



FINAL REPORT

Study on Carbon Governance at Sub-national Level in Indonesia

Case Study: Jakarta Province

November 2011

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Submitted to:

Institute for Global Environmental Strategies (IGES)

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Abbreviation

AFOLU	Agriculture, Forestry and Other Land Use
BAPPEDA	<i>Badan Perencanaan Pembangunan Daerah</i> (Local Development Planning Agency)
BAPPENAS	<i>Badan Perencanaan Pembangunan Nasional</i> (National Development Planning Agency)
BAU	Business As Usual
BPLHD	<i>Badan Pengelolaan Lingkungan Hidup Daerah</i> (Local Environmental Agency)
BPPT	<i>Badan Pengkajian dan Penerapan Teknologi</i> (The Agency for The Assessment and Application of Technology)
CDM	Clean Development Mechanism
COP	Conference of the Parties
DNPI	<i>Dewan Nasional Perubahan Iklim</i> (National Council on Climate Change)
DGEEU	Directorate General of Electricity and Energy Utilization
EEPSEA	Economy and Environment Program for Southeast Asia
GHG	Greenhouse Gas
GoI	Government of Indonesia
ICCSR	Indonesia Climate Change Sectoral Roadmap
IGES	Institute for Global Environmental Strategies
IPCC	Intergovernmental Panel on Climate Change
ITB	<i>Institut Teknologi Bandung</i> (Bandung Institute of Technology)
MRV	Measurement, Reporting and Verification
NAMA	Nationally Appropriate Mitigation Action
NGO	Non-Governmental Organization
OECD	Organization for Economic Co-operation and Development
PERDA	<i>Peraturan Daerah</i> (Local Regulation)
RAD	<i>Rencana Aksi Daerah</i> (Local Action Plan)
RAN-GRK	<i>Rencana Aksi Nasional Penurunan Emisi Gas Rumah Kaca</i> (National Action Plan in Reducing Greenhouse Gas Emissions)
RPJPN	<i>Rencana Pembangunan Jangka Panjang Nasional</i> (National Long Term Development Plan)
SIGN	<i>Sistem Inventarisasi Gas Rumah Kaca Nasional</i> (GHG Inventory System)
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

1. Introduction

1.1 Background

Institute for Global Environmental Strategies (IGES) is conducting the study on Establishing New Market Mechanism through the Development of Methodological and Institutional Framework for MRV in Asian Developing Countries from May 2011 to March 2012, its aims to promote proper evaluation methods on the activities initiated by the Japanese government in developing countries and assist developing systems to measure, report and verify GHG emissions reduction and/or sink in those countries in order to develop a crediting mechanism which will provide a win-win situation between Japan and those countries. In concrete terms, the following topics are planned: (1) Examination of methodological framework for the MRV of GHG; (2) Support and research for the establishment of institutional and governance structure, and capacity building for the MRV of GHG.

Governance and Capacity Group (GC) of IGES is in charge of the research for MRV of GHG emissions reduction by urban planning in relevant sectors in China, Indonesia, Indonesia, Malaysia, Thailand, and Laos, as part of the above umbrella study on MRV. The study under this TOR will be conducted as part of the study of GC.

In line with the world's commitment on climate change, in the national level, Government of Indonesia (GOI) announced non-binding emission reduction target of 26% below the BAU emission by 2020 through unilateral actions. With international support, the emission could be further reduced to 41%. The commitment is stipulated in Presidential Decree no. 61/2011, which is being implemented through the National Action Plan for GHG Emission Reduction (*Rencana Aksi Nasional Penurunan Emisi Gas Rumah Kaca - RAN GRK*), which will be carried out during 2010-2020.

Since Indonesia comprises of 33 provinces, in which each province has regional autonomy to administer, operate, and set their regional plan based on the interests of local society, the local governments shall develop Regional Action Plan for GHG Emission Reduction as part of National Action Plan. The study on Carbon Governance at Sub-national Level in Indonesia is carried out focusing on status and capacity of the local governments related to implementation of MRV for their mitigation targets. For this case study, Jakarta was chosen as target area considering its commitment in mitigating climate change.

Governor of the DKI Jakarta expressed Jakarta's intention in reducing 30% of their emission from BAU by 2030 in the Mayor's Summit held during COP 15 in Copenhagen (December 2009), the Government of DKI Jakarta. Following this, the DKI Jakarta has developed GHG inventory and its projection. An academic paper has also been prepared, in which GHG mitigation mechanisms and approaches developed to achieve the reduction target are documented. However, issues related to the implementation of the MRV are not discussed in this document.

1.2 Goals and Objectives

The study aims to capture the current condition of carbon governance in sub-nationals in Indonesia with emphasize on the case study area. It covers the assessment of existing management system and planned for the GHG emissions reduction measures and it's MRV. Specifically, the study tries to assess the following topics:

- Involvement of sub-national governments at development of National Communication.

- Involvement of sub-national governments in development of NAMA.
- Participation of sub-national governments on GHG inventory workshops organized by Intergovernmental Panel on Climate Change (IPCC) and national government.
- Progress made by sub-national governments on low-carbon development / climate change mitigation strategy, target, action plan, policies and measures.
- Implementation of GHG emissions monitoring by sub-national governments
- Involvement of sub-national governments in CDM project(s)
- Sub-national governments' authority in influencing companies and residents in their jurisdiction through policies and measures
- Status of GHG emission reduction enforcement

1.3 Methodology

The study has been carried out by conducting series of communication and discussion with Jakarta province's officials, especially Local Development Planning Agency (BAPPEDA) and Local Environmental Agency (BPLHD) during July to October 2011. The discussion has been focused on Jakarta's policies and programs on climate change and GHG emission status.

Communication was also made with the team of experts assigned to assist Jakarta provincial government in calculating their GHG emissions. For the parts of national policies and programs, data and information were obtained through literature review.

2. National Policies and Programs on Climate Change Mitigation

There are several government policies and program initiatives that are in-lined with and supportive to the climate change and GHG emission mitigation at national as well as sub-national level. Following the ratification of UNFCCC in 2004 and Kyoto Protocol in 1997, the Government of Indonesia (GoI) stated its strong commitment to support global efforts to combat climate change. One of them is in an effort to maintain the spirit of *Bali Action Plan* released in the 13th Conference of Parties (COP13) 2007, GOI made a number of significant efforts to effectively implement the UNFCCC post-conference. These include (i) development of a number of policy documents outlining GOI's efforts in integrating climate change mitigation and adaptation activities into the National Development Plan for the Long-Term (RPJMP 2005-2035) as well as Medium-Term (RPJMN 2004-2009) and (ii) preparation and the issuance of regulations that assist sectors and local governments in the implementation of climate change programs.

Recognizing climate change as one of challenges for its development, on 5th February 2007, the Government of Indonesia (GoI) issued Law no. 17/2007 on National Long Term Development Plan (RPJPN) for years 2005-2025, which on it also tries to integrate climate change mitigation and adaptation into all aspects of development planning.

In addition, the GOI has announced voluntary (non-binding) emission reduction in COP 15 with the target to achieve 26% GHG emission lower than the baseline of 2020 using domestic budget and could be further increased to 41% with international support. To meet this target, GOI is preparing National Action Plan on GHG Reduction (2010-2020).

Following the statement on Indonesia's voluntary emission reduction target and to provide policy guidance for implementation of national adaptation and mitigation responses to climate change, GoI developed Indonesia Climate Change Sectoral Roadmap (ICCSR). Development of ICCSR was coordinated by Bappenas with inputs from line ministries and relevant stakeholders such as NGOs and university representatives. Appendix 1 provides matrix of sectoral mitigation actions until 2020. Classification of sectors in the ICCSR was based on IPCC guide also being used in development of national communications of non-Annex I parties to the UNFCCC. Appendix 1 provides matrix of sectoral mitigation actions until 2020.

As consequence of non-Annex I parties of UNFCCC, beside its level of emissions Indonesia has also to report the above GHG mitigation efforts to UNFCCC as National Communication on Climate Change (Natcom) document. This document covers GHG inventory that reports level of GHG emission and its mitigation plan, national circumstance data and their effect to the GHG emissions level, mitigation programs, vulnerability, and adaptation programs in Indonesia.

This chapter discusses national policies and programs on climate change that are covered in the Natcom document, GOI's efforts in integrating climate change mitigation and adaptation activities into the National Development Plan for the Long-Term (RPJMP 2005-2035) as well as Medium-Term (RPJMN 2004-2009), preparation and the issuance of regulations that assist sectors and local governments in the implementation of climate change programs, and the involvement of sub-national governments at development of National Communication, and the involvement of sub-national governments in development of NAMA

2.1 Indonesia's Second National Communication

Indonesia has developed two national communication (Natcom) documents, namely INC (first national communication) that was submitted to UNFCCC in 1999 and SNC (second national

communication) that was submitted to UNFCCC in 2010. Several issues were addressed in both Natcom documents, among of them are national GHG inventory, mitigation plans, and

The development of both Natcom documents is carried out by Working Group (WG), which is established within a national system. The WG comprises member from various government institutions and sectoral ministries, which is worked on project base under coordination of the Deputy of Nature Conservation Enhancement and Environmental Destruction Control of the MoE. At this stage, the involvement of sub-national governments has not been conducted yet.

However, in 2010, a division was established within the MoE specifically dedicated for preparing the NGHGI (National GHG Inventory) one of the SNC componen. The MoE was strengthening current system of the GHG inventory through the establishment a National GHG Inventory System called as *Sistem Inventarisasi Gas Rumah Kaca Nasional* (SIGN). To support this NGHGI system, GOI has prepared a draft of Presidential Regulation on the implementation of GHG inventory under this new system. Under this new system, the sub-national governments will be included in the development of the Natcom document, especially in the national GHG inventory activities.

There are two approaches for NGHGI development, i.e. at national (central government) level and local government level. At central government level, all activities data will be collected from all line ministries relevant to GHG from energy, IPPU, AFOLU and waste (i.e. Ministry of Energy and Mineral Resources, Ministry of Agriculture, Ministry of Forestry, Ministry of Industry, Ministry of Transportation, etc). At local government level, all activities data will be collected from main resources at municipal/regency level, in which these data will be collected at provincial level and from provincial level to national level. In this system the MoE will compile all of these data beside The MoE also will coordinate all NGHGI processes.

2.2 National GHG Inventory

National GHG Inventory System is developed, among others, to provide periodic information on Indonesia's GHG emission status including the GHG emission reduction and its contributing activities.

On 10 October 2011, The President of Republic of Indonesia signed the Presidential Regulation no. 71 year 2011 concerning Implementation of National GHG Inventory. It contains the following points:

- Encourage the use local emission factors (article 4)
- Quality control and quality assurance is to applied to activity data, emission factor, and GHG emission/removal calculation (article 5)
- Verification are to be conducted to GHG inventory, including emission reduction and mitigation activities (article 6)
- Coordination for GHG inventory will be led by Minister at national level, Governor at provincial level, and Mayor/Regent at district/municipal level

Previously, Law no. 32/2009 on Environmental Protection and Management has stipulated in chapter 63 that GHG inventory to be carried on by governments, either by national, provincial, and/or district/municipal.

In 2010, Indonesia released the result of Second National Communication (SNC) to the UNFCCC. The GHG Inventory took year 2000 for calculation and resulted in 1.38 GtCO₂-eq.

Under BAU, it is estimated that in 2020 Indonesia’s GHG emission will reach 2.95 GtCO₂-eq.

Table 1. Summary of 2000 GHG emission and removal (in Gg CO₂e)

	CO ₂	CH ₄	N ₂ O	PFC	Total
Energy	247,522.25	30,174.69	3,240.64	NO	280,937.58
Industrial Process	40,342.41	2,422.73	133.22	145.15	43,043.52
Agriculture	2,178.30	50,800.18	22,441.25	NO	75,419.73
LUCF ¹	821,173.35	56.35	24.47	NO	821,254.17
Waste	1,662.49	153,164.02	2,501.45	NO	157,327.96
Total	1,112,878.82	236,617.97	28,341.02	145.15	1,377,982.95

(Source: Ministry of Environment, 2010)

Both development of the year 2000’s GHG Inventory and the projection were involving sectors’ representatives. Data and assumptions used were released and approved by each respective line ministries, such as the Ministry of Energy and Mineral Resources for energy sector and the Ministry of Forestry for forestry sector. There was no involvement of local governments during the development of the Second National Communication. As for private sectors, PT. Inalum and PT. Multi Nitrotama Kimia (MNK) were giving their consent to the SNC team for using data described in their CDM project’s PDD. PT. Inalum is the only aluminium smelter in Indonesia and just got its PFC emission reduction project’ registered, while MNK is developing a CDM project in reduction of N₂O emissions. Projections used in the SNC were based on several indicators such as population and GDP provided by relevant institutions.

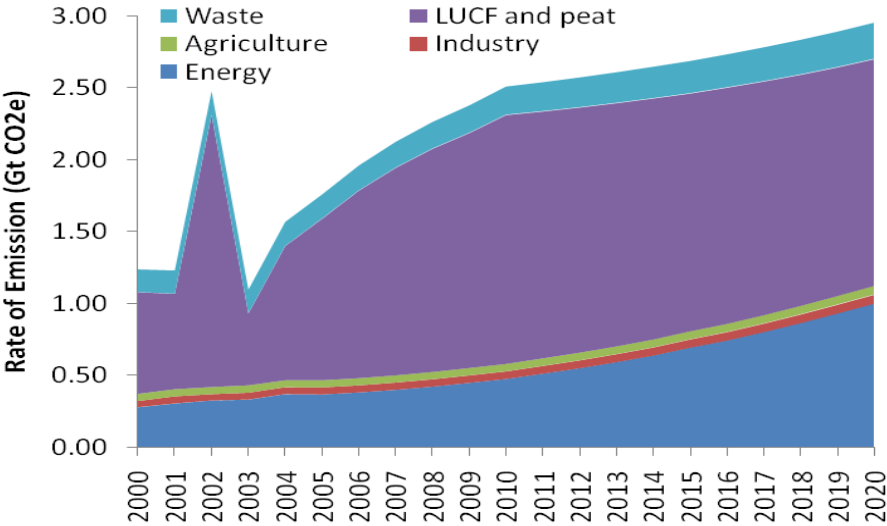


Figure 1. Historical and future projection of emissions from all sectors in Indonesia (Boer et al., 2010)

On its submission to the UNFCCC, the Government of Indonesia submitted seven prioritized mitigation actions, i.e: (i) sustainable peat land management, (ii) reduction in rate of

¹ Emission from peat fire included

deforestation and degradation, (iii) development of carbon sequestration projects in forestry and agriculture, (iv) promotion of energy efficiency, (v) development of alternative and renewable technology, (vi) reduction in soil and liquid waste and (vii) shifting to low emission transportation mode.

The coordination of the GHG Inventory System (*Sistem Inventarisasi Gas rumah kaca Nasional – SIGN*) will be handled by the Ministry of Environment (MoE). The MoE plans to apply both top-down and bottom-up approaches (Figure 2). On top-down approach, data will be collected and calculated by line ministries then submitted to the Ministry of Environment. Afterward, these data will be shared with the local government. On the bottom-up approach, local government will be collecting data, and to some extent, perform the calculation. Both data and the calculation will then be submitted to the Ministry of Environment. The combined approach is expected to assist in clarifying both data and calculation method and improve the consistency of data.

With support from JICA, the Ministry of Environment is currently conducting series of workshops to disseminate the SIGN system as well as GHG inventory for a number of sectors (waste and AFOLUF) to representative of provinces’ environmental agencies.

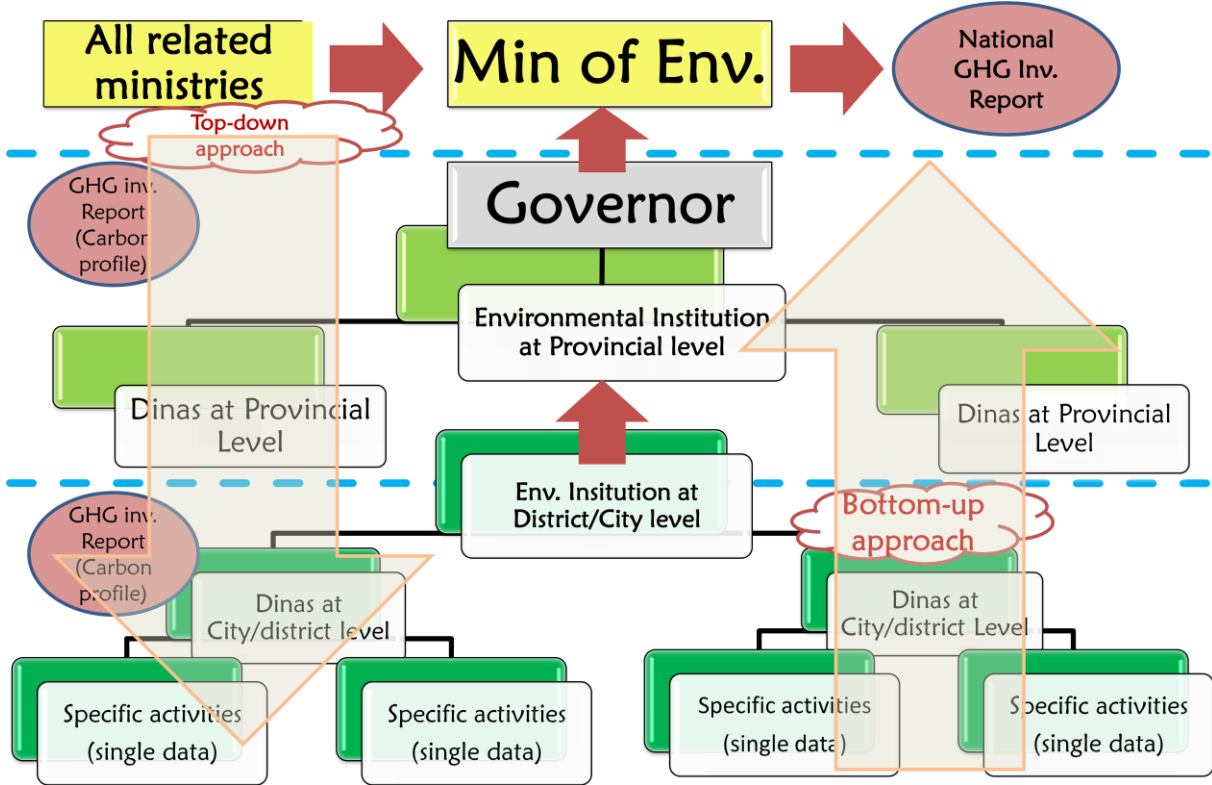


Figure 2. Indonesia GHG Inventory approach
(source: Ministry of Environment, 2011)

At the time of writing, there are no regulations with regard to GHG emission standard/limit. Some industries, however, were required to submit biannual report regarding their air quality level. However, at present the Government of Indonesia is in the process of drafting the government regulation (PP) on Conserving Atmosphere Function (*Rancangan Peraturan Pemerintah tentang Pelestarian Fungsi Atmosfer*) which will be submitted to the parliament this year. This PP states that all business activities which require environmental impact

assessment (EIA) will be obliged to mitigate their GHG emission. This mitigation plan will be elaborated in the Environmental Management and Monitoring Plan of the EIA document.

2.3 National Action Plan for Reducing Greenhouse Gas Emissions

National Action Plan in Reducing Greenhouse Gas Emissions, in Indonesia called *Rencana Aksi Penurunan Emisi Gas Rumah Kaca* (RAN-GRK), is an integrated action plan between sectors, also taking into account the national spatial and land use planning. It is expected to assist Indonesia in contribute towards global efforts in reducing GHG emissions, and to enhance the potential of international funding assistance to Indonesia. The RAN-GRK was formalized through President Regulation number 61/2011, dated 26 September 2011.

In general, the RAN-GRK as defined in articles 3 and 4 of the regulation, aims to serve as basic for:

- a. Ministries and related institutions in designing, planning, monitoring, and evaluating action plan in reducing GHG emissions
- b. Local governments in developing local strategy and action plan in reducing GHG emissions (the RAD-GRK)
- c. Communities and private sectors in planning and implementing programs contributing to GHG emission reduction

Activities listed the action plan should meet the following criteria:

- Directly reduce GHG emissions
- The activities should be measurable, reportable, and verifiable (MRV)
- Generate emission reduction with least cost and/or having co-benefit
- Does not impeding economic growth
- Support protection for low-income community, environmental preservation, and sustainable development

The action plan was developed by considering both national and local’s medium scale development plan and strategic plan. It also involved cross sectors coordination in selecting the activities for reducing GHG emission. Appendix 2 listed the core activities for RAN-GRK 2010-2020. The development was coordinated by Bappenas with inputs from line ministries.

2.4 Related Policies Contributing to GHG Emission Reduction

Before the issuance of RAN-GRK, there were no specific national policies/regulations targeted to reduce GHG emissions. However, there are several policies, for example on energy efficiency, which contributes to lower GHG emissions. Some of key national policies, regulations, and measures are given in Table 2.

Table 2. Some of key national policies related to GHG emission reduction

Level Sector	Policy(s)	Specific(s)
Energy supply and conservation	Law No. 30/2007 on Energy	Policy on availability, utilization, distribution, and mix of biofuel

	Government Regulation no.70/2009 concerning Energy Conservation	Incentives for measures in energy conservation. Fines for inefficient use of energy
	Presidential Regulation no.5/2006 concerning National Energy Policy	17% of 2025' energy mix to be supplied from renewable sources
	Presidential Instruction No. 1/2006 concerning the availability and utilization of biofuel as an alternative fuel	President instructs related Ministries to accelerate the supply and utilization of biofuel as an alternative fuel
	Presidential Instruction no. 10/2005 concerning Energy Savings	President instructs all government's sectors to perform EE measures in government building and transport facilities and to monitor and report the achievement of their measures to the President through DGEEU every 6 months. This also instructs to government official to disseminate energy efficient culture to all sectors.
	Minister of Energy and Mineral Resources' Decree no. 32/2008 concerning Availability, Utilization, and Trading System of Biofuel as an Alternative Fuel	Use of bio-fuel in power plant, transportation, and industry
Transport and its infrastructure	Law no. 22/2009 on Traffic and Railroad	Support the development of mass rapid transit systems
Industry, Residential and commercial buildings	Ministerial Regulation No 031/2005 concerning procedures/guidelines of energy conservation implementation	This provides specific procedure for conserving energy such as to set the air conditioned room temperature level of commercial building at 25°C (minimum), to reduce electricity for lighting to max 15 watt/m ² , to reduce operating time of all electrical appliances one hour before the end of working hour etc.
Waste management	Law no. 18/2008 on Waste Management	Regulate the conversion of Open Dumping system used in Municipal Dumpsites into Sanitary Landfill system

AFOLU	Forest Ministry Decree 159/Menhut-II/2004	Regulation on restoration of production forest ecosystem
	Presidential Instruction 4/2005	Banned of illegal logging
	Presidential Regulation No. 4/2001	Forbids all forest and land fires
	Law No. 41/1999	<p>Strict legal penalties for persons causing fire:</p> <ul style="list-style-type: none"> • <i>Intentionally setting fire to forest</i> : Prison sentence maximum 15 years and a maximum fine of 5 billion IDR • <i>Negligence leading to forest fire</i> : Prison sentence maximum 5 years and a maximum fine of 1.5 billion IDR • <i>Dumping of materials which can cause forest fire</i> : Prison sentence maximum 3 years and a maximum fine of 1 billion IDR
	Forest Ministerial Decree No 206/2005 and Environment Ministerial Decree No. 14/2004	Sink enhancement
	Law No. 26/2007 and Law No. 27/2007	The requirement for using Spatial Planning as tool to address climate change
	Presidential Instruction 10/2011 concerning the moratorium of issuing permits for and improving management of primary forest and peat land	In the next two years, Governments will not allow to issue any permits to cut or utilize primary forest and peatland to allow for the improvement of the land and forest management system. This is part of GoI commitment on REDD+
Spatial Planning	Law no. 26/2007	Green open space in a city should comprise of minimum 30% of the city area

2.5 National MRV System

To support the achievement of emission reduction target, MRV system needs to be set up. In developing the MRV system, the following steps are considered to take:

1. Development of registry system on national NAMA
2. Development of NAMA registration system in international level, defined through the UNFCCC COP decision
3. The measurement of emission reduction are using methodologies defined on national GHG inventory system
4. Report on implementation of national climate change mitigation actions will be made through document of Annual Report on Mitigation Actions

At the moment, no formal setting has been made with regard to the MRV institution and the MRV procedure to be applied. However, some related agencies such as DNPI, Ministry of Environment have proposed proposals on MRV. DNPI for example, has proposed initial technical process for MRV as shown in Figure 3.

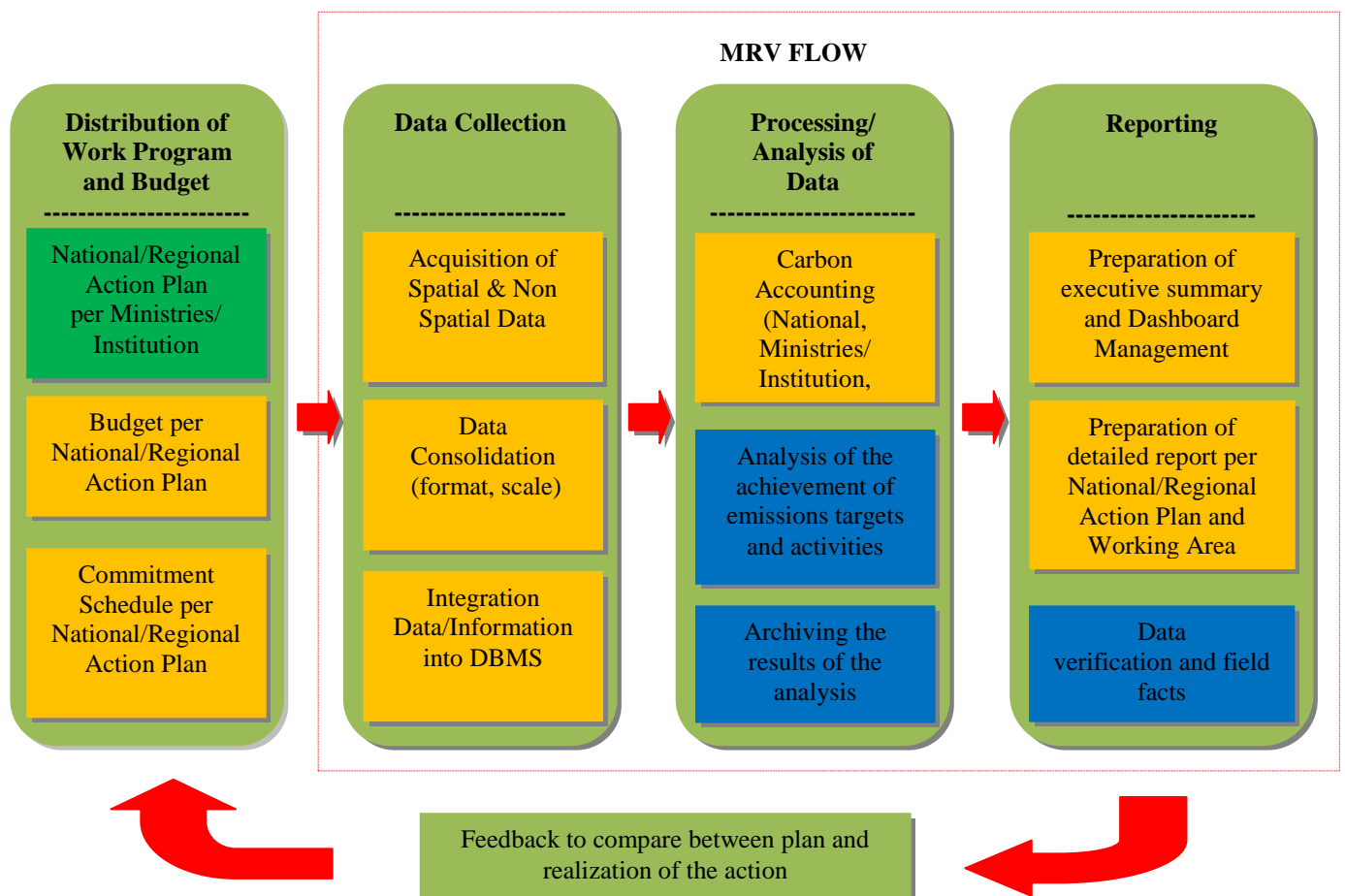


Figure 3. Proposed MRV setting from DNPI (Witoelar, 2010)

Currently, Indonesia applied MONEV (Monitoring and Evaluation) system to monitor and evaluate government programs and activities. Agencies responsible for MONEV are Inspectorate General and BPK (*Badan Pemeriksa Keuangan* – Financial Audit Board).

Inspectorate General in each ministry is responsible for internal auditing while BPK will perform the external auditing. On its auditing, BPK will assess and review the implementation of program/activity based on the reports prepared by the respective sectors. In addition, high level officials are required to submit LAKIP (*Laporan Akuntabilitas Kinerja – Performance Accountability Report*), a report to review the performance of the institution they are headed. Aspects reviewed are among others: (i) adequacy of management control system to ensure that the budget was used effectively, efficiently and economically, (ii) effectiveness of the implementation of programs/activities and the way funds were used, (iii) compliance to legislation and regulations, and (iv) achievement of programs/activities objectives. If auditors found any deviation in the program/activity implementation, the implementer have to provide clarification and if the clarification does not satisfy the inspector then the implementer have to return part of the fund or performs additional activities as required to meet the original targets/objectives. In case that some part of the fund has to be returned, the implementer will return the fund to the State Account at the Ministry of Finance.

3. Initiatives on Sub-national Level

On development of the National Communication and RAN-GRK, sub-nationals were not involved at all. However, they will play part in implementation of the SIGN and RAN-GRK. In the latter, sub-nationals is expected to develop Local Action Plan (*Rencana Aksi Daerah – RAD*) based on the RAN-GRK as mandated by the President Regulation numbers 61/2011 and 71/2011

Several provinces, such as DKI Jakarta, West Java, South Sumatera, East Kalimantan, Riau, North Sumatera, Central Kalimantan, and Jambi has started some activities and studies toward low carbon development including development of their emission status and RAD-GRK (see Appendix 3). The activities were mostly assisted by either national government or donor agencies since the level of understanding on climate change in sub-national level is low.

For carbon trading mechanism, government involvement is mostly on forestry and waste management projects since it is the area where government, especially local government, play role as regulator as well as operator. The national government such as line ministries, however, has limitation to be actively involved in carbon project development since they are not allowed to do business. While the local government can have local-owned enterprises or Public Service Unit (*Badan Layanan Umum*) to be involved in carbon projects.

Appendix 4 listed Indonesian DNA' approved CDM projects with involvement of government on it.

Aside from initiatives of the sub-national's government itself, international donor agencies and civil societies also have programs in development of strategy that may contribute to GHG emission reduction. The following table presented list of examples of non-government initiatives related to climate change mitigation at local level.

Table 3. Examples of non-government initiatives at local level

No.	Institution	Description
1	Green Building Council Indonesia	Encourage local governments in promoting green and sustainable building, means built using 'green' materials and efficient construction process. As well as being designed to utilize less fossil fuel based energy.
2	GIZ	PAKLIM program. Aimed to support cities, industries and government of Indonesia to implement a new strategy on effective climate change mitigation and adaptation. Targeted cities: Yogyakarta, Surakarta, Pekalongan, and Salatiga
3	Rockefeller Foundation, Mercy Corps	Asian Cities Climate Change Resilience Network Development of studies on climate change mitigation and adaptation with focus on spatial, infrastructure, waste, and water management. Participating cities in Indonesia: Semarang, Bandar Lampung

4. General Information on Jakarta

Located on the northwest coast of Java Island, Jakarta city was established in 1527. It is the capital of Indonesia and the province consists of five municipalities, one regency, 44 districts and 267 sub-districts. Based on Governor Decree No. 171/2007, Jakarta area is comprised of 662.33 km² of land, in which 40% of it is under mean sea level, and 6,977.5 km² sea area in the north with around 35 km of coastal line. Currently, there are 13 rivers crossing along the city.

As in other cities in Indonesia, Jakarta has two seasons in a year; wet and dry season in the period of December to March and June to September, respectively. The average temperature is 27.1-29.4⁰C, with the highest temperature ever recorded was 35.8⁰C. The average air humidity is between 68-71%.

Jakarta in particular has been named as the most vulnerable city to climate change in Southeast Asia in the vulnerability map of 2008 of the Economy and Environment Program for Southeast Asia (EEPSEA). The study covered 530 sub-national areas in seven South East Asian countries². The increase of global temperature has resulted in the raise of rainfall intensity as well as extreme weather, resulting in floods and rise of the sea level.

In February 2007, Jakarta was hit by one of the worst floods, covered 70% of its area. It cost of financial loss of US\$ 879.12 million, and loss of 79 lives and 223,203 refugees³. This man-made disaster was most possibly happened because of lack of environmental consciousness such as habit in throwing wastes on rivers and development of illegal settlements in riverbanks.

4.1 Demography

The Jakarta Province is known as the most populated area in Indonesia, as there are 9.6 million permanent inhabitants, with rate of population growth of 1.4%⁴, hence the population density is 13.9 thousand/km². Also there are 1.5-2 million commuters working in the province by day, adding up to day population of over 10.7 million.

Table 4. Jakarta's Population by Gender, Sex Ratio and Regency/Municipality, year 2009

Regency/ Municipality	Gender		Total	Sex ratio
	Male	Female		
Kepulauan Seribu	9,384	10,203	19,587	91.97
South Jakarta	1,079,475	1,080,163	2,159,638	99.94
East Jakarta	1,192,077	1,256,576	2,448,653	94.87
Central Jakarta	453,535	448,681	902,216	101.08
West Jakarta	1,073,923	1,147,320	2,221,243	93.60
North Jakarta	711,717	759,946	1,471,663	93.65
Total	4,520,111	4,702,889	9,223,000	96.11

Source: Jakarta Bureau of Statistics, 2009

² Jakarta at the Edge — Will Sea Level Rise Overcome Southeast Asia's Most Vulnerable City?(EEPSEA Climate Change Policy Brief)

³ Numbers were taken from Bappeda Jakarta's presentation titled "Jakarta's Adaptation Strategy" presented at the Workshop on Low Carbon City

⁴ Jakarta Bureau of Statistics, draft result of Population Census 2010

4.2 Governance System

Jakarta is the nation's centre of economic, culture, and politic. As a province, Jakarta's official name is *Daerah Khusus Ibukota Jakarta* ("Special Capital City District of Jakarta"), which famously abbreviated to DKI Jakarta. Its area is divided into five municipalities and one district, namely (1) Thousand Islands district administration, (2) West Jakarta city administration, (3) Central Jakarta city administration, (4) South Jakarta municipality, (5) North Jakarta municipality, and (6) East Jakarta municipality.

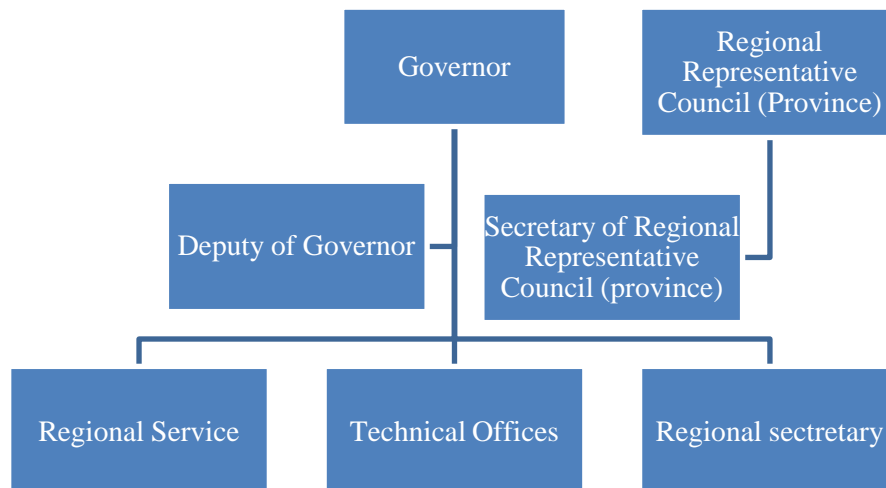


Figure 4. General structure of provincial government based on Law no.32/2004 on Local Government

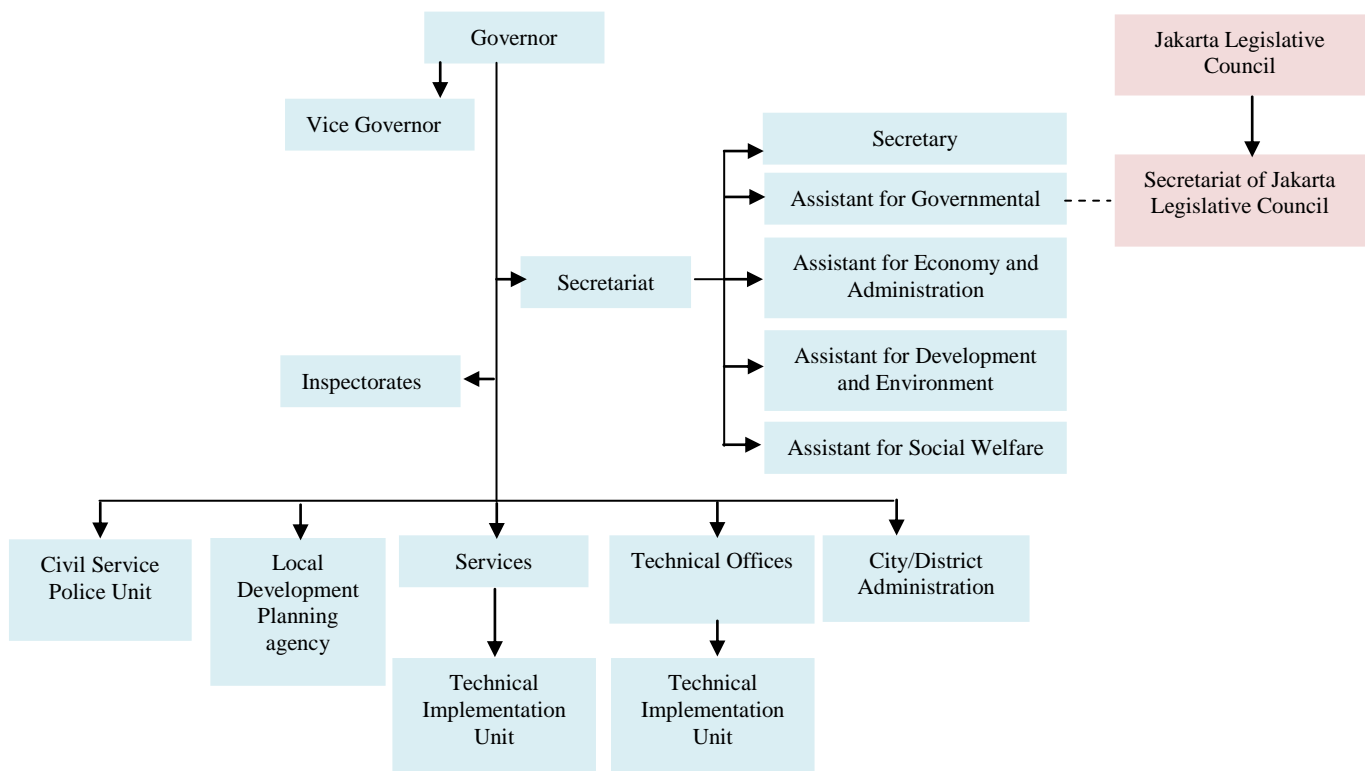


Figure 5. General structure of the government of DKI Jakarta

Jakarta bears a Special Province status where it has several different governance systems in comparison with other provinces. Its governmental structure was regulated under Law 29/2007 and later on being specified under the Local Regulation no. 10/2008.

While the Governor and his/her vice are elected through general election, the mayor in each of Jakarta cities is appointed directly by the Governor, and not by election as happens in other provinces. The city/district in Jakarta also has no representative council, different from other cities/districts in Indonesia. Representative Council in Jakarta only exists in province level.

Table 5. List of Jakarta Province's Governmental Institutions

No	Organization
1	Deputy Governor
2	Secretariat of Development Cooperation Agency
3	Secretariat of Local Government
4	Secretariat of Local Parliaments
5	Secretariat of Officials Corps of the Republic of Indonesia
6	Secretariat of Electoral Commission
7	Inspectorate
8	Bureau of Government
9	Bureau of Law
10	Bureau of Organization and Management
11	Bureau of the Regional Chief and International Cooperation
12	Bureau of General
13	Bureau of Infrastructure
14	Bureau of Spatial Planning and Environmental Management
15	Bureau of Social Welfare
16	Bureau of Educational and Mental Spiritual
17	Bureau of Economy
18	Department of Demography
19	Department of Fire and Disaster Management
20	Department of Communication, Information, and Public Relation
21	Department of Cooperatives, Micro, Small and Medium Trade
22	Department of Industry and Energy
23	Department of Marine and Agriculture
24	Department of Tourism and Culture
25	Department of Transportation
26	Department of Manpower and Transmigration
27	Department of Civil Works
28	Department of Public Housing and Government Building
29	Department of Spatial Planning
30	Department of Supervision and Control Building
31	Department of Park and Cemetery
32	Department of Sanitation
33	Department of Social
34	Department of Education
35	Department of Health
36	Department of Sport and Youth

37	Department of Tax
38	Regional Financial Management Agency
39	Local Development and Planning Agency
40	Regional Labor Agency
41	National Unity and Political Agency
42	Local Educational and Training Agency
43	Local Investment and Promotion Agency
44	Local Environmental Agency
45	Community and Women Empowerment Agency
46	Local Library and Archive Agency
47	Charity and Infaq Agency
48	Office of Family Planning
49	Civil Service Police Unit
50	BP. Construction of West New Primary Center
51	Office of Thousand Island Regency
52	Office of South Jakarta Regency
53	Office of East Jakarta Regency
54	Office of West Jakarta Regency
55	Office of Central Jakarta Regency
56	Office of North Jakarta Regency

Source: Jakarta Bureau of Statistics, 2009

According to the local statistics, the number of Local Government employees of DKI Jakarta in 2009 were 80,496, consists of 41,653 men (51.57 percent) and 38,496 women (48.26 percent). Meanwhile the number of Civil Servants in non local government of DKI Jakarta in 2009 was recorded as 21,949 employees. They consists of 14,191 men (67.13 percent) and 7,758 women (38.87 percent).

4.3 Transportation System

Traffic is one of the heaviest issues in Jakarta, as the result of increased population and there was no road expansion has been made during 2007-2009. In 2009, it is estimated that 10.49 million vehicles travelling in Jakarta streets every day with increasing rate of 8.78% from a year before.

Table 6. Number of Registered Vehicles

Year	Motorcycles	Passenger Cars	Cargo Cars	Buses	Total
2009	7,518,098	2,116,282	550,924	309,385	10,494,689
2008	6,765,723	2,034,943	538,731	308,528	9,647,925
2007	5,974,173	1,916,469	518,991	318,332	8,727,965
2006	5,310,068	1,835,653	504,727	317,050	7,967,498
2005	4,647,435	1,766,801	499,581	316,502	7,230,319

(Source: Jakarta Bureau of Statistics, 2010)

To overcome the issue, Jakarta provincial government developed a Bus Rapid Transit system called TransJakarta in 2004. Its implementation is regulated by Local Regulation (PERDA)

No.12 year 2003. As per mid 2011, TransJakarta operates 10 corridors serving an average of 250,000 passengers per day. It is planned that additional 5 corridors will be constructed in the next years.

4.4 GHG Emission Status

Calculation of the GHG emission and projection was conducted in 2010 and coordinated by Jakarta Province's Environmental Management Agency (*Badan Pengelolaan Lingkungan Hidup Daerah – BPLHD*), with assistance from a team of experts from BPPT, ITB, and SwissContact. Their current estimation resulted in GHG emission for year 2005 of a 43.68 Mton CO₂ and projected emission for 2030 of 203.94 Mton CO₂. Largest emitters in 2005 were coming from energy and transportation, followed by emission from industrial sector. On projection side, emissions were estimated to be resulted mostly from energy sector.

Table 7. Jakarta's estimated GHG emissions in 2005 and 2030

GHG Emission		2005 = 43.68 MtCO ₂ e		2030 = 203.94 MtCO ₂ e	
Sector	Percentage	MtCO ₂ e	Percentage	MtCO ₂ e	
Industry	5.17%	2.26	2.43%	4.96	
Electricity	40.74%	17.79	50.50%	102.99	
Household	4.10%	1.79	2.87%	5.85	
Transportation	44.89%	19.61	42.85%	87.39	
Solid Waste	5.06%	2.21	1.28%	2.61	
Wastewater	0.03%	0.01	0.06%	0.12	

(Source: Jakarta Provincial Government, 2011. Booklet on Jakarta Climate Action: Now and Looking to 2030)

4.5 Level of Understanding on Climate Change Issue

Being in an easy access with national governments, and its participation in the C40 – Large Cities Climate Leadership Group, the level of understanding on climate change issues in Jakarta's officials is considerably well, although at the time being it is mostly attributed to officials at the Bappeda and BPLHD.

Aside from participating in the C40 events, officials from the BPLHD were attending the Ministry of Environment's series of training and seminars on GHG inventory. In addition, Jakarta is also receiving assistance from the World Bank in the form of Carbon Finance Capacity Building Program (CFCB), a program which program encourages the use of carbon finance to reduce greenhouse gas emissions in cities. In Jakarta, the CFCB works on the use of CDM in municipal waste management activity.

5. Jakarta's Policies and Programs on Climate Change Mitigation

In the past few years, Jakarta has showed increasing commitment and interest in climate change issue. In 2008, they held their first major exhibition titled “Jakarta Initiatives in Fighting Climate Change”, an exhibition and expo showcasing initiatives conducted by local agencies, companies, and communities in contributing to climate change cause such as waste management and development of small scale renewable energies.

Several buildings in Jakarta were also being audited for their energy management and the provincial government (through BPLHD) is also an active member of the Green Building Council Indonesia, an informal association caring on development of environmentally friendly buildings.

5.1 Programs and Action Plan for Reducing GHG Emission

In recent years, Jakarta has been cooperating with numerous institutions in conducting GHG mitigation related activities, such listed in table 8 below.

Table 8. List of existing and planned mitigation related activities in Jakarta

Sector	Existing Activities	Planned Activities
Energy consumption	<ul style="list-style-type: none"> ▪ Retrofit city hall; including installation of low wattage bulbs and upgrade of air conditioning system ▪ Kerosene to Liquid Petroleum Gas conversion ▪ Pilot project green building ▪ Participate in Earth Hour ▪ Shifting from petroleum to bio-fuel and bio-diesel ▪ Renewable energy in the Seribu Island ▪ 	<ul style="list-style-type: none"> ▪ New green building code ▪ Retrofit public buildings (schools and clinics) ▪ Retrofit streetlights with LEDs ▪ Review fuel sources of local plants
Transportation	<ul style="list-style-type: none"> ▪ 10 corridors of 524 units BRT (Trans Jakarta) ▪ CNG BRT expansion ▪ CNG for public transportation ▪ Car free day ▪ Vehicles emissions control ▪ Traffic restriction zone at peak hour (3 in 1) ▪ Blue bajaj program (run on compressed natural gas instead of diesel) 	<ul style="list-style-type: none"> ▪ Mass rapid transit ▪ Electronic road pricing ▪ Light rail transport ▪ New rail transport/monorail
Solid waste	<ul style="list-style-type: none"> ▪ Sanitary landfill in Bantar Gebang ▪ Landfill gas to energy ▪ Awareness building of proper waste disposal ▪ Neighborhood scale 	<ul style="list-style-type: none"> ▪ Inner-city treatment and waste diversion facilities ▪ Private developer requirement to sort and manage waste ▪ Reduce transportation of waste ▪ New final disposal site

Sector	Existing Activities	Planned Activities
	<ul style="list-style-type: none"> composting programs ▪ 3R (reduce, reuse, recycle) program 	
Wastewater	<ul style="list-style-type: none"> ▪ Wastewater conversion into fertilizer 	<ul style="list-style-type: none"> ▪ Drinking water treatment ▪ Recapture methane gas for energy ▪ Phased separation of storm water drainage and sewage system ▪ Recycling wastewater into clean water ▪ Oversee the management of industrial and domestic wastewater

(Source: " World Bank, 2010. *Jakarta: Urban Challenges in a Changing Climate*" and "Jakarta Provincial Government, 2011. *Booklet on Jakarta Climate Action: Now and Looking to 2030*")

On transportation sector, Jakarta is receiving support from JICA on Urban Transport Policy Integration Program, and a technical support (implementation and engineering) for the Jakarta MRT. The program aims to build and improve a comprehensive urban transport system in Jakarta, and is planned to run for 5 years (2009-2014).

With regard to the voluntary emission reduction target, the Jakarta Province has incorporated their GHG emission reduction plan into their 2030's Spatial Plan. Furthermore, Jakarta is now in the process of developing a roadmap toward development of Local Action Plan (*Rencana Aksi Daerah – RAD*). The RAD will act as Jakarta's adoption to the National Action Plan developed by Bappenas, and will describe detail plans for sectors in implementing activities to reduce Jakarta's GHG emission. Appendix 5 presented lists of policy articles related to climate change included in Jakarta's 2030' Spatial Plan.

The emission reduction target of 30% by 2030 is estimated to reduce around 60 Mton CO₂eq. The largest source to reduction is expected to come from transportation with 57% contribution, followed by electricity. Table 9 below listed the target of sector's contribution to the reduction.

Table 9. Targeted sector's contribution to DKI's voluntary emission reduction

Sector	Percentage
Transportation	57%
Electricity	35%
Solid waste	3.4%
Industry	2.4%
Green open space	1.1%
Household	0.4%

Waste water	0.2%
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As described in the “Jakarta: Urban challenges in a Changing Climate”, the Government of DKI Jakarta will work with *lurah*⁵, RT (*Rukun Tetangga*) /RW (*Rukun Warga*)⁶ in implementing the actions. The initial effort is to develop a logical, systematic plan to begin gathering population and household information from the RW offices. Identify which agencies are suffering from lack of investment and upgrading in their computer systems and necessary database systems. Evaluate which are the resources digitized and backed up electronically and where the gaps are. Develop a plan to make the data available online at the *lurah* level. The agencies that would benefit from this immediately are those related to the land use, housing, solid waste and transportation sectors. All this data will aid in shaping priorities for DKI government decisions.

5.2 Supporting Local Regulations for the Implementation of Climate Change Mitigation Programs and Action Plan

With regard to supporting policies for climate change mitigation, the following provincial regulations have accommodated the idea of cleaner environment, including reduction of GHG emissions.

Table 10. Local regulations contributed to less GHG emission

Sector	Policies and measures
Integration of climate change aspects in urban planning	Development of Local Spatial Plan (RTRW) year 2030 with inclusion of climate change mitigation and adaptation aspects
Transportation	<ul style="list-style-type: none"> - Governor Regulation No. 92/2007 on Emission Test and Vehicle Maintenance - Governor Regulation No. 141/2007 concerning Utilization of Fuel Gas in Public Transportation and Local Government Vehicles - Governor Regulation No. 31/2008 on Standard of Vehicle Emission
Water	Governor Regulation No. 68/2005 regarding Changes to Governor Regulation No. 115/2001 on Development of Infiltration Well
Air quality	Provincial Regulation No. 2/2005 on Air Pollution Management

For involvement in carbon trading mechanism, the Governor Regulation No. 75/2006 on Utilization of Clean Development Mechanism was issued.

⁵ Leader of a village in urban area

⁶ RT is group of households on a village, while RW is group of RT in the same village

5.3 Development of Institutional System for Measuring, Reporting, and Verifying the Implementation of the Climate Change Mitigation Programs and Action Plan

To serve as a basic for developing their emission reduction target, in 2010 the Jakarta province, coordinated by the BPLHD, developed their GHG emission profile. Calculation and projection analysis for the profile was assisted by experts from BPPT⁷, ITB⁸, and SwissContact.

Data used for calculation was taken from year 2005' statistics, and obtained through relevant technical agencies such as the Local Transportation Agency, Energy and Industrial Agency, Transportation Agency, etc.

In principal, Jakarta's GHG Inventory is classified by following the sectors below:

1. Energy
 - a. Electricity (generation)
 - b. Fuel combustion for industrial, household, and commercial purposes
 - c. Transportation
 - i. Road transportation
 - ii. Train
 - iii. Air flight (domestic and international)
 - iv. Sea transportation (domestic and international)
2. Industrial processes
3. Waste
 - a. Municipal solid waste
 - b. Liquid waste
4. AFOLU

Due to availability of data, emission sources included in calculated at the time were the following:

- Energy consumption (electricity and non-electricity)
- Domestic waste water
- Municipal solid waste
- Carbon sequestration from planting of trees in city park and along the streets

GHG emissions generated from, among others, industrial production process and AFOLU has not been calculated.

Approaches used in the calculation were based on the "International Standard for Determining Greenhouse Gas Emissions for Cities"⁹, while calculation method was following the IPCC

⁷ *Badan Pengkajian dan Penerapan Teknologi* (National Agency for Assessment and Implementation Technology)

⁸ *Institut Teknologi Bandung* (Bandung Institute of Technology)

⁹ Developed by UNEP, World Bank, and UN Habitat (www.unep.org/urban_environment)

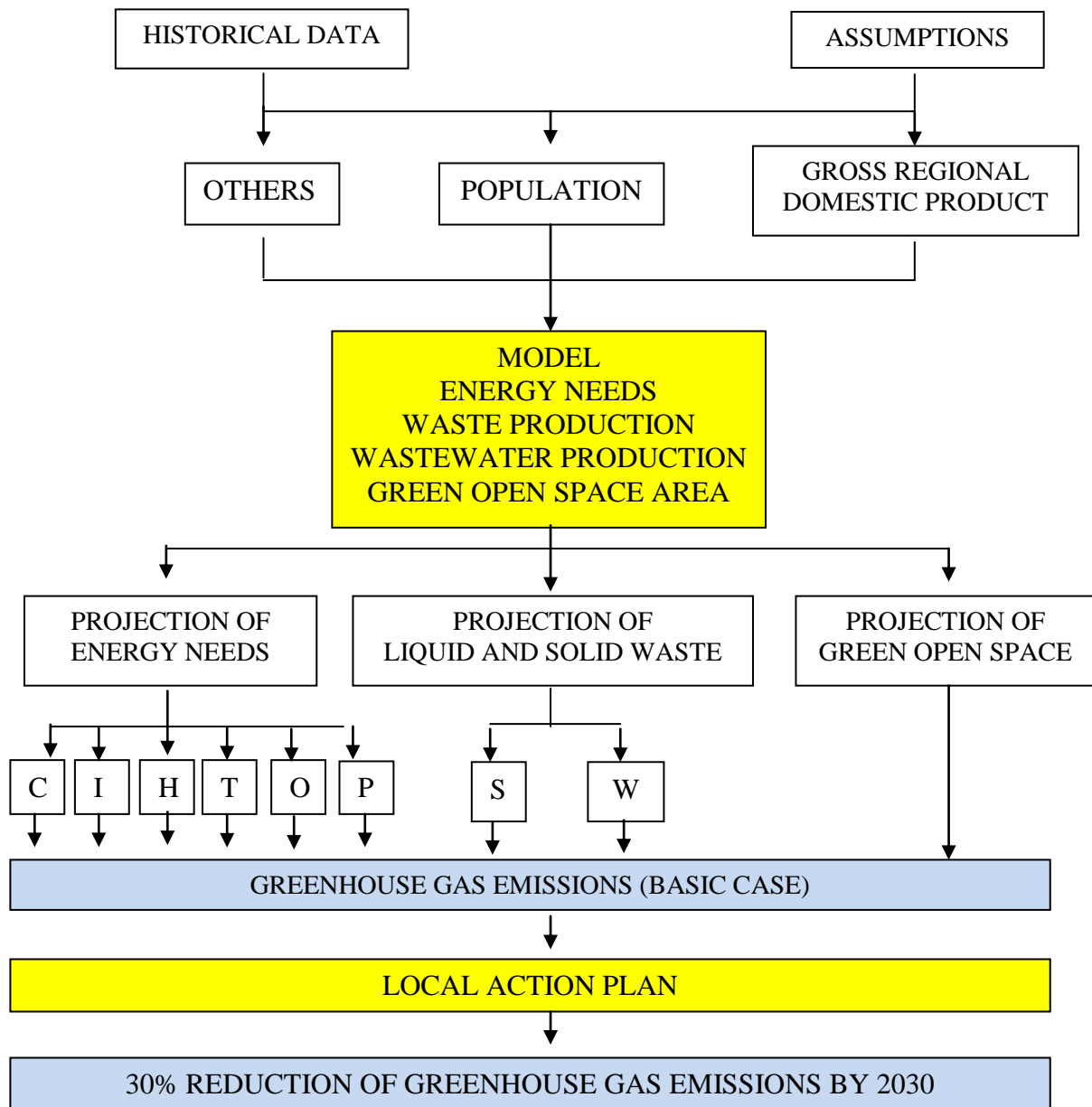
Guidance. The standard stipulated that the city's dynamic also caused generation of emissions outside the city's boundary to fulfill the city residents' needs, and thus these emissions also need to be accounted as the city's emission. Unfortunately, to calculate all emissions related to the city's consumption is difficult and unpractical, thus a protocol set by *World Resources Institute* (WRI) and *World Business Council for Sustainable Development* (WBCSD) was then followed.

The Protocol divided city's emission into three of the following scopes:

- 1) Emissions generated inside the city area
- 2) Emissions generated outside the city area, but occur as result of the city's consumption
- 3) Indirect emission generated outside the city area due to the city activities, such as the dumping of municipal waste

Projections were made by taking into account the growth of GDP and population. For population, data from 2010' census showed that Jakarta's population was increased to around 9, 04 million from 8.43 million in 2005, meant that average population growth was about 1.4% per year. Assuming that the trend will be continued, it was estimated that in 2030 Jakarta's population will reach 11.64 million. The number did not include the commuters who populating Jakarta by day. It is estimated that the number of commuters in 2030 will be around 20% of total population¹⁰.

¹⁰ Source: Academic Paper for Jakarta's Local Action Plan in reducing greenhouse gas emissions



(Note: C = commercial, I = industry, H = household, T = transportation, O = other, P = power plant, S = solid waste, W = liquid waste)

Figure 6. Jakarta’s GHG Inventory process

5.4 Involvement in Carbon Trading Mechanism

The TransJakarta activity was once assessed potential for CDM, unfortunately it never got developed under the scheme due to failure to comply the CDM’ additionality assessment.

Two projects in municipal waste management titled “**Bantargebang Landfill Gas Management & Power Generation**” and “**Bantargebang Integrated Waste Treatment Plant**” were developed in cooperation with Bekasi City government, PT. Navigat Energy Organic Indonesia (a private company). As stated in the PDDs, both projects were carried out using BOT (Build Operate and Transfer) scheme through work-concession granted by the Jakarta provincial government to PT. NOEL.

6. Institutional Mechanism and Capacity for the Implementation of Climate Change Mitigation Policies and Programs in Jakarta

With regard to climate change issues, the following are local agencies with responsibilities related to both climate change mitigation and adaptation (Table 11). Works related to construction and infrastructure will mostly be conducted in cooperation with the Ministry of Public Works (*Kementerian Pekerjaan Umum*), a ministry responsible for the development of major large infrastructure projects. In Jakarta, the examples are the East and West Flood Canals. Much of Jakarta's infrastructure is financed in part through the national government. The agency is also responsible for infrastructure maintenance.

Table 11. Jakarta's governmental agencies with responsibilities related to climate change issues

Institution	Responsibility
Governor's Assistant in Development and Environment	Coordinate the implementation of all physical, infrastructural, and environmental projects.
BAPPEDA (local development and planning agency)	Coordinate all development plans, including those related to infrastructure, environment, and economy
BPLHD (local environmental agency)	Handle the technical and social aspects of environmental programs. The BPLHD is involved in number of greenhouse gas abatement programs in Jakarta, and was managing the development of greenhouse gas emission baseline.
BPDB (local disaster management agency)	It was established at the end of 2010 to act as city-wide agency for disaster risk management.

(Source: Jakarta Provincial Government, 2010. *Actions to Address Climate and Disaster Risks*)

In addition, the Planning and Development Agency (BAPEDDA) supported by an integrated team from NGO, private and University is in the process of establishing a Resilience City Committee. This committee is planned to be established after realizing the facts that capacity at community and institution level in the cities in developing long term planning as well as implementing current programs which includes climate change issues, access to fund, funding allocation is still lacking. On the other hand, there are overlapping programs and lack of synergy among programs implemented by various entities and stakeholder in DKI Jakarta which leads to inefficient use of resources and ineffective programs. While, there are some strategic activities related to climate change mitigation actions implemented by non-government organizations have not been streamlined to DKI Jakarta program. At the same time, opportunities from external sources are not used optimally by the local governments as no authority yet of the local governments to directly utilize and manage the fund from external sources. The establishment of the committee is expected to be able to play role in (Bappeda DKI Jakarta, 2011):

- providing strategic advices for the Government of DKI Jakarta toward resilience city

- increasing effectiveness of utilization of internal resources and to optimize opportunities from external resources in developing resilient city
- enhancing and accelerating the implementation of capacity building programs for human resources and institutions at different level across sectors and community level
- developing knowledge management on climate change and resilience cities
- creating database and information focusing on climate change and resilient city

6.1 Key Institutions and their Roles in the Implementation of Climate Change Mitigation Programs and Action Plans

The institutional arrangement handle climate change mitigation programs and action plan may to some degree mirror the setting in national level, though it has not formally established yet. In national level, Bappenas is the one who coordinated development plans, including plans related to climate change mitigation and adaptation, while the implementation is carried out by respective line ministries.

In Jakarta, Bappeda, the local form of Bappenas, is coordinating programs and action plans related to climate change mitigation and adaptation, while the implementation is conducted by respective agencies, related offices, and with support from non-governments.

For GHG inventory, as mandated in Presidential Regulation no. 71/2011 concerning GHG Inventory System, the BPLHD will be the one coordinating it at provincial level.

Monitoring and reporting of provincial programs in terms of implementation and its financing, will possibly following the existing system of MONEV (monitoring and evaluation) where the implementation agencies are submitting report to Bappeda. Audit is applied internally and externally. Internally, audit is carried out by Bawasda (*Badan Pengawas Daerah* – Local Supervisory Board) or Inspectorate, while externally audit is conducted by KPK (*Komisi Pemberantasan Korupsi* – Corruption Eradication Committee).

6.2 Institutional Capacity and Capacity Building Needs

Existing capacity in understanding climate change mitigation issues is not distributed well among agencies and related stakeholders in Jakarta province. Bappeda and BPLHD are in general the agencies with more knowledge on the issue compared to others. However, the knowledge possessed by them is still insufficient to enable them develop, for example, RAD-GRK and GHG inventory system on their own. In this regard, capacity building activities are necessary, especially on the following areas:

- Develop capacity of government and the private sector in designing development programs with lower emissions and defining baseline;
- Improve activity data collection procedures, particularly for key sources such as transportation
- Design effective MRV systems taking into consideration the current monitoring and evaluation (MONEV) system;

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Appendix 1. Matrix of sectoral mitigation actions until 2020

Source: Bappenas, 2010. Indonesia Climate Change Sectoral Roadmap (ICCSR)

Sector	Cumulative BAU (MtCO ₂)	Cumulative Emission Reduction (MtCO ₂)	Total Mitigation Cost (billion USD)	System Abatement Cost (USD/tCO ₂)	% of Emission Reduction Each Sector	Required Policy Measures and Instruments
Energy (Java-Bali)	1713	106.21	53.776	22.45	6.20 %	Presidential Decree No 5/2006 Optimizing Energy Mix Scenario the government intervention is counted through the introduction of geothermal and hydropower plants
Energy (Sumatra)	206.93	45.97	9.714	8.28	22.22 %	
Industry/ Cement	562.95	43.15	0.47	10.89	7.66 %	Reducing the clinker content in produced cement Review and set new cement performance standards Eco-label cement products Lead by example – government procures blended cement Review national building codes National communications campaign to encourage the use of blended cements Increase government support for building local institutional capacity in policy development and program delivery for eco-efficiency, energy audits, energy services.
Transport /Mode Shifting	917.1	91.4	2.01*	22.0**	10.0 %	Three Plus (3+) transport policies including: <u>Urban Transport Improvement</u> (Public Transport, Non Motorised Transport, Campaign/education Programs, Congestion Changing/road Pricing, Parking Management, Bus Modernisation, Traffic Impact Control and Integrated Land Use and Transport Planning). <u>Freight Transport</u> (Promote Modern Logistic System and Truck Modernisation). <u>Efficiency Technology</u> (CO2 Emission Standard for Car and Motorcycle, Fuel Efficient, government Fleets, Mandatory Inspection and Maintenance, Car Labeling and Training Program for Smart Driving) and <u>Biofuel</u> (Low Carbon Quota, Fuel Taxation and Vehicle Taxation based on Emissions).
Waste/Electrical Generation from Sanitary Landfill in Urban	378.1	159.2	1.49	9.35	42.1 %	Converting 30 sites of open dumping to sanitary landfill sites each year and develop electricity generator facility from Sanitary Landfill Development and Enforcement of environmentally based infrastructure policies for the

						waste sector Capacity development for human resources and institutions on local government level Partnership with and involvement of the private sector and civil society on LG Level
Waste/ 3R and Composting in Rural	200.5	50.4	0.81	16.10	24.8 %	Develop the implementations of environmental policy for the principle of 3R (reduce, reuse, recycle) and composting in waste management Development of 3R and composting center in every regency in Indonesia
Forestry (LULUCF) and peatland	14,738.0	3,937.0	0.34	7.8	26.7 %	Law enforcement and best management practices in existing land under production use including forests and agriculture crops. Peatland rehabilitation and prevention of uncontrolled fire. Revisions of land allocation, forest conversion and land swaps, possibly using REDD as an incentive, that direct future development away from peat lands. SFM- Law enforcement and sustainable forest management will depend on the consistency of national policies to protect forest and the development of forest management units at local level. These combined efforts will enhance forest carbon stock in protected and production forests with forest cover. REDD- Avoiding emission linked to planned deforestation. Plantations-Increasing carbon sink capacity thanks to plantations on non forest cover lands would add another 37 MtCO ₂ /year from 2010 to 2019.
Total	18,716.6	4,433.3	68.6	13.8	23.7 %	Note: the total emission reduction and associated abatement costs are based on conservative and most cost efficient scenarios. The amount of emission reductions can be increased if different scenarios are chosen (see full ICCSR sector reports).

Appendix 2. List of the Core activities of RAN-GRK

Source: Appendix 1 of Presidential Regulation no. 61/2011

Sector	Amount of Action Plan	Emission Reduction Target (Giga Ton CO ₂)		Supporting policies
		26%	41%	
Agriculture	6	0.008	0.011	<ul style="list-style-type: none"> • Strengthen of national food security and increase of agricultural production with low GHG emissions • Improvement on the function and maintenance of irrigation systems
Forestry and Peat Land	13	0.672	1.039	<ul style="list-style-type: none"> • Reduction of GHG emissions while improving environmental comfort, preventing disasters, creating employment, and increasing the income of people and the state • Management of network system and water in swamps • Maintenance of swamp reclamation network • Improvement of productivity and efficiency of agricultural production on peat land with emissions as low as possible and optimal absorption of CO₂
Energy and Transportation	26	0.038	0.056	<ul style="list-style-type: none"> • Increase energy savings • Utilization of cleaner fossil fuels (fuel switching) • Increase the use of new and renewable energy (RNE) • Utilization of clean technologies for power generation and transportation facilities • Development of low-emission, sustainable, and environmentally friendly' mass transportation nationwide
Industry	3	0.001	0.005	Improvement of industrial growth by optimizing energy consumption
Waste	2	0.048	0.078	Improvement of waste and domestic wastewater' management

Appendix 3. Low Carbon Development related activities in sub nationals

No	Area	Name of Activity	Source of support	Key Summaries
1	Central Kalimantan Province	Creating Carbon Prosperity in Central Kalimantan	Low in	<p>The National Council on Climate Change, with partial funding from: Acsé Française de Development (AFD), the ClimateWorks Foundation, the Norwegian government, and Packard Foundation</p> <ul style="list-style-type: none"> • Calculation on Central Kalimantan's GHG emissions in 2005 resulted in 292 Mt CO₂-eq, mostly from LULUCF. It was estimated that the emission level will grow around 18% between 2005-2030 • It is estimated that in establishing readiness on first year, an amount between USD 143 mio-236 mio is required. • Identified seven priority growth sectors potential to drive low carbon development are: <ol style="list-style-type: none"> 1. Crops plantation on non-forested land 2. Sustainable forestry 3. Environmentally-sustainable mining 4. Food crops on non-forested land 5. Aquaculture 6. Financial service 7. Ecotourism
2	Jambi Province	Creating Carbon Prosperity in Jambi	Low in	<p>The National Council on Climate Change, with partial funding from: Agésé Française de Development (AFD), the ClimateWorks Foundation, the</p> <ul style="list-style-type: none"> • Calculation on Jambi's GHG emissions in 2005 resulted in 57 Mt CO₂-eq, mostly from LULUCF. It was estimated that the emission level will grow around 30% between 2005-2030 • Five largest carbon reduction potential in Jambi are: (1) Prevent forest and peatland fires; (2) Reduce deforestation through more effective land use, land allocation policies, and improving agricultural productivity; (3) Rehabilitate idle or degraded peatland; (4)

			Norwegian government, and Packard Foundation	Sustainable forest management; and (5) Reforestation
3	East Kalimantan Province	East Kalimantan Environmentally Sustainable Development Strategy	The National Council on Climate Change, with partial funding from the Norwegian government and Climate Land Use Alliance	<ul style="list-style-type: none"> • Abatement initiatives aimed at climate-compatible economic development are among others: <ol style="list-style-type: none"> (1) enforcement of zero burning policy, estimated to reduce 47 MtCO₂ by 2030 at a cost of USD 0.4/ton; (2) reduced impact logging, estimated to reduce 34 MtCO₂ by 2030 at a cost of USD 1.1/ton; (3) reforestation and rehabilitation of forests, estimated to reduce 12 MtCO₂ by 2030 at a cost of USD 2.6/ton; (4) rehabilitation and water management at previously opened peatland, estimated to reduce 18 MtCO₂ by 2030 at a cost of USD 0.5/ton; (5) The use of degraded land (<i>lahan kritis</i>) for future expansion of oil palm plantations, timber plantations, and agriculture, estimated to reduce 24 MtCO₂ by 2030 at a cost of USD 5.5/ton • Complementary growth initiatives that may contribute to increase of GDP are among others: <ol style="list-style-type: none"> (1) Development of coal-bed methane (2) Development of integrated pulp and paper mills (3) Improvement of timber plantation management (4) Acceleration of oil and gas exploration (5) Improvement of agricultural productivity

Appendix 4. Approved CDM projects with government involvement

(As per 31 October 2011)

No	Project Name	Participants	Description of Activities	Project Status	Estimated ER	
					Annual (tCO ₂ /yr)	Total (tCO ₂ /yr)
1	Gianyar Waste Recovery Project	<ul style="list-style-type: none"> • Rotary Club Bali Ubud • District Government of Temesi - Bali • Myclimate Foundation 	The project activity is composting in landfill site of Gianyar Regency in Bali, also with the expansion of the facility's capacity to 50 tons of waste per day or around 17,500 tons per year, to cope with all waste in the Gianyar Regency with its 500,000 inhabitants.	CER issued as per 31 March 2010 (2,110 CER)	7,671	76,707
2	Pontianak-GHG Emission Reduction through Improved MSW	<ul style="list-style-type: none"> • PT Gikoko Kogyo Indonesia • The Municipal Government of the City of Pontianak, West Kalimantan • IBRD (Netherlands) 	Located in Pontianak's landfill, at TPA Batu Layang, the project activity covers the landfill gas collection and flaring systems as well as the required budgetary requirement for landfill management and waste collection improvements.	Registered in EB	49,098	343,689
3	Gikoko Palembang-LFG Flaring Project	<ul style="list-style-type: none"> • PT. Gikoko Kogyo Indonesia • The Municipal Government of the City of Palembang, South Sumatra, Indonesia • Asian Development Bank as Trustee for the Asian Pacific Carbon Fund 	Located in Palembang's landfill, at TPA I Sukawinatan, the project activity covers the landfill gas collection and flaring systems as well as the required budgetary requirement for landfill management and waste collection improvements.	Registered in EB	49,307	345,151
4	Gikoko Bekasi- LFG Flaring Project	<ul style="list-style-type: none"> • PT Gikoko Kogyo Indonesia • City Government of Bekasi • IBRD 	Located in Bekasi's landfill, at TPA Sumur Batu, the project activity covers the landfill gas collection and flaring systems as well as the required budgetary requirement for landfill management and waste collection improvements.	Registered in EB	69,987	489,906

5	Gikoko Makassar-LFG Flaring Project	<ul style="list-style-type: none"> • PT Gikoko Kogyo Indonesia • The Municipal Government of the City of Makassar, South Sulawesi, Indonesia. • IBRD (Netherlands) 	Located in the City of Makassar landfill, at TPA Tamangapa, the project activity covers the landfill gas collection and flaring systems as well as the required budgetary requirement for landfill management and waste collection improvements.	Registered in EB	69,987	489,906
6	Piyungan Landfill Gas Capture Project in Yogyakarta	<ul style="list-style-type: none"> • Bantul Regency • Sleman Regency • Yogyakarta City • Yogyakarta Special Province • Centre for Application and assessment of Energy Resources Technology (PTPSE), BPPT • Shimizu Corporation 	The project is planned to capture landfill gas (LFG) emitted and to combust and destroy methane gas on Piyungan Landfill Site in Bantul Regency of Yogyakarta Special Province.	Registered in EB	51,231	512,310
7	Bantargeban Integrated Waste Treatment Plant	<ul style="list-style-type: none"> • PT. Navigat Organic Energy Indonesia • Zeus Innavitas 	Project covers of material recycling facility, wet-waste treatment plant, and dry-waste treatment plant.	DNA Approval	243,026	1,701,181
8	Bantargeban Landfill Gas Management & Power Generation	<ul style="list-style-type: none"> • PT. Navigat Organic Energy Indonesia • Zeus Innavitas 	Project covers of improvement of existing infrastructure including the expansion of the sanitary landfill areas, management of municipal solid-waste, and extraction of landfill gas and its utilization for power generation.	DNA Approval	838,937	5,872,561

Appendix 5. Climate Change Related Policy Articles on 2030 Spatial Plan of the Jakarta Province

(Source: Academic Paper for Local Action Plan in Reducing Jakarta's Greenhouse Gas Emissions, 2010)

Article	Description
Article 5	<p>5) To realize the integration and control of space utilization as referred to in Article 4, letter e, set the policy as follows:</p> <ul style="list-style-type: none"> a. implement nature conservation reserves, nature conservation areas, land protection, water resources and development of green space for urban ecological balance in Jakarta; b. improve the quantity and quality of green space in an effort to improve the quality of Jakarta city life; c. reduce greenhouse gas emissions in an effort to anticipate global warming and climate change; and d. establish and maintain areas that have strategic value or strong influence on environmental aspects.
Article 5	<p>8) In order to achieve disaster risk reduction as referred to in Article 4 letter h, set the policy as follows:</p> <ul style="list-style-type: none"> a. develop infrastructure and facilities for natural disaster risk reduction b. develop infrastructure for man-made disaster risk reduction; and c. promote adaptation and mitigation to prepare for the threats of global warming and climate change and the increased risk of disaster
Article 10	<p>3) Strategies to implement the policy referred in Article 5 paragraph (5) c, include:</p> <ul style="list-style-type: none"> a. implement the carrying capacity of natural resources and environmental capacity for sustainable development; b. apply the concept of environmentally friendly building and the concept of sustainable urban design; c. improve the quality and quantity of green space d. increase alternative energy e. based waste management technology f. improving waste water treatment g. reduce the use of ozone depleting substances h. restore the function of mangrove forest i. improve public facilities, mass transit, and j. improve the control of both mobile and stationery sources of emissions.
Article 13	<p>1) Strategies to implement the policy referred to in Article 5 paragraph (8) letter a, including:</p> <ul style="list-style-type: none"> a. Develop infrastructure and facilities for flood control b. Improve and enhance the drainage system c. Develop routes, regions, and spaces for disaster evacuation; and

	d. Build a sea dike in order to anticipate rising sea water
Article 13	<p>3) Strategies to implement the policy referred to in Article (5) paragraph (8) c, include:</p> <ul style="list-style-type: none"> a. direct utilization of disaster areas for cultivation activities have a high adaptability b. reducing disaster risk through redesign through the application of technology and engineering in disaster areas c. develop of North Coast region (northern) as an effort to anticipate changes in climate d. improve the provision of open space for anticipated blue intensity rainfall e. create life side by side with water f. Laws refine areas of the building and the environment appropriate hazard threat