

STUDY ON LOCAL ACTIONS IN ASIA CONTRIBUTING TO CLIMATE CHANGE MITIGATION AND ALTERNATIVE FINANCIAL MECHANISM

COUNTRY : INDONESIA



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Bogor, December 2008

EXECUTIVE SUMMARY

Energy policy measures are mainly directed to the improvement of energy sector. They are not intended to the reduction of GHG emissions or climate change mitigation. The resulted reduction of GHG emissions or climate change mitigation that could be achieved from those policies measures are the by-product instead of the objective. However, prior to and after the COP 13 in Bali, Government of Indonesia has now put serious attention how to integrate climate change issues into national development programs. Local governments are encouraged to utilize financial mechanisms under Kyoto and Non-Kyoto. Government of Indonesia also plans to create Climate Change (Local) Trust Fund to support local governments to implement climate change programs.

CO₂ is dominant GHG being emitted from energy sector. In 1990, rate of CO₂ emission from this sector was about 114 million ton (Mt) and in 2004 it increased to 288 Mt. The annual growth rate of CO₂ emission is about 7%. The highest growth rate was observed in electricity generation sector, i.e. 9% per annum. The share of liquid fuels to the emissions is the largest compare to other fuels and the transportation sector is the major contributor. Therefore, the mitigation efforts are focussed in this sector.

To reduce the dependency on oil products, Government of Indonesia has issued Presidential Regulation 5/2005 on the changes of energy mix policies (energy diversification) and other policies related to energy conservation. Implementation of these changing policies will result in emission reduction of about 17% from the BAU (CO₂ emission in 2025 under BAU will be 1200 million ton CO₂e).

Waste sector is also one of the sources of GHG emission in Indonesia. Methane emissions from this sector was predicted about 400 million m³ methane per year (Morton, 2005). Emission of GHGs from industrial waste water may also be significant. However, due to limited data availability, the emission from this source can not be estimated.

In responding to climate change, after COP13 Government of Indonesia has launched a Yellow Book called National Development Planning: Indonesia Responses to Climate Change (Bappenas, 2008). The document was an initial input to prepare Medium Term National Development Planning (RPJM) 2010 – 2014. It has been identified about 54 climate change projects (26 adaptation, 18 mitigation and 8 integrated adaptation and mitigation projects) that will be implemented in the next five years. These programs required about 897 million USD.

In term of implementation of mitigation projects, Indonesia has a number of experiences. As per 19 December 2008, Indonesian DNA has approved 70 CDM projects. Of 70 projects, there are 17 projects have been registered. In addition there are also a number of non-CDM mitigation projects funded by public fund, grant, or CSR (*corporate social responsibility*) fund. As there is no approval process required for energy carbon voluntary project, it is hard to track information on voluntary carbon projects that has been or being developed. Other mitigation projects funded by public funds but not defined as carbon project also exist. Most of the projects are in the area of power generation or waste management such as Rural Electricity (Listrik Pedesaan) Program and Energy Self-Sufficient Village (Desa Mandiri Energi) Program.

Most of CDM mitigation projects are implemented by big companies and funded by profit-oriented fund, while the non-CDM ones are mostly funded by non-profit fund. Some of these funds include government/public funds, technical assistance/grant from foreign donors, soft loan as part of DNS program, and CSR fund. Government of Indonesia also planned to develop Climate Change (Local) Trust Fund to support the implementation of climate change program. The existence of these funds are very important for encouraging communities and small companies to implement climate change mitigation projects as the main barriers for these group is lack of investment.

In implementation of mitigation project at the community level, the role of NGOs is very important not only as facilitator but also as implementer especially those who has technical competency. It has been identified that there are about 18 NGOs are working in the area of climate change mitigation project that focussing on energy and waste sectors. Most of the NGOs are working in Java island while outside Java is very little.

To increase communities involvement in mitigating climate change, support from local governments is very crucial not only as facilitator but also as finance providers. Local Government in developing countries can create umbrella program for communities throughtout the country to implement small scale mitigation project activities, such as Programmatic CDM. Local government in developed countries may mobilize resources from private companies or other public fundings in their countries to support the implementation of community-based-mitigation projects in developing countries.

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ABBREVIATIONS

AusAID	: Australian Government Overseas Aid Program
Bappenas	: Badan Perencanaan dan Pembangunan Nasional (<i>National Planning and Development Board</i>)
BOE	: Barrel of Oil Equivalent
CC	: Climate Change
CCBS	: Climate, Community and Biodiversity Standard
CDM	: Clean Development Mechanism
CER	: Carbon Emission Reduction
CIDA	: Canadian International Development Agency
COP	: Conference Of the Parties
CSR	: Corporate Social Responsibility
DANIDA	: Danish International Development Agency
DFID	: Department For International Development
DNA	: Designated National Authority
DNS	: Debt for Nature Swap
GOI	: Government of Indonesia
GEF	: Global Environment Facility
GHG	: Green House Gas
GTZ	: Gesellschaft fur Technische Zusammenarbeit
JICA	: Japan International Cooperation Agency
KfW	: Kreditanstalt fur Wiederaufbau
kW	: kilo Watt
L/C	: Letter of Credit
MTN	: Mulya Tiara Nusa
MW	: Mega Watt
NGO	: Non Government Organization
ODA	: Official Development Assistance
PP	: Peraturan Pemerintah (<i>Government Regulation</i>)
PPN	: National Development Planning
PU	: Pekerjaan Umum (<i>Public Work - ministry</i>)
RAF	: Resource Allocation Framework
RPJM	: Rencana Pembangunan Jangka Menengah (<i>Medium Term National Development Planning</i>)
SIDA	: Swedish International Development Cooperation Agency
SPA	: Strategic Prioritized on Adaptation
SSCF	: Safer and Stronger Communities Fund
UNDP	: United Nation Development Program
UNFCCC	: United Nations Framework Convention on Climate Change
VCS	: Voluntary Carbon Standard
VER	: Voluntary Emission Reduction
VGS	: Voluntary Gold Standard

1. Introduction

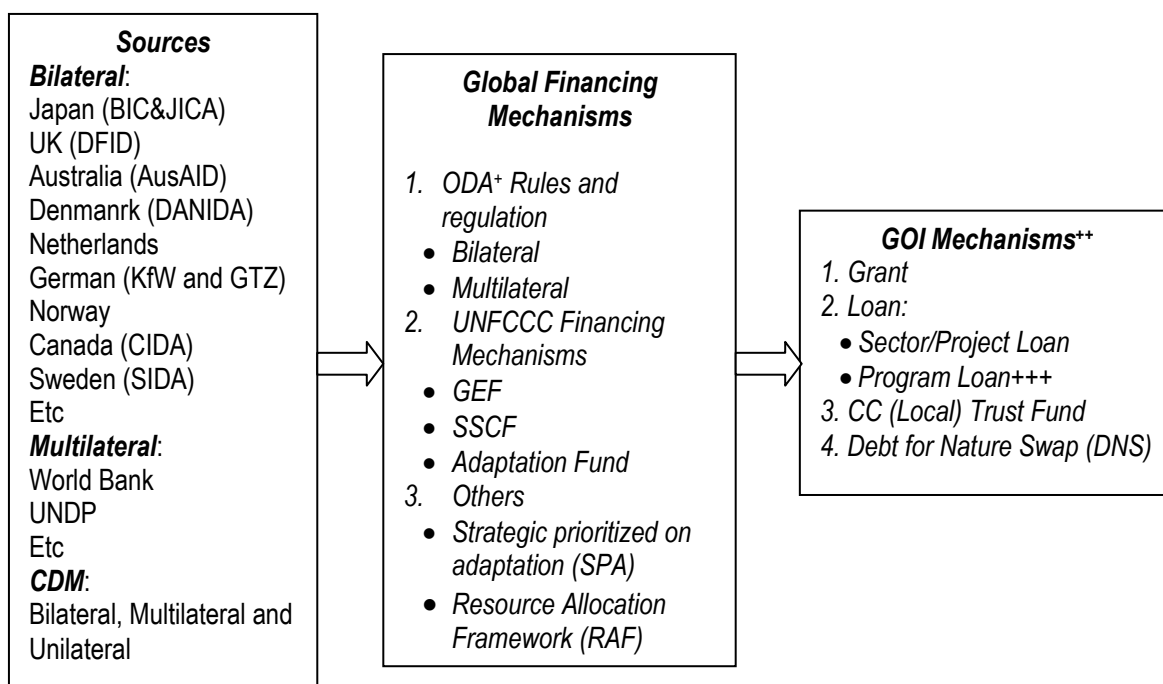
For combating global warming, all nations need to work together to reduce their greenhouse gases (GHGs) emission. There are three options that can be done to have low carbon growth namely improving energy efficiency through technological and behavioral changes, producing less-emission-technologies especially for new power plants, and reducing carbon dioxide emission from non-energy sectors. However, not all these measures are done by developing countries in effective ways due to a number of constraints particularly financial and institutional constraints. In addition, the status of non-Annex 1 countries also put the emission reduction efforts as second priority.

In Indonesia, the energy policy measures cited in the initial national communication, such as (i) gradual subsidy removal, (ii) promotion the use and development of renewable energy, (iii) encouragement of public adoption of energy efficiency, (iv) the use of clean and efficient energy for industry and commercial sectors, and (v) restructure the price for various energy sources, are all directed to the improvement of energy sector and are not intended to the reduction of GHG emissions or climate change mitigation. The resulted reduction of GHG emissions or climate change mitigation that could be achieved from those policies measures are the by-product instead of the objective.

However, prior to and after the COP 13 in Bali, Government of Indonesia has now put serious attention how to set up climate change issues into national development programs. Efforts to reduce the GHG emissions will be done through various initiatives. Local governments are encouraged to utilize financial mechanisms under Kyoto and Non-Kyoto. Indonesia government also plans to create Climate Change (Local) Trust Fund to support local governments to implement climate change program such as mitigation (Figure 1).

This report highlighted the barriers encountered to implement mitigation projects, focusing on energy and waste sectors. The aspects being covered are focused to financial and institutional issues. Financial issue includes alternative financial mechanisms to promote mitigation projects including conditions that limit or promote the mechanisms to work. Institutional issue includes roles of local governments both developed and developing countries in supporting the implementation of mitigation projects. Several case studies were used to illustrate how the two above issues are being addressed.

The report is divided into six sections. Section 1 describes briefly GHG emission from energy and waste sector. Section 2 presents Indonesia GHG emission in energy and waste sector. Section 3 highlights national policy on climate change. Section 4 discusses mitigation measures being implemented through CDM and other local initiatives. Section 5 discusses barriers and financial mechanisms for the implementation of the mitigation activities. Section 6 discusses role of local governments and NGOs in supporting the implementation of mitigation.



Note: ⁺ODA expected to come from additional existing ODA commitment from Monetary consensus, ⁺⁺Comply with Government Regulation No. 2/2006, ⁺⁺⁺: Climate Change Program Loan

Figure 1. Financial mechanisms FOR the implementation of climate change programs in Indonesia (Bappenas, 2008)

A survey study was conducted within period of October to mid of December 2008 to obtain data regarding cases of mitigation activities in Indonesia. Data from nine activities was obtained although it was not in detail. Most respondents were unable to provide detail data and information especially on financial matters. Information on the survey methodology and list of institutions contacted is attached in Appendix 1 and 2.

2. Energy and Waste Sector's GHG Emissions

The GHG emissions of energy sector comprise CO₂, CH₄, and N₂O, in which, the CO₂ is the major emission in the sector. These emissions were increased significantly during the last two decades. According to the Centre for Data and Information of the Ministry of Energy and Mineral Resources, the rate of GHG emissions from energy sector tends to increase from 114 million ton (Mt) in 1990 to 288 Mt in 2004 with an annual growth rate at 7%. Figure 2 presents the emission level of energy sector from 1990 to 2004. It can be seen from the figure that industrial sub-sector was the highest contributors, followed by electricity generation and transportation. Although electricity generation was not the highest contributor, however, the highest growth rate was observed in electricity generation sector, i.e. 9% per annum.

In terms of type of fuels, the share of liquid fuel (oil products) to the total emissions of energy sector was the largest compare to other fuels. The growth of these emissions followed the growth of final energy consumption, which was dominated by oil product and then followed by coal, natural gas, and electricity (see Figure 3). The oil product was consumed primarily by transportation, while coal and natural gas were consumed

by industries (see Figure 4). Electricity consumption is shared by industry, household, and commercial. Concerning households electricity, Indonesian electrification ratio is still low (55%) and electricity losses is still high ($\pm 11\%$). The GOI sets a target to decrease the losses and increase the ratio up to more than 90% in 2020. This target will contribute in decreasing the GHG emissions of energy sector.

Other significant contributor to the GHG emissions of energy sector was fugitive emissions, namely CH₄ and CO₂ emissions from gas flaring and venting at oil and gas field production facilities. The growth of these emissions will follow the growth of oil product and natural gas consumptions. However, recent global gas flaring reduction program at oil and gas production companies regarding their commitment to contribute with the climate change mitigation will have significant impact to the growth of these fugitive emissions in the future.

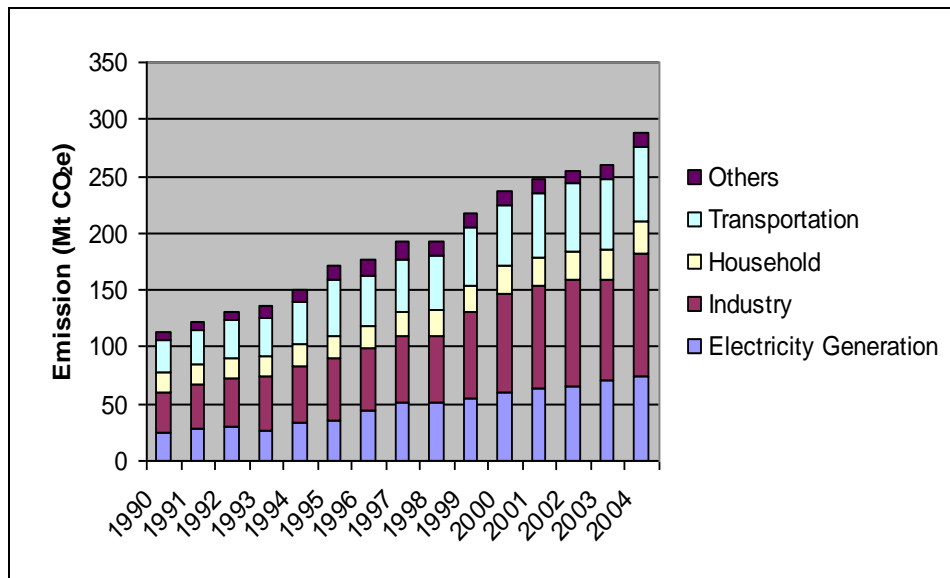


Figure 2. Trend of CO₂ emission from various activity in energy sector (MEMR, 2007)

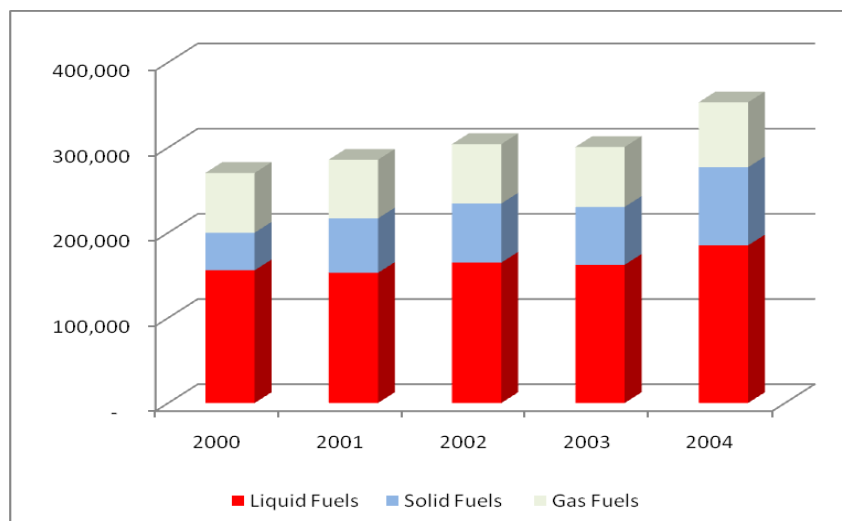


Figure 3. Trend of CO₂ emissions (Mt) from various types of fuel in energy sector

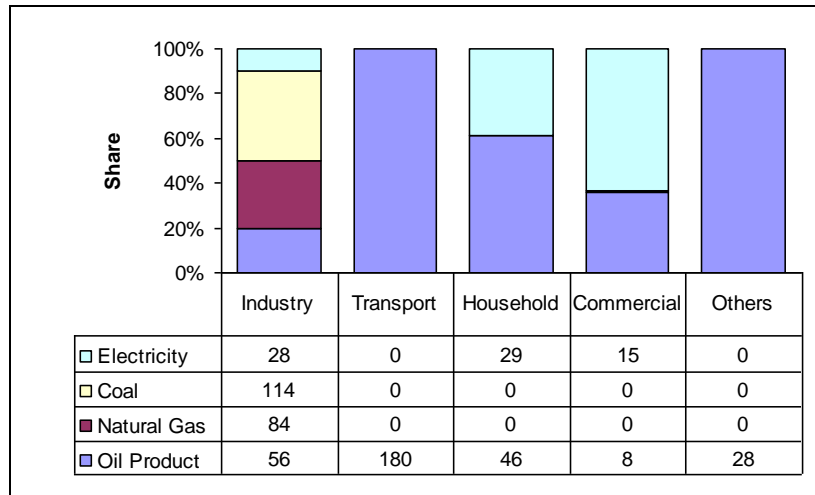


Figure 4. Final energy consumption by sector, 2007 (in MMBOE)

Regarding the Blue Print of National Energy Planning 2006 - 2025, it can be seen that GOI will change the energy supply mix by 2025 by increasing the share of renewable energy and coal. The change of supply mix will dictate the level of GHG emissions. The planning of energy supply mix of Blue Print and the impact of this planning will be discussed in Section 3 National Policies for Reducing GHG Emissions.

Waste sector is also one of the sources of GHG emission in Indonesia. Indonesia's major urban areas produce nearly 10 million tons of waste per year. Methane emissions from this waste was predicted about 400 million m³ methane per year (Morton, 2005). Until this year, only several cities have paid attention to reduce the GHGs emissions from landfill sites through CDM project development in cooperation with private sectors. The total number of dumpsites that have initiated process for developing CDM project is 26 dumpsites distributed in 22 cities (Appendix 5). Emission of GHGs from industrial waste water may also be significant. However, due to limited data availability, the emission from this source has not been counted yet. The second national communication, which is now under preparation will include the estimated emission from this source.

3. National Policies for Reducing GHG Emissions

There is no specific national policy of energy and waste sectors to the climate change mitigation, however, many of policies and regulations of these sectors could lead to the reduction of GHG emissions or climate change mitigations. The following sections described briefly these policies and regulations.

3.1 Energy Sector

Since Indonesia is becoming net importer of crude oil as well as oil products due to the oil resource of the country is becoming limited, GOI has released new policy with main objective to reduce the dependency on oil products through increasing the use of other energy alternatives and efficiency. This policy was stated under Presidential Decree No. 5/2005. In this decree, it was targeted that by 2025 the energy elasticity is less than 1.0 (now 1.8%), the share of natural gas, coal, and new and renewable energy in energy supply mix increase from 26.5% to 30%, from 14% to 33%, and from 5% to 17%

respectively with total energy supply is estimated around 2800 MMBOE in 2025 (see Figure 5). Although the share of new and renewable energy is increased, however, the share of fossil fuels is still dominant. From this figure, it can be seen that significant reduction of GHG emissions through the national energy policy is difficult to be achieved without introducing cleaner production technology.

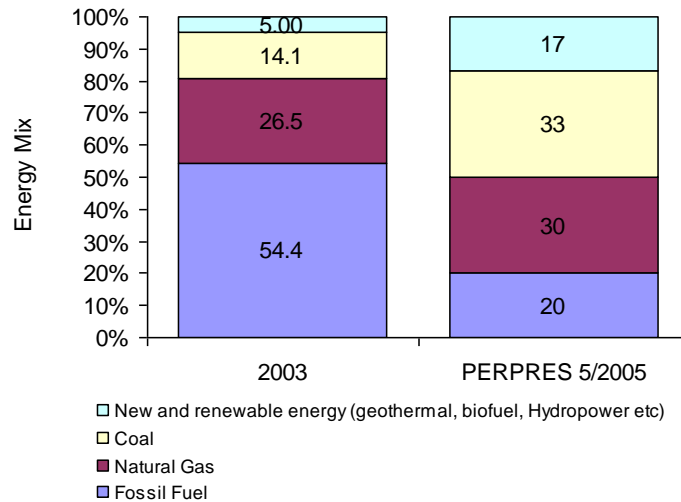


Figure 5. Energy mix policy under BAU and PERPRES 5/2005 (Source: PEN, 2007)

Before the GOI released Presidential Decree, ministerial policy (MEMR Decree No. 02/2004 concerning Green Energy development) was released to increase efficiency of energy utilization and to maximize the use of renewable energy and other clean energy technologies (clean coal technology, fuel cell, etc). This policy is called Green Energy Policy. To boost the development of renewable energy, GOI has launched several regulations, namely:

(i) biofuels:

- President Instruction No. 1/2006 concerning supplying and utilization of biofuels
- President Instruction No.10/2006 concerning the establishment of national team for biofuels development for poverty alleviation and unemployment reduction

(ii) renewable-based power plant:

- MEMR Decree No. 1122/2002 concerning PLN (National electricity enterprise) obligation to purchase electricity that is generated from small scale distributed renewable power plant (below 1 MW), in which the power purchase agreement is governed by this regulation;
- MEMR Decree No. 02/2006 concerning PLN obligation to purchase electricity that is generated from medium scale renewable power plant (1 MW to 10 MW) or excess power of captive power plants .
- Government Regulation No. 26/2006 (revision of Government Regulation No. 10/1989) concerning supply and utilization of electricity with some new provisions, such as introducing direct purchase without bidding for electricity that is generated from renewable energy, excess power, or under emergency situation. For non-renewable, the electricity purchase is based on competition through bidding process. Procedure for power purchase agreement and transmission fee is covered under the Ministerial Decree No. 001/2006.

Investing in renewable energy in Indonesia is attractive business opportunity since Indonesia is very rich in renewable energy sources, and could benefit from increasing the share of renewable in the energy supply mix and benefit for carbon reduction projects. However, Indonesia is still less favorable investment climate compared with other countries since there are limited access to project financing, lack of government budget, limited knowledge and capacity, and less of government policy and regulation in energy sector that directly lead to the increasing of the investment of renewable energy development in the context of climate change. Concerning policy and regulation related to renewable energy development, government regulations on renewable based power plant, particularly new power purchase agreement can boost the development of renewable energy in Indonesia.

There are also a number of policies/laws related to energy efficiency (EE). However, current policy (national energy policy 2006) does not explicitly state or mention the target of EE achievement, affected market players of EE, and main features of EE. There are also no policies or regulation related to EE that are governed incentives or penalties to support the EE activities. The latest national energy policy (Presidential Regulation No 5/2006) mentions the need to pursue energy conservation in all sectors so that the energy elasticity is reached less than 1 by 2025. This policy is supported by Indonesia's Energy Law. As stated in the Energy Law, the utilization of energy has to consider energy resources potential and availability and has to follow energy conservation directives/policy. The implementation of EE program in Indonesia was regulated by (i) Presidential Decree No. 43/1991 that leads to the formulation of National Master Plan of Energy Conservation (RIKEN), (ii) Presidential Instruction No. 10/2005 to the government sector to perform EE measures in government building and transport facilities, (iii) Ministerial Regulation No. 031/2005 concerning procedures/guidelines of energy conservation implementation.

The government is also to apply energy pricing policy whereby energy prices are to be adjusted gradually to reflect the economic value of energy. Staging and adjustment of energy prices are to be designed in such a way so that it could promote and optimize energy diversification. With regard to incentives, GOI is to provide incentives to efforts leading to the energy conservation implementation and alternative energy development.

In transportation activity, there are relevant policy to the energy use and climate change mitigation, namely:

- Policy to reduce traffic jam in Jakarta through the reduction of private vehicles utilization, such as three in one' regulation, transport demand management (TDM), electronic road pricing and the application of intelligent transport system (ITS). This policy will improve 20% of road network without construction of new roads and reduce significantly the traffic accident, total time travel, and CO₂ emissions
- Policy to more efficient of fossil fuel utilization through the improvement of the quality of transportation facilities in some big cities in Indonesia by the development of MRT, for example *Bus Rapid Transit* (BRT), Trans Jakarta (2004), Trans Pakuan Bogor (2006), Trans Jogja (2007), and BPP Batam (2006). Other programs are the planning of local government to construct special bus lines in 6 city toll roads, namely Rawa Buaya-Sunter, Sunter Pulo Gebang, Duri Pulo-Kampung Melayu, Ulujami-Tanah Abang, Kemayoran-Kampung Melayu, Pasar Minggu-Casablanca.

- Policy to increase the utilization of gas fuel (CNG and LPG) for vehicles. In 2007, a total of 1755 conversion kits have been installed for Taxi in Jakarta and most of BRT in Jakarta also the use of CNG. The program of gas fuel in transport sector (CNG/LPG) will be continued to other big cities in Indonesia.
- Policy to increase the diversification of fuel use by encouraging the use of biodiesel and bioethanol. The utilization target of biodeiesel and bioethanol is boosted by mandatory policy (MEMR Regulation No. 32 /2008) that targeted the utilization of biodiesel and biethanol for transportation are 1% and 5% respectively. Other energy alternatives, such as fuel cell, electric cars, and others are under studied since the infrastructure of these energy types has not available yet.
- Policy to implement quality standard for liquid fuel, namely EURO 2 in 2007, EURO 4 in 2012, and EURO 5 in 2015 in order to reduce the CO₂ emissions from vehicles (ACEA & EU Commission), CO₂ Emission Index for Euro II (gasoline 186 gr/km, diesel 175 gr/km), CO₂ Emission Index for Euro IV (gasoline 160 gr/km, diesel 136 gr/km).

Except the application of Euro 2 and Euro 4 policy in the transportation activity, most policies of energy sector are not directly intended for the reduction of GHG emissions. However, the application these policies could lead to the reduction of GHG emissions. The reduction is more as by prodcut of those policies measures instead of the objectives. Figure 6 shows the projection of energy primary consumption with and without energy diversification and conservation policies.

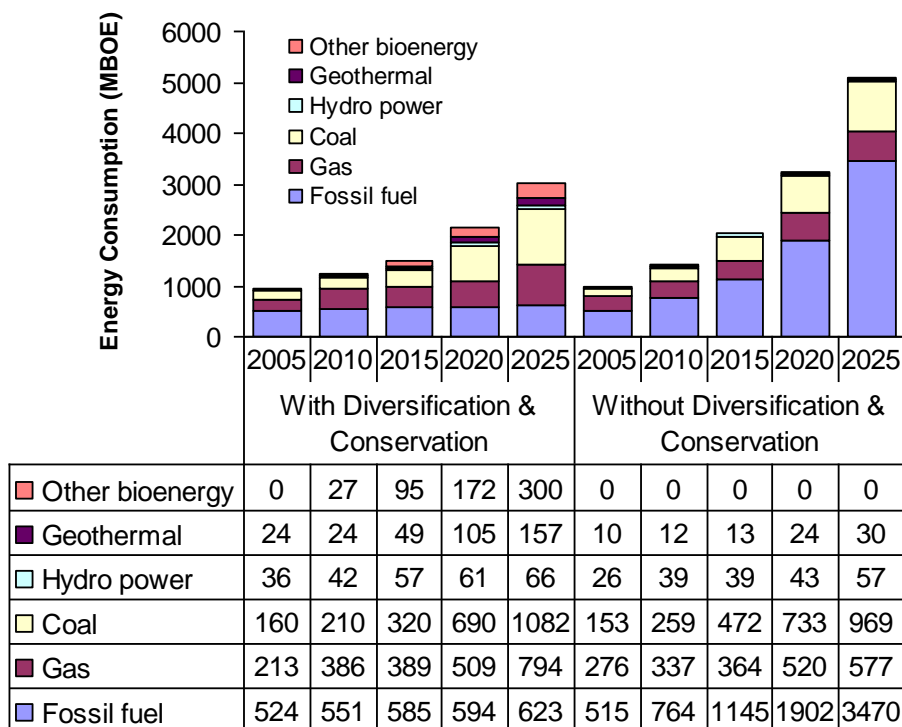


Figure 6. Projection of primary energy consumption with and without energy diversification and conservation (Blueprint PEN, 2007)

The implementation of energy diversification (increasing share of renewable energy to 17%) and conservation policies will result in reduction of GHG emissions. Figure 6 shows primary energy consumption projection with and without energy diversification and conservation while Figure 7 and 8 presents projection of estimated CO₂ emissions and the result of changing policies to the CO₂ emissions level. It can be seen that changing the policies will lead to decreasing of total energy consumption and reducing fossil fuels utilization. These policies could lead the reduction of GHG emissions by 17% from BAU and could reach the emission level at 1,200 million tons CO₂e in 2025.

In the National Action Plan Addressing Climate Change (MoE, 2007), it was stated (see Figure 8) that nuclear electric power plant (exceed the Presidential Instructions target of 2%) can reduce the CO₂ emission up to 20%. It was further stated that by optimization of geothermal electric power plant to 8.4% of the national energy mix, the CO₂ emission could be reduced further 23% and by implementing Carbon Capture and Storage (CCS) technologies, the CO₂ emission could reduce further to 40%.

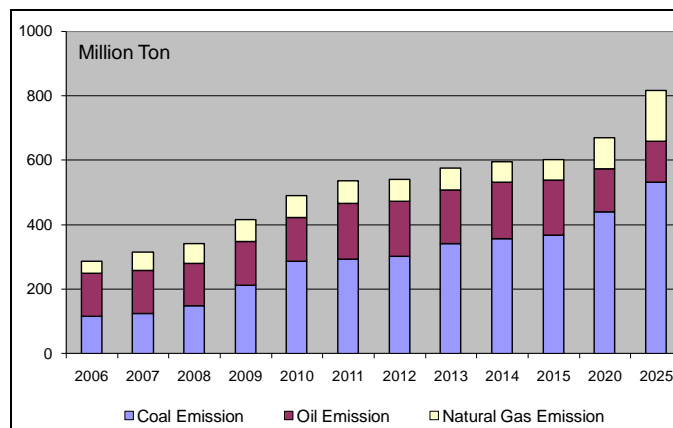


Figure 7. The projection of GHG emissions by type of Fuel

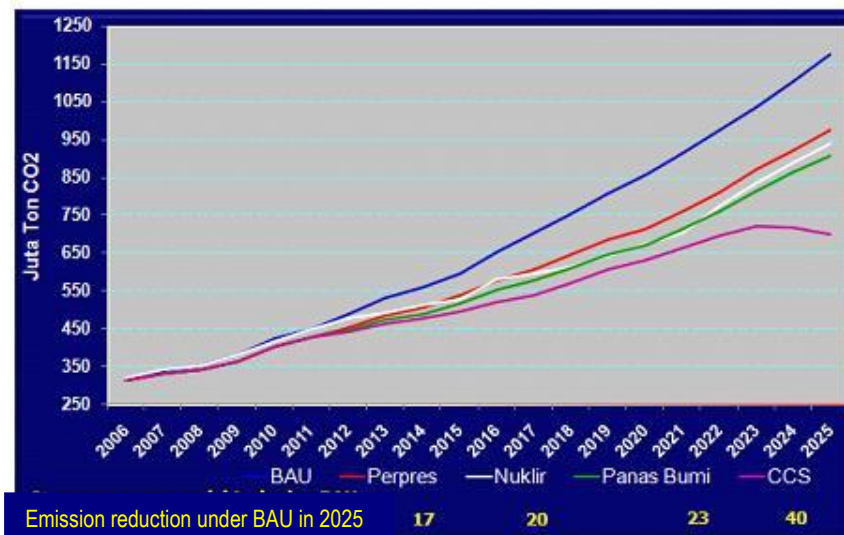


Figure 8. CO₂ emission reduction resulted from implementing energy diversification and conservation policies (MoE, 2007)

3.2 Waste Sector

In waste sector, this year Government of Indonesia launched National Law on Solid Waste Management. The Law No.18/2008 article 22 about waste management, stated that the waste management activity at the landfill site should emphasized on environmentally friendly treatment and reuse of send the residues back to the environment in safe way¹. The Law also encourage cities to establish regional landfills utilizing sanitary landfill technology. The state-of-the art of Sanitary Landfill technology include the methane capture and landfill gas flaring.

At the Ministry of Public Works, a ministry regulation was released in 2006, Permen PU No.21/2006, about National Policy and Strategy on Waste Management System (*Kebijakan dan Strategi Nasional Pengembangan Sistem Pengelolaan Persampahan/KSNP-SPP*) addressed the strategy for 2006 - 2010 which among others support the improvement of waste management at the landfill sites into Sanitary Landfill especially for metropolitan and big cities, Controlled Landfill for medium and small cities and close all the open dumping landfill practices in cooperation with other parties.

Policy that encourages cities and municipalities to establish regional dumpsite will increase the opportunity of the cities and municipalities to implement CDM project. This is because the minimum waste quantities for a landfill to be feasible for a landfill gas CDM project are in the range of 400 to 500 tons/day with minimum size of 8 ha. Thus it is not possible for smaller municipal dumpsites, which has smaller amount of waste, can get benefit from CDM.

In addition, by uniting a number of small dumpsite into a regional dumpsite, the cost efficiency will increase. Thus, the reasonably sized landfills will use lesser disposal costs and be more adapted to the requirements for CDM projects. At present, in term of size of most of landfills of metro and big cities are suitable for LFG project as the size is mostly more than 8 ha (minimum TPA size suitable for LFG project), while for medium and small cities on average the size of the landfills is about 7 ha. However about 17 of 77 landfills in medium and small cities have landfill area of more than 8 Ha.

3.3 National Development Planning: Indonesia Responses to Climate Change

After COP13 in Bali, Government of Indonesia has issued a Yellow Book called National Development Planning: Indonesia Responses to Climate Change (Bappenas, 2008). The document was an initial input to prepare Medium Term National Development Planning (RPJM) 2010-2014.

In this document, Bappenas along with sectoral ministries has identified a number of climate change adaptation and mitigation programs. There are about 54 climate change projects (26 adaptation, 18 mitigation and 8 integrated adaptation and mitigation projects) being proposed for implementation in the next five years (Figure 10). The programs required about 897 million USD. Funding for implementing the climate change programs is expected come from various sources as shown in Figure 9.

¹ (1) Kegiatan penanganan sampah sebagaimana dimaksud dalam Pasal 19 huruf b meliputi:
e. pemrosesan akhir sampah dalam bentuk pengembalian sampah dan/atau residu hasil pengolahan sebelumnya ke media lingkungan secara aman.

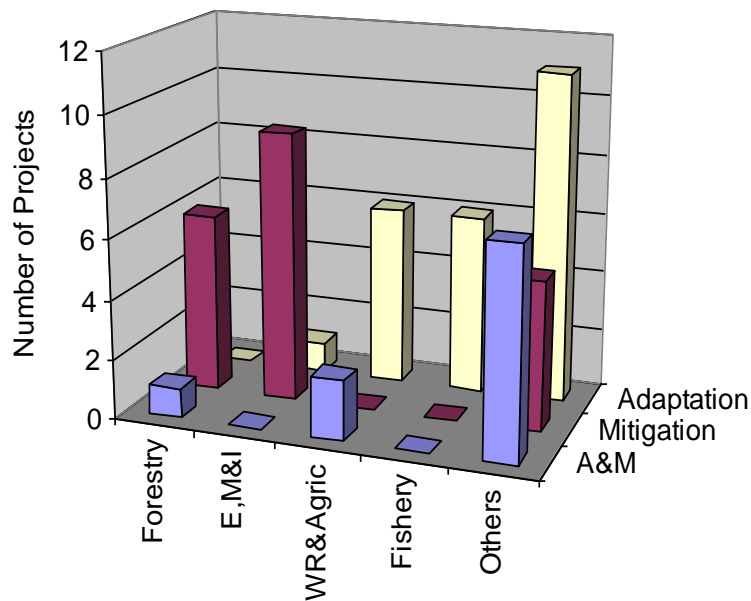


Figure 9. Number of climate change adaptation and mitigation projects prioritized in the Yellow Book of Bappenas (2008)

Management of foreign loans and grants for climate change is expected to follow the mechanism as stated in Government Regulation, PP No. 2/2006 regarding Foreign Loan and/or Grant Procedures and Foreign Loan and/or Grant Extension, and Permeneg PPN (Minister of the National Development Planning/Head of Bappenas) No. 005/2006 regarding Planning Procedures and Proposed and Reviewed Activities funded by foreign loan and grant. Minister of Finance Regulation No. 143/PMK.05/2006 about Procedures of Payment for Foreign Loan/Grant describes four methods for payments/distribution of foreign loan/grant, *i.e.*: (1) direct payment, (2) special account, (3) reimbursement, and (4) Letter of Credit (L/C).

4. Implementation of Mitigation Projects in Indonesia

4.1. CDM projects

As per 19 December 2008, Indonesian DNA has approved 70 projects. The sectoral scope of these projects only covered 7 of the 15 sectoral scopes. The Most of DNA approved CDM projects are renewable energy projects (under sectoral scope 1) and waste management projects (under sectoral scope 13). Figure 10 and 11 present the distribution of projects according to its sectoral scope and size of CER. The high rate of development of renewable energy projects especially in electricity generation is due to answer the demand in electricity, and also because this kind of projects is less complicated in terms of methodology than projects under other sectoral scope.

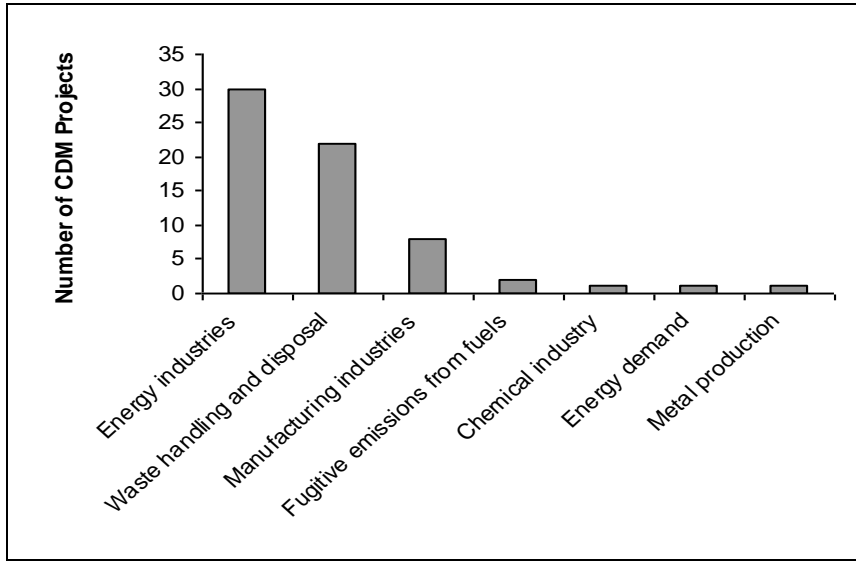


Figure 10. Distribution of DNA approved CDM projects by its sectoral scope

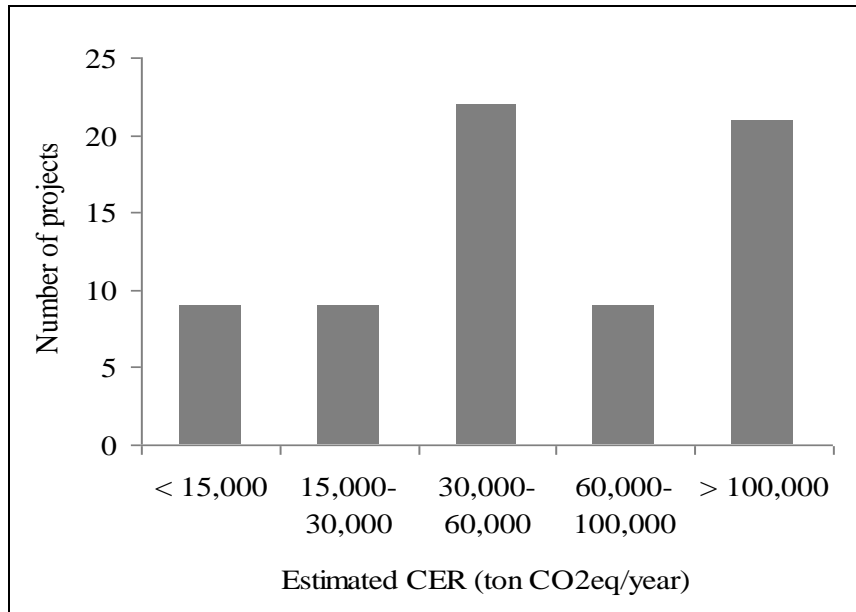


Figure 11. Distribution of DNA approved CDM projects by its size

Out of 70 projects, only 17 projects that have been registered by the CDM Executive Board, one was rejected from registration due to additionality issue, and three are still under registration process. And of these 70 projects, only six projects are being developed by government while the remaining is developed by private. List of the DNA approved CDM project is presented in Appendix X.

Figure 11 also shows that about 57% of Indonesia current DNA approved CDM projects is small scale where half of them are estimated to generate CERs of 30,000-60,000 per year. This portion is quite equal to number of projects estimated to generate more than 100,000 CERs per year. In average, about 6.5 million CERs per year are expected to be

generated from DNA approved CDM projects, but only around 80,000 CERs have been issued as per November 2008.

4.2. Non-CDM projects

There are a number of carbon projects in Indonesia, which are not proposed as CDM projects. Some of the projects are under voluntary market and some others are non-market based projects such as local initiatives funded through public, grant, or CSR (*corporate social responsibility*) funds. As there is no approval process required for energy carbon voluntary project, it is hard to track information on voluntary carbon projects that has been or being developed. From survey and interview process, it has been found that currently at least 3 voluntary projects are being developed in Indonesia. These include:

a. Bali Biogas Program

Project activity is installation of about 3,000 units of household scale biodigester in Bali. It aims to manage waste manure from cows and pigs as well as provide additional income from selling of sludge as fertilizer. Participants of the project is PT. Mulya Tiara Nusa, a private company also act as biodigester provider, and the farmers who implementing biodigester. Funding assistance for the project is partially provided by the fund from Ministry of Environment through Bank Syariah Mandiri and PT. Mulya Tiara Nusa (MTN). The program is expected to generate about 10,000 VER per year.

b. Mobuya Mini Hydro Power Plant

Project activity is installation of 3x1000 kW hydro power plants in North Sulawesi. The project is now under validation process and expected to generate about 12,250 of VERs per year.

c. Gianyar Waste Recovery Project

Project activities is to turn about 50-100 ton of waste/day into compost using forced aeration process. Rotary Club Bali Ubud and GUS Foundation is the project developer and operator. The project expected to generate about 7,000 CER per year for 10 years crediting period. Developed through Voluntary Gold Standard, the buyer of the project is Kuoni, a Europe-based travel agent. More information about the project is described on Appendix 4.

4.3. Other Project Activities

Other mitigation projects funded by public funds but not defined as carbon project also exist. These are usually part of government initiatives in meeting energy demand or in order to improve environmental quality. Most of the projects are in the area of power generation or waste management. Examples of the program are Rural Electricity (Listrik Pedesaan) and Energy Self-Sufficient Village (Desa Mandiri Energi) programs. The Rural Electricity Program aims to provide electricity to community in remote areas, while Energy Self-Sufficient Village Program aims to utilize local resources in generating power to meet their own needs. Most energy sources under these programs are renewables such as micro-hydro, solar energy, hybrid and biomass based energy. Some of the renewable energy projects that have been implemented to electrify or to meet energy demand of community living in the remote areas is given in Appendix 7.

Potential of renewable energy in Indonesia is very high compare to installed ones. According to Indonesia' Blueprint of National Energy Management (Pengelolaan Energi Nasional) year 2005-2025, as per year 2004 Indonesia have energy potential as described in Table 1.

Table 1. Indonesia Renewable Energy Potency

Non – Fossil Energy	Resource	Equivalent (GW)	Installed Capacity (GW)
Hydro power	845,00 million BOE	75.67	4.2
Geothermal	219,00 million BOE	27	0.8
Mini/micro hydro	0.45 GW	0.45	0.084
Biomass	49.81 GW	49.81	0.302
Solar power	-	4.80 kWh/m ² /d	0.008
Wind power	9.29 GW	9.29	0.0005

Source: PEN, 2007

Mitigation projects can also be funded through CSR funds, but at this moment allocating CSR fund for mitigation projects is less popular than allocating the fund for education and health facilities. Survey and interview process found only one plan for using CSR fund to finance mitigation projects. A power generation company in East Java is currently developing a plan to allocate their CSR fund to build a 2x400 kW rice husk based power plant. The rice husk will be collected from local farmers.

5. Financial Mechanisms for the Mitigation Projects

5.1 Cost for mitigation projects

There are many financial schemes for mitigation projects, which are classified into CDM and non-CDM mechanisms (voluntary market and non-market based projects such as local initiatives funded through public, grant, or *corporate social responsibility* funds) such as described previously in section 4. Each of these schemes will have different structure.

For CDM and non-CDM that are considered as voluntary market has financial structure, such as described below. Costs of mitigation project consist of:

- (1) Cost of implementation of project activity. It comprises costs for:
 - EPC (engineering procurement, and construction), which covers land aquisition, engineering design, administration or legal aspects, civil works, metal construction works, including mechanical and electrical works, contingencies
 - equipment purchasing; if the project is renewable based power generation the project cost may also include cost for electricity transmissions and sub-station if the sub-station has not available in that area yet.
 - costs for operation and maintenance
 - interest (if the project involves investment loan from bank/non-bank institution)
 - tax/vat;

- (2) Cost of transaction for carbon credit scheme. This cost usually comprise of costs for pre-operational phase design and operational phase.
- costs of pre-operational phase cover costs for (i) consultant in developing design project (PDD), (ii) validation, (iii) consultation and project appraisal, (iv) legal and contractual arrangement;
 - costs of operational phase cover costs for (i) verification, (ii) administration fee for registration by Executive Board of UNFCCC, (iii) risks mitigation, and (iv) sales of CER (certified emission reduction)

The transaction cost is sometimes covered by carbon credit buyers. This mostly happen if the carbon credit purchase agreement is concluded in early project stages.

In the case of mitigation projects are under non-CDM mechanisms that are non-market based projects, the structure of mitigation project cost comprises the cost for project implementation of project activity.

5.2. Revenue from mitigation projects.

The revenue from carbon credit will depend on price of the credit. In Indonesia, the price being offered depends on the risk sharing between the project developer and the buyer and also party covering the cost of transactions. This arrangement is normally defined in the ERPA. The price being offered is ranged from 4-10 Euros per ton of CO₂.

5.3. Funding for mitigation projects

There are several existing mechanism in financing mitigation activities which can be classified into two major purposes, ie. profit-oriented fund and non-profit fund.

a. Profit oriented fund

Funds fall into this category are the following:

1. Commercial loan from banks and other financial institutions. In Indonesia, involvement of commercial banks on CDM projects is still limited. Currently, there are some bank can provide loan for supporting renewable energy projects with lower interest than the commercial loan.
2. Carbon trading scheme. Payments can be the form of upfront or upon delivery of carbon credit. An upfront payment can assist in financing the initial investment while payments upon delivery of carbon credit can be used for operational & maintenance costs. Therefore, most financing on carbon credit scheme requires strong project prospect, such as high profile of the developer and low implementation risks i.e.: secured feedstock supply, no social conflict, etc.

Most of CDM projects in Indonesia used profit oriented fund. Costs for implementing the projects are financed by the company's equity and/or loan from banks or financial institutions. While the transactions costs are mostly financed by CERs buyers and/or brokers. One example of project financed by carbon developer is a 145 MW New Built CCGT (Combined Cycle Gas Turbine) by PT ASTA Keramasan Energi whose both project implementation and its CDM transaction costs, were partially financed by Climate Change Capital Carbon Fund.

b. Non-profit fund

(i) Government/public funds. Supporting small scale carbon project, government also provides grant or soft loan for communities. One of the financial schemes is DNS program which is managed by the Ministry of Environment. Most of the funding is normally to cover cost for initial investment. An example of this scheme is Bali Biogas Program (see section 4.2).

(ii) Soft loan

Several institutions have schemed to provide loan with low interest rate to activities with high environmental preservation aspects, including mitigation projects. Ministry of Environment have a DNS (Debt for Nature Swap) scheme that can also facilitate soft loan provision through providing guarantee to banks giving soft loan to mitigation projects. This is however, not an open process. Projects facilitated have to be recommended and approved by Ministry of Environment.

(iii) Local Trust Fund. Government of Indonesia is now in the process of developing climate change (local) trust fund to support any activities related to climate change mitigation and adaptation (Bappenas, 2008). Source of the funding is expected coming from various international sources (bilateral or multilateral donor).

(iv) CSR. Although the concept is less popular recently, CSR funds can be allocated to finance mitigation projects especially those that will improve community's living such as local renewable energy resources' based power plant and small scale waste management system. CSR in Indonesia is regulated through chapter 74 Law No. 1 year 2007 regarding Limited Company. It is stated that Company is obligate to implement CSR. Ministry of State Owned Company' Decree No. Kep. 236/MBU/2003 stated that CSR can be seen as Partnership Program with small enterprises and Environmental Development Program. CSR fund can be allocated from company's net profit (1-3% of net profit).

There are also financing potentials provided through CSR and through National Phylantrophy Institution especially to support the small-medium enterprises mainly to support the underlying investment.

c. Mixed for-profit and non-profit fund

Mixed scheme are also practice in Indonesia, especially projects involving both government and non-government. Most of municipal waste management projects in Indonesia are partially funded by local government, while remaining funds may come from technology provider, soft loan from foreign financial institutions, etc.

One example is CDM project entitled "Pontianak – GHG Emission Reduction through Improved MSW Management – LFG Capture, Flaring, and Electricity Generation" conducted in Batu Layang Dumpsite - Pontianak City, West Kalimantan. Project owner is the municipal government of Pontianak City while funding for investment was partially provided by IBRD (International Bank for Reconstruction and Development) and PT. Gikoko Kogyo. PT. Gikoko Kogyo also act as the technology provider.

5.4 Supporting scheme for mitigation-related activities

Beside the abovementioned funding schemes, there were several mitigation related activities implemented through technical assistance programs from foreign donors. Several institutions such as ADB and World Bank have provided funds for various programs aimed to improve local awareness and capacity in developing mitigation activities. For example, in 2005-2007, an ADB supported project on Institutionalizing CDM, produced 2 important documents related to CDM from Waste Sector. The first book is a Strategy Paper on CDM from Waste Sector, described and recommended establishment of regional landfills, promote landfill gas flaring and composting as the low-hanging-fruits options for CDM. The first book also describe necessary institutional aspects need to be prepared by project developers or participants. The second book, CDM Manual for Waste Sector, provided guidelines and detail information related to CDM project development.

UNDP, through its GEF Small Grant Program has given soft loan to projects which contributes to rural society development. Some of the projects assisted were mitigation activities such as micro hydro and small scale composting. List of the activities is attached in Appendix 8. Table 2 provides examples of program related to mitigation capacity building supported by donors.

Table 2. Examples of Donor Supported Programs in Improving Local Capacity

Institution	Program(s)
Asian Development Bank	<ul style="list-style-type: none"> - Institutionalizing the Clean Development Mechanism (2005-2007) - Carbon Sequestration through the Clean Development Mechanism (2004-2006) - Gas Generation from Waste (2005-2006) - Renewable Energy Development Sector Project (2002-2008) - Strengthening of Urban Waste Management Policies and Strategies (1997-1999)
World Bank	<ul style="list-style-type: none"> - Carbon Finance Development for Flare Reduction Projects (2005-2006)
IGES	<ul style="list-style-type: none"> - Integrated Capacity Strengthening for Clean Development Mechanism (2003-2007) - IGES CDM Capacity Building (2008-present)
UNDP	<ul style="list-style-type: none"> - ACEH Tsunami Recovery Waste Management Program (2005-2010), - Support to Second National Communication on Climate Change (2007-2009) - Microturbine Cogeneration Technology Application Program (2008-2013) - Support to Indonesia's Implementation of the Montreal Protocol (2003-2009) - Integrated Micro-Hydro Development and Application Program (2007-2010)

	- Global Environment Facility Small Grants Program (1992-2010)
European Commission (EC)	- EU-SPF Regional University Building in Capacity Building in Regional Energy Sector Development through ITB (Indonesia) and CIRPS (Italy) 2005 - 2006.
CIDA	- Capacity building in Analysis of Creditability of CDM Projects in Indonesia” through Pembina institute (Canada), TERI (India), ITB (Indonesia) 2000 – 2002
EU/British Chamber	- Capacity building for Clean Technologies in Industry and Transport (CTIT)

6. Barriers on Implementation of Mitigation Projects

6.1 Energy Sector

One of the weaknesses of the policy measures in reducing the GHG emissions or climate change mitigation, as previously discussed in this report, are the least cost considerations. The current government programs/plans address only type of energy sources in energy supply mix with the main objective is to achieve energy supply security; there are no programs or plans related to type of technology in the energy supply side with the aim to combat the GHG emissions. Other weaknesses are technology availability, human resources capability in providing or operating such technology, government budget availability, and activities/programs availability.

In terms of type of energy sources, the GOI is to increase the share of renewable and new energy in national energy supply mix. According to the decree, although the government is planned to increase the share of renewable in the national energy supply mix, however the share of coal is also to be increased to fulfill high domestic demand of energy. Therefore, in overall it is not guaranteed that total GHG emissions from the supply side will decrease in the future. Prioritizing of the increasing share of the renewable energy, for example, increasing of the share of biofuel utilization in energy sector through Biofuel Mandatory in the Ministry of Energy and Mineral Resources Decree (September 2008) will be considered as a challenges for the reducing of the GHG emissions or climate change mitigation.

Basically, investing in renewable energy in Indonesia is attractive business opportunity. Indonesia is very rich in renewable energy sources, and could benefit from increasing the share of renewable in the energy supply mix while fossil energy source is became limited. It also could benefit for carbon reduction projects although Indonesia is non-annex I country that does not compulsory target for GHG emission reduction. However, Indonesia is still less favorable investment climate compared with other countries since there are some barriers, namely limited access to project financing, lack of government budget, limited knowledge and capacity in carrying carbon emission reduction projects, and less of government policy and regulation in energy sector that directly lead to the increasing of the investment of renewable energy development in the context of climate change. Concerning policy and regulation related to renewable energy development, government regulations on renewable based power plant, particularly ‘power purchase agreement’, can boost the development of renewable energy in Indonesia. Lack of

access to obtain funding for underlying investment will become bottleneck for renewable and clean technology energy projects.

While for power generation activities, barriers faced are:

- a. The difficult process in engaging a PPA (Power Purchase Agreement) for electricity selling with PLN and biofuel with Pertamina. Any entity who wants to sell electricity to PLN has to prepare proposal describing technical and economic feasibility of the project. The proposal is to be submitted to PLN regional office. The regional office will then review the proposal and conduct inspection of the site, PLN and the entity will then negotiate the price;
- b. Low power selling price. The selling price of electricity has been stated as follows: (a) 0.8 x PLN Local Production, applicable for medium voltage plant; (b) 0.6 x PLN Local Production, applicable for low voltage plant.

Some barriers identified by the Ministry of Energy and Mineral Resources (Lestari, 2007) in developing renewable energy are:

- Law awareness and knowledge on the utilization and operation of renewable energy technologies including law capacity of industry manufacture in using these types of technologies.
- High cost due to high reliance to import technologies so that the selling price of renewable energy becomes higher than the conventional energy such as fuel oil and electricity.

Therefore to optimize the use of renewable energy, it is required good incentive and financial support from the governments or public-private partnership model to fund mitigation projects as well as awareness rising and capacity development in utilizing and operating the renewable technologies.

5.3. Waste Sector

As energy supply become limited, more source of energy alternatives are being promote. One of it is from waste. But the awareness about the proper waste-to-energy concept is not yet being widely discussed and defined. Indonesia wastes characteristic is 70% organic and 30% anorganic. The average calorific value of Indonesian wastes is about 2500-4000 KJ/cal. With that rage of calorific value, thermal treatment, such as incinerator, gasification, pyrolysis and plasma arc, will not be appropriate. Thus the idea of waste-to-energy plant will not be suitable for Indonesia. Composting and landfill gas flaring technology are the most recommended technology for waste treatment especially at the landfill sites. To some extend, power generation can be done from landfill gas flaring activities but it will need additional investment.

Barriers for the implementation of mitigation projects through CDM in waste sector include:

- a. Waste quantity.

For CDM suitability, minimum amount of wastes, about 400-500 ton/day, must be send to the landfill. This amount of wastes can only be generated from a big or

metropolitan cities, or bundled from several medium size cities which also means generated from one big landfill site or a regional landfill sites.

- b. Lack of emission standard, guidance and policy umbrella as well as readiness at the local level

Indonesia has no specific emissions standards yet especially for dioxins and mercury emission from thermal treatment. Yet the laboratory to test the dioxins emissions does not exist yet. The emission standards are now being discussed in compliance with Indonesia National Implementation Plan of the Stockholm Convention.

Local governments are frequently approached by CDM investors without knowing what the proposal about. Umbrella policy especially from technical department did not socialized or trickled down to the local level.

- c. Modalities for under lying investment/infrastructure:
 - Some projects, especially those utilizing World Bank Carbon Fund, borrow the fund for infrastructures improvement and underlying investment from the Bank. Other projects, financed by the investors.
 - In one project, limited capacity of investor halted the project realization.
 - Lack of knowledge on the low-hanging-fruit options from investors as well as government sides.

- d. Lack of institutional set up

Local institution set up need to be fostered and supported to create a more favorable platform to communicate with CDM investors. In one of the CDM project, local government set up a special body to bridge the communication between local governments and CDM investors or related parties.

7. Role of NGOs and Local Governments in Supporting the Implementation of Mitigation Activities

7.1 NGOs

There are a number of NGOs working in the area mitigation projects. From SGP-GEF UNDP program and authors experiences, it has been identified about 18 NGOs are working in the area of climate change mitigation project that focussing on energy and waste sectors (Figure 12). Most of the NGOs are working in Java island while outside Java is very little. The types of mitigation activities and name of NGOs is given in Appendix 9.

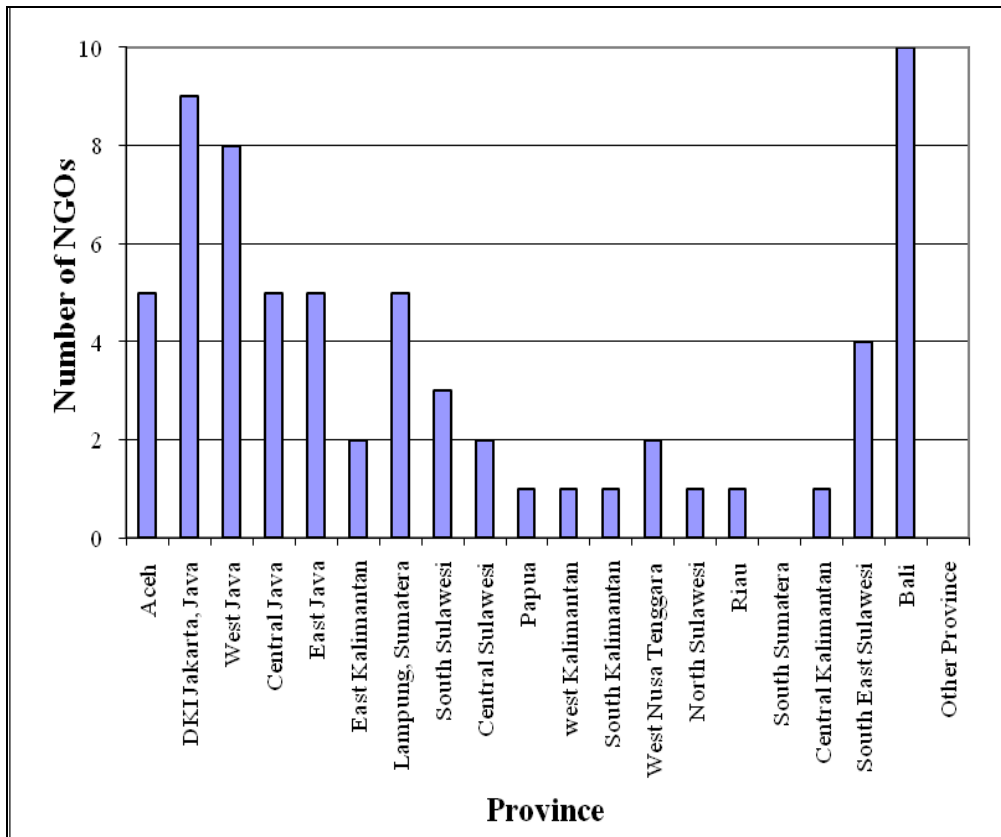


Figure 12. Number of NGOs working in the area of climate change mitigation activities on energy and waste sector

In general, NGOs can play their roles as implementer and facilitator of CDM and or voluntary carbon projects. Several NGOs, especially those who have technical competency, could act also as CDM or voluntary carbon project developers. NGOs who have technical expertise on digester construction such as BORDA (Bremen Overseas Research and Development Association) and its partners such as BaliFokus and LPTP (Lembaga Pengembangan Teknologi Pedesaan), or SNV (Dutch NGO) in Nepal, provide technical assistance for designing the necessary infrastructures.

NGOs also received funds from developed countries to implement the projects and facilitate community to be ready and comprehends with the correlation of wastes with climate issues. Moreover, NGOs could facilitate the operation and maintenance stage to ensure the project implementation monitored and implemented properly. Some funds are grants from German government or Dutch government through development aid program distributed through the INGOs (International NGOs).

In Temesi Composting project in Gianyar, BaliFokus, GUS (Gelombang Udara Segar) Foundation together with Rotary Club Bali Ubud, act as project developers and implementers. The role of BaliFokus was as technical consultant and community preparation at the first stage while Rotary Club Bali Ubud role is more as the fund raisers and proposal developers. GUS played their role as project operation facilitators and educators especially for students and visitors. IDRC (International Development and Research Cooperation) based in Canada provide support for the PDD, validation

and verification process. Local government of Gianyar provide support in terms of land use and permit provision. While local community of Temesi Village actively involve in project implementation, operation and maintenance, serves as manager, workers and beneficiaries of the project.

7.2 Local Government in Developing Countries

7.2.1 Energy Sector

In energy sector, role of the BP Migas is as a facilitator in developing of Global Gas Flaring Reduction program that will lead significant impact in reducing of the CO₂ and CH₄ emissions from flaring/venting activities at oil and gas production field facilities.

In developing of Desa Mandiri Energy (DME), most local Governments of Indonesia are trying to start with renewable energy development for DME program. In this case, Local Government acts as initiator and supporter fund to the Program. In addition to the renewable energy, many local Governments also start with biodiesel and bioethanol development in order to meet the biofuel mandatory (MEMR decree No. 32/2008).

Some of Local Governments of Indonesia are trying to have roles as project proponents in CDM projects as shown by:

- Provincial Government of Riau for the CDM project in a biomass (empty fruit bunch of Plam Oil Plants) based power plant at Siak Hulu Cluster and the Province Government of Gorontalo for the CDM project in biofuel based liquid fuels (the development of Jatropa).
- Provincial Government of Jakarta for CDM project in MRT development (mono rail),

In addition, a role of Local Governments of Indonesia is to provide better environment that could support the increasing the quality of transportation facilities, for example:

- the reduction of private vehicles utilization program through several programs, such as 'three in one', transport demand management (TDM), electronic road pricing, and application of intelligent transport system (ITS). These programs will improve 20% of road network without construction of new roads and will reduce significantly the traffic accident, total time travel, and CO₂ emissions.
- the improvement of the quality of transportation facilities by the development of MRT, such as *Bus Rapid Transit* (BRT), Trans Jakarta (2004), Trans Pakuan Jakarta - Bogor (2006), and planning of local government to construct special bus lines in 6 city toll roads, namely Rawa Buaya-Sunter, Sunter Pulo Gebang, Duri Pulo-Kampung Melayu, Ulujami-Tanah Abang, Kemayoran-Kampung Melayu, Pasar Minggu-Casablanca.
- Increasing the utilization of alternative energy that has less GHG emissions through the utilization of gas fuel (CNG and LPG) for vehicles. In 2007, a total of 1755 conversion kits have been installed for Taxi in Jakarta and most of BRT in Jakarta also the use of CNG. The program of gas fuel in transport sector (CNG/LPG) will be continued to other big cities in Indonesia by local government.
- Increasing the diversification of fuel use by encouraging the use of biodiesel and bioethanol in transportation activity. The utilization target of biodeisel and

bioethanol by local government is boosted by mandatory policy (MEMR Regulation No. 32 /2008) that targeted the utilization of biodiesel and biethanol for transportation are 1% and 5% respectively.

- Implementation of standard for liquid fuel, namely EURO 2 in 2007, EURO 4 in 2012, and EURO 5 in 2015 in order to reduce the CO₂ emissions from vehicles (ACEA & EU Commission), CO₂ Emission Index for Euro II (gasoline 186 gr/km, diesel 175 gr/km), CO₂ Emission Index for Euro IV (gasoline 160 gr/km, diesel 136 gr/km). In this implementation, the role of local Government is to give directives to local office of Pertamina who will manage the fuels supply.

7.2.2 Waste Sector

In solid waste management area, Local Governments in developing countries can play their roles as facilitators of CDM projects as shown by Sarbagita (Denpasar, Gianyar, Badung, Tabanan) local governments. Sarbagita governments facilitate the CDM project through the establishment of Regional Waste Management Body (*Badan Pengelola Kebersihan Sarbagita*). The body received mandates to announce the call for investment, select proper and qualified investor, negotiate and monitor project implementation.

Bekasi and Pontianak authorities through the designated agency (*Dinas Kebersihan dan Pertamanan*) act as implementer of CDM project. LGs allocated partial budget for Feasibility Study, EIA (Environmental Impact Assessment) and underlying investment or infrastructures through local fiscal budget. Partial supports also provided by central government in form of technical assistance study and infrastructures provision.

In waste manure management, Ministry of Agriculture, Ministry of Environment, and Ministry of Energy and Mineral Resources are promoting the application of biodigester to manage waste manure and convert it into biogas, which also serve as alternative energy. Annually, they allocated certain fund for dissemination of bio-digesters and providing loan for purchasing bio-digester.

Some LGs could facilitate and promote the project implementation through Programmatic of Action and provision of multi-years funds from local budget (APBD II) and partially from provincial fund (APBD I). Pro-active provincial government such as Gorontalo who has successfully launched an Agropolitan Province with Maize as their special agriculture products) could be approached for PoA ideas. The same approach could be introduced to other regency or city such as Sragen Regency who has successfully launched and implemented the “Go Organic Agriculture” program since 1999.

The PoA also could be supported by private companies or banks. Danamon group has shown their supports in development of market composting projects in several cities. The activities can be expanded or developed into a PoA.

To support realization of national strategy and policy, central government also should provide Fast Track program of mitigation to support conversion of open dumping landfill to sanitary landfill. Ministry of Public Works through their investment division could also finance the modalities of CDM for some pilots as incentives for cities.

7.3 Local Government in Developed Countries

Technical assistance and coordination of financial assistance also provided by LGs from developed countries. One of the example is Kitakyushu Techno-Cooperation Assistance (KITA) conducted in several cities in Indonesia, among others in Surabaya City. KITA provided technical assistance in form of provision of experts in composting. KITA implemented the project in cooperation with university-based NGO, Pusdakota, and the relevant government agency (Dinas Kebersihan dan Pertamanan). The LG of Surabaya then replicate the Takakura composting techniques city wide to handle households and market organic wastes. Takakura composting techniques is a semi-aerobic composting technique which emitted very low amount of methane during the process. Takakura composting technique considered as one of the low-cost option of composting.

APPENDICES

Appendix 1. Survey Implementation

Survey was implemented within period of early October up to mid December 2008, and consists of several activities as follows:

1. End of September - early October 2008: Listed all potential target institutions and person that to be surveyed and interviewed. This list was developed through contacting Indonesian DNA, CDM consultants and Indonesian NGOs who are working on climate change mitigation activities or programs.
2. Mid October 2008: Developing questionnaires. The questionnaire was developed based on the example provided by IGES, incorporated with the nature of targeted respondents. For example, questionnaire sent to local governments are made in Bahasa Indonesia. Meanwhile, questionnaires sent to DNA approved CDM projects were filled with short information extracted from their PDDs. General Form of the questionnaire sent is attached in [Appendix 2](#).
3. Mid – end of October 2008: Sending the questionnaires to all potential institutions/organization listed in [Appendix 3](#), and conducting direct interview with few developers located nearby.

Questionnaires were sent to 80 institutions while direct interview was conducted with 7 institutions.

4. Early November 2008: Analyzing the results of the questionnaires. A shortlist of target activities for in-depth analysis was made afterward.
5. Mid November 2008 – Mid December 2008: Conducting in depth interview with the shortlist institutions/organization (project developers) through phone or e-mail. Since only four activities shortlisted by the submission of Interim Report, more interviews conducted whether by phone or face to face meeting.

Throughout the survey period, data and information gathering through survey on literatures was also conducted.

Appendix 2. General form of Questionnaire used

Table 3. Company/institution Information

Name of Institution		
Category of institution (please highlight the right box)	Private company	
	Local government	
	Government agency	
	NGO	
	Foundation	
	Others (please specify)
Address		
Phone/Fax		
Email address		
Contact Person		
Position/designation		

Table 4. CDM Project Questionnaire

		Project 1	Project 2	Project (n)
Name of the Project				
Year of Implementation				
Location				
Participants				
Project's sector	Renewable energy			
	Energy efficiency			
	Waste management			
	Transport			
Project's brief descriptions				
Status	(PDD development/Approved by Host Country/Validation/Registration process/Registered/CER Issued)			
Crediting period	(year a to year b)			
Estimated CER	ton CO2-eq/year			
Estimated project costs	in USD (without CDM transaction costs)			
CDM transaction costs	in USD			
Source of funding	(% equity, % debt, others)			
Is there any involvement of local government in the project?	No			
	Yes, please specify its role			
Is there any involvement of community in the project?	No			
	Yes, please specify its role			

Barriers/challenges (please specify)	Financial			
	Technology			
	Institutional			
	Social			
	Others			
Solution to barriers/challenges (please specify)	Financial			
	Technology			
	Institutional			
	Social			
	Others			

Table 5. Voluntary Project Questionnaire

(Please include only projects that have been implemented in year 2000 and onwards)

		Project 1	Project 2	Project (n)
Name of the Project				
Year of Implementation				
Location				
Participants				
Project's sector	Renewable energy			
	Energy efficiency			
	Waste management			
	Transport			
Project's brief descriptions				
Voluntary scheme	(VCS, VGS, CCBD, others)			
Status	(PDD development/Validation/Verification Process/ER Issued)			
Crediting period	(year a to year b)			
Estimated ER	ton CO2-eq/year			
Estimated project costs	in USD (without CDM transaction costs)			
Transaction costs	in USD			
Source of funding	(% equity, % debt, others)			
Is there any involvement of local government in the project?	No			
	Yes, please specify its role			
Is there any involvement of	No			

community in the project?	Yes, please specify its role			
Barriers/challenges (please specify)	Financial			
	Technology			
	Institutional			
	Social			
	Others			
Solution to barriers/challenges (please specify)	Financial			
	Technology			
	Institutional			
	Social			
	Others			

Table 6. Non Market Project Questionnaire

(Please include only projects that have been implemented in year 2000 and onwards)

		Project 1	Project 2	Project (n)
Name of the Project				
Year of Implementation				
Location				
Participants				
Project's sector	Renewable energy			
	Energy efficiency			
	Waste management			
	Transport			
Project's brief descriptions				
Status	(planning/implementation/completed)			
Project period	(year a to year b)			
Estimated ER (if calculated)	ton CO2-eq/year			
Estimated project costs	(USD/IDR/EUR)			
Source of funding	(% equity, % debt, others)			
Is there any involvement of local government in the project?	No			
	Yes, please specify its role			
Is there any involvement of community in the project?	No			
	Yes, please specify its role			
Barriers/challenges (please specify)	Financial			
	Technology			

	Institutional			
	Social			
	Others			
Solution to barriers/challenges (please specify)	Financial			
	Technology			
	Institutional			
	Social			
	Others			

Appendix 3. List of Institution Contacted for Survey and Questionnaires

Table 7. List of Institution Contacted for Survey and Questionnaires

No.	Name of the Institution	Address
1	BPPT (Agency for the Application and Assessment of Technology) & Climate Interchange, AG	BPPT: Jl. MH. Thamrin, No. 8 BPPT Building Jakarta Climate Interchange, AG: Lichtenbergstr. 8 GATE Garching bei München Bavaria Germany D-85748
2	Darajat Unit III Geothermal Project	Sentral Senayan I Jl. Asia Afrika No. 8 Jakarta 10270
3	The Municipal Government of the City of Tarakan	Tarakan City, East Kalimantan
4	EcoSecurities Indonesia	Graha Niaga Lt 17 Jl. Jend Sudirman Kav 58 Jakarta 12190
5	Energy Equity Epic	Plaza 89 Suite 802 Jl.HR. rasuna Said X7 No.6 Jakarta
6	Navigat Organic Energy Indonesia	Jl. Jend. Sudirman Kav 44-46, Fl. 8, Suite 808 BRI II Tower Jakarta
7	Nubika Jaya Biogas Extraction for Bio-Hydrogen Production	PT. Cabot Indonesia (PTCI): Jl. Amerika I Kav.A-5, Krakatau Industrial Estate Cilegon, Cilegon Banten 42435
8	Pemda Temesi Bali & Rotary Club Bali Ubud	Pemda Temesi Bali: Temesi Village Chief Office, Gianyar Bali 80551 Rotary Club Bali Ubud: PO-BOX 10010 Ubud Bali 805701
9	Government of Bekasi City & PT Gikoko Kogyo Indonesia & IBRD	Government of Bekasi City : Jl. Ir. H. Juanda No. 100, East Bekasi, The Municipality Building of Bekasi Kota Bekasi West Java PT Gikoko Kogyo Indonesia: Pulogadung Industry Estate, Jl Pulokambing Kav. II /i9 Jakarta 13930 IBRD: 1818 H Street, NW, MC, Washington District of Columbia 20433 USA
10	Government of Makassar City & PT Gikoko Kogyo Indonesia	PT Gikoko Kogyo Indonesia: Pulogadung Industry Estate, Jl Pulokambing Kav. II /i9 Jakarta 13930 The Municipal Government of the City of Makassar: Jl. Jend. Achmad Yani No. 2, The Municipality Building of Makassar, Makassar South Sulawesi 90111
11	Permata Hijau Group & Mitsubishi UFJ Securities Co., Ltd.	PT Nagamas Palm Oil Lestari, Permata Hijau Group: Jl. Iskandar Muda No. 107, PHG Building Medan North Sumatra 20154 Mitsubishi UFJ Securities Co., Ltd.: 2-4-1 Marunouchi, Chiyoda-ku, 26th Floor, Marunouchi Building Tokyo 100-6317 JAPAN
12	PLN (National Electricity Utility Company/Perusahaan Listrik Negara)	
13	PLN Distribusi Jawa Timur	Jl. Embong Trengguli No. 19-21 Surabaya, East Jawa
14	PT Adei Plantation & Industry	
15	PT AES AgriVerde Indonesia	Suite 25.10, Wisma 46, Kota BNI, Jl. Jend. Sudirman Kav.1 Jakarta 10220
16	PT AES AgriVerde Indonesia & PT Tolan Tiga Indonesia	Suite 25.10, Wisma 46, Kota BNI, Jl. Jend. Sudirman Kav.1 Jakarta 10220
17	PT AES AgriVerde Indonesia & PT Victorian Alam Lestari	Suite 25.10, Wisma 46, Kota BNI, Jl. Jend. Sudirman Kav.1 Jakarta 10220
18	PT Asahimas Flat Glass Tbk.,	Jl. Ancol IX/5, Ancol barat Jakarta 14430

19	PT Asta Keramasan Energi, Climate Change Capital Carbon Fund 2 SARL, Climate Change Capital Carbon Managed Account SARL	PT Asta Keramasan Energi: Jl Jend Sudirman Kav 54-55 Plaza Bapindo, Mandiri Tower 20th Floor Jakarta 12190 Climate Change Capital Carbon Fund 2 SARL, Climate Change Capital Carbon Managed Account SARL: 3 More London Riverside London SE1 2AQ United Kingdom
20	PT Bahari Dwikencana Lestari & EcoSecurities Group Plc.	PT Bahari Dwikencana Lestari: Jalan Dagan No. 6C Medan North Sumatera 20113 EcoSecurities Group Plc.: 40 Dawson Street Dublin 02 Ireland
21	PT BUDI ACID JAYA (BAJ) & SUMITOMO	PT. BUDI ACID JAYA: Jl. H.R. Rasuna Said Kav, C-6 Wisma Budi 8th, 9th floor Jakarta 12940 Sumitomo Corporation: 1-8-11, Harumi Chuo-ku Tokyo Japan
22	PT Bukit Kapur Reksa (BKR)	Jl. Belitung no. 1 Kawasan Industri Dumai (KID) Pelintung Dumai
23	PT Cahaya Kalbar Tbk (CK)	Jl. Raya Pluit Selatan Blok S No. 6. Jakarta
24	PT Cargill Indonesia & EcoSecurities	PT. Cargill Indonesia: Plaza Bapindo Tower Citibank Lt. 23 Jl. Jend. Sudirman Kav. 54-55 Jakarta 12190 EcoSecurities Group Plc.: 40 Dawson Street Dublin 02 Ireland
25	PT Fajar Futura Luwu Energi Luwu, Centre for Application and Assessment of Energy Resources Technology, Agency for the Application and Assessment of Technology (BPPT), The Chugoku Electric Power Co., Inc. & Kajima Corporation	PT Fajar Futura Luwu Energi Luwu: Jl Tanjung Duren Raya No. 12 Jakarta BPPT: Jl. M.H. Thamrin no.8 BPPT building 2nd, 22nd flr. Jakarta The Chugoku Electric Power Co., Inc.: 4-33, Komachi, Naka-ku, Hiroshima, Hiroshima Prefecture 730-8701 Japan Kajima Corporation: 3-7-1 Nishi Shinjuku Shinjuku-ku, Shinjuku Park Tower 29F, Tokyo 163-1029 Japan
26	PT Fetty Mina Jaya	Jalan Rajawali No.45, Sukajadi Pekanbaru Riau Province
27	PT Gandaerah Hendana, PT Enviro Mitra Abadi & EcoSecurities Group Plc.	PT Gandaerah Hendana: Jl. Jend. Sudirman kav.1 Gedung Wisma 46 Kota BNI – Unit 16.09 Jakarta 14440 PT Enviro Mitra Abadi: Jl. Raya Pluit Selatan Blok S no.8 / Unit 9 -10 Jakarta 14440 EcoSecurities Group Plc.: 40 Dawson Street Dublin 02 Ireland
28	PT Gikoko Kogyo Indonesia	Pulogadung Industry Estate, Jl Pulokambing Kav. II /i9 Jakarta 13930
29	PT Gikoko Kogyo Indonesia, The Municipal Government of the City of Pontianak, West Kalimantan, Indonesia & IBRD (Netherlands)	PT Gikoko Kogyo Indonesia: Pulogadung Industry Estate, Jl Pulokambing Kav. II /i9 Jakarta 13930 The Municipal Government of the City of Pontianak: Jalan Rahadi Usman No. 2, Kantor Walikota Pontianak, Province of West Kalimantan IBRD: 1818 H Street, NW, MC, Washington District of Columbia 20433 USA
30	PT Great Giant Pineapple (GGP)	Terbanggi Besar Km 77 Terbanggi Besar Lampung Tengah
31	PT Harapan Sawit Lestari, Cargill International SA & EcoSecurities Group Plc.	PT Harapan Sawit Lestari: Manis Mata Kantor Pusat Kabupaten Ketapang Propinsi Kalimantan Barat Cargill International SA: 14 chemin de Normandie Geneva 1206 Switzerland EcoSecurities Group Plc.: 40 Dawson Street Dublin 02 Ireland
32	PT Holcim Indonesia Tbk & Holcim Group Support Ltd	PT Holcim Indonesia Tbk: Jl Jenderal Gatot Subroto No. 38, Menara Jamsostek, North Tower, 15th floor Jakarta 12930 Holcim Group Support Ltd: Hagenholzstrasse 85 Zürich 8050 Switzerland

33	PT Indo Matra Power & Sindicatum Carbon Capital	PT Indo Matra Power: Jl. Darmawangsa VI – 37 Kebayoran Baru Jakarta 12160 Sindicatum Carbon Capital: Hanover Square, 18, London W1S 1HX UK
34	PT Indocement Tunggal Prakarsa	Jl. Jenderal Sudirman Kav. 70-71 Wisma Indocement Jakarta 12910
35	PT Indonesia Power & Agency for the Assessment and Application of Technology (BPPT) & The Chugoku Electric Power Co., Inc.	PT. Indonesia Power: Jl. Jend. Gatot Subroto Kav. 18 Jakarta The Chugoku Electric Power Co., Inc.: 4-33, Komachi, Naka-ku, Hiroshima Prefecture 730-8701 Japan BPPT: Jl. M.H. Thamrin BPPT building 2nd, 22nd Fl. Jakarta
36	PT Indotirta Suaka	Jalan Culindo Lestari Blok B 3/4 Komplek Tiban Kencana Batam 29421
37	PT Intibenua Perkasatama	Jalan KL Yos Sudarso, Spring Tower 02-21 Tanjung Mulia-Medan, North Sumatera 20241
38	PT Karya Makmur Bahagia & EcoSecurities	PT Karya Makmur Bahagia: Jalan Sungai Sambas IV no. 24A Jakarta EcoSecurities Group Plc.: 40 Dawson Street Dublin 02 Ireland
39	PT Listrindo Kencana, PT Sawindo Kencana & Misubishi UFJ Securities	PT Listrindo Kencana: Jl. Raya Perjuangan No. 88GK, Graha Kencana Building Jakarta 11530 PT Sawindo Kencana: Jl. Raya Perjuangan No. 88GK, Graha Kencana Building Jakarta 11530 Misubishi UFJ Securities: 2-4-1 Marunouchi, Chiyoda-ku, Level 26th Marunouchi Building Tokyo Japan
40	PT Manunggal Energi Nusantara	Jl. Gatot Subroto Kav. 22, 2ndFloor Wisma Argo Manunggal Jakarta 12930
41	PT Manunggal Energi Nusantara & Mitsubishi UFJ Securities Co. Ltd	PT Manunggal Energi Nusantara: Jl. Gatot Subroto Kav. 22, 2nd Floor Wisma Argo Manunggal Jakarta 12930 Mitsubishi UFJ Securities Co. Ltd: 2-5-2 Marunouchi, Chiyoda-ku, 2F, Mitsubishi Building Tokyo 100-0005 Japan
42	PT Medco Energi Oil & Gas	PT Medco Energi Internasional Tbk: Jl. Jend. Sudirman Kav.58 Graha Niaga Office Tower 16th floor Jakarta Selatan 12190 PT Medco LPG Kaji: Jl. T. B. Simatupang Plaza 3 Pondok Indah Blok B2-2 Jakarta Selatan 12310 PT Medco E&P Indonesia: Jl. Gatot Subroto Kav. 71-73 Bidakara Office Building Jakarta 12870
43	PT Mega Power Mandiri	Jl. Amil Raya No. 7, Buncit Raya Jakarta 12741
44	PT Multi Nitrotama Kimia & Sindicatum Carbon Capital Ltd	PT Multi Nitrotama Kimia: Menara Kebon Sirih 20th Floor JL Kebon Sirih N0 17-19 Jakarta 10340 Sindicatum Carbon Capital Ltd.: 18 Hanover Square London W1S 1HX UK
45	PT Multimas Nabati Asahan	Jalan Imam Bonjol No. 7, Gedung Bank Mandiri Lantai V Medan North Sumatera 2011
46	PT Murini Samsam (MSS)	Jalan Imam Bonjol No. 7 Gedung Bank Mandiri Lantai V Medan North Sumatera 20112
47	PT Musim Mas	Jalan KL Yos Sudarso Km 7,8, Kelurahan Tanjung Mulia Kecamatan Medan Deli Medan North Sumatra

48	PT Nubika Jaya & Mitsubishi UFJ Securities Co. Ltd.	PT Nubika Jaya: Jl. Iskandar Muda No. 107 PHG Building Medan North Sumatra 20154 Mitsubishi UFJ Securities Co. Ltd.: 2-5-2 Marunouchi, Chiyoda-ku, 8 Floor, Mitsubishi Building Tokyo 100-0005 Japan
49	PT Odira Energy Persada & Sindicatum Carbon Capital Ltd.	PT Odira Energy Persada: Jalan Patal Senayan No. 38 Jakarta 12210 Sindicatum Carbon Capital Ltd.: Hanover Square 18 London W1S1HX, UK
50	PT Patisari	Jl. Masjid No. 129 Medan North Sumatra 20111
51	PT Pelita Agung Agrindustri & Mitsubishi UFJ Securities Co. Ltd.	PT Pelita Agung Agrindustri: Jl. Iskandar Muda No.107 Medan North Sumatra 20154 Mitsubishi UFJ Securities Co. Ltd.: 2-5-2 Marunouchi, Mitsubishi Building, Chiyoda-ku, Tokyo 100-0005 Japan
52	PT PLN (Perusahaan Listrik Negara/ National Electricity Utility Company) & PT PERTAMINA GEOTHERMAL	PT. Perusahaan Listrik Negara: Jl. Trunojoyo I / 135 – Kebayoran Baru Gedung PLN Jakarta 12620 PT. Pertamina Geothermal Energy: Jalam M.H. Thamrin 9, 15th fl. Menara Cakrawala Jakarta 10340
53	PT Petromat Agrotech	Taman Bougenville Estate Blok A, No. 44, Kali Malang Jati Bening Gede Raya Bekasi Jakarta 17412
54	PT Poso Energi	Jl. Amil Raya No. 7, Buncit Raya Jakarta 12740
55	PT Pura Barutama & NEDO	PT Pura Barutama: Jalan AKBP Agil Kusumadya 203; PO Box 87, Head Office, PT. Pura Group Kudus Central Java 59347 NEDO: Omiya-cho, Saiwai-ku, 1310, Kawasaki city, Kanagawa prefecture 212-8554 Japan
56	PT Rimba Partikel Indonesia	127 Kendal Desa Mororejo, Kaliwungu, Kendal Central Java
57	PT Sumi Rubber Indonesia (SURINDO), PT Nusantara Energy Solution (NES) & Toshiba Corporation (TOSHIBA)	PT Sumi Rubber Indonesia (SURINDO): Kota Bukit Indah, Sektor IA, Blok H, Kawasan Industri Indotaisei Cikampek West Jawa PT Nusantara Energy Solution (NES): EJP Industrial Park, Plot 3A Lemahabang Bekasi 17550 Toshiba Corporation (TOSHIBA): 1-1, Shibaura 1- Chome, Minato-ku Tokyo 105-8001 Japan
58	PT Windu Nabatindo Lestari & EcoSecurities	PT Windu Nabatindo Lestari: Jalan Sungai Sambas IV no. 24A Jakarta EcoSecurities Group Plc.: 40 Dawson Street Dublin 02 Ireland
59	PT. AES AgriVerde Indonesia & AES AgriVerde Ltd.	PT. AES AgriVerde Indonesia: Suite 25.10, Wisma 46, Kota BNI, Jl. Jend. Sudirman Kav.1 Jakarta 10220 AES AgriVerde Ltd.: 10 Queen Street, suite 105 Gibbons Building Hamilton HM11 Bermuda
60	PT. Asahimas Chemical	Jl. Raya Anyer KM.22 Cilegon Banten
61	PT. Batamindo Investment Cakrawala & PT. Asia Carbon Indonesia	Jl Beringin Kav. 204 Batamindo Industrial Park Batam, Kepulauan Riau Indonesia Telp : +62 (770) 611048
62	PT. BUDI ACID JAYA (BAJ)	Jl.H.R. Rasuna Said Kav, C-6 Wisma Budi 8th , 9th Floor Jakarta 12940
63	PT. Citra Koprasindo Tani	Jl. H.R. Rasuna Said Kav. X-2 No:5, Abriobimo Sentral 4th Floor Jakarta

64	PT. Indah Kiat Pulp and Paper, Tbk	WIK Serpong Jl. Raya Serpong KM.8 Tangerang, Banten
65	PT. Indo Bharat Rayon	Jl. Raya Curug KM 10 Desa Cilangkap Kec. Babakan Cikao Purwakarta West Java
66	PT. Indo Karya Kimia	Desa Dawuan Kec.Cikampek, Kab Karawang, Propinsi West Java
67	PT. Indonesia Asahan Aluminium & South Pole Carbon Asset Management Ltd & PT. Carbon and Environmental Research	PT. Inalum: PO BOX 1 Kuala Tanjung North Sumatera South Pole Carbon Asset Management Ltd.: Technoparkstrasse 1 Zurich 8005 Switzerland
68	PT. Krakatau Steel	Jl. Industri No.5, PO.BOX 14 Cilegon 42435 Banten
69	PT. Molindo Raya	Sumber Waras 255 Lawang Malang East Java
70	PT. Pembangkit Jawa Bali	Jl. Ketintang Baru No.11 Surabaya 60231 East Java
71	PT. Prakarsa Tani Sejati & Aretae Limited	PT. Prakarsa Tani Sejati: Jl. Pembangunan I, No. 3 Jakarta 10130 Aretae Limited: 9 Castle Street, Elizabeth House, St. Helier JE4 2QP, Jersey
72	PT. Riau Andalan Pulp and Paper	Jl. Teluk Betung No.31 Jakarta
73	PT. Rimba Partikel Indonesia	Desa Mororejo Kaliwungu Kendal PO BOX 127 Central Java
74	PT. Rohul Sawit Industri & EcoSecurities	PT. Rohul Sawit Industri: Jalan Sungai Sambas IV no. 24A Jakarta EcoSecurities Group Plc.: 40 Dawson Street Dublin 02 Ireland
75	PT. Semen Bosowa	Desa Baruga Kecamatan Bantimurung Maros
76	PT. Semen Gresik	Jl. Veteran, Gresik 61122 East Java
77	PT. Semen Tonasa	Jl. Tonasa II Pangkep
78	PT. Sulawesi Mini Hydro Power	Jl. Raya Dermaga Duren Sawit, Ruko Duren Sawit Center No. 9E, Jakarta 13440
79	PT.Pindo Deli Pulp and Paper Mills	Prof.Dr.Ir.H. Sopotami 88 Karawang, West Java
80	PT.YTL Jawa Timur	Jl. Raya Surabaya Situbondo KM.141 Paiton 67291 Probolinggo

Appendix 4. Summary of Projects Information Obtained from Survey Activity

1. Bali Biogas Program

Name of the Project	:	Bali Biogas Program
Project participants	:	PT. Mulya Tiara Nusa, technology provider
Location	:	Bangli, Tabanan, and Badung Regencies, Bali
Project Costs and Source	:	Total Investment : IDR 15,000,000,000 80% in the form of loan from Bank Syariah Mandiri 20% from PT. Mulya Tiara Nusa
Summary	:	
<p>Project activity is installation of 3000 units of biodigesters which capture and utilise methane from cattles and pigs manure in three regencies in Bali Province. The project aims at reducing methane emissions released by livestock waste by converting it into biogas and utilized it for household activities. The biogas produced will replace the use of woods and kerosene for cooking activities.</p> <p>Currently, cattles and pigs manure from small scale farms are discharged to an open space without any treatment. Through this project activity, cattles and pigs manure will be captured and hold in biodigester unit. The manure will be kept for 5 days to produce methane gas and slurry under anaerobic process. Captured methane will be used for cooking in order to reduce greenhouse gas emissions.</p> <p>The Bali Biogas Programme is the first mass biogas project in Indonesia that started on November 2007. Funding assistance for the project is partially provided by the fund from Ministry of Environment through Bank Syariah Mandiri and PT. Mulya Tiara Nusa (MTN).</p> <p>Installation of biodigesters is being conducted in several stages. Total of 1200 units are targeted to be installed in 2008 while the remaining 1800 units are planned to be installed in 2009.</p> <p>Carbon credit aspect of the project is being developed under Voluntary Gold Standard. The project developer has also engaged in a VER purchase agreement with a UK institution.</p>		

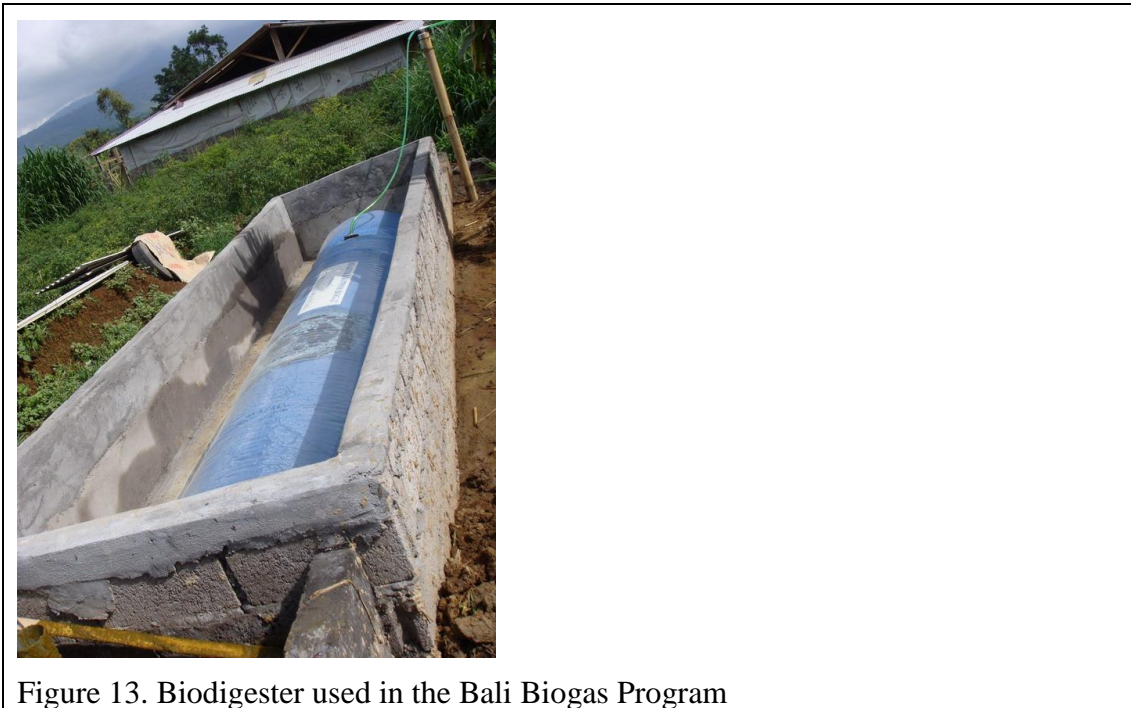


Figure 13. Biodigester used in the Bali Biogas Program

2. Bandung Hotels Energy Efficiency

Name of the Project	:	Bandung Hotels Energy Efficiency
Project participants	:	Bandung Hotel Association
Location	:	Several hotels in Bandung including : Grand Hotel Preanger, Homann Hotel, Pasundan Tower Hotel, Horizon Hotel, and Papandayan Hotel
Project Costs and Source	:	No data Available 100% funded by each hotels
Summary	:	

In order to overcome fuel crisis, Bandung Hotel Association has an idea to promote energy efficiency activity. Activity suggested were replacement of old air conditioners with more energy efficient version, displacement of diesel to fuel water heater system with gas.

Several Hotels were took the initiatives and proved that implementation of energy efficiency contributed significantly to saving of operational costs, in this case up to 14 million rupiahs per month.

The main barrier of this project is on financial issue since replacements of new air conditioning need a high investment. Other barrier is hotel policies which discourage energy efficiency measures. For example, management of several hotels refused to switch the ordinary lamp into more efficient lamp because they were afraid the hotel guests will become uncomfortable with this change.

3. Biomass Power Plant at PT. Rimba Partikel Indonesia

Name of the Project	:	Biomass Power Plant PT. Rimba partikel Indonesia
Project participants	:	PT. Rimba partikel Indonesia Sumitomo Forestry Co. Ltd.
Location	:	Monorejo Village, Kaliwungu Subdistrict, Kendal Regency, Central Java Province
Project Costs and Source	:	USD 6.4 million without CDM transaction cost, while the CDM transaction cost itself is about USD 1.1 million (not the exact number, they only willing to give an estimation) 45% equity, 55% debt (source of debt is confidential)
Summary	:	
<p>PT. Rimba Partikel Indonesia (RPI) is a manufacturing company located in Kendal - Central Java that produces particleboard.</p> <p>The proposed project activity is the construction and operation of new heat (steam boiler) and power generation system (\pm 4 MW) using biomass waste to replace the existing diesel based power generation. The steam generated from the boiler system will be used for wood chips processing and electricity production (steam power plant). Estimated emission reduction from the activity is 14,858 ton CO₂eq per year.</p> <p>Barriers identified is (i) financial barriers due to high investment cost of more than USD 7 million. To overcome this issue, RPI has obtained a loan from a financing institution; (ii) technological barriers with regard to energy stability on combustion in application of wood biomass alone (rather than mix coal and biomass). To handle the problem, RPI devised a system for fuel introduction, furnace capacity, combustion method and removal of combustion ash in order to stabilize combustion energy.</p>		

4. Bogor City Trans Pakuan

Name of the Project	:	Bogor City Trans Pakuan
Project participants	:	Bogor City Government
Location	:	Bogor City, West Java
Project Costs and Source	:	About 10 billion rupiahs (equivalent to about USD 1,000,000) funded through Bogor City budget
Summary	:	
<p>There are several environmental issues in Bogor City. Some of these issues are traffic congestion and air pollution. These problems' solution is supported by the City Management Priorities 2004-2009, which stated transportation issue as the first issue to be solved. Corporate emission from transportation is 67.63% while community emission from transportation is 23.61%. One of Local Government effort in reducing GHG and increasing city transportation service is initiating mass transportation mode</p>		

by developing Bus Rapid Transit (BRT) for replacing small public vehicle gradually. Objectives of mass rapid transit program are (i) changing Small Public Vehicle - SPV (1.000-1.500 cc minibus) with larger capacity vehicle to meet the street spaces efficiency, (ii) improving the mass rapid transit' quality service, and (iii) improving the occupational mobility and discipline culture. This program aims to develop an efficient and qualified mass rapid transit system, which creates a good, safe, and comfortable traffic. The bus can only stop in the shelter, with height of shelter is 70 cm. Type of the bus is Airconbus with 18 seats and 17 stands.

The benefits of implementing BRT are efficiency of fuel consumption and reduce CO2 emission up to 52.3 %. Per unit of BRT (4.500 cc diesel engine) will replace 3 units of SPV (1.000-1.500 cc gasoline engine). The project was initiated by Bogor City Government with 10 buses in year 2007 and another 20 buses in year 2008. It is managed by Bogor City government through PD. Jasa Transportasi as local company. Trans Pakuan is one of business unit on PD Jasa Transportasi's transport service. PD Jasa Transportasi is planning to replace 1.376 SPV served selected route (from total of 10.401 SPV) which equal to 459 buses in 2015.

30 units of SPV which consumed 47.500 liter gasoline per year emit about 1.246 tons CO2 emission, while 10 units BRT which consumed 219.000 liter diesel fuel per year emit 594.21 tons CO2 emission. It means that through replacement of 30 units SPV and operating 10 units BRT, CO2 emission would decrease about 651.79 tons CO2 or 52.3%. Trans Pakuan operated based on PERDA (local government regulation) Kota Bogor No. 5 year 2007, in which the 10 billion rupiahs capital of PD Jasa Transportation is from Bogor City Government budget. 60% of the basic capital has been deposited when PD Jasa Transportation is built, and the remaining will be paid by Local Government within five years by observing the balance report. About 55% of the net profit after tax is shared to local government. However, this arrangement will taking effect only if the basic capital has been paid in full.

Operational activity of the project is monitored by Board of Controller (Badan Pengawas). Its authority is to assess and give approval or rejection to both activity plan and budget as well as finance report. All of the monitoring report is delivered to Mayor of Bogor City. The Board of Controller is consisting of local government element and elite figure/professional personal, such as DLAJ (Traffic, Land Transportation, and Road Agency), Kepolisian (Police), dan Organda (public land transportation association).

Initially the buses used diesel oil as fuel, but after PD Jasa Transportasi develop a cooperation with PT Bumi Egeri Equatorial (PT BEE), who supplies biodiesel oil, all of buses fueled by mix fuel of diesel fuel and biodiesel with comparison of 1 liter BDF: 4 liters diesel.

Before local government decided to launch the Trans Pakuan buses, they made a feasibility study, conducted by an independent institution. During the initial stage of the project implementation, there was a problem with other public transportations' drivers who felt that the project implementation would reduce their income. By that time, Bogor City government transferred public transportation that has same route with Trans Pakuan buses to area that there does not having any public transportation yet.

During the period of April 2007 up to September 2008, PD Jasa Transportasi is

experiencing loss. Total loss up to September 2008 is equal to Rp 816.129.374. Based on calculation for cost of goods sold, ideal ticket price for Trans Pakuan was Rp 6.964,48, while ticket sold only equal to Rp 3.000. PD Jasa Transportation gives subsidy equal to Rp 3.964,48. Income from sale of ticket up to September 2008 is Rp. 1.558.329.500. It is estimated that by the end of December 2008 income comes from ticket selling will be about Rp 2.077.772.664. Other income sources are from Giro account and etc., given total income of Rp 2.108.314.788 at end of December 2008. Operational expenses' of Trans Pakuan up to December 2008 is 48.46% of budget. Other expenses are sourced from bank administration, tax, etc. So total current cost equal to Rp 3.196.487.281. There is no other source of capital, except from Bogor City Budget. Other cost besides operational cost is cost for auditing or feasibility study.

Other technical support came from Ministry of Transportation who donated buses. In year 2007, Ministry of Transportation donated 10 buses type $\frac{3}{4}$ to be tested as public transportation in Bogor. This 10 unit buses is included as deposited basic capital from local government. Later during project implementation, Ministry of Transportation donated another 20 buses which will be operated in December 2008.

This project did not involve any local NGOs.

5. *Bus Rapid Transit : Trans Jakarta*

Name of the Project	:	Bus Rapid Transit : Trans Jakarta
Project participants	:	Jakarta City Government, private investors
Location	:	Jakarta
Project Costs and Source	:	858 billion rupiah for adding three more corridors in 2008. average cost for constructing each corridor : 286 billion rupiahs Operational cost, 15 billion rupiahs per year Source of fund : APBD Jakarta
Summary	:	

As many major cities, Jakarta is plagued with complex transportation problems. In last few years the problems getting worse and can be foreseen to become a major problem in the future. Without fundamental changes to transportation policies, it is estimated that Jakarta will be stuck in a gridlock by 2014. In response to this, the government has been searching for the best solution to be implemented. Finally in 2003 the Jakarta Master Plan was compiled.

The Trans Jakarta system was started operating in Jakarta at the beginning of 2004 and are being gradually expanded. The implementation of Trans Jakarta is regulated through Local Regulation (PERDA) No.12 year 2003. By early 2007, Jakarta operates 7 corridors of Trans Jakarta, and by 2008 is expected to operate 10 corridors.

Currently, Trans Jakarta operational activity is managed by a Badan Layanan Umum (Public Service Unit) as a technical unit under Jakarta City Government. This unit has a direct coordination with Jakarta City's Transportation Agency (Dinas Perhubungan)

Jakarta.

Annual Trans Jakarta operational cost is about 15 billion rupiahs. When the project started, all cost (15 billion rupiahs) was covered by Jakarta City Government, in which 6 billion rupiahs of it was provided as soft loan. This loan is given periodically. Per month, the Trans Jakarta operator will pay the loan return from their income to the Jakarta City's Local Finance Office.

Initially, the bus provisioning was held by Municipal Government of Jakarta, but then it was thought to be conducted in cooperation with private investors. These private investors are public transport companies such as PPD, Mayasaribakti, and Bianglala company.

For the example for financial case, we can use the calculation made by the consultant

According to Ernst & Young calculation (Ernst & Young is an independent financial consultant hired by Jakarta Government). Total operational cost of Trans Jakarta for Corridor I (Blok M-Kota) is 6,500 IDR/km, and the BEP will be reached when passengers total is 37,565 person/day.

Based on the data assumption, Ernst & Young also calculated total income of Trans Jakarta since February 1st up to July 11th 2004 (160 operational days) as follows :

$$\begin{aligned}\text{Income} &= 37,565 \text{ person/ day} \times 160 \text{ days} \times \text{ticket price} \\ &= 37,565 \text{ person/day} \times 160 \text{ days} \times \text{Rp } 2,500 \\ &= \text{Rp } 15,026,000,000\end{aligned}$$

Meanwhile, according to the data from Trans Jakarta' operational agency, the actual income of Trans Jakarta in 160 operational days, with total of 7,405 million passengers is : 7. 405.827 passengers x Rp 2,500

$$= \text{Rp } 18,514,567,500$$

Based on that calculation, Trans Jakarta Operational Agency total profit, in 160 operational days since February 1st till July 11th 2004 : Rp 18.514.567.500 - Rp 15.026.000.000 = Rp 3.488.567.500

Total operational costs are consisting of: Trans Jakarta Operational Agency cost, ticket operator cost, shelter operational cost and depreciation cost.

Social aspects became the main challenge, since the new transportation system (Trans Jakarta) will change public's transportation behavior. Peoples who were previously use private cars for example, was encouraged to use the Trans Jakarta. Another issue was raised by public buses operators who felt that the operation of Trans Jakarta will reduce their income. To overcome these issues, Jakarta City Government conducted socialization events and talk show to public through media such as television and newspapers.

Up to November 2008, Trans Jakarta has operated 295 units, with detail as follows:

Corridor 1 : operating 91 units with all units using diesel fuel

Corridor 2 : operating 55 units with all units using natural gas fuel
Corridor 3 : operating 71 units with all units using natural gas fuel
Corridor 4 : operating 30 units with all units using natural gas fuel
Corridor 5 : operating 17 units with all units using natural gas fuel
Corridor 6 : operating 31 units with all units using natural gas fuel
Corridor 7 : operating 51 units with all units using natural gas fuel

6. Gianyar Waste Recovery Project

Name of the Project	:	Gianyar Waste Recovery Project
Project participants	:	Local Government of Gianyar and Rotary Club Bali Ubud
Location	:	Temesi Village, Gianyar Regency, Bali
Project Costs and Source	:	USD 300,000 Multi-donors (SDC, USAID, IDRC), Local Government of Gianyar, and Rotary Clubs
Summary	:	
<p>Gianyar Regency is one of the wealth regencies in Bali Province. The regency is well known as artisans' regency, wooden sculpture, silver and gold smiths, agriculture, handicrafts and tourism are the main economic activities of Gianyar. Located approximately 70 km to the east of Denpasar, the populations of Gianyar is about 416,728 inhabitants. About 200 ton wastes per day generated but only 50% of it is brought to the landfill, the rest are ended up at the illegal dumping sites in several places.</p> <p>The Temesi landfill operates in conventional open dumping system, create foul smell and pollute the rice fields. To avoid methane release generated from the landfill, the project treat about 50% of waste bring to the landfill which are mostly organic wastes and turn it into compost to be used as soil conditioners. Run by the local community, supervise by GUS Foundation and the Rotary Club (RC) Ubud, the project is implemented in coordination with the local government of Gianyar Regency.</p> <p>Started in February 2004, a 400 m² Material Recovery Facility (MRF) was built in Temesi landfill with the support of USAID/OTI, SDC, Rotary Club Hamburg, Rotary Club Atlanta, Rotary Club Ubud, and BALIFOKUS BORDA, for technical assistant. The facility, which designed to manage 80 m³/day or equal to 20 trucks/day of wastes, was inaugurated in June 2004 and run by the Village Waste Management Council with the supervision from RC Ubud and BALIFOKUS. Starting of 2006, BALIFOKUS role replaced by GUS Foundation. During that period the RC Ubud approached IDRC Canada to get the support for carbon credit potential assessment. IDRC provide supports for voluntary carbon credit through Gold Standard. IDRC also support the development of Environmental Theme Park at the landfill site.</p> <p>The activities implemented were:</p>		

- detail engineering design (DED) development
- construction of the facility
- waste segregation
- composting using force aerobic technique
- training for workers
- environmental education for children, students and public in general

Main outcomes

- Create employments for 60 workers
- Compost production approximately 50 ton/month sold at the price of Rp.1000/kg. Potential revenues from composts are approximately Rp. 50 millions
- Annual operation and maintenance cost is approximately Rp. 120 millions.
- Apply approved methodology IIF Avoidance of methane production from biomass decay through composting (Version 03, 23 December 2006)
- Total carbon emissions reduction 70,000 ton e-CO₂ for 10 years or about in average about 7,696 ton e-CO₂/year
- Total investment cost of project's infrastructure was about US\$ 150,000² received from several donors (Swiss Development Cooperation/SDC, USAID, Rotary Club Hamburg, Rotary Club Atlanta, JICA, Bali hoteliers, etc.). Another US\$ 120,000 still needed to improve and expand the facility operations.
- No information about Gold Standard transaction costs. But IDRC Canada was provide funding support about approximately US\$ 126,500 (CAD 180,800) to develop the PDD and other carbon credit related modalities.
- Credit period is 10 years
- Carbon buyer is KUONI, Swiss-based travel agent. No information available about the carbon price agreed in the transaction.
- About 10% of the ERs goes to LG of Gianyar
- The Temesi villagers enjoy the benefits of 7% from the ERs

Barriers identified:

- ⊗ Financial barriers : Infrastructure investment was quite high
- ⊗ Tecnonology Barriers : Need to explore different composting methods
- ⊗ Institutional barrier : Institutional set up is still heavily coordinated
- ⊗ Social Barrier : Temesi villagers and NGO need more capacity building to be able to manage and monitor the project in the future in a proper way



Figure 14. One of the illegal dumpsite in Gianyar



Figure 15. New composting facility designed for capacity to handle waste about 100 ton/day



Figure 16. Composting process using forced aeration technique

7. *Kabil II 11.4 MW Gas Fired Project*

Name of the Project	:	Kabil II 11.4 MW Gas Fired Project
Project participants	:	Sindicatum Carbon Capital Ltd
Location	:	Jl. Hang Kesturi KM. 4 , Kawasan Industri Terpadu Kabil, Batam, Riau Island Province
Project Costs and Source	:	No data available
Summary	:	
<p>The proposed project activity is the construction and operation of a new natural gas fired grid-connected power plant owned by PT. Indo Matra Power. It will install 6 sets of gas engines, each with the output of 1.9 MW. The generated electricity is imported to Batam grid to increase the generating capacity of PT. PLN Batam1, thereby helping in bridging the gap between demand and supply of electrical energy in Batam.</p> <p>The project activity is estimated to produce reduction emission of 12,798 tCO₂e/year</p>		

8. *Micro Hydro Power Plant at Garung District – South Garut*

Name of the Project	:	Micro Hydro Power Plant At Garung District-South Garut
Project participants	:	YBUL, Ford Foundation, GEF/SGP
Location	:	Garung District, Garut-West Java
Project Costs and Source	:	About 164 million rupiahs, equal to about \$ 16,000 Source of funding: YBUL (Soft loan), GEF/SGP, Community participation
Summary	:	
<p>This project aimed to meet the electricity needs of Desa Garung community. Cipaleubeuh river had the potency needed to develop Micro Hydro Power Electricity (PLTMH). With 140 l/sec of water flow discharge, the Cipabeuleuh river was estimated to be able to generate electricity up to 15 kW.</p> <p>Prior to the project implementation, community of Garung has conducted meetings, discussion and obtained result of survey analysis about the micro hydro technology from YBUL experts.</p> <p>PLTMH unit construction was started at January 2002, and the local community was actively participated on, not only in providing labor but also in providing materials for the construction. The PLTMH was fully operated and by April 2002.</p> <p>Below is information regarding costs and funding in developing PLTMH Garung unit.</p>		

Table 8. Costs and funding in developing PLTMH Garung unit

Amount	Application	Remark
IDR 32.500.000	Capacity building and institutionalizing the community	Grant from GEF/SPG
IDR 117.000.000	Engineering, supply and electricity generator construction	Soft loan from YBUL
IDR 13.678.000	Cost for construction of the generator and electricity transmission unit	Community participation
IDR 350.000	Connection installation to the house	Paid by customer upon installation of the electricity connection
IDR 7.200.000	Operational and maintenance expenses of the electricity generator unit	Annual expenses
IDR 15.000	Customer contribution	Paid by customer every month

PLMTH supply electricity of 220 volt to each house. Initially there were 35 houses participating as the consumer, but by December 2004 it was increased to be 87 house

Beside for domestic lighting, the electricity is useful for economic development such as hulling flour, lighting for home industry and also to operate satellite phone communication, and to access information through television.

To manage the electricity at Garung area, the local community established a Community Financial Management Organization (Lembaga Pengelolaan Keuangan Masyarakat - LPKM), its activity ranges from collecting payment from houses up to PLTMH' maintenance. The LPKM consist of several people chosen by the community to manage PLTMH. Beside the LPKM, there is also a monitoring board which consists of Mosque Management Comitee (DKM) and local house group comitee.

The LKPM were given PLTMH operator training to increase their capacity building in operating and maintaining PLTMH unit. The LPKM' management is responsible for give periodic report to the community meeting.

With training, PLTMH operator is expected to be able to solve technical problem when performing maintenance. PLTMH operator has knowledge about electricity generation component and is able to do minor repair.

9. Surabaya Household Waste Management

Name of the Project	:	Management of Households Organic Waste
Project participants	:	Kalirungkut Village, Surabaya
Location	:	Citizens, Puskota and Surabaya City Government
Project Costs and Source	:	No data Available
Summary	:	

The activity is part of Kitakyushu Techno-Cooperation Assistance (KITA). KITA provides assistance in terms of provisioning expert. On implementation of the activity, KITA cooperated with NGO and local government.

Since year 2000, citizens of Kalirungkut Village have segregated its wastes into organic and non-organic. The organic waste are then manage in Graha Kompos Puskota using open windrow, bio filter and basket stack method.

When this project started, the community of Kalirungkut used their own cost. But in the mean time, government of Surabaya and also donating some support to this program

This project has a number of barriers. Among other is social barriers in terms of difficulty faced in inviting citizen to participate, many of them were not optimist with this program. To overcome this barrier, PUSDAKOTA made a pilot project and socialization to the community through community meeting

Another barrier is technology barriers as follows: (i) Technology applied is Takakura composting method which is previously less familiar and need to be adjusted with Indonesian environmental condition. (ii) Lack of knowledge of the citizens on how to segregate the wastes. The barriers were solved by conducting research activity to find ways to adjust the technology, and by providing guidance to the local community in segregating the wastes.

Appendix 5. List of Carbon Credit Program in Municipal Waste Management Sector

Table 9. List of Carbon Credit Program in Municipal Waste Management Sector

No.	City / Regency	Landfill Site	Waste generation (M3/day)	Waste collected & send to Landfill (M3/day)	Potential Annual Emission Reductions (ton CO2)	Remarks
1	Padang City	Air Dingin	560	448	90.000	FS by ADB & Bappenas
						Cooperation with Global Eco Rescue
2	Jambi City	Talang Gulo	540	324		Cooperation with Global Eco Rescue
3	Palembang City	TPA I (Sukawinatan)	3.315	2.552		Cooperation with PT Gikoko and WB
		TPA II (Karyajaya)		100		
4	Bandar Lampung	Bakung	1.528	1.222		Cooperation with Global Eco Rescue
5	DKI Jakarta	Bantargebang	25.444	25.404		FS by Kajima Corp
6	Bandung/ Cimahi	Babakan Ciparay	5.000	850		FS by Kajima Corp
		Leuwigajah		1.208		
		Sarimukti		2.000		
		Jelekong				
7	Batam City	Punggur	1.303	651		MOU with Eco Securities
						Cooperation with Global Eco Rescue
8	Tangerang City	Rawa Kucing	520	445		Cooperation with PT. Gikoko, WB/CF & The Netherlands
9	Bekasi Regency	Sumur Batu	1.090	300	250.000	Cooperation with PT. Gikoko, WB/CF & The Netherlands, ERPA signed March 2008
10	Malang City	Supi Urung, Mulyorejo	824	659		Cooperation with Global Eco Rescue
11	Mataram City	Gapur-Lobar	750	577		Cooperation with Global Eco Rescue
12	Palu City	Kel.Kawatuna		382		Cooperation with Global Eco Rescue
13	Semarang City	Jatibarang	4.000	3.200		MOU signed with PT. Gikoko
14	Surabaya City	Benowo	8.700	6.064		FS available
15	Yogyakarta agglomeration	Regional Piyungan	1.571	1.335		FS conducted by investor, MOU signed with Eco Securities

16	Pontianak City	Batu Layang	1.400	980	120.000	Cooperation with PT. Gikoko, WB/CF & The Netherlands, ERPA signed 14 June 2007
17	Banjarmasin City	Basirih	947	615		MOU with PT. Gikoko
18	Samarinda City	Bukit Pinang	1.503	1.428		Cooperation with Global Eco Rescue
19	Balikpapan City	Manggar	1.128	1.076		Cooperation with Global Eco Rescue
20	Denpasar/Badung (SARBAGITA)	Suwung	2.909	2.327	100.000	Cooperation with PT.NOEI & UK, ERPA signed Dec 2007
21	Makassar City	Tamangappa	953	810		Cooperation with PT. Gikoko, WB/CF & The Netherlands
22	Gianyar Regency	Temesi	500	150	7.000	Voluntary, Gold Standard, Rotary Club Ubud, buyer KUONI travel

Appendix 6. List of Indonesian DNA Approved CDM Project as per 19 December 2008

Source : summarized from Indonesian PDDs of DNA Approved CDM Projects posted at www.dna-cdm.menlh.go.id/id/database

Table 10. List of Indonesian DNA Approved CDM Project as per 19 December 2008

No	Project Developer	Project Name	Status	Estimated Average Annual ER (tCO ₂ -eq/yr)	Crediting Period	Estimated Project Costs - without CDM transaction costs (USD)
1	PT Indocement Tunggal Prakarsa	Indocement Alternative Fuels Project	First issuance : 80,967 tCO ₂ eq	144,413	2005-2025	15,750,107
2	PT Indocement Tunggal Prakarsa	Indocement Blended Cement Project	Request for issuance	469,750	2005-2014	5 to 10 million during the first five years
3	PT Multimas Nabati Asahan	MNA Biomass 9.7 MWe Condensing Steam Turbine	Registered in EB	46,322	2006-2016	8,000,000
4	PT Murini Samsam (MSS)	MSS Biomass 9.7 MWe Condensing Steam Turbine	Registered in EB	56,116	2006-2016	8,000,000
5	PT Petromat Agrotech	CDM Solar Cooker Project Aceh 1	Registered in EB	3,500	2006-2012	214,776
6	PT Indotirta Suaka	Methane Capture and Combustion from Swine Manure Treatment Project	Request for first issuance was rejected by EB	165,700	2006-2013	2,200,000
7	Darajat Unit III Geothermal Project	Chevron Geothermal Indonesia Ltd.	Registered in EB	628,748	2006-2013	N.A
8	EcoSecurities Indonesia	Biogas Lampung Bekri Project	Registered in EB	21,837	2007-2016	N.A
9	BPPT & Climate Interchange, AG	Cook Stove Kupang Project 1	Approved by Host Country DNA	42,379	2007-2017	N.A
10	Navigat Organic Energy Indonesia	PT. Navigat Organic Energy Indonesia Integrated Solid Waste Management (GALFAD) Project in Bali	Registered in EB	108,749	2007-2014	13,636,000
11	PT Medco Energi Oil & Gas	Medco Energi Associated Gas Recovery and Utilization Project	Approved by Host Country DNA	131,390	2006-2014	N.A

12	PT Cargill Indonesia & Ecosecurities	Amurang Biomass Cogeneration Project	Registered in EB	29,479	2008-2014	N.A
13	PT Multi Nitrotama Kimia & Sindicatum Carbon Capital Ltd.	Multi Nitro, Indonesia Nitrous Oxide Abatement Project	Approved by Host Country DNA	73,656		N.A
14	PT Indonesia Power & Agency for the Assessment and Application of Technology (BPPT) & The Chugoku Electric Power Co., Inc.	Siteki, Plumbungan, Ketenger #4 and Cileunca Hydroelectric Power Project in Indonesia	Approved by Host Country DNA	21,139	2008-2014	N.A
15	PT BUDI ACID JAYA (BAJ) & SUMITOMO	Tapioca Starch Production Facilities Effluent Methane Extraction And On-site Power Generation Project in Lampung Province, Republic of Indonesia	Registered in EB	271,436	2007-2014	N.A
16	PT Odira Energy Persada & Sindicatum Carbon Capital Ltd.	Tambun LPG Associated Gas Recovery and Utilization Project	First year monitoring stage	327,335		Capex : 20,520,000
17	Permata Hijau Group & Mitsubishi UFJ Securities Co., Ltd.	Nagamas Biomass Cogeneration Project in Indonesia	Registered in EB	77,792	2007-2013	8,000,000
18	PT Holcim Indonesia Tbk & Holcim Group Support Ltd	Emission reductions through partial substitution of fossil fuel with alternative fuels in the 2 cement plants of PT Holcim Indonesia Tbk.	Approved by Host Country DNA	453,656	2007-2016	29,545,000
19	PT Manunggal Energi Nusantara & Mitsubishi UFJ Securities Co. Ltd	MEN-Tangerang 13.6MW Natural Gas Co-generation Project	Registered in EB	58,961	2007-2014	12,500,000
20	PT Intibenua Perkasatama	PTIP Biomass to Electricity Project (7 MW)	Approved by Host Country DNA	40,849	2007-2017	N.A

21	PT Sumi Rubber Indonesia (SURINDO), PT Nusantara Energy Solution (NES) & Toshiba Corporation (TOSHIBA)	Gas turbine co-generation project in Indonesia	Registered in EB	28,222	2008-2018	N.A
22	PT Fajar Futura Luwu Energi Luwu, Centre for Application and Assessment of Energy Resources Technology, Agency for the Application and Assessment of Technology (BPPT), The Chugoku Electric Power Co., Inc. & Kajima Corporation	Ranteballa Hydroelectric Power Project in Indonesia	Approved by Host Country DNA	9,748	2008-20014	N.A
23	PT Musim Mas	PTMM Biomass to Electricity Project 26.4 MW(e)	Approved by Host Country DNA	114,210	2007-2017	14,500,000
24	PT Gikoko Kogyo Indonesia, The Municipal Government of the City of Pontianak, Kalimantan Barat, Indonesia & IBRD (Netherlands)	Pontianak-GHG emission recuction through improved MSW management-LFG Capture, Flaring, and Electricity Generation	Registered in EB	91,814	2007-2027	1,369,608
25	PT Listrindo Kencana, PT Sawindo Kencana & Misubishi UFJ Securities	Listrindo Kencana Biomass Power Plant	Request for Registration	76,104	2007-2014	8,400,000
26	PT Bahari Dwikencana Lestari & EcoSecurities Group Plc.	Bahari Co-Composting Project	Approved by Host Country DNA	58,458	2007-2017	Capex : 1,218,014
27	PLN (Perusahaan Listrik Negara)	Lahendong II-20 MW Geothermal Project	Approved by Host Country DNA	N.A	N.A	N.A

28	PT Rimba Partikel Indonesia	4 MW Biomass Power Plants, Using Waste Wood Chips & Saw Dust	Registered in EB	14,858		7,100,000
29	PT Poso Energi	Pamona 2 Hydroelectric Power Plant Project	Approved by Host Country DNA	345,880	2008-2015	141,353,339
30	PT Mega Power Mandiri	Parlilitan 1 Hydro Power Plant	Approved by Host Country DNA	27,673	2008-2015	10,040,000
31	PT Patisari	Patisari Co-composting Project	Approved by Host Country DNA	54,204	2008-2018	1,581,661
32	PT AES AgriVerde Indonesia	Methane Recovery in Wastewater Treatment	Request for Registration	31,895	2008-2015	> 1,000,000
33	PT Asahimas Flat Glass Tbk.,	Fuel switching at Asahimas Ancol a flat glass manufacturing facility	Approved by Host Country DNA	50,474	2008-2014	N.A
34	PT Asahimas Flat Glass Tbk.,	Fuel switching at Asahimas Sidoarjo a flat glass manufacturing facility	Approved by Host Country DNA	40,892	2008-2014	N.A
35	PT Gikoko Kogyo Indonesia	Gikoko Palembang-LFG Flaring Project	Approved by Host Country DNA	105,483	2008-2028	2,371,320
36	PT Fetty Mina Jaya	Fetty Mina Co-composting Project	Approved by Host Country DNA	46,744	2008-2017	756,263 (capital cost) + 245,450 (operational cost/year)
37	PT AES AgriVerde Indonesia & PT Victorian Alam Lestari	Methane Recovery in wastewater treatment, Project AIN07-W-04	Approved by Host Country DNA	42,283	2008-2015	> 1,000,000
38	PT Great Giant Pineapple (GGP)	GGP-UJA Biogas Project	Approved by Host Country DNA	114,551	2008-2028	N.A
39	PT AES AgriVerde Indonesia & PT Tolan Tiga Indonesia	Methane Recovery in Wastewater Treatment, Project AIN07-W-05	Approved by Host Country DNA	31,737	2008-2015	> 1,000,000
40	Pemda Temesi Bali & Rotary Club Bali Ubud	Gianyar Waste Recovery Project	Request for Registration	7,696	2008-2017	N.A
41	PT. Rohul Sawit Industri & EcoSecurities	Rohul sawit industri co-composting project	Approved by Host Country DNA	43,081	2008-2014	1,173,297

42	PT Windu Nabatindo Lestari & EcoSecurities	Windu Nabatindo Lestari Co-compostin Project	Approved by Host Country DNA	104,536	2008-2017	1,698,218
43	PT Karya Makmur Bahagia & EcoSecurities	Karya Makmur Bahagia co-composting project	Approved by Host Country DNA	68,296	2008-2017	1,698,218
44	PT Pura Barutama & NEDO	Partial Fuel Switching From Coal to Biomass Residues (Rice Husk and Saw Dust) in Boilers for Electricity and Heat Generation	Approved by Host Country DNA	70,028	2008-2012	N.A
45	PT Pelita Agung Agriindustri & Mitsubishi UFJ	PAA Biogas Extraction Project for Heat Generation	Request for Registration was rejected	40,021	2008-2014	2,100,000
46	Pemkot Bekasi & PT Gikoko Kogyo Indonesia & IBRD	Gikoko Bekasi- LFG Flaring Project	Approved by Host Country DNA	91,943	2008-2014	3,591,283
47	PemkotMakasar & PT Gikoko Kogyo Indonesia	Gikoko Makassar-LFG Flaring Project	Approved by Host Country DNA	111,455	2008-2014	2,550,980
48	PT Gandaerah Hendana, PT Enviro Mitra Abadi & EcoSecurities Group Plc.	Gandaerah Hendana Co-Composting Project	Approved by Host Country DNA	81,629		2,115,730 (capital cost) + 365,351 (opr cost/year)
49	PT Adei Plantation & Industry	Mandau Biomass Power Plant	Approved by Host Country DNA	32,752	2007-2014	N.A
50	PT Manunggal Energi Nusantara	MEN Energy Efficiency Improvement Project	Approved by Host Country DNA	32,324	2008-2014	14,393,262
51	PT Perusahaan Listrik Negara (PLN) & PT PERTAMINA GEOTHERMAL	Kamojang Geothermal	Approved by Host Country DNA	408,843	2008-2015	N.A
52	PT Pelita Agung Agriindustri & Mitsubishi UFJ Securities Co. Ltd.	Pelita Agung Agriindustri Biomass Cogeneration Plant	Approved by Host Country DNA	130,655	7 years (from 01/08/2008 or immediately after registration)	13,349,717

53	PT. Indo Karya Kimia	Utilization of waste heat from Sulphur Recovery Unit to generate electricity	Approved by Host Country DNA	3,750	2008-2017	N.A
54	PT. Indo Bharat Rayon	Energy efficiency improvement by installation of Circulating Fluidized Bed Combustion (CFBC) Boiler and Back Pressure Turbine at PT. Indo Bharat Rayon, Indonesia	Approved by Host Country DNA	21,599	2009-2015	N.A
55	PT. Batamindo Investment Cakrawala & PT. Asia Carbon Indonesia	Fuel Switch for Power Generation form Heavy Fuel Oil (HFO) Based Engines to Natural Gas (NG) Based Engines at Batamindo Industrial Park (BIP), Batam, Indonesia	Approved by Host Country DNA	44,957	2008-2017	N.A
56	PT. Sulawesi Mini Hydro Power	10 MW Manipi Hydro Electric Power Plant	Approved by Host Country DNA	26,424	2010-2016	N.A
57	PT. AES AgriVerde Indonesia & AES AgriVerde Ltd.	AIN08-W-07, Methane Recovery in Wastewater Treatment, Sumatera Utara, Indonesia	Approved by Host Country DNA	10,495	2008-2015	N.A
58	PT. AES AgriVerde Indonesia & AES AgriVerde Ltd.	AIN08-W-06. Methane Recovery in Wastewater Treatment, Sumatera Utara, Indonesia	Approved by Host Country DNA	17,575	2008-2015	N.A
59	PT. Indonesia Asahan Aluminium & South Pole Carbon Asset Management Ltd & PT. Carbon and Environmental Research	PCF Emission Reductions at PT. Indonesia Asahan Aluminium (PT. INALUM) Kuala Tanjung	Approved by Host Country DNA	58,117	2008-2017	About 5-6 million
60	PT. Citra Koprasindo Tani	Operating Waste Composting at CKT Palm Oil Mill, Indonesia	Approved by Host Country DNA	217,609	2008-2014	4.9 million total
61	PT. Prakarsa Tani Sejati & Aretae Limited	Operating Waste Composting at PTS Palm Oil Mill, Indonesia	Approved by Host Country DNA	101,026	2008-2018	4.9 million total

62	PT. AES AgriVerde Indonesia & AES AgriVerde Ltd.	AIN08-W-03. Methane Recovery in Wastewater Treatment, Sumatera Utara, Indonesia	Approved by Host Country DNA	22,290	2008-2015	N.A
63	PT. BUDI ACID JAYA (BAJ)	Methane avoidance through utilisation of anaerobic reactor for wastewater treatment at tapioca Starch factories	Approved by Host Country DNA	72,560	2008-2017	N.A
64	PT Harapan Sawit Lestari, Cargill International SA & EcoSecurities Group Plc.	Harapan Biogas Project	Approved by Host Country DNA	41,488	2008-2015	N.A
65	PT Nubika Jaya & Mitsubishi UFJ Securities Co. Ltd.	Nubika Jaya Biogas Extraction for Bio-Hydrogen Production	Approved by Host Country DNA	44,181	2008-2015	N.A
66	Nubika Jaya Biogas Extraction for Bio-Hydrogen Production	Utilization of heat content of tail gas at PT Cabot Indonesia, Cilegon	Approved by Host Country DNA	40,384	2008-2012	N.A
67	PT Indo Matra Power & Sindicatum Carbon Capital	Kabil II 11.4 MW Gas Fired Project	Approved by Host Country DNA	12,798	2009-2015	N.A
68	PT Asta Keramasan Energi, Climate Change Capital Carbon Fund 2 SARL, Climate Change Capital Carbon Managed Account SARL	PT ASTA Kerasaman Energi - 145 MW new build CCGT	Approved by Host Country DNA	271,953	2009-2018	N.A
69	PT Cahaya Kalbar Tbk (CK)	CK Biomass 2.4 MWe Condensing Steam Turbine Project	Approved by Host Country DNA	12,842	2008-2018	N.A
70	PT Bukit Kapur Reksa (BKR)	BKR Biomass 4 MWe Condensing Steam Turbine Project	Approved by Host Country DNA	11,616	2008-2017	N.A

Appendix 7. Examples of Renewable Energy Utilization to Electrify Rural Area

Table 11. Examples of Renewable Energy Utilization to Electrify Rural Area

No.	Activity	Capacity	Utilization	Location	Operator
Hydro Pwer Plant					
1.	PLTMH Leuwi Kiara	1 unit @ 12 kW	Electricity	Nagrog Village, West Java	
2.	PLTMH Tou	1 unit @ 50kW	Electricity	Tou Village, Jambi	Village Electricity Manager of Tou Village
3.	PLTMH Rengah Sungai Besar	1 unit @ 50 kW	Electricity	Rengah Sungai Besar Village	Village Electricity Manager of Rengah Sungai Besar Village
4.	PLTMH Talang Tembago	1 unit @ 50 kW	Electricity	Desa TalangTembago, Jambi	Village Electricity Manager of Talang Tembago Village
Solar Cell Power Plant					
5	PLTS Cikawung	100 unit @ 50 wp	Electricity	Cikawung Village, West Java	Village Electricity Manager of Cikawung Village
6	PLTS Ciseureuh	200 unit @ 50 wp	Electricity	Ciseureuh Village, Central Java	Village Electricity Manager of Ciseureuh Village
7	PLTS Pakisan	150 unit @ 50 wp	Electricity	Pakistan Village, East Java	Village Electricity Manager of Pakistan Village
8	PLTS Sumberejo	150 unit @ 50 wp	Electricity	Sumberejo Village	Village Electricity Manager of Sumberejo Village
9	PLTS Sebira	160 unit @ 10 kW	Electricity	Sebira Island, Jakarta	
10	Pompa Air Tenaga Surya (PATS) Sikijang	2 unit @ 64m ³ /day	Water pump	Sikijang Village	
11	Pengering Surya (Solar Dryer) Kali Jaya	1 unit cylinder type	Dryer	Kali Jaya Village, West Java	Harapan Jaya Farmer Group

12	Pengering Surya (Solar Dryer) Ciherang Pondok	1 unit	Dryer	Ciherang Pondok Village, West Java	Mr. Dullah
Hybrid (Combining more than one energy source)					
13.	Hibrida PLTS-Diesel Santian	1 unit diesel generator @ 15 KVA and 1 unit PLTS @ 7 kWp	Electricity	Santian Village, East Nusa Tenggara	Villagers
14.	Hibrida PLTS-PLT Angin-Diesel Oeledo	1 unit diesel generator @ 20, 1 unit PLTS @ 22 kWp and 1 unit PLT Angin @ 10 kW KVA and 1 unit PLTS @ 7 kWp	Electricity	Oeledo Village, East Nusa Tenggara	Village Electricity Manager of Oledo Village
Biomass					
15.	Biogas Cikandang	1 unit	Cooking	Cikandang Village, West Java	Cattle Farmers (cow) of Renteng Village
16.	Biogas Dalemen	1 unit	Vermicelli industry	Daleman Village, Central Java	Vermicelli producer in Daleman Village

Appendix 8. List of Mitigation-related Activities on UNDP Global Environment Facility Small Grants Programme

Table 12. List of Mitigation-related Activities on UNDP Global Environment Facility Small Grants Programme

No	Activity	Location	Local counterpart	Period	Project cost (USD)
1	Micro Hydro	Cagar Alam Simpang (Simpang Wildlife) - West Java	Yayasan Pribumi Alam Lestari (YPAL)	2003-2004	44,338
2	Pico Hydro	Cianjur and Bandung - West Java	Perkumpulan Kelompok Pelestari Hutan (Poklan)	2001-2002	25,000
3	Development of Fresh Water Self-Management trough Utilization of Renewable Energy	West Java	Paguyuban Masyarakat Tambun	2004-2005	2,000
4	Energy Efficient Furnace	Central Java	Yayasan Konservasi Lingkungan	200-2002	15,125
5	Composting	East Java	Citra Bangun Indonesia	2000-2002	28,471
6	Wind power	East Nusa Tenggara	Yayasan Haumeni Soe	2000-2002	21,000
7	Improving Community's Prosperity through Utilization of Renewable Energy	Tana Toraja - South Sulawesi	Walda	2000-2002	40,285
				2003-2004	28,090
8	Renewable Energy for Brick Manufacture Process	Gowa, Takalar - South Sulawesi	Lembaga Advokasi & Pengkajian Pembangunan Desa & Pariwisata	2003-2004	2,000
9	Energy Efficient Furnace and Solar Heating for Fish and Crop' Post Harvest Process	Central Sulawesi	Yayasan Katopasa Indonesia	2003-2004	15,955
10	Solar Thermal Dryer for Cacao	South East Sulawesi	SWAMI	2000-2002	25,000

Appendix 9. Examples of NGOs Working on Mitigation Issues

Table 13. Examples of NGOs Working on Mitigation Issues

Location	Number of NGO	NGO's name
Aceh, Sumatera	4	Forum Study Kependudukan dan Lingkungan Hidup
		Lembaga Pembelaan Lingkungan Hidup Aceh
		Lembaga Pengembangan sosial Ekonomi dan Lingkungan Hidup
		Community for Farmers and Environment Development
Bali	8	GUS (Gelombang Udara Segar) Foundation
		BaliFokus
		LPTP (Lembaga Pengembangan Teknologi Pedesaan)
		Rotary Club Bali Ubud
		Pusat Pendidikan Lingkungan Hidup Bali
		Sekretariat Kerja Penyelamat dan Pelestarian Lingkungan Hidup
		WALHI Bali
Yayasan WWF Indonesia Program Wallacea		
Banten, Java	0	-
Bengkulu, Sumatera	0	-
DKI Jakarta, Java	5	YKEL
		YBUL
		Yayasan Pelangi
		WALHI
		Yayasan Kajian Agama Humanisme dan Lingkungan
Gorontalo, Sulawesi	0	
Jambi, Sumatera	0	
West Java	5	Yayasan Pribumi Alam Lestari
		Poklan
		Ibeka
		YMD
		Paguyuban Masyarakat Tambun Membangun
Central Java	2	Yayasan Konservasi Lingkungan
		Geni
East Java	5	YCBI
		KSM Peduli seloliman
		Konsorsium Seloliman
		Citra Bangun Indonesia
		Pusat Pendidikan Lingkungan Hidup
Jogjakarta, Java	0	-
West Kalimantan	0	-

South Kalimantan	1	WALHI South Kalimantan
East Kalimantan	2	Yayasan Padi Indonesia
		Lembaga Pengembangan Lingkungan dan Sumber Daya Manusia
Central Kalimantan	1	Lembaga Rakyat Penyelamat Lingkungan
Lampung, Sumatera	2	Mina Jaya
		WALHI Lampung
Maluku	0	-
West Nusa Tenggara	1	Yayasan Sumberdaya Lingkungan untuk Pelestarian Pembangunan
East Nusa Tenggara	0	-
Papua	0	-
South Sulawesi	2	LP3M
		Environmental Partner Institute
Central Sulawesi	2	Yayasan Kotapasa Indonesia
		WALHI Central Sulawesi
Southeast Sulawesi	2	Social and Environmental Concern Institution
		Cooperation and Action for Rural and Environment Foundation
North Sulawesi	0	-
South Sumatera	0	-
North Sumatera	0	-
Riau	1	Lembaga Kajian Ilmiah Lingkungan Hidup

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