Disposal Methane Factor (MCF) Calculate Distribution of Waste Management Type • MSW Activitiy Data Input		Volume of garbage collected at Sanitary Landfill, by category, 2017	CENRO

SECTOR/SUB-SECTOR	APPLICATIONS	AVAILABLE DATA	SOURCE OF DATA
Option 2 • Solid Waste Disposal (Landfill) • Other Solid Waste Disposal (Composting, Anerobic Digestion, Other) • Solid Waste Disposal (Open Burning)		Volume of garbage collected at Sanitary Landfill, by category, 2017	CENRO
WASTEWATER			
• Wastewater		No available data	
FORESTRY			
• Forestry Emission		Data requirement very specific at Barangay level, figures not available. Wood for fuel trading is an informal economic activity	DENR
• Forestry Removal			
INDUSTRIAL PROCESSES			
• Emission		No. of establishments engaged in industrial activities	Business Bureau

ISSUES AND CONCERNS:

- Need to strengthen institutional arrangements.
  (Executive Order/ Memo for TWG)
- Need to strengthen arrangements by academe/partners in sharing data/technology.
- Inavailability of required data.
- Need for standard units of measure in quantifying GHG emissions for proxy indicators.
- Need for capacity building of TWG on GHG emission inventory.

Daghang Salamat!

ありがとうございました

Workshop on Greenhouse Gas Inventory Development of Davao City

Date: Jan 22nd 2019 (Tuesday)
Time: 9:30～11:45
Venue: City Accountant's Conference Room

No	Time	Programme	Presenter
1	9:30～9:35	Opening remarks	Mr. Ivan Cortes Head, City Planning and Development Office, Davao City
2	9:35～9:40	Opening remarks	Mr. Yasuhiko Takatsuka Deputy Director, Kitakyushu Asian Center for Low Carbon Society, Environment Bureau, City of Kitakyushu
3	9:40～9:50	Photo session	
4	9:50～10:20	Current situation of an development of GHGI of Davao City: Progress and Challenges	Ms. Melody S. Dapusala City Environment and Natural Resources Office (CENRO), Davao City
5	10:20～10:50	Introduction of an guideline for local GHGI development and other cities' experiences on GHGI development in the Philippines	Ms. Sandee G. Recabar Implementation Oversight Division, Climate Change Commission of the Philippines
6	10:50～11:40	Q&A and discussions on GHGI development of Davao City	Facilitator: Dr. Junko Akagi, Research Manager, Kitakyushu Urban Centre, Institute for Global Environmental Strategies (IGES)
7	11:40～11:45	Closing Remarks	Mr. Tristan D. Domingo Assistant City Administrator, Davao City

＊The kick-off meeting will be held in English (A consecutive translator between English and Japanese will be available)

List of participants

- Mr. Tristan D. Domingo, Assistant City Administrator, Davao City
- Mr. Ivan Cortes, Head, City Planning and Development Office, Davao City
- Ms. Melody S. Dapusala, City Environment and Natural Resources Office (CENRO), Davao City
- Dr. Doris B. Montecastro, Chairperson, Environmental Science Department, Ateneo de Davao University

  and other relevant staffs from Davao City
- Ms. Sandee G. Recabar, Implementation Oversight Division, Climate Change Commission of the Philippines
- Mr. Shiko Hayashi, Programme Director, Kitakyushu Urban Centre, Institute for Global Environmental Strategies (IGES)
- Ms. Junko Akagi, Research Manager, Kitakyushu Urban Centre, Institute for Global Environmental Strategies (IGES)
- Mr. Yasuhiko Takatsuka, Deputy Director, Kitakyushu Asian Center for Low Carbon Society, Environment Bureau, City of Kitakyushu
- Mr. Noboru Kawai, Senior Manager, Nippon Steel & Sumikin Engineering Co., Ltd. / Representative of Davao Office, PNS Construction, Inc.
- An interpreter

DAVAO CITY
GREENHOUSE GAS INVENTORY (GHGI)
PROGRESS AND CHALLENGES

BACKGROUND:

- November 28, 2017 Memorandum of Understanding (MOU) between Davao City and Kitakyushu City.
- May 15, 2018 City to City Collaboration kick-off meeting for LCCAP preparation.
- June 26, 2018, July 17, 2018..... Series of GHGI Training Workshop conducted by Ateneo de Davao University.
- November 5 to 9, 2018 Training Workshop on Local GHGI in Kitakyushu City, Japan.

CHALLENGES:

- Need to strengthen institutional arrangements. (Executive Order/Memo for TWG)
- Need to strengthen arrangement by academe/partners in sharing data/technology.
- Unavailability of required data.
- Need for capacity building of TWG on GHG emission inventory.

PROGRESS:

- Coordination with Ateneo de Davao University – done, awaiting feedback from ADDU.
- Draft Memorandum of Understanding between ADDU and Davao City Gov. - done
- Executive Order No. 40, Series of 2018, signed by the City Mayor Sara Z. Duterte last December 28, 2018.

EXECUTIVE ORDER NO. 40
Series of 2018

"AN ORDER CREATING A TECHNICAL WORKING GROUP (TWG) TO FACILITATE IN THE PREPARATION OF THE LOCAL CLIMATE ACTION PLAN OF DAVAO CITY FOCUSING ON GREENHOUSE GAS (GHG) INVENTORY, MITIGATION AND ADAPTATION."

WHEREAS, In November 28, 2017 a Memorandum of Understanding was signed creating a Green Sister City relationship between Davao City and the City of Kitakyushu. The objective of the Memorandum of Understanding is to establish Green Sister City Cooperation in order to promote and expand effective and mutually beneficial cooperation in the development of the two cities. The parties shall undertake to implement the MOU in accordance with the laws and regulation of their respective countries in the environment fields as follows:

a.) Low Carbon Society
b.) Resource Recycling
c.) Capacity Building for the Officials of each City
d.) Other fields of cooperation as mutually agreed upon by the Parties in writing.

WHEREAS, a kick-off meeting of the City to City collaboration was conducted in May 15, 2018 at Grand MenSeng Hotel regarding the preparation of the Davao City Local Climate Change Action Plan (LCCAP);

WHEREAS, pursuant to Section 14 of Republic Act No. 9729 or also known as the Climate Change Act of 2009; the Local Government Units (LGU's) shall be the frontline agencies in the formulation, planning and implementation of climate change action plans in their respective areas;

WHEREAS, pursuant to Section 18 of Republic Act No. 7160 or the "Local Government Code of 1991" authorizes local government units to establish an organization that shall be responsible for the efficient and effective implementation of their development plans, programs, objectives and priorities;

NOW, THEREFORE, I, **SARA Z. DUTERTE,** Mayor of the City of Davao, by virtue of the powers vested in me by law, do hereby order the following:

SECTION 1. CREATION AND COMPOSITION. There is hereby created a **TECHNICAL WORKING GROUP (TWG)** to facilitate in the preparation of the Local Climate Action Plan of Davao City focusing on greenhouse gas (GHG) inventory, mitigation and adaptation.

The Technical Working Group (TWG) shall be composed of the following City Government of Davao (CGD) personnel:

Head- City Mayor's Office (CMO)
Permanent Representative - Assistant City Administrator for Administration (ACAdO)

Assistant Head - Office of the City Planning and Development Coordinator (OCPDC)

Members:

1. City Environment and Natural Resources Office (CENRO)
2. City Transport and Traffic Management Office (CTTMO)
3. City Engineer's Office (CEO)
4. City Agriculturist's Office (CAgO)
5. City Veterinarian's Office (CVO)
6. Disaster Risk and Reduction Management Office (DRRMO)
7. Department of Environment and Natural Resources – Environmental Management Bureau (DENR-EMB)
8. One (1) Representative from the Local Academe

For this purpose, the aforementioned offices shall name a permanent representative to the TWG herein created.

The City Administrator may hereinafter designate additional CGD employees and/or identify qualified personnel, including those under job order or contract of services, representatives from the academe, private sector and other stakeholders, to support the group herein created in preparation of the LCCAP.

SECTION 2. DUTIES AND FUNCTIONS. The Technical Working Group shall perform the functions as follows:

- Directly coordinate, collaborate and work with Japanese government representatives, national government offices, CGD agencies and private entities as may be required for the preparation of the LCCAP;
- Provide technical expertise and render administrative decision support to the City Mayor; and
- Manage the implementation schedule of the LCCAP preparation, data collection, reporting process, as well as document key decisions.

SECTION 3. FUNDING/OPERATING COSTS. All costs pertaining to the operation of the TWG shall be taken from the available funds of the City Government of Davao subject to the usual accounting and auditing rules and regulations.

SECTION 4. SUPPORT. All City Government of Davao (CGD) offices are hereby directed to provide their full and active support, and utmost cooperation to the preparation of the LCCAP focusing on Greenhouse Gas (GHG) inventory, mitigation and adaptation. The City Administrator and/or the respective heads of the offices to which the members of the TWG belong shall endeavor to allow the said members to prioritize the performance of their functions herein for the success of the plan.

All national government offices within the territorial jurisdiction of Davao City are likewise requested to extend their support and assistance to the endeavors of the TWG and the plan.

SECTION 5. SUNSET CLAUSE. The TWG shall function as a special unit that exists only for the duration of the LCCAP preparation and shall be discontinued thereafter, or as may be determined by the City Mayor.

SECTION 6. SEPARABILITY CLAUSE. If any provision of this Executive Order is declared invalid or unconstitutional, the other provisions not affected thereby shall remain valid and subsisting.

SECTION 7. REPEALING CLAUSE. All orders or parts thereof which are inconsistent with the provisions of this Executive Order are hereby repealed or modified accordingly.

SECTION 8. EFFECTIVITY. This Executive Order shall take effect immediately.

Done on 28 DEC 2018 at Davao City, Philippines.

SARA Z. DUTERTE
City Mayor

Attested by:

ATTY. ZULEIKA T. LOPEZ
City Administrator

CMO - CRD
RELEASED
28 DEC 2018 4:00

Republika ng Pilipinas
LUNGSOD NG DABAW
TANGGAPAN NG SANGGUNIANG PANLUNGSOD

April 5, 2018

MR. JAIME JOSE Y. ABOITIZ
President & Chief Executive Officer
Davao Light and Power Company (DLPC)
C. Bangoy Sr. St., Davao City

Sir:

Attached is a copy of Resolution No. **01927-18**, with its corresponding Ordinance No. **0409-18,** both Series of 2018, of the Sangguniang Panlungsod, City of Davao, for your information and guidance.

For and in the absence of the Secretary:

NILDA C. MAGNO
Acting Secretary to the Sangguniang Panlungsod
(Assistant Secretary to the Sangguniang Panlungsod)

Republic of the Philippines
City of Davao
Office of the Sangguniang Panlungsod

18th City Council
8th Regular Session
Series of 2018

PRESENT:

Councilor	Victorio U. Advincula Jr.	- Temporary Presiding Officer
Vice Mayor	Bernard E. Al-ag	
Councilor	Nilo M. Abellera Jr.	
Councilor	Maria Belen S. Acosta	
Councilor	Al Ryan S. Alejandre	
Councilor	Dante L. Apostol Sr.	
Councilor	Conrado C. Baluran	
Councilor	Ma. Cherry Ann M. Bonguyan	
Councilor	Pilar C. Braga	
Councilor	April Marie C. Dayap	
Councilor	January N. Duterte	
Councilor	Edgar P. Ibuyan Jr.	
Councilor	Diosdado Angelo A. Mahipus Sr.	
Councilor	Bonifacio E. Militar	
Councilor	Avegayle Dalodo Ortiz	
Councilor	Antoinette G. Principe-Castrodes	
Councilor	J. Melchor B. Quitain Jr.	
Councilor	Halila Y. Sudagar	
Councilor	Mary Joselle D. Villafuerte	
Councilor	Jesus Joseph P. Zozobrado III	

ON OFFICIAL BUSINESS:

Councilor	Danilo C. Dayanghirang	- Attended the Regional Assembly of the Philippine Councilors League-Zamboanga Peninsula
Councilor	Rene Elias C. Lopez	- Davao City delegation on the study of the Solid Waste Management Program of Kitakyushu City, Japan
Councilor	Marissa P. Salvador-Abella	- Attended the 1st Quarterly Meeting of the National Fisheries and Aquatic Resources Management Council (NFARMC)

ABSENT:

Councilor	Joanne M. Bonguyan-Quilos	- On Maternity Leave
Councilor	Jimmy G. Dureza	- On Domestic Emergency Leave
Councilor	Leah A. Librado-Yap	- On Domestic Emergency Leave

RESOLUTION NO. 01922-18
Series of 2018

ENACTING AN ORDINANCE REQUIRING THE DAVAO LIGHT AND POWER COMPANY (DLPC) TO CONFORM WITH THE STREET LIGHTING EFFICIENCY PROGRAM OF THE CITY GOVERNMENT OF DAVAO THROUGH THE INSTALLATION OF LIGHT-EMITTING DIODES (LED) ON ALL STREET LIGHTING FACILITIES WITHIN THE TERRITORIAL JURISDICTION OF THE CITY OF DAVAO

WHEREAS, modern energy-efficient street lighting technology such as Light-Emitting Diodes (LED) provides lower energy consumption and maintenance cost as well as improve efficiency of the street lights in terms of road safety, environmental impact, and energy and cost effectiveness;

WHEREAS, the City is currently using Sodium Light Bulbs in all street lighting facilities within its territorial jurisdiction that consumed more energy compared to Light-Emitting Diodes (LED);

WHEREAS, there is a need to replace the existing sodium light bulbs to Light-Emitting Diodes (LED) in all street lighting facilities of the City of Davao in order to save energy consumption and improve light efficiency;

NOW THEREFORE, on motion of Councilor Diosdado Angelo A. Mahipus Sr., duly and jointly seconded by Councilors Pilar C. Braga, Edgar P. Ibuyan Jr., J. Melchor B. Quitain Jr., Mary Joselle D. Villafuerte, Avegayle Dalodo Ortiz and Conrado C. Baluran, be it resolved, as it is hereby resolved, **TO ENACT AN ORDINANCE REQUIRING THE DAVAO LIGHT AND POWER COMPANY (DLPC) TO CONFORM WITH THE STREET LIGHTING EFFICIENCY PROGRAM OF THE CITY GOVERNMENT OF DAVAO THROUGH THE INSTALLATION OF LIGHT-EMITTING DIODES (LED) ON ALL STREET LIGHTING FACILITIES WITHIN THE TERRITORIAL JURISDICTION OF THE CITY OF DAVAO;**

RESOLVED FURTHER, that copies of this Resolution be furnished the Office of the City Mayor through the City Administrator's Office, the Vice Mayor's Office, Davao Light and Power Company (DLPC), the City Engineer's Office (CEO), the City Planning and Development Office (CPDO) and all other offices/departments concerned, for their information, guidance and appropriate action;

ADOPTED, February 27, 2018, by a unanimous vote of all the Members of the Sanggunian present, there being a quorum.

CERTIFIED CORRECT:

NILDA C. MAGNO
Assistant Secretary to the Sangguniang Panlungsod
(City Government Assistant Department Head II)

ATTESTED:

VICTORIO U. ADVINCULA JR.
City Councilor
Temporary Presiding Officer
ncm/jsdam

Republic of the Philippines
City of Davao
Office of the Sangguniang Panlungsod

18th City Council
8th Regular Session
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ABSENT:

Councilor	Joanne M. Bonguyan-Quilos	- On Maternity Leave
Councilor	Jimmy G. Dureza	- On Domestic Emergency Leave
Councilor	Leah A. Librado-Yap	- On Domestic Emergency Leave

ORDINANCE NO. 0409-18
Series of 2018

AN ORDINANCE REQUIRING THE DAVAO LIGHT AND POWER COMPANY (DLPC) TO CONFORM WITH THE STREET LIGHTING EFFICIENCY PROGRAM OF THE CITY GOVERNMENT OF DAVAO THROUGH THE INSTALLATION OF LIGHT-EMITTING DIODES (LED) ON ALL STREET LIGHTING FACILITIES WITHIN THE TERRITORIAL JURISDICTION OF THE CITY OF DAVAO

Be it ordained by the Sangguniang Panlungsod of Davao City in session assembled, that:

SECTION 1. TITLE - This Ordinance shall be known as **"AN ORDINANCE REQUIRING THE DAVAO LIGHT AND POWER COMPANY (DLPC) TO CONFORM WITH THE STREET LIGHTING EFFICIENCY PROGRAM OF THE CITY GOVERNMENT OF DAVAO THROUGH THE INSTALLATION OF LIGHT-EMITTING DIODES (LED) ON ALL STREET LIGHTING FACILITIES WITHIN THE TERRITORIAL JURISDICTION OF THE CITY OF DAVAO";**

SECTION 2. SHORT TITLE – This ordinance shall be known as the "LED ORDINANCE OF DAVAO CITY;

SECTION 3. DEFINITION OF TERMS – As used in this Ordinance, the following terms are defined as follows:

a. Central Business District (CBD) – is the commercial and business center of the City. It is the City's financial district, city center or downtown historic district.
b. Installation – the act of putting something in place so that it is ready to use. For purposes of this Ordinance, installation includes the conversion into, replacement or the placing of new Light-Emitting Diodes (LED) lights.
c. High Pressure Sodium (HPS) Lamp – is a broad-spectrum gas-discharge lamp that uses sodium in an excited state to produce light at a characteristic wavelength near 589 nm.
d. Light-Emitting Diode (LED) Light – is a two-lead semi-conductor light source. It is a p-n junction diode that emits light when activated. When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons.

SECTION 4. COVERAGE – This Ordinance shall cover all street lighting facilities within the territorial jurisdiction of Davao City;

SECTION 5. PURPOSE – This Ordinance is enacted for the following purposes:

a. To reduce energy consumption and maintenance cost and eventually generate savings to the City;
b. To improve efficiency of the street ights in terms of road safety, environmental impact, and energy and cost effectiveness.

SECTION 6. IMPLEMENTATION – The Implementation of this Ordinance shall Conform with the 5-year implementation plan scheduled as follows:

a. Initial Phase: Installation or conversion of the HPS to LED units within the Central Business District (CBD) of the City starting immediately after the approval of this City Ordinance;
b. Succeeding Implementation Phase: Once the installation within the CBD shall have been completed, all other street lights within the remaining City area shall likewise be replaced with LED units, to commence from the nearest area to the farthest.

SECTION 7. COSTS – The installation of all LED Lights, including all gadgets to improve lighting focus, shall be at the expense of the Davao Light and Power Company (DLPC). Only appropriate – type LED lights shall be installed as replacements to the existing street lights as specified in Section 8;

SECTION 8. LED STREET LIGHTING REQUIREMENT – The installation of LED lights shall take note of the following minimum specifications:

a. The luminary may be designed specifically for the use of the light source based on solid-state technology (LED). Products designed for other types of light sources, adapted or retrofitted to LED light sources will not be allowed.
b. Tightness level of both optical and control gear compartments have minimum rating of IP66.
c. Impact resistance level against vandalism rating must be minimum IK08 (on a scale of 10).
d. Lifespan of the luminary performance must be minimum of L80B10 @ 100,000 burning hours (90% lamp survived at 80% lumen remaining at 100,000 hours) to prevent fast depreciation of the light output of the luminary.
e. Electrical Safety Class: Class I with double insulated wires.
f. Power Factor: > 90 at full load.
g. Operating Ambient Temperature (Ta): minimum of 45 degrees Celsius.
h. Mains voltage tolerance: 120V – 227V
i. Color Temperature CCT: 3000k
j. Color rendering CRI: >70.
k. Lumen per Watt: Minimum-85
l. Casing be made of Die Cast Aluminum Alloy with clear flat tempered glass protector (no polycarbonate or any related products allowed).
m. Surge protection devise: 10kV.
n. Luminary inclination angle system: Minimum + 5 to -10 degrees.
o. Manufacturer's Warranty: Minimum-6 years
p. IEC complaint Certificates need to be provided for: IP, IK, Fragmentation, EMC, LM80 Tests.
q. All measurements from ISO 17025 accredited laboratory.
r. Appearance on CCTV Security Monitoring Equipment must not be impeded/impaired by these lights used.

SECTION 9. LED STREET LIGHT TASK FORCE – There is hereby created a LED Street Light Task Force composed of the following:

Chairperson	: City Mayor or the City Administrator
Co-Chairperson	: Davao Light and Power Company (DLPC)
Vice-Chairperson	: City Engineer
Members	: City Planning and Development Officer (CPDO)
	: Chairperson, Committee on Energy

SECTION 10. FUNCTION – The LED STREET LIGHT TASK FORCE shall oversee the implementation and enforcement of this Ordinance.

SECTION 11. SEPARABILITY CLAUSE – If, for any reason, any section or provision of this Ordinance is declared unconstitutional or invalid, other sections or provisions hereof not affected by such declaration shall continue to be in full force and effect;

SECTION 12. EFFECTIVITY – This Ordinance shall take effect immediately upon approval;

ENACTED, on February 27, 2018, by a unanimous vote of all the Members of the Sanggunian, there being a quorum.

CERTIFIED CORRECT:

NILDA C. MAGNO
Assistant Secretary to the Sangguniang Panlungsod
(City Government Assistant Department Head II)

ATTESTED:

VICTORIO U. ADVINCULA JR.
City Councilor
Temporary Presiding Officer
ncm/jsdam

APPROVED: MAR 19 2018, 2018

SARA Z. DUTERTE
City Mayor

ATTESTED:

ATTY. ZULEIKA T. LOPEZ
City Administrator

Low Carbon Development under City-to-City Collaboration Prorgamme between Davao City and City of Kitakyushu

February 19th, 2019

Shiko Hayashi
Programme Director, Kitakyushu Urban Centre

IGES
Institute for Global Environmental Strategies

Project to realize low carbon society in Davao City through a support for a development of Local Climate Change Action Plan

City of Kitakyushu ⇔ Davao City

Green Sister City Agreement
（November, 28th, 2017）
Expanding the cooperation area to
a development of low carbon society

Agreement on cooperation

Focal point

Institute for Global Environmental Strategies (IGES) ⇔ Ateneo De Davao University

Agreement on cooperation

Support for a development of **Local Climate Change Action Plan** of Davao City

- A development of GHG inventory（supported by IGES）
- A development of mitigation measures（supported by Kitakyushu City and IGES）
- A development of adaptation measures (supported by Ateneo De Davao Uni.)

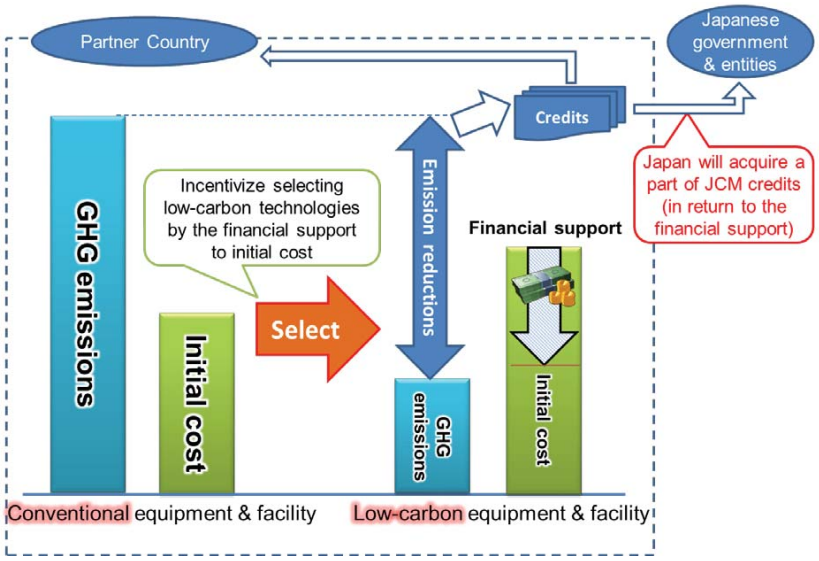
An implementation of concrete mitigation measures

Study on a feasibility of low-carbon project (for JCM Model Project)

- Feasibility study on other low-carbon projects (renewable energy and energy saving projects)
- Coordination with related-stakeholders for an implementation, technical study, evaluation of the amount of CO2 reduction, etc.
- Supporting for a preparation of applying JCM Model Project

Financing Programme for Joint Crediting Mechanism (JCM)

- Facilitating diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions of partner countries.
- Evaluating contributions from Japan to GHG emission reductions or removals from fossil fuel combustion in a quantitative manner by MRV.
- Contributing to achieve Japan's emission reduction target of the UNFCCC by facilitating global actions for GHG emission reductions.



*measurement, reporting and verification

17 Countries
(signed with the Philippines in Jan 2017)

Source: Ministry of the Environment, Japan

Some conditions for JCM Model Project

- Finance rate will be determined based on the number of already selected JCM Model Projects using a similar technology in each country.
- Regardless of the finance rate, selected entities in JCM Model Project are expected to deliver at least half of JCM credits issued to Government of Japan.

Number of already selected project(s) using a similar technology in each partner country	Percentage of financial support
None (0)	Up to 50%
Up to 3 (1 – 3)	Up to 40%
More than 3 (>3)	Up to 30%

Cost effectiveness (JPY/t-CO_2e)

- Dividing "the amount of proposed subsidy" by "the accumulated emission reduction" achieved during "the legal durable years" (under Japanese tax law).
- **Below 4,000 JPY/t-CO_2e** (Energy saving projects: 10,000 JPY/t-CO_2e in FY2016)

Payback period (year) $\dfrac{\text{(Total initial cost) – (Amount of subsidy)}}{\text{(Reduction for annual operation cost)}}$

*** Average: 3,500 JPY/t-CO_2e**

- Payback (or Return of Investment) period of should be more than 3 years with the financial support.

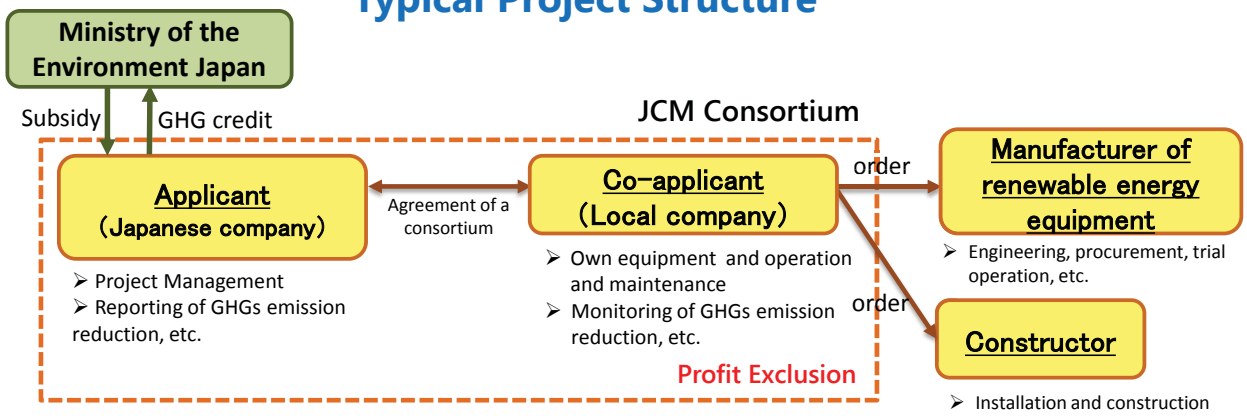
Source: Ministry of the Environment, Japan

Study on possible application of JCM Model Project

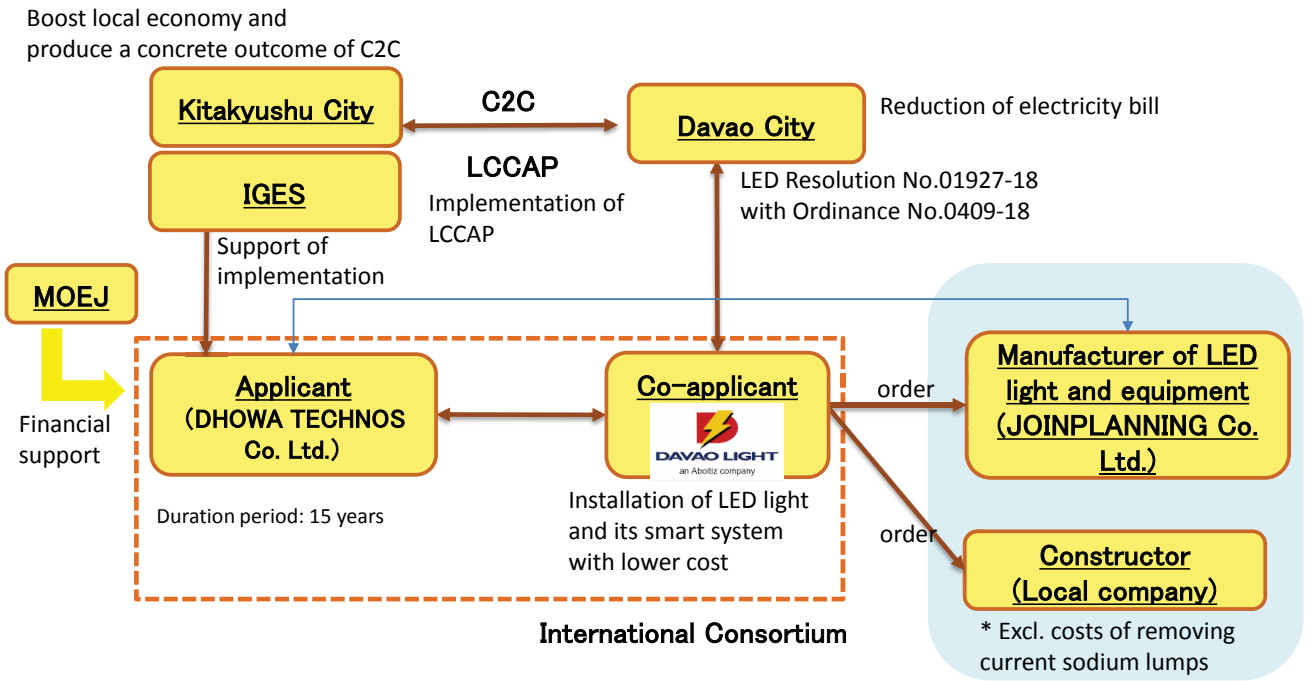
Components will be checked for a feasibility study on low-carbon projects:

- Forming an **international consortium** including both a owner and user of the equipment, etc.
- Coordination on a **timing and condition** of a procurement of a low-carbon project in Davao City with related organizations, etc.
- Coordination with **manufacturers** of renewable energy equipment as well as **constructors**
- **Selection of equipment**, calculate the amount CO2 reduction, support for a preparation to apply for JCM Model Project

Typical Project Structure

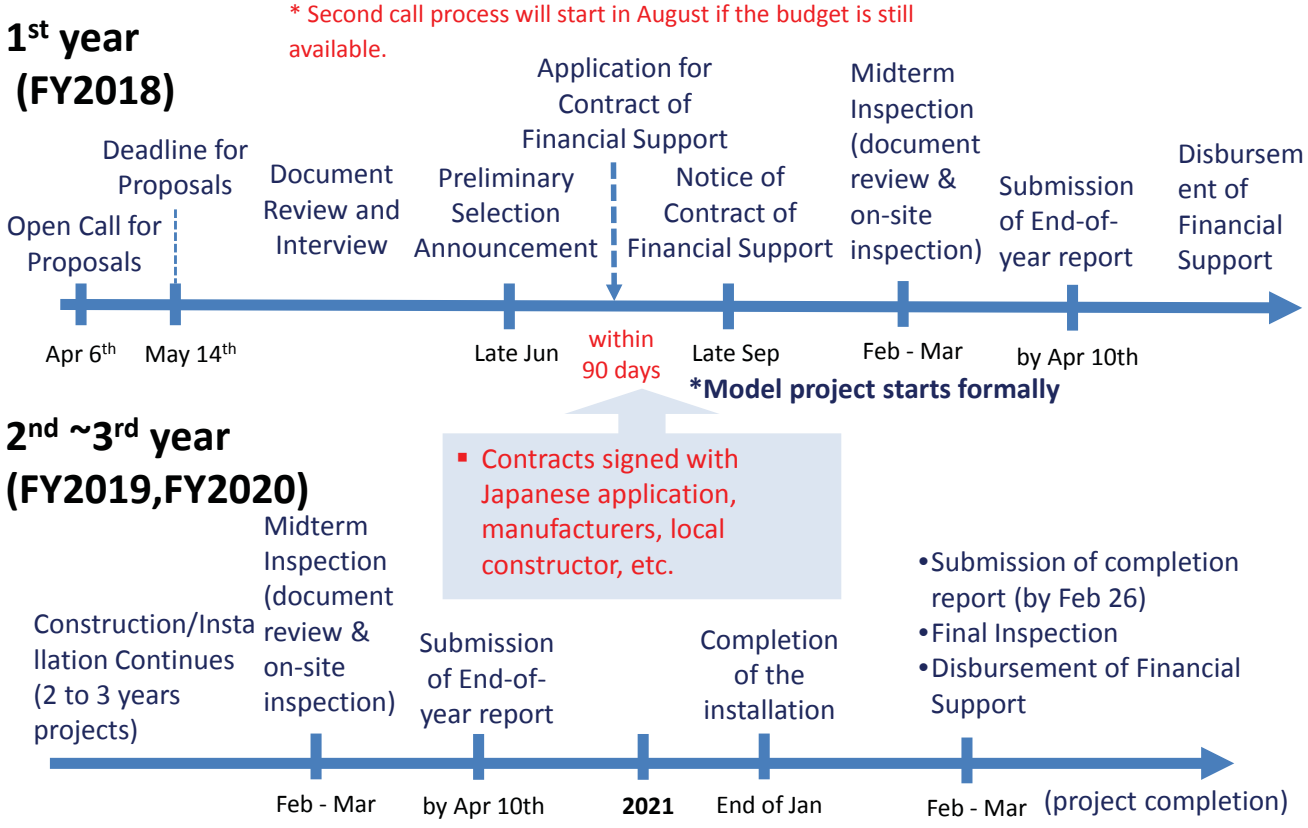


Possible Project Structure (draft as of 2019.1.21)



Schedule for Applying JCM Model Project

* The schedule is followed to Japanese fiscal year (April - March)
* Second call process will start in August if the budget is still available.



Discussion points today

- Safety standard: PSE (Product Safety Electrical Appliance & Materials) in Japan

  → Is this compatible with the Philippines standard, PS standard?

- Ordering system

  Proposal A

  - **Pattern 1: a full-spec as proposed today (supplying LED lights with arm parts)**
  - Pattern 2-1: supplying LED units and arm parts are designed by Japan-side but manufactured by local companies
  - **Pattern 2-2: supplying LED units but utilizing existing arm parts**
  - Pattern 3: selling as ready made product (products shown in a catalogue)

- Return of Investment

  How long term will be set by DLPC for recovering the investment costs for LED replacement project?

Calculation of GHG emission reduction

$$ER_p = RE_p - PE_p$$

ER_p Emissions reduction during the period p (tCO_2/p)
RE_p Reference emissions during the period p (tCO_2/p)
PE_p Project emissions during the period p (tCO_2/p)

Criterion 1	The project installs LED street lighting system utilizing wireless network control, which is connected to an electricity grid system.
Criterion 2	All lighting equipment in one lighting system has the same specifications.
Criterion 3	Wireless network technology enables controlling of the volume of lighting.

$$RE_p = \sum_i P_i \times \left(\eta_{PJ,i} \div \eta_{RE}\right) \times PO_{i,p} \times EF_{grid} \times 10^{-6}$$

RE_p Reference emissions during the period p (tCO_2/p)
P_i Rated power consumption of a lighting equipment used in the project lighting system i (W)
$\eta_{PJ,i}$ Luminaire efficiency of a lighting equipment used in the project lighting system i (lm/W)
η_{RE} Luminaire efficiency of the reference lighting system (lm/W)
$PO_{i,p}$ Total operating hours of project lighting system i during the period p (hrs/p)
EF_{grid} Grid emission factor of Mindanao grid (tCO_2/MWh)
i Identification number of the lighting system

$$PE_p = \sum_i PEC_{i,p} \times EF_{grid} \times 10^{-6}$$

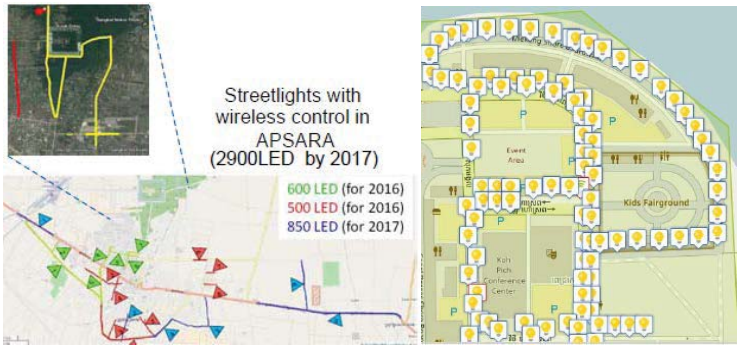
PE_p Project emissions during the period p (tCO_2/p)
$PEC_{i,p}$ Total amount of electricity consumed in the project lighting system i during the period p (Wh/p)
EF_{grid} Grid emission factor of Mindanao grid (tCO_2/MWh)
i Identification number of the lighting system

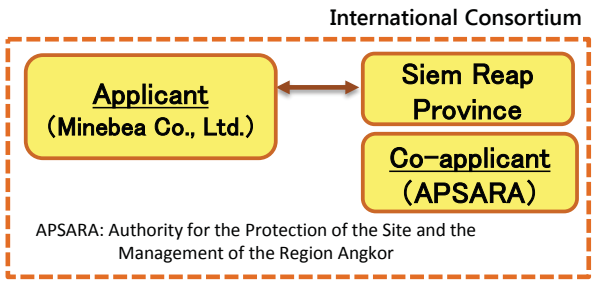
Source: https://www.jcm.go.jp/kh-jp/methodologies/34

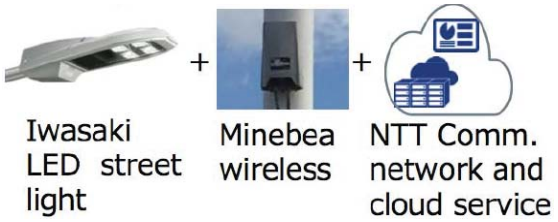
REFERENCE: LED light projects for JCM Model Project: Example 1

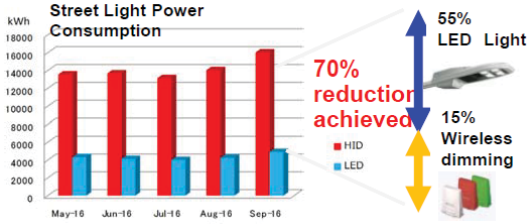
Introduction of High Efficiency LED Lighting Utilizing Wireless Network (Cambodia)

- Introducing total of 9,755 units of high efficiency LED Lighting utilizing wireless network technology
- Also, using smart lighting system with wireless network and dimmer adjustment
- Expected GHG emission reduction: 4,190 tCO2/ year (70% of energy reduction)







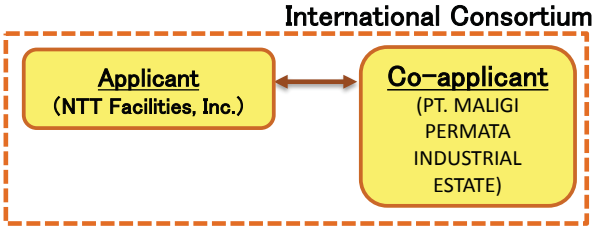


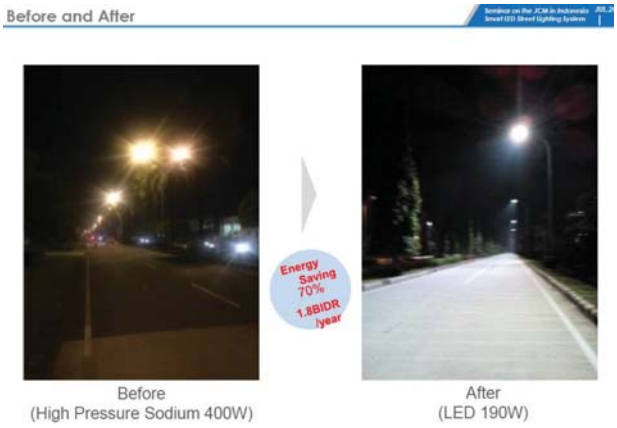
Source: http://gec.jp/jcm/jp/projects/15pro_cam_01/

REFERENCE: LED light projects for JCM Model Project: Example 2

Energy Saving for Industrial Park with Smart LED Street Lighting System (Indonesia)

- Replacement of existing street lights with high efficient LED lights
- Dimmable High Efficient LED: 95W for 660 pcs and 190W for 600 pcs
- Smart Lighting System: 14 smart boxes and 1,260 Outdoor Lighting Controllers
- Power line communication, Remote controlling, Remote monitoring, Cloud based service
- Expected GHG emission reduction: 1,016 tCO2/ year (70% energy saving)





Source: http://gec.jp/jcm/projects/15pro_ina_02/

1. Actions taken by your city's/region's for the C2C collaboration project up to now and future prospects

Milestones in the implementation of C2C collaboration between Kitakyushu City and Davao City.

✓ Signing of Green Sister City Agreement by both parties on November 17, 2016 and November 28, 2017 in Davao City and Kitakyushu City respectively.

Nov. 28, 2017

Nov. 17, 2016

✓ Learning visits of Davao City Government to City of Kitakyushu on best practices of solid waste mgt.

May, 2017

Nov, 2017

Feb, 2018

1. Actions taken by your city's/region's for the C2C collaboration project up to now and future prospects

Milestones in the implementation of C2C collaboration between Kitakyushu City and Davao City.

✓ Jointly worked with Japan Project Team:

- Data acquisition and conduct of Waste analysis. (Waste-to-energy Feasibility Study)
- Establishing links and acquiring permissions for visits to business establishments. (recyclers, food establishments, malls, bus companies and etc.)
- Upgrading of city's solid waste management system through JICA Grassroots Project.
  1. Establishing a system for waste analysis in CENRO
  2. Setting up preparatory body to develop an organization to promote waste reduction
  3. Pilot activities on waste reduction in business sector and barangay to be conducted

1. Actions taken by your city's/region's for the C2C collaboration project up to now and future prospects

Milestones in the implementation of C2C collaboration between Kitakyushu City and Davao City.

- ✓ Adopting Waste-to-Energy (WTE) as part of City's 10-yr. Solid Waste Management Plan (2018 – 2027).
- ✓ Creation of "Waste-to-Energy – Project Management Team" through Executive Order No. 18. (City Admin., CEO, City Legal Office, CPDO, City Budget Office, CENRO)

- ✓ Creation of Inter-Agency Team for the development of LCCAP. (City DRRMO, CPDO, CENRO, Ateneo de Davao University)
- ✓ Jointly worked with Japan Project Team:

  - Project to realize low carbon society in Davao City through a support for a development of Local Climate Change Action Plan (LCCAP).
    1. A development of GHG inventory （supported by IGES）
    2. A development of mitigation measures （supported by Kitakyushu City and IGES）
    3. A development of adaptation measures (supported by Ateneo De Davao University)

May 15, 2018

1. Actions taken by your city's/region's for the C2C collaboration project up to now and future prospects

Future Prospects:

- ✓ Part of the Objectives is to come up with a Waste analysis manual for the city being crucial in the implementation of Waste-to-energy facility in Davao.
- ✓ Promotion of waste reduction and recycling activities in communities and businesses and other preparations for WTE.
- ✓ Construction of Waste-to-energy (WTE) facility in Davao City.
- ✓ Development of City Greenhouse Gas Inventory and Local Climate Change Action Plan.
- ✓ Investigate and promote a potential JCM model project in Davao based on the needs and proposed mitigating plans enumerated in the LCCAP. .

Kogasaki Waste-to - Energy Plant in Kitakyushu

2. What kinds of challenges does your city/region face in the C2C collaboration project?

- Implementation schedules and expected results were delayed or didn't went as planned.
  (Barangay elections, delays in selection of WTE sites, and etc.)

- Available systems and facilities crucial to the attainment of Solid Waste reduction and recycling are limited or lacking.
  (Lack of Segregated collection, Solid waste management facilities e.g. Material Recovery Facilites, Composting, Recycling facilities and Industries)

- Paradigm and behavioral shift in adopting to new Solid Waste Mgt. methods takes time to show positive effects.

THANK YOU!