

Carbon Finance for Low-Carbon Community Development in East Asia

- Cases of the Philippines, Indonesia and China -

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Abstract

Low-carbon development is required in East Asia to achieve development constrained by energy availability and to mitigate anticipated climate change. Incorporating climate change mitigation into community development efforts is important to help put countries on a low-carbon developmental pathway. However, this is not easy to achieve, and one of the major obstacles is finance. In many developing countries, local funding sources are scarce. To address this obstacle, this study explores the potential to use new forms of carbon finance from developed countries, such as carbon credits and voluntary carbon offsets which have recently been being operating in practice, in order to support low-carbon community development projects in developing countries.

This study tries to address several questions. What is the state of carbon finance for low-carbon community development projects in East Asian developing countries where the projects have developmental benefits to the community as well as greenhouse gas (GHG) emissions reduction effects? Are there any low-carbon community development projects that are financed by either not-for-profit finance (i.e., loans which do not seek financial returns), or contributions by non-profit organisations (NPOs) and foundations in developed countries? How can project proponents – either local governments or private organizations – better utilise carbon finance for low-carbon community development projects? What could other stakeholders, such as national governments and international organisations, do to support such local initiatives?

This report examines the above questions and discusses implications for local actors, in particular local governments, who are promoting low-carbon development in the areas of energy, waste and transport, and develops policy suggestions for national and international public institutions to support such local actors in selected East Asian developing countries, i.e. the Philippines, Indonesia and China. To answer these questions, three country case studies were conducted, including nation-wide preliminary surveys and in-depth case studies of nine projects in each of the three countries.

This study found that there were increasing numbers of development oriented clean development mechanism (CDM) projects in the three countries. Also, there are a few climate change mitigation projects for carbon offsetting in Indonesia, some low-carbon community development projects without carbon credits funded by contributions and donations in the Philippines and Indonesia, and no such projects funded by not-for-profit finance.

The study also suggests several barriers to the utilisation of international carbon finance, in particular for carbon finance, especially unfavourable conditions for investors such as high transaction costs and limited knowledge and experiences of local actors. This study also examines the roles played by local governments, including as project proponents and facilitators, as well as the means that local governments use to facilitate projects, such as support for project proponents, enhancing communication among local stakeholders, and providing necessary local ordinances and regulations.

Based on the findings and analyses of the country studies, this study suggests several ways for stakeholders to further promote carbon finance for low-carbon community development projects in East Asian developing countries.

For project developers interested in development, including either local governments or private companies, it is desirable to refocus existing development programmes to incorporate additional GHG emissions reduction effects in order to utilise carbon finance, and to select technologies that utilise locally available technology to avoid higher costs that discourage investors, if international technology transfer hinders project formulation. Project developers should also make more efforts to outreach the concepts of voluntary carbon management and

offsetting.

Local governments should select, revise and implement appropriate developmental programmes that have GHG emissions reduction effects, utilising carbon finance schemes. Local governments are also encouraged to develop and extend the programmatic approach which aggregates many small-scale projects in a certain geographical area so that low-carbon projects can contribute to existing developmental programmes as well as generate revenues from carbon credit production and sales. National governments could support the development of programmatic framework. Local governments would also be able to promote two-step loan to finance low-carbon community development projects by means of effective coordination with national governments and international / local financial institutions. Local governments that are already committed to or interested in developing energy and resource efficient economies could learn from the experiences and knowledge of other local governments using formal and informal networks of individuals and organisations.

National governments and international organisations could support development of low-carbon community development projects by establishing a fund that operates a competitive grant programme, whose grants can be used for underlying finance to projects that show high prospects in terms of contribution to community developmental benefits, and by assisting in knowledge dissemination and capacity development activities for the staff of local governments and financial institutions.

Contents

List of Abbreviations.....	5
List of Tables	6
1. Introduction	7
2. Objectives	8
3. Scope	8
3.1. Financial mechanisms covered in this study	8
3.2. Low-carbon community development projects covered in this study	9
3.3. Case study countries	10
3.4. Methodology	11
3.5. Value-added and limitation	11
4. Findings from country studies.....	12
4.1. Philippines.....	12
4.1.1. State of low-carbon community development projects and their finance	12
4.1.2. Barriers to utilising carbon finance	13
4.1.3. Roles of local governments.....	14
4.2. Indonesia.....	15
4.2.1. State of low-carbon community development projects and their finance	15
4.2.2. Barriers to utilising carbon finance	16
4.2.3. Roles of local governments.....	17
4.3. China	18
4.3.1. State of low-carbon community development projects and their finance	18
4.3.2. Barriers to utilising carbon finance	18
4.3.3. Roles of local governments.....	20
5. The current state of carbon finance and ways to promote low-carbon community development projects	21
5.1. The state of carbon finance for low-carbon community development projects in the Philippines, Indonesia and China	21
5.2. Barriers to financing low-carbon community development projects with carbon credits and difficulties of not-for-profit and non-profit private finance.....	21
5.3. Roles of local governments	22
5.4. Ways to promote carbon finance for low-carbon community development.....	23
6. Conclusion	26
Acknowledgements.....	28
References	29
A1 Cases in the Philippines.....	31
A2 Cases in Indonesia	70
A3 Cases in China.....	81

List of Abbreviations

BaU	business-as-usual
BRT	bus rapid transit
CCBA	Climate, Community and Biodiversity Alliance
CCP	Cities for Climate Protection
CDM	clean development mechanism
CER	certified emissions reduction
CFL	compact fluorescent lamp
CNC	certificate of non coverage
CNG	compressed natural gas
CO	carbon monoxide
CO ₂	carbon dioxide
CSR	corporate social responsibility
DNA	designated national authority
DNS	Debt for Nature Swap
DOE	designated operational entities
EB	Executive Board
EIA	environmental impact assessment
ESCO	energy service company
EU-ETS	European Union Emission Trading System
GHG	greenhouse gas
GWh	giga watt hour
HCs	hydrocarbons
HFC	hydrofluorocarbon
IND	Indonesian rupee
IRR	internal rate of return
LFG	landfill gas
LGU	local government unit
LLDA	Laguna Lake Development Authority
MOA	memorandum of agreement
MOU	memorandum of understanding
MRT	mass rapid transit
MWh	mega watt hour
NPO	non-profit organisation
N ₂ O	nitrous oxide
ODA	official development assistance
PDD	project design document
PDRC	Philippines-China Development Resource Center
PFC	perfluorocarbon
Php	Philippines peso
PIN	project idea note
PNL	Perusahaan Listrik Negara (National Power Company, Indonesia)
PoA	Programme of Action
PPA	power purchase agreement
VER	verified emissions reductions
VOC	volatile organic compound
WTE	waste to energy

List of Tables

- Table 1 Category of underlying finance and carbon credit
- Table 2 Illustrative examples of low-carbon development projects in developing Asia by sectors and by financial mechanisms
- Table 3 Comparison of candidate countries for the study
- Table 4 Number of low-carbon development projects and their finance in the Philippines
- Table 5 Projects for in-depth study in the Philippines
- Table 6 Projects for in-depth study in Indonesia
- Table 7 Projects for in-depth study in China
- Table 8 Estimated transaction cost for CDM projects in China
- Table 9 State of carbon finance for low-carbon development projects

1. Introduction

East Asian developing and emerging countries are experiencing high population growth and increasing demand for improved quality of lives. It is vital to shift the developmental pathways of these countries from existing energy intensive ones to low-carbon ones to avoid negative consequences of limitation of natural resources and climate and ecosystem change. Local and individual behavioural change will be necessary to realize this shift in developmental pathways. It is desirable to promote local initiatives based on self-reliance to make the transition to low-carbon development. Yet financing climate change mitigation projects will be more difficult for developing countries where economic growth for poverty reduction or solving local environmental problems is a priority.

Despite these limitations, several local governments in developing Asia have initiated local actions to mitigate climate change, as shown in ICLEI's Cities for Climate Protection (CCP) programme and a few CDM and voluntary offset projects coordinated by local governments.

However, securing the underlying finance also remains a major challenge for demand-side mitigation projects. Some of these actions often rely on financial support from international donors to secure initial investments or operation and maintenance costs. Without further financial support, replication of demonstration projects is difficult. These issues were discussed by a group of cities in developing Asia at the 4th Kitakyushu Initiative network meeting, one of the international intercity networks for environmental management, held in June 2007. Although international donors have announced several new initiatives of public finance for mitigation in developing countries, the local governments would not be the direct beneficiaries of this financial assistance¹. In addition, there have been few small-scale CDM projects that have developmental benefits to communities and residents compared to large-scale supply-side mitigation projects under the Kyoto Mechanism although there are exceptions such as biomass power generation projects. Securing the underlying finance also remains a major challenge for demand-side mitigation projects.

Recent practices of carbon finance can be seen as one of the new tools to incorporate environmental costs explicitly into the current price of goods and services in developed countries. By using "carbon credits" or "allowances" consumers eventually pay the extra cost associated with GHG emissions either through an emissions trading system or a baseline and credit system. This is a system associated with compliance under intergovernmental agreements such as the Kyoto Mechanism and European Union – Emission Trading System (EU-ETS). These payments can also be made through carbon offsetting, which is a voluntary payment to purchase carbon credits produced by additional reduction of emissions or absorption of GHGs. This kind of carbon finance enables consumers to pay extra money to cover the cost of reducing the environmental burden of the goods and services they consume.

Moreover, these carbon finance mechanisms could be used outside the consumer's home region or country as well as inside. Therefore the money paid by consumers in developed countries to support carbon-offset projects in developing countries could finance projects that have both climate change mitigation and developmental benefits. Examples of this include CDM and voluntary carbon offsetting, which are different from conventional official development assistance through bilateral and multilateral development agencies, since they explicitly value the effects of the reduced environmental burden resulting from the projects.

¹ The World Bank announced the introduction of the Climate Investment Fund, which is composed of the Clean Technology Fund and the Climate Strategy Fund, with 5 billion USD for mitigation and adaptation in developing countries. The Asian Development Bank introduced the Asia-Pacific Carbon Fund with 150 million USD and the Future Carbon Fund with 100 million USD for mitigation. The Japanese government announced the cool technology partnership with Indonesia which will lend 300 million USD.

To what extent are carbon finance mechanisms utilised in developing East Asia to support the projects that have both developmental benefits to local residents and communities and climate change mitigation effects? The study tries to answer this question empirically, and explores what kind of financial sources are utilised to finance community development-oriented climate change mitigation projects in East Asia. This study will examine projects whose GHG emissions reduction additionality is clear as well as some in which it is not clear.

The study also discusses who could fund low-carbon community development projects in developing East Asia through the channel of carbon finance. On one hand, from the perspective of communities in developing countries, the developmental benefits may seem more important than climate change mitigation effects. On the other hand, from the perspective of an investor in climate change mitigation projects, the priority is to minimize the cost of climate change mitigation, since this is what will maximize profits. If the cost is too high, then the investment cannot be justified. Thus, the investors do not have an interest in the developmental benefits of projects, in particular when such elements of the project increase the cost, so the climate change mitigation and developmental objectives of the projects may conflict.

In addition, the study addresses the question of what are the barriers to securing finance and implementing low-carbon community development projects. By looking at the process of project formulation and implementation, the study clarifies the factors that promoted and hindered the development of projects using carbon finance.

Finally the study suggests several options for local actors in developing East Asia, in particular local governments, to best utilise international carbon finance to execute or facilitate low-carbon community development projects with additionality, as well as the roles of national governments and international organisations in promoting international carbon finance for low-carbon community development projects.

2. Objectives

The objectives of this study are to understand the current state of carbon finance for low-carbon community development projects in selected East Asian developing countries and to explore possible ways to further extend the opportunities provided by current international carbon finance schemes, focusing on the roles played by local governments as well as national governments and international organisations.

3. Scope

3.1. Financial mechanisms covered in this study

The financial mechanisms for underlying finance for mitigation projects in general include public and private ones (See Table 1 for a reference). Private finance can be divided into three types: for profit, not-for-profit and non-profit. Private not-for-profit finance is also called social finance². Public finance includes grants from national governments, loans and grants from local governments financed through taxation and bond issuance, loans from public financial institutions, and loans and grants from official development assistance (ODA). For-profit private finance includes private equity investment, loans from commercial banks, and energy service companies (ESCO), which is a special financial scheme for energy efficiency improvement projects. Not-for-profit private finance (social finance) involves loans made by not-for-profit organizations such as credit unions. The loans are expected to be

² Note that some private for-profit finances such as community development finance in developed countries are also included in social finance sometimes. Nature of social finance is its objective to deliver societal values by financing, and is pursuing financial autonomy unlike donation and grant.

repaid with interest, and costs need to be covered, but there is no expectation of dividends or a positive financial return exceeding the initial investment. Renewable energy generation can be financed this way since it can generate income. Another example is not-for-profit microfinance. Non-profit private finance includes funding from foundations, contributions based on corporate social responsibility (CSR) and individuals' donation. These often take the form of grants which do not need to be repaid.

There is also a characteristic financial flow for projects with additional GHG emissions reduction, which produce carbon credits, in terms of the revenue cash flow of the projects. The money is paid to the project proponents when the carbon credits are purchased in advance or after issuance. The carbon market is composed of these transactions of carbon credits, in addition to allowances that are transacted between agents that have emissions reduction goals. There are two kinds of carbon markets to transact credits or allowances, 1) compulsory markets which include certified emission reductions (CERs) produced by CDM projects, and 2) voluntary markets which trade verified emission reductions (VERs). CERs are credits produced for the purchase by entities which have made commitments to reduce GHG emissions under the Kyoto Protocol, whereas VERs are produced for voluntary purchasers.

The underlying finances of for-profit CDM projects are often secured through for-profit finance within developing countries. In contrast, purchase of CERs generally comes from developed countries³.

Among these possible finance mechanisms to implement GHG mitigation projects with community developmental benefits in developing East Asian countries, this study focuses on not-for-profit private and non-profit private finance mechanisms, as well as carbon credit markets as shown in Table 1. Public finance and for-profit private financial flows are also studied when they are mobilised to finance the local mitigation projects that produce carbon credits.

Table 1 Categories of underlying finance and carbon credit to be covered in this study

	Public finance	Private finance		
		For-profit	Not-for-profit (Reimbursable social finance)	Non-profit (Grant / Donation)
With carbon credit	<i>Covered</i>	<i>Covered</i>	<i>Covered</i>	<i>Covered</i>
Without carbon credit	Not covered	Not covered	<i>Covered</i>	<i>Covered</i>

3.2. Low-carbon community development projects covered in this study

In Asia there are demonstrated and potential low-carbon community development projects in the sectors of energy efficiency, renewable energy, waste and wastewater, and transport. These projects include those that were not necessarily implemented for climate change mitigation but for other developmental objectives. The community development projects that are funded through not-for-profit / non-profit private finance include those that reduce GHG emissions but not necessarily additionally. Table 2 shows several examples of projects classified by sector as well as underlying financial sources and carbon credit⁴. To discuss the applicability of carbon credit, the study focuses on the projects that have developmental benefits for communities and climate change mitigation effects, which may or may not be additional.

³ PEAR Carbon Offset Initiative, communication, 17 August 2009.

⁴ For details of these projects and other examples, see the following: Energy efficiency; CDM EB (2006a; b), Renewable energy; CDM EB (2003; 2006d; e; f; g), World Bank Carbon Finance Unit (2008); Waste and Wastewater; CDM EB (2005a; b; 2008); Transport; Roesli (2007).

Table 2 Illustrative examples of low-carbon community development projects in developing Asia by sectors and by financial mechanisms

Sectors	For-profit / public finance with carbon credit	Not-for-profit private finance with / without carbon credit	Non-profit private finance with / without carbon credit
Energy efficiency	Compact fluorescent lamp (CFL) (potential)	None	None
Renewable energy	Solar cooker (India, Indonesia)	Solar Photovoltaic (Bangladesh, India)	Organic waste composting (Bangladesh) Biogas micro digester (China)
Waste and waste water management	Organic waste composting (Bangladesh, Philippines) Biogas micro digester for waste water treatment (Nepal, China)	None	None
Transport	Bus rapid transit (BRT) (potential) Fuel change (potential)	None	None

3.3. Case study countries

In selecting the case study countries among East Asian developing countries the first criterion was to find countries that have cities which are willing to contribute to climate change mitigation since the study is in particular interested in the current and potential roles of local government in low-carbon community development. The number of local governments that are members of international climate networks was used to measure this willingness, as well as some actual experience, as shown in Table 3. The East Asian developing countries that are not listed in Table 3 have no cities or only one city as a member of international networks on climate change. Thus, China, Thailand, Indonesia, and the Philippines are the East Asian developing countries which meet this criterion.

Since the study also looks at the roles of local governments, it is preferable to study countries with different levels of fiscal autonomy of local governments. In this regard, China, Philippines and Indonesia⁵ are selected to represent high, medium and low degrees of fiscal autonomy, respectively.

Therefore, this research focused on the cases of China, Indonesia and the Philippines.

Table 3 Comparison of candidate countries for this study

	Number of local governments that are members of	Fiscal autonomy of local governments (ratio of local revenues to total
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⁵ At the time the data was obtained in this research, the fiscal autonomy of local governments in Indonesia was low, but recent administrative reforms have been enacted to increase their autonomy.

	international climate networks ⁶	revenue)
China	3	57% (2005) ⁷
Thailand	7	19% (2001) ⁸
Indonesia	11	7% (2002) ⁹
Philippines	16	36% (2001) ¹⁰

3.4. Methodology

The necessary information was gathered to analyse current state of finance for low-carbon community development projects with or without additional GHG emissions reduction and the barriers and promoting factors of financial mechanisms such as carbon credits and not-for-profit / non-profit financing in the three case study countries. For each country, an initial overall survey was conducted, and then nine project cases were selected for in-depth study.

There were four criteria for selecting the cases of projects for in-depth study: 1) the project provides developmental benefits to the local community, 2) either the local government or the local community is engaged with the project, if possible, 3) data is available for analysis, and 4) for each country, both implemented projects as well as at least one project that was attempted but not yet financed at the time of the study, should be included among the cases.

The country studies were conducted from September 2008 to January 2009.

After analysing the current state of carbon finance in the case study countries, an analysis of the barriers to utilizing international carbon finance, and the roles of local governments was conducted, and ways to further develop international carbon finance for low-carbon community development projects were examined.

3.5. Value-added and limitation

As Hamilton, Musier and Sjardin (2008) and Hamilton, Sjardin, Marcello and Xu (2008) show, the market for voluntary carbon credits was growing as of 2008 but limited data is available in terms of the state of production of voluntary carbon credits, in particular in developing countries, as opposed to CERs generated from CDM projects. In addition, there is an emerging trend of social finance, such as not-for-profit, and non-profit private finance that are used for social and environmental causes in Europe, the US and Japan. However, in developing East Asia, the current status of the use of these kinds of social and carbon finance, or whether they are used at all, is not clear (Fujii, 2007). This study will address the information gap regarding the current state of voluntary carbon credit generation as well as not-for-profit and non-profit private finance for low-carbon community development projects in selected Asian developing countries. In addition, this study will shed light on the extent to which low carbon development projects such as CDM are associated with local development and are formulated and implemented with the engagement of local communities and local governments.

This study, however, is not necessarily a comprehensive survey of voluntary offsetting and

⁶ ICLEI Cities for Climate Protection, ICLEI Climate Change and Energy, ICLEI Local Renewables Initiative, C40 Climate Leadership Group, Asian Network of Major Cities 21 – Global Warming, UNEP Climate Neutral Network, and ASEAN+6 City Forum on Climate Change

⁷ CLAIR, 2007, *Local administrative and fiscal institutions in China*, p. 78 (in Japanese)

⁸ Takeuchi, T., 2005, “Decentralization: Impacts on infrastructure provisions in East Asian countries,” in *Development Finance Institute Report*, 25, p. 53 (in Japanese)

⁹ Takeuchi, T., 2005, p. 53

¹⁰ Takeuchi, T., 2005, p. 53

not-for-profit and non-profit finance, particularly for the case of China. It is possible that there could be other attempted projects or projects with demonstrated results other than the ones covered in this study, although every effort was made to gather information as comprehensively as possible from various networks and sources available to the local research partners in each country. Moreover barriers and promoting factors were analysed and examined based on only nine projects for each country. Therefore, the results of this study cannot necessarily be generalized, and it is important to be cautious when considering the potential implications of this research. Moreover, it was very difficult to obtain detailed financial data on each project because of the need to maintain confidentiality.

4. Findings from country studies

4.1. Philippines¹¹

4.1.1. State of low-carbon community development projects and their finance

In the Philippines, more than one hundred low-carbon community development projects with the intention of carbon credit production or funding through not-for-profit or non-profit private finance were surveyed. This study found that there are dozens of low-carbon development projects that produce carbon credits and a handful of low-carbon projects that are funded by not-for-profit or non-profit private finance. All carbon credits produced in those projects are CERs and not VERs. No projects that were intended to produce VERs were found.

As explained earlier, it shall be noted, however, that these results are not exhaustive and there might be other low-carbon development projects that are intending to issue voluntary carbon credits, or more projects that are partly funded through non-profit private finance such as contribution of international NGOs, that were not found by this research.

The current state of finance for low-carbon community development projects in the Philippines is summarized in Table 4. This data is based on a questionnaire survey to 110 low-carbon community development projects in the areas of energy efficiency, renewable energy, waste and wastewater management, and transport. These 110 projects were selected in order to examine as many low-carbon projects as possible. More than half of the projects are related to waste and wastewater management such as animal waste management for piggery farms, and around one third are related to renewable energy such as hydropower. The energy efficiency projects include system loss reduction, efficient lighting and heat recovery from power generation. The transport projects include electric jeepneys – mini-bus in the Philippines – retrofitting tricycles, automated dispatch systems for public buses, and establishment of bikeways.

Table 4 Number of low-carbon community development projects and their finance in the Philippines

	For-profit, private	Not-for-profit / non-profit, private	Public	Total
With carbon credit	67	0	2	69
Without carbon credit	1	9	31	41
Total	68	9	33	110

As Table 4 shows, 69 low-carbon development projects are expected to have revenues from

¹¹ This section's description is based on klima's country study of the Philippines. klima (2008)

carbon credits. Most of them are financed by private for-profit financial sources. Thirty-three (33) projects are funded by public financial sources; most of these are from international organisations. Nine (9) projects are funded by not-for-profit or non-profit private financial sources and they do not produce carbon credits for sale.

4.1.2. Barriers to utilising carbon finance

From of the above projects, nine cases of low-carbon community development projects with strong engagement of the local community or the local government were selected and studied in detail to analyze the barriers to utilising carbon finance and the roles of local governments. The selection criteria include: intention to produce carbon credits or obtain funding by non-profit private finance, engagement of the local government or community, and good data availability. Six projects were studied involving carbon credits, and three projects non-involving carbon credits were investigated as shown in Table 5. The three projects not involving carbon credits are funded by non-profit private finance.

Table 5 Projects for in-depth study in the Philippines

	Project name	Sector	Estimated annual credit [ton-CO ₂ e]	Financing status
Projects with carbon credits	Enviro-fit Tricycle Project of Palawan	Transport	7,708	Financed
	Cebu Landfill Gas to Energy Project	Waste	78,889	Financed
	Laguna de Bay Community Waste Management Project: Methane Avoidance - Bundle 1	Waste	6,058	Financed
	Bolinao Methane Recovery Project	Wastewater	6,787	Attempted
	PDRC Biogas Digesters for the province of Cebu	Wastewater	Not available	Attempted
	Sipangpang 1 New Mini Hydropower Plant	Renewable energy	2,471	Financed
Projects without carbon credits	The Electric Jeepney Project in Makati City	Transport	Not available	Financed
	Gawad Kalinga Green Villages	Renewable energy / waste	Not available	Financed
	Micro Hydro Project in Kiangan, Ifugao	Renewable energy	Not available	Financed

Based on the analysis of project formulation and implementation for the above nine projects, the barriers to financing projects were identified in order to help find ways to overcome them. These barriers are grouped into two categories:

Unfavourable conditions for investors

Low-carbon development projects that are focusing on local developmental effects faced higher barriers than normal for-profit projects in obtaining funding through conventional financial institutions that prefer profitability, as expected. Local financial institutions are reluctant to fund projects which are perceived to have high risk, particularly first-of-their-kind projects that have never been tried before. Because of high perceived risks, local financial institutions basically will not finance projects that earn revenue only from selling carbon credits, as was the case for the Bolinao Methane Recovery project and the Philippines-China

Development Resource Center (PDRC) Biogas Digesters project for the province of Cebu. Even if a project has a revenue stream in addition to carbon credits, many local banks consider projects using new technology to be too risky due to lack of knowledge and experience, as was the case for initial stage of the Cebu landfill gas to energy project, which was eventually financed by the largest electric company in Spain. Expected revenues from beneficiaries that are poor may not easily materialise as is the case for the Enviro-fit tricycle-taxi retrofit project. The case of the Sipangpang hydropower project shows that even conventional hydropower projects encountered difficulties to secure funds in the early stages because of its comparatively low internal rate of return (IRR). Financial institutions prefer to lend to organisations that have good credit records. In reality, project proponents of low-carbon community development projects seldom have such records.

The point here is that investors' rational attitude of risk aversion is still hindering realisation of financing low-carbon community development projects even though funding mechanisms have already been established, such as CDM, which is intended to fund projects that would not be realised otherwise.

The size of the project also matters. International investors and carbon buyers tend to look for large amounts of carbon credits, so small-scale projects that produce only a small amount of credits are not very attractive.

There also several cases in which these unfavourable risks and costs discussed above were born by international organisations and donors. In the cases of the Laguna Lake Development Authority (LLDA) waste management project, the Makati electric jeepney project, the Gawad Kalinga Green village project, and the Micro Hydro project in Kiangan, Ifugao, lower expected profits and risks associated with carbon credit issuing were not significant obstacles because public funders appreciated the developmental effects of the projects and could cover these costs and risks.

CDM / carbon offsetting specific issues

Though no projects that produce voluntary carbon credits were found, the projects that are intended to provide CERs, some of which were included in the in-depth project case studies, faced CDM specific issues, as expected.

Regarding the preparation of CDM projects, potential issues that might increase development costs include applicability of CDM methodologies, validation of additionality, appropriateness of IRR, and monitoring methods, as shown in the Enviro-fit tricycle-taxi retrofit project. Transaction costs associated with CDM would be another problem. According to a small-scale waste to energy project developer in the Philippines, the total CDM transaction costs could range from 2.8 to 3.5 million pesos¹², including the project design document (PDD), national approval, validation and verification, registration, monitoring and training.

4.1.3. Roles of local governments

All of the nine cases selected for in-depth study were characterized by strong participation of local governments. Seven projects were implemented by local governments while two projects, i.e. PDRC biogas digesters project and Gawad Kalinga Green Village project, were not. In the PDRC project, provincial officials were expected to identify local beneficiaries and help mobilise local support. In the Green Village project, the municipal government provided the lot for the village through the community mortgage programme and usufruct agreement.

¹² 1 USD = 49 pesos

In the remaining cases, aside from implementation roles, the local governments enacted relevant ordinances necessary for the project or provided counterpart funds to develop and execute the projects. For example, the Vigan city government developed and enacted an ordinance that required all tricycle franchise holders to shift to cleaner technology, and supported the ordinance with sanctions, in the Enviro-fit tricycle retrofit project.

It is notable that four local governments are project proponents of projects that produce carbon credits, when we consider most of the CDM projects in the Philippines are formulated and implemented by private companies funded by for-profit finance. These cases in renewable energy, waste and transport show the possibility of utilising carbon credit to supplement public finance to execute local public investment projects. Moreover, if local governments have planned developmental projects and programmes that also have GHG emissions mitigation effects, but these projects and programmes have not yet realised for various reasons, then they would become eligible for financing through carbon credits, since additionality would be valid. This would contribute to both local development and climate change mitigation.

The case of Vigan city also indicates the importance for local governments to coordinate necessary institutional development, without which new development projects cannot be realised. Local governments can play this kind of coordination role in low-carbon development projects that require public rules and regulations.

4.2. Indonesia¹³

4.2.1. State of low-carbon community development projects and their finance

To study the state of low-carbon community development projects and their finance in Indonesia, questionnaires were sent to ten local governments and seventy CDM project proponents to obtain project descriptions including financing. Interviews were also made to gather necessary information which was not provided through the questionnaire survey.

The study showed that most of the projects with carbon credits are CDM projects but there are a few projects involving voluntary carbon offsetting. In addition, there are a small number of low-carbon development projects that are funded through non-profit private finance, but no projects were found using not-for-profit private finance.

In Indonesia, the designated national authority (DNA) had approved 70 CDM projects as of December 2008. Of these, 30 are renewable energy projects and 12 are waste management projects. Other than these CDM projects, there are at least three voluntary carbon offsetting projects in Indonesia. They are the Bali biogas programme, the Mobuya mini hydro project, and the Gianyar waste recovery project. Their estimated annual emissions reductions are 10,000, 12,250, and 7,000 [tCO₂e], respectively. The Gianyar waste recovery project complies with the Gold Standard.

There are also some low-carbon community development projects that do not produce carbon credits in Indonesia. They are basically a part of governmental programmes for power generation and waste management. Examples include rural electricity programmes and energy self-sufficient village programmes. Most energy sources are renewable such as micro-hydro, solar and biomass. Yet these are not the focus of this study which is mainly interested in new schemes such as carbon credit or not-for-profit / non-profit private financing. One example of this is a project involving rice husk based biomass power generation in East Java, which is funded by a corporate CSR contribution. In Indonesia, however, companies' CSR funds tend to be channelled to the education and health sectors, and it is less popular to use these funds

¹³ This section is mainly based on CER Indonesia (2008).

for development-oriented GHG mitigation.

In terms of the financial sources of the different types of low-carbon projects discussed above, most of the CDM projects in Indonesia are funded through for-profit private finance. Some projects that produce carbon credits are funded by a governmental soft loan called Debt for Nature Swap (DNS), under the Ministry of Environment. An example includes the above Bali biogas programme for voluntary offsetting. Although there have been no demonstrated cases, the Indonesian government developed the Climate Change (Local) Trust Fund to finance local mitigation projects. This fund will be utilised to finance low-carbon development projects from now on.

4.2.2. Barriers to utilising carbon finance

Out of the above projects whose basic project information was collected, nine low-carbon community development projects with strong involvement of local communities or local governments were selected and studied in detail to understand the barriers of utilising carbon finance and the roles of local governments, as in the case for the country study of the Philippines. The selection criteria are the same: intention to produce carbon credits or funding by non-profit private finance; engagement of local governments or communities, and good data availability. Four projects involving carbon credits and five projects non involving carbon credits were analysed. The nine projects for in-depth study in Indonesia are listed in Table 6.

Based on the analysis of these case studies, the barriers to financing projects are summarised as follows, following the same categories as the Philippines case:

Table 6 Projects for in-depth study in Indonesia

	Project name	Sector	Estimated annual credit [ton-CO ₂ e]	Financing status
Projects with carbon credits	Bali Biogas Programme	Wastewater	10,000	Financed
	Gianyar Waste Recovery Project	Waste	7,696	Financed
	Kabil II 11.4 MW Gas Fired Project	Energy Efficiency	12,798	Financed
	Biomass power plan at PT. Rimba Partikel Indonesia	Renewable Energy	Not available	Financed
Projects without carbon credits	Bogor City Trans Pakun	Transport	Not available	Financed
	Bus Rapid Transit: Trans Jakarta	Transport	Not available	Financed
	Bandung Hotels Energy Efficiency	Energy Efficiency	Not available	Attempted
	Micro Hydro Power Plant at Garung District-South Garut	Renewable Energy	Not available	Financed
	Management of Households Organic Waste	Waste	Not available	Financed

Unfavourable conditions for investors

Investing in renewable energy in Indonesia is relatively attractive since Indonesia is rich in renewable energy sources and fossil energy sources are becoming scarce. There are, however, some barriers for renewable energy projects. The first one is the difficulty in concluding power purchase agreements (PPA) to sell electricity to Perusahaan Listrik Negara (PLN, or National Power Company) or to sell biofuel to Pertamina, the National Oil Company. The

review and negotiation process for the PPA raises transaction costs. The second barrier is the low selling price of electricity, because renewable power plants produce low to medium voltages which is more costly than conventional energy sources due to reliance on imported technology. This also leads to unfavourable conditions for project proponents and investors.

In the waste sector, project size can be an issue for landfill waste to energy projects. For CDM suitability at least around 400 to 500 tons per day of waste generation is necessary and this can be achieved only in a large metropolitan city. Many small-size projects are not attractive for private investors. Even for a project that could secure non-profit funds from international organisations, international NGOs and the local government, the project proponent still encountered difficulties in securing necessary funds for facility operation as shown in the case of the Gianyar Waste Recovery project.

Specific issues regarding CDM / carbon offsetting

Local governments are often approached by CDM investors, but local government officials often do not have adequate knowledge about CDM and do not understand the proposals. Such limited readiness at local level hinders the development of feasible projects. In the case of one CDM project, the local government set up a body to facilitate communication with CDM investors and other stakeholders in order to overcome this barrier as described in the next section.

4.2.3. Roles of local governments

In Indonesia, the study found that local governments play the roles of both project implementer and facilitator for low-carbon development project in their localities. Some local governments take a proactive role to help compensate for their own lack of experience in carbon finance as well as that of other local stakeholders.

In some cases local governments act as project proponents. For the energy sector, the provincial governments of Riau and Gorontalo are trying to develop and implement CDM projects of a biomass power plant in Siak Hulu Cluster and a project to produce biofuel from *Jatropha*, respectively. For the waste management sector, the local governments of Bekasi and Pontianak set up a designated agency called Dinas Kebersihan dan Pertamanan as an implementer of a CDM project. In the transport sector, the local governments of Jakarta and Bogor introduced Bus Rapid Transit programmes to increase the utilisation and quality of public transport, including fuel switching to compressed natural gas (CNG). The government of Jakarta also tried to develop a CDM project for a monorail.

Local governments have also facilitated and supported the realisation of low-carbon community development projects. The local governments of Bekasi and Pontianak mentioned above also allocated funds for a feasibility study, an environment impact assessment (EIA) and underlying investment of infrastructure construction for a waste management CDM project. The local governments of Sarbagita, comprised of one city of Denpasar and three regencies of Gianyar, Badung and Tabanan, facilitated the CDM projects by establishing a Regional Waste Management Body. The body is responsible for attracting investment, selection of investors, negotiation with investors and monitoring of the projects. The body works as a bridge between local governments and CDM investors.

A Programme of Action (PoA)¹⁴ scheme that combines several small projects in a wide area under an overall programme could be also effective to facilitate development-oriented GHG mitigation projects. PoAs have been adopted by several local governments such as the provincial governments of Gorontalo and Sragen Regency to provide multi-year funds for

¹⁴ This PoA is different from Programme of Activities for CDM.

endogenous or organic agriculture projects through local and provincial government funds. National and / or provincial financial support is provided to replicate a specific practice. The local government would coordinate with project proponents seeking investment. This PoA mechanism could be utilised to promote small-scale low-carbon community development projects in a particular region.

4.3. China¹⁵

4.3.1. State of low-carbon community development projects and their finance

For China, the only low carbon development projects found by the study were CDM projects with carbon credits. No voluntary carbon offsetting projects were found in the areas of energy efficiency, renewable energy, and waste and wastewater management. Also, the study did not find any low-carbon development projects funded through not-for-profit or non-profit private finance, though it is possible that some low-carbon development projects funded by non-profit private finance may be funded by international developmental assistance from NGOs in developed countries.

The number of CDM projects that were approved by the Chinese DNA has increased drastically. After the very first CDM project was approved on 10 January 2006, 255 projects were approved by the end of year 2006. In 2007, 773 projects were approved and 570 projects had been approved by 3 November 2008. The total number of CDM projects approved is 1,598 as of 3 November 2008. Around half of the projects approved are hydropower projects. Wind power, waste heat / gas utilisation, methane recovery, energy efficiency, and biomass projects are the next most common project areas. The CDM projects relating to hydropower, wind power, methane recovery and biomass are considered to contribute local low-carbon development in the sectors of energy and waste management in particular in rural areas. Yet most of these projects are related to energy supply and do not directly incorporate the demand-side of energy, although such a project of biogas micro digester using programmatic CDM has been developed in Chongqing and is currently under review¹⁶.

The number of development-oriented GHG mitigation projects that produce voluntary carbon credits is still limited in China. This study could find such projects only for reforestation prepared by the Climate, Community and Biodiversity Alliance (CCBA)¹⁷.

Regarding the low-carbon community development projects that do not produce carbon credits, opportunities in China for not-for-profit or non-profit private finance were also found to be limited. Low-carbon community development projects in the sectors of renewable energy, waste and wastewater management and transport are funded by either national / local governments or international organisations.

4.3.2. Barriers to utilising carbon finance

To understand the roles of local governments and the barriers of utilising carbon finance, nine low-carbon community development projects with involvement of the local community or local government were selected for in-detail study out of the projects that were initially surveyed. The selection criteria are the same as the other two country studies: intention of carbon credit production, engagement of local government or community, and good data availability. Six projects involving carbon credits and three projects not involving carbon credits were analysed. The nine projects for in-depth study in China are listed in Table 7.

¹⁵ This section is mainly based on the study with local partners in China (Sun, Liu and Qu (2008))

¹⁶ <http://www.pear-carbon-offset.org/project/02.html> (in Japanese)

¹⁷ <http://www.climate-standards.org/projects/index.html>

Table 7 Projects for in-depth study in China

	Project name	Sector	Estimated annual credit [ton-CO ₂ e]	Financing status
Projects with carbon credits	Shandong Weihai 69 MW Wind Power Project	Renewable Energy	137,239	Financed
	Xiaohe Small Hydropower Project	Renewable Energy	41,589	Financed
	Hebei Jinzhou 24MW Straw-fired Power Project	Renewable Energy	178,625	Financed
	Rizhao Luxinjinhe Methane Power Project	Renewable Energy	210,000	Attempted
	Qingdao Biomass Power Project	Renewable Energy	49,540	Attempted
	Daba Cement Works Waste Heat Recovery and Utilisation for Power Generation Project	Energy Efficiency	65,000	Attempted
Projects without carbon credits	Weihai Waste Incineration Project	Waste	Not available	Financed
	Weihai Methane Programme for Rural Area	Wastewater	Not available	Financed
	Weihai Urban Greening Project	Forestation	Not available	Financed

Based on the case studies of project formulation and implementation of the above nine projects, the barriers to financing projects were classified as follows in the same way as the two other country studies:

Unfavourable conditions for CDM investors

Although all projects have risks associated with expected benefits, CDM projects are seen to have higher risks than many other business projects, including uncertainties and costs specific to CDM projects. The risks associated with CDM projects in general are explained first, and those specific to China are described later.

The first one is registration risk. The project proponent must go through three levels of domestic approval processes, including the city, provincial and national levels. For the international application, the proponent needs to find buyers of carbon credit, pass the designated operational entities (DOE) validation, and clear the registration assessment by the CDM Executive Board (EB). This registration process normally takes more than one year and there is also a risk of failure of registration at some point.

The second risk is the prepayment of transaction costs, which include PDD preparation costs, negotiation costs, DOE validation costs, registration costs, monitoring costs, verification costs, consultant fee, and the charge by the DNA. These costs are required for the project proponents before they earn the revenue from credits unless the sales are prepaid. In addition, the unit transaction cost is larger for smaller projects. The case of China is shown in Table 8¹⁸. For example, if the figures in Table 8 are valid, the price of carbon credit should exceed at least 13 [USD/tCO₂e] to cover the transaction costs of a small-scale project. The smaller the project size, the larger this critical credit-selling price becomes.

Table 8 Estimated transaction costs for CDM projects in China

Project size	Annual emission	Transaction cost
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¹⁸ China 21st Agenda Administration Centre, Global Environment Research Centre, Tsinghua University, 2008, *Clean Development Mechanism project development and practice in China*.

	reduction [tCO ₂ e]	[USD/tCO ₂ e]
Very large	> 200,000	0.1
Large	20,000 – 200,000	0.4 – 1.3
Small	2,000 – 20,000	13
Very small	200 – 2,000	130
Micro	< 200	1,300

The third risk is associated with the gap between the estimated and actual amount of credits issued. This could happen for example in the case of methane recovery projects at landfill sites.

Another problem specific to China is that there is a discrepancy between the CDM-EB rule of additionality and the related domestic regulations. The Chinese government requires that each CDM project should have a higher IRR than the benchmark for each industry, yet the CDM-EB considers that such a high IRR indicates no additionality. Therefore, Chinese project proponents need to modify the feasibility study to meet the CDM-EB requirement after they obtain domestic approval.

In addition, China has a regulation that limits eligibility to be a CDM project proponent to private companies and excludes local governments. This hinders some CDM projects where it is more appropriate to have a governmental organization as coordinator, for example in the case of biogas micro digester distribution projects for farmers in Chongqing¹⁹.

China's special policies on CERs can also discourage investors²⁰. The revenue from CERs will be owned both by the Chinese government and the project owner, and the allocation ratio of the revenue to the government differs according to the type of project. The ratio for hydrofluorocarbon (HFC) and perfluorocarbon (PFC) projects is 65%, nitrous oxide (N₂O) projects 30%, and energy efficiency / renewable energy / methane recovery and utilisation / forestation projects 2%. This allocation policy creates an incentive for investing projects in the priority areas of development policy. The number of DNA approved projects in the sectors of energy efficiency, hydropower, wind power, and methane recovery and utilisation have steadily increased since 2005 to 2008 while the number of HFC reduction projects did not increase between 2005 and 2007 and there have been no projects since 2008.

4.3.3. Roles of local governments

In China, local governments actively play various facilitating roles, but they do not develop and implement projects directly due to CDM regulations.

For CDM projects, local governments in China have played the role of facilitator, recognising the benefits of local development through CDM projects. Local governments sometimes provide necessary land and electricity with favourable conditions to CDM projects, as was the case for the Shandon Weihai 69 MW wind power project, the Rizhao Luxinjinhe methane power project, the Daba cement works waste heat recovery and utilisation for power generation project, and the Qingdao Fulai biomass power project. In the case of the Xiaohe small hydropower project, the local government took the necessary GHG mitigation actions after the Environmental Impact Assessment and before they issued the construction permit. The Jinzhou government set up an organisation to collect and supply straw from farmers to the power station, and let all factories and buildings use the central heating system which would be provided by the CDM project in the Hebei Jinzhou 24 MW straw-fired power project. The local government also assisted the project proponent to organise the straw collection and transportation in the case of Qingdao Fulai biomass power project.

¹⁹ PEAR Carbon Offset Initiative, interviewed on 11 March 2009.

²⁰ Iyadomi (2009).

In many cases of CDM projects, the local government also coordinated the relationship between project proponents and communities, including holding public hearings, conducting outreach activities, and providing benefits to the stakeholders who would be affected by the new project. For example the local government conducted a public campaign to explain the expected benefits of a new project and constructed the water supply system to provide running water to nearby people, and combined it with the hydropower project in the case of the Xiaohu small hydropower project operated in a county which is a high priority for poverty alleviation. The Jinzhou government provided owners of small boilers with preferential policies and subsidies when they eliminated small boilers in the case of Hebei Jinzhou 24 MW straw-fired power project.

Regarding the projects that do not produce carbon credits, local governments also play a facilitating role, as is the case for the Weihai Methane Programme for Rural Areas. The initial costs to install methane micro digesters are borne by the national government, the local government and individual farmers, one third each. The local government initiated the rural methane programme in Weihai and provided the information for the programme, training courses, subsidies, and free technical services. The Agriculture Bureau is responsible for the programme and the rural energy service under the bureau is responsible for the technical services.

5. The current state of carbon finance and ways to promote low-carbon community development projects

5.1. The state of carbon finance for low-carbon community development projects in the Philippines, Indonesia and China

The state of carbon finance for low-carbon community development projects in the Philippines, Indonesia and China is summarised in Table 9 below:

Table 9 State of carbon finance for low-carbon community development projects

	Carbon credits	Not-for-profit private finance	Non-profit private finance
Philippines	CDM only	None	Some
Indonesia	CDM plus voluntary offset	None	Very few
China	CDM only	None	None

This study shows that currently most carbon finance in the Philippines, Indonesia and China is based on CDM. The number of projects for voluntary carbon offsetting is limited. It also shows that there are a few low-carbon community development projects that are partly funded by non-profit private financial sources, but none for not-for-profit private finance, which requires financial reimbursement of initial investment if not a positive return²¹. This implies that the supply of CERs is larger than that of voluntary VERs in East Asia. This might be partly attributable to the lower price of VERs from project owner's perspective. It is also suggested that types of environmental projects that produce revenue cash flow are limited and hence it is difficult to find low-carbon development projects that are funded through not-for-profit finance.

5.2. Barriers to financing low-carbon community development projects with carbon credits and difficulties of not-for-profit and non-profit private finance

²¹ Examples of not-for-profit private finance are lending by microfinance institutions and credit unions.

The above discussion illustrates the existence of several types of barriers to the utilisation of carbon finance, in particular CDM, to fund low-carbon community development, as was initially expected.

The first category is unfavourable conditions for investors, which make it difficult to secure the underlying finance. New technology used in low-carbon development is seen by investors as risky and makes them reluctant to finance projects as observed in the Philippines and Indonesia. Low profitability associated with high transaction costs and small size of projects, or the low amounts of the carbon credits, also reduces the attractiveness for the investors. High transaction costs were concretely demonstrated in Indonesia and China and difficulties of investment for small-scale projects were pointed out in the Philippines, Indonesia, and China.

In addition to these unfavourable conditions, local government officials and the staff of local financial institutions often have limited or no knowledge and experience regarding carbon finance. This has also made project development and finance difficult in the Philippines, Indonesia, and even China, which is the second largest host country of CDM projects in terms of registered projects. Moreover, the concepts of carbon credit or even climate change mitigation in general, are still difficult for ordinary citizens to understand.

Though these barriers are not necessarily characteristic for all low-carbon community development projects, the lower profitability of development-oriented projects and the novelty of carbon credits are important obstacles to consider when developing possible promotion measures.

One reason for the absence of not-for-profit finance for low-carbon community development projects is the difficulty in developing appropriate business models which incorporate mitigation of GHG emissions while receiving payments from the beneficiaries of the project could pay and / or the project produces products and services that can be sold to external buyers.

Barriers to non-profit finance for low-carbon development projects include the higher costs associated with their lack of viability as an ordinary business. This tends to limit non-profit finance such as CSR contribution and grants from international organisations to small-scale projects and prevents the extension of good practices, as exemplified in the Philippines and Indonesia.

5.3. Roles of local governments

The study showed that local governments can play various roles. In the Philippines and Indonesia, local governments are both implementers and facilitators of many low-carbon development projects including CDM projects. In China local governments play various facilitating roles for CDM projects because of governmental regulation of CDM. As facilitators, local governments support project proponents to help to develop the project smoothly and remove obstacles. Local governments provide the necessary land and electricity if necessary. Local governments also facilitate communication between project proponents, local stakeholders and residents so that stakeholders understand the benefits of new projects and potentially can be compensated for negative consequences, if any, in advance. Local governments can also develop necessary regulations and implement local ordinances to support the new projects as shown in the Philippines cases. All these demonstrated cases could be further promoted and shared with other local governments in different countries.

The rural methane programme in China suggests that local governments could effectively and proactively utilise carbon finance for conventional developmental programmes. Local governments should select and implement appropriate developmental projects and

programmes that also have GHG emissions reduction effects. These kinds of projects are likely to be able to demonstrate additionality of emission reductions, so they should be able to effectively mobilise carbon finance.

In addition to the roles played by local governments, the study found that provincial and national governments played complementary roles in the cases of PoAs in Indonesia and the rural methane programme in China. In those cases, higher level local or national government units provided funds necessary for the initial investment by local governments so that small-scale low-carbon community development projects could be extended according to the maximum financial capacity of each stakeholder under the matching principle.

The roles of provincial and national governments should be mutually reinforcing and further promoted to maximize the geographical and diffusion of good practices.

5.4. Ways to promote carbon finance for low-carbon community development

Based on the study results summarised in sub-sections 5.1 to 5.3, possible ways for stakeholders such as local governments, project proponents, national governments, international organisations, and funding institutions in developed countries to promote private finance for low-carbon community development projects in East Asian developing countries are discussed in this section.

Addressing investment barriers

Although CDM is a carbon finance mechanism which is relatively widely used in the Philippines, Indonesia and China compared to the other financial mechanisms, there is still considerable scope to expand its use further. In order to do this, unfavourable conditions for investors and CDM specific issues should be addressed.

From a project proponent's point of view, it is wise to use locally available conventional technologies (rather than imported technologies) as much as possible to develop low-carbon development projects to avoid perceived risks of local investors, since such perceived risks actually hinder financing as shown in Indonesia. This implies the selection of appropriate locally sustainable technologies is desirable to maximize the utilisation of carbon finance at this time. Methane recovery projects or biomass power generation from agricultural waste would be included in such technologies in many regions. Technology diffusion within developing countries is suggested when international technology transfer could involve difficulties in obtaining financing. Otherwise it is better to seek financial institutions and funders who understand the concept of carbon credit and technologies that are well understood internationally. To realize this, one option could be two-step loans specifically for carbon finance from international financial institutions to designated funding agencies to local financial institutions. In this case, coordination and guidance of national and local governments are necessary. It would also be effective for an organisation such as a regional CDM centre in China to provide information on investors who are familiar with technologies as well as the concept of carbon credit as utilised in carbon markets. Capacity development of domestic financial institutions would be important in order to mobilise domestic credit capacity.

What project proponents can do to reduce high transaction costs is again the selection of appropriate methodologies that have lower uncertainty of credit issuance and high availability of local workers and supporting industries, or at least supportive programmes by local, regional and national governments. Since project proponents are basically private companies, local governments could guide local project developers to formulate desirable projects by creating small incentives so that the projects are aligned with existing local and national development programmes.

Concerns that small-scale projects might not produce enough carbon credits or other revenue streams could be addressed through the utilisation of programmatic CDM schemes as much as possible. A programmatic CDM scheme bundles and coordinates many small projects in a particular area; otherwise they are too small to be considered by investors to be a single project. As exemplified in the Indonesian case, a PoA approach could be effective when the project does not produce carbon credits. The project proponent, however, does not necessarily need to produce a large enough amount of credits to attract investors. Since the focus of the study is to promote low-carbon development through carbon finance, too much emphasis on a least-cost approach for GHGs emission reduction might not be a priority when there are diverse environmental and societal values that could be realised through the projects. This leads to the argument that it is important to incorporate the value of developmental benefits into projects' financial considerations, in addition to the value of additional GHG emissions reductions. Moreover it is not wise to generate more waste simply to make a landfill waste project economically viable. This contradicts the value of sustainability.

Simplification of the registration process is a very important issue, but it is a matter to be decided by the organisations that decide the concrete requirements for the approval of the projects that produce carbon credits. If a scheme using voluntary carbon credits could achieve a simplified approval process and produce several projects that actually issue carbon credits, then the institutional design would become easier. There is, however, a caveat on simplification of registration. Carbon credits should not be easily issued since they allow purchasers of credits to emit more GHGs. Selection of appropriate methodologies that provide accurate estimates of expected reductions would be essential.

Knowledge dissemination and capacity development

The study showed that limited knowledge and awareness of carbon credit schemes and climate change issues in general were found to be obstacles to financing projects with carbon credits. These barriers could be addressed by further implementation of capacity development training targeting local stakeholders including local governments and financial institutions. Gradual extension of trainees from committed organisations to interested ones and utilisation of a Training of Trainers (TOT) mechanism could be effective to best utilise the available resources. This capacity development activity can be justified by the local and national governments if these new environmental financial mechanisms can effectively generate funds for projects which address existing local and national priorities, respond to local development needs, and which can gain the support of local stakeholders who will appreciate their benefits.

Enhancing the roles of local governments

Several local governments have played effective facilitation roles to support project proponents as well as promote communication among stakeholders. They have also provided land and electricity, developed necessary local institutions, and provided benefits and subsidies.

These local governments' experiences can be shared with other local governments, both domestically and sometimes internationally, that are interested in low-carbon development using new environmental financial mechanisms. The roles of international networks between local governments were seen as positive by Puerto Princesa, Vigan, Cebu and Cantillan for the Philippines, Surabaya for Indonesia, and Weihai for China.

In addition to the demonstrated cases, local governments could promote two-step loans to finance low-carbon community development projects by effectively coordinating with national governments and international / local financial institutions.

A key point is that local governments can use carbon financing to revitalize stalled developmental projects, if these projects also have GHG emissions mitigation effects, since additionality could be demonstrated.

Further development of not-for-profit / non-profit private finance

The barriers to not-for-profit private finance for low-carbon development projects could be overcome if the revenues could be increased or costs could be reduced. The social business model, which creates social value while paying back the original investment but does not deliver profits or dividends to investors, such as the microcredit business in Bangladesh by Grameen²² or IT-based educational and medical services in Bangladesh by bracNet²³, is an attractive business model if it could be applied to low-carbon community development in East Asian developing countries.

There are several trials of microcredit for renewable energy in India and China and these cases might demonstrate potential ways to overcome these barriers. They include solar photovoltaic power generation financed by microcredit²⁴, solar photovoltaic power generation operated and maintained through a fee-for-service mechanism similar to ESCO²⁵, solar heating funded through two-step loans²⁶, and solar rechargeable lanterns paid by beneficiaries²⁷, all in India. Other cases include a solar photovoltaic water pumping system for irrigation in India funded through subsidies, soft loans and beneficiaries' payments²⁸ and wind power generation funded by government investment and partially operated and maintained by beneficiaries' payment in China²⁹.

What, then, can project proponents do for the low-carbon community development projects that do not expect conventional revenue streams either from big utility companies or beneficiaries? A combination of carbon credits and non-profit private finance could be the answer. If the buyers of carbon credits expect the return of social value such as GHG emissions reduction, biodiversity conservation and community sustainability, instead of financial return from the initial investment, the project could earn a cash revenue stream, to support the initiation and operation of the project. If there is a solid market for carbon credits, those credits could be purchased and utilised for carbon offsetting by individuals and organisations that have such financial capacity as well as some motivation to pay additional costs to support social responsibility³⁰. Though such money might be considered as an ordinary donation or contribution, it can also be regarded as the purchase of products or services associated with a concrete social value. National governments and international organisations could establish a fund that could be used to finance projects that demonstrate a high potential to contribute to community developmental benefits. This would be like a combination of the World Bank's Community Development Carbon Fund and its Development Marketplace. The former finances projects that benefit both community development and GHG emissions reduction. The latter is a competitive grant programme that identifies and funds innovative, or early stage projects that may have large developmental impacts.

When the demand becomes steady for carbon credits with high expected contribution to

²² Yunus (2007)

²³ Hara (2009)

²⁴ Kamal (2002) and Rehman (2003)

²⁵ Chaurey (2003)

²⁶ Garud (2004a)

²⁷ Garud (2004b)

²⁸ Garud and Kamal (2004)

²⁹ Shi (2004)

³⁰ The size of voluntary carbon market in the world in 2007 is estimated as 90 million [tCO₂e] and 555 million USD (Hamilton, Musier and Sjardin (2008)). Around the half of the credits sold at OTC market in the US were produced in developing countries, in particular Asia (Hamilton, Sjardin, Marcello and Xu (2008)).

development, there would not necessarily be a concern about fluctuating unforeseeable demand and cash flows. Therefore it is important to consider how this trend of a transition from voluntary market valuation of environmental services to compulsory monetary valuation of such services could be promoted. This could be one step towards the eventual realisation of carbon pricing, by helping ordinary people to visualise the environmental burden attached to daily consumption in monetary terms.

Although in the three country studies there were no clear cases of low-carbon development projects in the transport sector which are either producing carbon credits or funded through non-profit private finance, some remarks should be added. For the low-carbon development projects in transport sector, which face significant difficulties in producing carbon credits because of unclear effects and project boundaries, conventional public or non-profit private finance could be effective funding sources. Transport issues are often associated with urban planning, which requires management of land use and land use change and are basically funded through public finance. However, small-scale low-carbon projects such as car or bicycle sharing might be supported by international non-profit private finance. These projects might perhaps be operated even as a social business in cities in emerging countries in East Asia with growing numbers of middle-class urban residents.

6. Conclusion

This study found that there are at least dozens of CDM projects that are oriented towards local community development in each case study country -- the Philippines, Indonesia and China -- and there are a few development-oriented mitigation projects that are producing voluntary carbon credits in Indonesia in the areas of energy efficiency, renewable energy, waste and wastewater, and transport, but there are none in the Philippines and China. Low-carbon development projects that are funded through not-for-profit or non-profit private finance are few. In particular those funded through not-for-profit private finance such as not-for-profit microfinance were not detected in this limited survey. There is a tendency for low-carbon development projects with carbon credit to be funded by for-profit private finance while low-carbon development projects without carbon credit are funded with either public or non-profit private finance.

Even though utilisation of carbon finance for low-carbon community development is not very active currently, there should be some room to extend such opportunities based on the assessment of obstacles in the country studies.

Based on the analysis of investment barriers and roles of local governments and other actors in section 5, various ways to promote further development and utilisation of carbon finance, i.e. carbon credit and not-for-profit / non-profit private finance, to low-carbon community development projects in East Asian developing countries are suggested below.

To project developers:

For project developers that are either local governments or private entities who are interested in promoting development, it is desirable to refocus existing development programmes and projects to those that are low-carbon so that they could use carbon finance. This should be done in a way that best utilises existing local institutional assets, which in turn will make it easier to engage local actors. It is also encouraged to select appropriate locally available technology, if applicable, to avoid high costs of imported technology or technologies that are only applicable in a limited number of large cities. This will promote the use of locally available supporting industries and businesses, which in turn is expected to lead to reduced investment, operation and maintenance costs, and to increased sustainability.

Regarding demand-side renewable energy or energy efficiency projects, project proponents

could try to use microcredit and fee-for-service schemes so that the initial investment and operational and maintenance costs can be supported by revenues from beneficiaries, learning from the cases in India and elsewhere. To facilitate formulation and implementation of such social businesses, initial investments could be partly supported by either public or non-profit private finance.

To local governments:

Local governments could expand their roles as facilitators of low-carbon development projects as demonstrated in several local governments in three countries. Such roles include linking project proponents and financial institutions, providing land and electricity to project proponents, hosting meetings and hearings to disseminate project information to residents, developing local ordinances, and coordinating local stakeholders, etc.

Local governments should examine existing and planned developmental projects and programmes and assess their potential to reduce GHG emissions in order to identify the possibility of applying for carbon finance. CDM or carbon offset projects might be developed through reorganisation of the projects and programmes.

Local governments are encouraged to develop and extend the programmatic approach which could increase the contribution of low-carbon projects to existing developmental programmes and to link them with carbon credits. This programme for small-scale projects can be applied to projects both with and without carbon credits.

Coordination of two-step loans for low-carbon community development projects in relation to the national government, international organisations, and local and national financial institutions is another area where local governments could play a potential role.

Local governments that are already committed to or interested in energy and resource efficient economies, even if they are not interested in low-carbon development itself, could share their experiences of facilitation roles, better utilisation of international carbon finance, and project management through intercity network programmes such as ICLEI and CITYNET, so that they could learn from experiences and knowledge of other local governments.

To national government and international organisations:

National governments should develop and implement a programmatic framework of low-carbon development projects which involves the aggregation of small-scale projects, integration of development and climate change mitigation targets, and utilisation of revenue from carbon credits. Under this framework, project owners, local governments and national / regional governments share the costs of implementation of the aggregated small scale projects.

It is also desirable for national governments and international organisations to assist knowledge dissemination and capacity development activities for the staff of local governments and financial institutions where they lack experience of carbon finance. It might be desirable to set up such capacity development measures in a package of programmes to foster small-scale local low-carbon practices such as wastewater biogas digesters.

To carbon offset providers and private foundations in developed countries:

Carbon offset providers and supporting bodies such as governments and environmental NGOs should put more emphasis on outreaching the concepts of voluntary carbon management and offsetting to individuals and companies in developed countries and to partnering local organisations engaged in low-carbon development in East Asian developing countries. To do

so, it is desirable to seek financial support from private foundations and CSR funds from private companies.

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Appendixes

A1 Cases in the Philippines³¹

A1.1: Envirofit tricycle-taxi retrofit project

Background of the Project

A. Project Description

Tricycle taxis are the primary means of public transportation in the two pilot cities of Vigan, Ilocos Sur and Puerto Prinsesa, Palawan. As with most places in the Philippines, tricycles are the vehicle of choice in these cities because of their schedule flexibility, simple construction, high power-to-weight ratio, and their relatively low cost. Unfortunately, the tricycles currently in use are carbureted two-stroke engines which emit high levels of unburned hydrocarbons, carbon monoxide, carbon dioxide, and particulates.

The project activity thus addresses the high emissions of conventional two-stroke engines by retrofitting up to 6,000 carbureted two-stroke engine tricycle taxis with direct in-cylinder fuel injection (direct injection or DI) technology. Called the “*Envirokits*”, this DI technology addresses the specific sources of particulates, HC, CO, and CO₂ emissions as well as fuel and oil losses in a conventional carbureted two-stroke tricycle unit. In the retrofit process, the carburetor is removed. This thus allows exhaust products to be eliminated (“scavenging”) using fresh air only. Also, since fuel is injected directly into the combustion chamber, loss of unburned fuel during scavenging is avoided. This allows for stable combustions and, in turn, avoids using oil for unnecessary lubrication.

Field trial tests (conducted by the project proponents from May to December 2005) show that the retrofitted units contributed significant reductions in air pollution. Concretely, the results show 89% reduction in hydrocarbons (HCs), 76% reduction in carbon monoxide (CO) and 35% reduction in carbon dioxide (CO₂).

The project activity is expected to reduce 7,708.2 tones of CO₂equivalent each year (using AMS-III.C - emission reduction by low-greenhouse gas emitting vehicles).

B. Profile of the Project Proponent

Envirofit Philippines Foundation Inc. is a non-stock, not-profit corporation existing under the Philippine laws. Its primary purpose is to develop and disseminate products and services that address major environmental problems in the developing world, including, but not limited to: a) developing and commercializing cost-effective technological solutions reducing emissions from two-stroke gasoline engines; b) developing installation centers for such technological solutions throughout the Philippines; and c) enlist commitment from local government units with the end goal of making development and commercialization efforts self-sufficient.

Envirofit Philippines Foundation Inc. was incorporated only last February 27, 2007 and is a relatively young corporation. However, its parent company, Envirofit International which is based in the United States of America, and is also a nonprofit organization, has been engaged in such noteworthy purposes of developing and commercializing cost-effective technological solutions that reduce emissions from two-stroke gasoline engines since October 2003. Envirofit has earned several notable awards for their work, including 2007 World Clean Energy Award, 2007 World Bank Development Marketplace (finalist), “Top 10 Most Innovative Technologies for Creating Social Change” by Stanford

³¹ Adopted from klima (2008).

Social Innovation Review in 2006, and the 2005 Tech Museum Environment Laureate.

C. Financial Mechanism/s Used in the Project

The project activity is a pilot project in the Philippines. The following are the financial mechanisms used for this project:

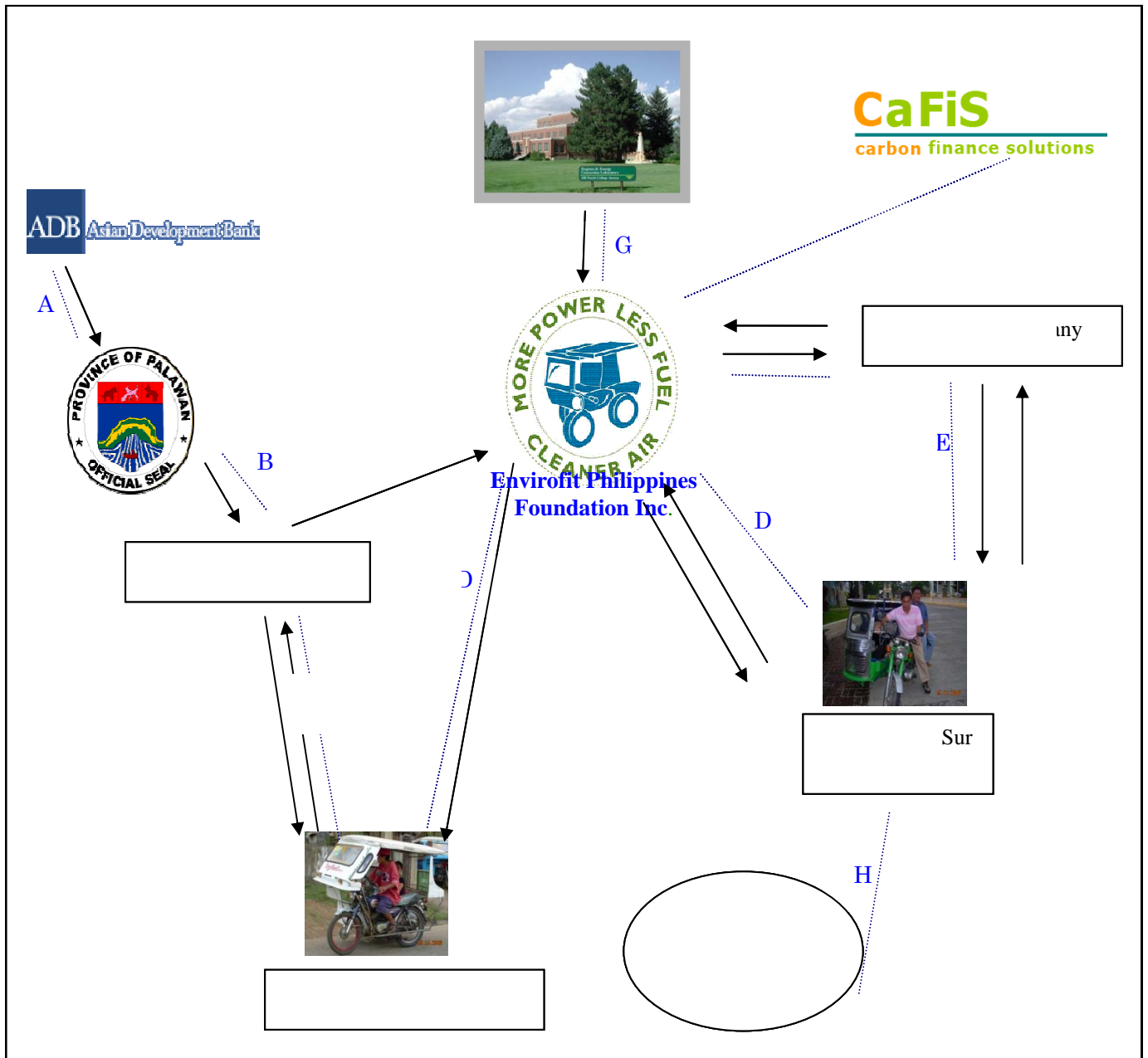
- 1) Grants (private donations) - Research and development (i.e. creation of envirokits) grants given to Envirofit International which started as a research center under the auspices of the Colorado State University in the USA. The goal of Envirofit International is to use the grant to perfect the technology, and commercialize the technology to be self-sufficient after 2 years.
- 2) CDM (carbon credits) – revenues from CDM will be used to offset the per unit cost of the envirokits, so that the end-user cost (i.e. selling price of the kit) will be much lower. Carbon credits will go to Envirofit Philippines Foundation Inc.
- 3) Suppliers' Credit Scheme – applicable only in Vigan City.
 - a. A financing company was commissioned to handle the collection of payments for the envirokits. Collection can either be daily, weekly and monthly, depending on the contract entered into between the tricycle driver and Envirofit. The financing company charges a small percentage as collection management fee.
 - b. In-house Financing Scheme – Payment options of 6, 12 or 18 months can directly be negotiated and paid in the local Envirofit office. Envirofit charges a small interest to cover collection management and also for the risk of loaning a tricycle owner the kit which she/he will pay for a period of time.
- 4) Grant from Multilateral Organization (ADB) – To offset financing for the per-unit cost of envirokit, applicable only in Puerto Princesa.
 - a. The grant is from the 'Air and Noise Pollution Reduction Project' of the Poverty and Environment Program of the ADB, totaling \$240,000.00 for the LGU of Puerto Princesa. Half of this grant will go to the Tricycle Multi-Purpose Fund (Tryke Fund) where operators can upgrade their engines from two-stroke to four-stroke or avail of other means of livelihood. This fund is the source of the money which will be used by the LGU to subsidize 50% of the cost of the 200 initial tricycles to be retrofitted. To date, the LGU already paid Envirofit for 50% of the selling price of all 200 envirokits.
 - b. The other 50% of the cost will be paid by the drivers under an LGU in-house financing scheme, also managed by the Tryke Fund Office, wherein the drivers can pay for the envirokits via a 12-month, 0 percent interest rate offer.

D. Chronological Events/ Milestones of the Project

Project kickoff – introduction of concept in the Philippines and the LGUs – 2003
CDM Training - Predecessors of Envirofit Philippines Foundation Inc. attended CD4CDM training to see if project can use CDM - 2003
Phase 1: Single demonstration vehicle in Quezon City – Nov 2003
Phase 2: Field trials using 18 vehicles – 2005
CDM PDD-making contracts entered into – early 2006
CDM Stakeholder consultations Vigan – late 2006
Phase 3: start of project implementation in Vigan and Puerto Princesa (Pilot running of a few units for testing) – late 2006
CDM stakeholder consultations Puerto Princesa – 2007
CDM validation – late 2007

E. Institutions Involved in Financing of the Project / Diagram of Roles of Relevant Institutions

Note: → Black full arrows signify flow of finances
 Blue dashed lines signify relationship of the institution
 Blue numbers correspond to the Roles of Relevant Institutions



Roles of Relevant Institutions in this Project

- A. ADB
Financed the Puerto Prinsesa Project
- B. The Puerto Prinsesa City Government
Facilitated the implementation of the project. It negotiated with the ADB for the grant. It also created and finances for the operating cost of the Tryke Fund Office. Took the lead role in designing the payment scheme which will benefit the tricycle drivers
- C. Tryke Fund Office

Facilitates the collection of the payment for Puerto Prinsesa Project

- D. Envirofit Philippines Foundation Inc.
Implements the project, provides all technical support, in some instances, collects the payments for the kits in Vigan.
- E. Financing Company
Commissioned by Envirofit to collect payments for the Vigan Project
- F. CaFiS Inc.
CDM Consultant. Commissioned by Envirofit to handle carbon credit requirements of the project
- G. Envirofit International/ Univ of Colorado
Provided seed money for Envirofit, provided the technology, provides technical support for Envirofit Philippines.
- H. The Vigan City Government
The City of Vigan has a comprehensive City Master Plan that incorporates the city's agenda and actions on traffic management, air and noise pollution, among others. It signed a Memorandum of Understanding (MOU) with Envirofit last December 17, 2005 that provides an outline on how to reform the tricycle situation in Vigan. The MOU states that the City of Vigan will issue a legislation/ordinance that will require all two-stroke tricycle taxi owners to shift to a cleaner technology, and one of their options is to retrofit their engines with the Envirokit.

Soon after, an ordinance requiring all tricycle franchise holders to shift to cleaner technology was enacted. In a nutshell, the ordinance requires that all those wishing their franchises to be renewed in the next year will have to show that they are using a cleaner technology. Otherwise, their franchises will be revoked and stiff sanctions will be imposed.

Barriers Encountered in Financing the Project

- A. Risks associated with securing underlying finance
 - Risks related to being first-of-its kind. The technology is a newly developed technology, and the Philippines is a pilot area for its commercial implementation.
 - Even if cost per unit are highly subsidized and big savings in the long term are expected from the project, still the cost is relatively high for tricycle drivers in the Philippines to afford. The end-user selling price was pegged by Envirofit at Philippines Peso (Php). 18,500.00 (including installation and 1year warranty). Also, average daily savings per tricycle unit is Php 80- 150, translated to monthly savings of Php 1,920 – 2,880 which totals to a yearly savings of Php23,040 – 34,560. But even so, these rates are not convincing enough for the drivers to make long term investment plans (1 year) who try to make ends meet as they go on with their day to day operations.
 - The table below shows the sources of and estimated savings that the tricycle drivers and operators can gain from the DI technology against the standard calibrated two-stroke units:

<i>Technology</i>	<i>Fuel Consumption per day</i>	<i>Oil Consumption per day</i>	<i>Total Cost per day</i>
Carbureted two-stroke	4.5 L	200 milliliters (mL)	200 Php
Direct injection two-stroke	3.0 L	100 mL	130 Php
	<i>Fuel Savings per day</i>	<i>Oil Savings per day</i>	<i>Total Savings per day</i>
	1.5 L	100 mL	70 Php

- B. Lack or the absence of specific regulations to address the complex nature of the project
- Project activity is outside the purview of the EIA system, as such no assessment is needed, however for CDM purposes, a Certificate of Non Coverage (CNC) has to be applied for. In the application for the CNC, minor confusions as to who the issuing agency was, were encountered.
 - Noise and air pollution were traditionally relegated in the sidelines of LGU planning. However, with increased awareness, mainly brought by ADB initiatives, LGUs slowly appreciated the need to address the issue. But then again, a good amount of lobbying for the project, and a lot of promotions were needed to be able to penetrate the concerned LGUs.

C. CDM- specific barriers

- CDM methodological issues: The project used AMS III-C. However, the CDM methodological panel ruled that the applicability conditions of the methodology is not applicable for the project, hence an application for a new methodology was made. It is still pending in the EB for deliberations.
- Gold Standard Rules: The project is aiming for a gold standard accreditation, however, because of the unforeseen delays and the then unclear rules of the Gold standard, a few issues still need to be addressed by the project to meet the qualifications set by the Gold Standard team.
- Additionality: certain issues were faced by the project, but were eventually clarified in favor of the project. These include:
 - Type E+ policies under the CDM rules – the two LGUs issued ordinances encouraging the use of cleaner technology using retrofitted kits as among the solutions. Without the CDM ruling on these policies, the project's additionality stands to be compromised. But it was eventually pointed out/made clear to the validators that the ordinances do not single out the Envirofit kits as the only alternative, hence, the reasons used to prove the project as additional has not been negated.
 - Seemingly high IRR, and the most feasible among the outlined solutions – the project seemed to have the highest IRR among the solutions stipulated by the LGUs in the ordinances. However, if one computes for all costs associated with the project, the IRR is very low considering that it is a pilot project, and initial investments are really high. Therefore, economic barriers can be used to further prove the project's additionality
 - Monitoring issues: Because the tricycles are mobile, monitoring also became an issue. A complex monitoring devise has to be included in the kit, the price of which is included in the contract price for the kit.

D. Socio-cultural and political barriers

- Acceptance of new technology – the sound of the retrofitted engines is similar to the sound of malfunctioning conventional engines. Tricycle drivers, and the

commuting public, have been accustomed to the sound of the latter, hence, there was resistance to accept the new technology simply because of the sound.

- Entry of these types of projects highly dependent on political will of the LGUs – The project was able to find in the two LGUs ‘champions’ who believed in the idea, and were willing to sponsor the project in the LGU meetings. For Vigan, one of the councilors (who also sits as the transport committee chairman) was key in pushing for the project and getting the ordinance enacted. For Puerto Prinsesa, the Mayor himself believes in the project, and was willing to go the extra mile to provide the kits to the local tricycle drivers at the least cost possible.

A1.2: Cebu landfill gas to energy project

Background of the Project

A. Project Description

The purpose of the Cebu City Landfill Gas and Waste to Energy Project (the Project) is twofold: (a) to reduce greenhouse gas (GHG) emissions by capturing and flaring the methane (CH₄) gas from the existing Inayawan landfill, and (b) to avoid new GHG emissions from the decomposition of additional organic waste that would otherwise be disposed of in the landfill, through a process of anaerobic digestion with biogas collection. The methane captured in the latter activity will be combusted to generate electricity to be used as an alternative source of cheap, indigenous, stable and renewable source of electricity that will reduce dependence on grid power, and thus, displace fossil fuel-based electricity generation that would have emitted CO₂.

The Inayawan landfill started operating in 1998 and is not expected to be closed before 2015, with a possible lifetime extension until 2025. Currently, the landfill is receiving 450 tons of municipal waste daily. An additional 500 tons per day of other organic waste streams, such as night soil, market waste, commercial food waste and agro-processing wastes, such as fruit peelings will be received at the landfill once the Project is operative.

The total emission reductions to be achieved by the Project during the first crediting period from 2008 to 2014 are 552,225 tCO₂e. The result was obtained using the Approved Consolidated Baseline Methodology for Landfill Gas Project Activities, ACM0001, and the Approved Baseline Methodology for Avoided Emissions from Organic Waste through Alternative Waste Treatment Processes, AM0025, and based on the approved global warming potential value of methane which is 21 tCO₂e per metric ton of methane.

B. Profile of the Project Proponent

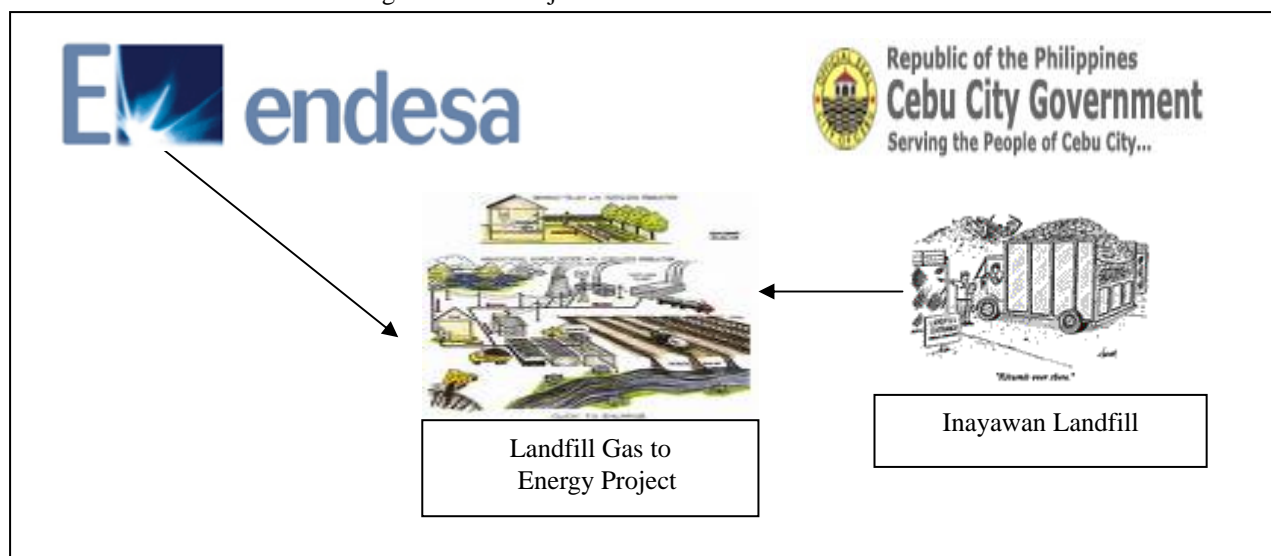
Empresa Nacional de Electricidad, S.A. is the largest electric utility in Spain and the third largest compliance buyer of CERs in Europe. It has an installed capacity of 23,667 MW in Spain, Portugal and the rest of Europe. It has an output of 85,849 GWh as of 2007. It has a good credit rating by known financial platforms, A- (Standard & Poor’s), A3 (Moody’s) and A (Fitch).

Ahlcarbono & Endesa teamed up in mid-September 2008. They have contracted 32 CDM projects, 17 are registered with diversity in technology and location. Their projects will generate 90 million tons of CO₂ for the first commitment period. 9.12 million tons have been delivered with 2.5 million tons using carbon funds.

C. Financial Mechanism/s Used in the Project

The Project will be wholly financed by Endesa.

Financial Mechanism Diagram of the Project



D. Chronological Events/ Milestones of the Project

September 2005 – The Sangguniang Panlungsod of Cebu City approved the proposal of PhilBio the Construction of a Waste to Energy Facility Demonstration Project at the Inayawan Controlled Landfill.

January 2006 –PhilBIO was awarded a contract by the City of Cebu to rehabilitate and upgrade its Inayawan Waste Disposal Facility. The contract enables PhilBIO to develop the Inayawan WDF into a viable full-scale biogas waste to energy (WTE) facility. The project envisioned two phases; namely, 1) a Demonstration Phase consisting of a 100 kW pilot power plant and 2) a Main Phase: a 6 to 10 MW ReSTORE biogas facility.

2006 - Construction of the Demonstration Phase Project started. However, due to some technical problems, the demonstration project failed to operate.

2006 – The Project requested for national approval from the Philippine DNA

6 December 07 – 4 January 08 – the PDD of the project was posted for validation at the UNFCCC website.

Present - The Project is still not registered with the CDM Executive Board; The Cebu City Government is preparing to bid out the technology for the construction of the Project.

Barriers Encountered in Financing the Project

A. Risks associated with securing underlying finance

LFG systems have a difficult time securing financing for their implementation. Most local banks are typically not interested in these projects primarily because of lack of knowledge and experience with the technology. Therefore, LFG projects are perceived to be high risk. This investment barrier is also accentuated by the relatively high cost of capital, high financial risks, and an unsophisticated capital market in the Philippines. Coupled with relatively limited access to international capital markets, which are in any case more attracted to investment in natural gas projects, it is difficult for alternative plants in the Philippines to attract adequate capital.

B. Prevailing Practice

The current open dumpsite waste disposal method for mixed municipal waste is considered standard operating practice in the Philippines and the region for MWS treatment. The current system represents the lowest cost option, with the only cost being the opportunity cost for alternative land use. The highest priority for most municipalities in the sector is the management of a variety of elements, input of organic material, humidity, pH etc. In general, they are perceived as a risky solution.

Role of LGUs and other players to facilitate/support the project

A. The Cebu City Government

In October 6, 2004, the City of Cebu passed Ordinance No. 2017 Creating the Cebu City Solid Waste Management Board (SWMB) and Appropriating Funds Therefore. The purpose and objectives of the Ordinance are:

- To supplement and enforce the provision of existing laws and ordinances pertaining to solid waste management;
- To plan, guide and monitor the generation, storage, collection, transportation and disposal of solid wastes within the city through well-defined systems;

The Sangguniang Panlungsod of Cebu City approved the proposal of PhilBio the Construction of a Waste to Energy Facility Demonstration Project at the Inayawan Controlled Landfill last September 2005.

B. The Philippine Bio Sciences Company, Inc.

Philippine Bio-Sciences Co. Inc. "PhilBio" designs, constructs, finances and operates proven, advanced waste-to-energy-systems to recover methane gas and reuse organic waste materials. Organic wastes are converted into fuels, energy and value-added by products to provide significant profits.

PhilBio market its engineering products and services as an "integrated solutions provider". They adopt anaerobic digestion techniques to advance specific business and waste management goals for the clients. PhilBio promotes Clean Energy Technologies such as micro turbines. All operations employ technologies that mitigate greenhouse gas emissions (GHG). Some projects qualify for carbon offsets as per the Kyoto Protocol of the United Nations.

PhilBio operates as a design and consulting engineer. They deliver complete 'Greenfield' or 'turnkey' facilities; or operate anaerobic digestion facilities under B.O.O. (Build-Own-Operate) or B.O.T. (Build-Own-Transfer) arrangements.

PhilBio introduced the concept of waste to energy project to the city government of Cebu in early 2005 and prepared the feasibility study for the Cebu City Landfill Gas and Waste to Energy Project. They planned to construct a demonstration project to convince the city government of the benefits of the proposed project. However the demonstration project did not prosper due to some technical problems. PhilBio prepared the Project Design Document for the Inayawan Project which is presently under validation in the UNFCCC website. They will also participate in the bidding to develop the project.

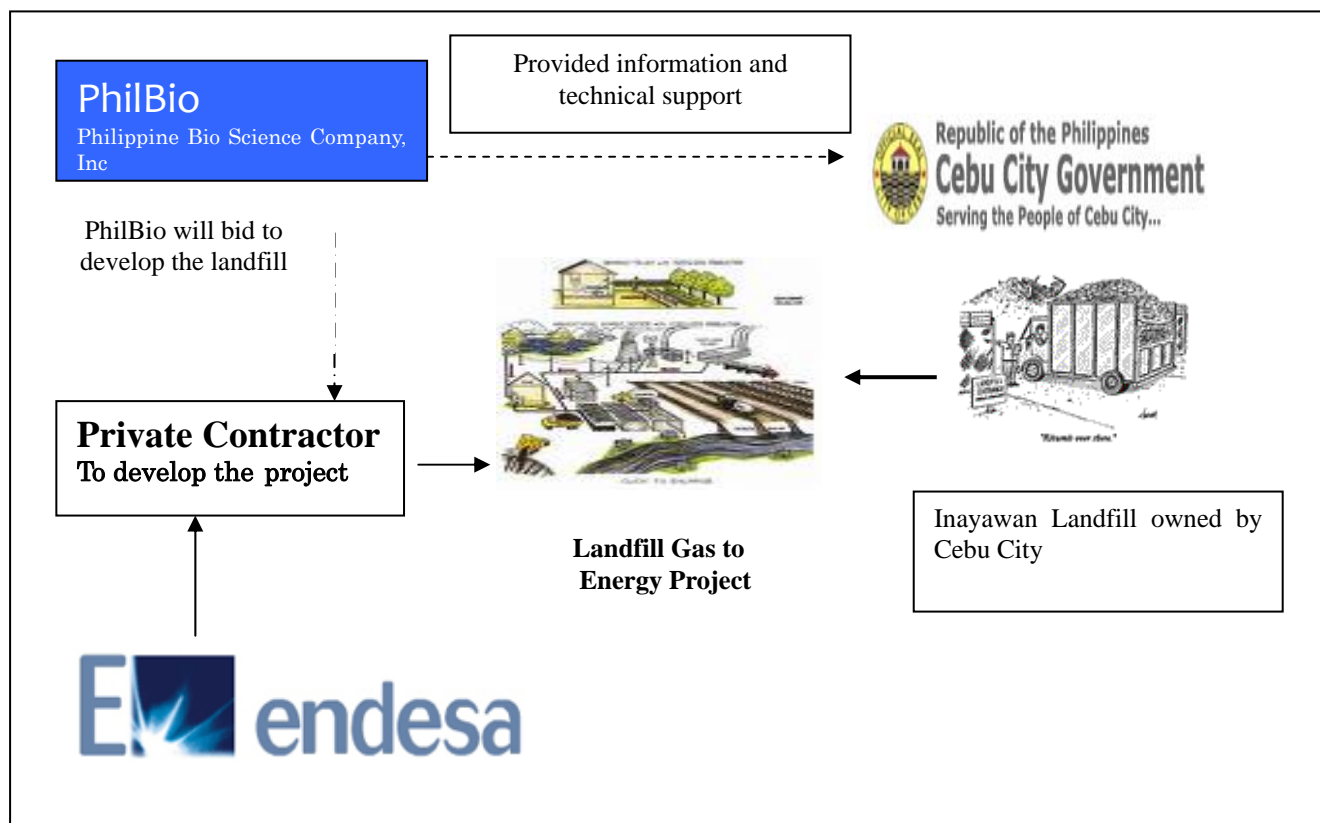
C. AHL Carbono

AHL Carbono is a local CDM consultant in the Philippines and a partner of Endesa. They are presently coordinating the activities of the project in behalf of Endesa Generacion S.A.

D. Private Contractor

Private contractor will be hired to develop the project. The city government will conduct the bidding to identify the private contractor.

Role of LGUs and other players to facilitate/support the project



A1.3: LLDA waste management project

Introduction

The Laguna de Bay Community Carbon Finance Project is an initiative parallel to and complementary with the Laguna de Bay Institutional Strengthening and Community Participation Project (LISCOP). The LISCOP Project was initially funded by the Japan Trust Fund for Climate Change Initiatives which aims to reduce carbon emissions. The grant amounting to USD 358,450.00 from the Japanese Trust Fund-Special Program for Climate Change Initiatives was signed between the World Bank and the Laguna Lake Development Authority (LLDA) in 2004. Later on, LISCOP was able to secure a loan from the World Bank amounting to USD5.0 million, a grant from the Netherlands Government amounting to USD5.0 million and USD2.0 million from the Philippine Government and LLDA counterpart to fully implement its programs including the CDM component.

One aspect of the LISCOP project was for the community to identify priority projects in their respective communities. Most of the priority projects identified were on waste management and reforestation. LLDA negotiated with the Community Development Carbon Fund and Bio Fund of the World Bank for the purchase of the carbon credits and possible assistance in developing the CDM projects.

Background of the Project

A. Project Description

The objective of the Laguna de Bay Community Waste Management Project is to implement a set of small scale waste management projects in the Laguna de Bay

watershed. The continued degradation of the watershed has resulted in increasing greenhouse gas emission from waste, and through the waste management intervention under the project, both environmental degradation and greenhouse gas emissions will be reduced.

The Laguna de Bay Community Waste Management Project is made up of two different CDM projects, consisting of two separate PDDs: methane recovery by wastewater and methane avoidance by composting. The solid waste composting project includes seven (7) small municipalities with populations ranging from 23,000 to 145,000. The project will reduce methane emissions by establishing and operating composting facilities in the participating municipalities to treat organic matter produced from municipal waste. Through this, the anaerobic decay of organic matter in disposal sites will be avoided and allow decomposition to take place under aerobic conditions producing carbon dioxide. Composting will thereby avoid the production of methane emission that would otherwise occur if organic wastes were left to degrade in disposal sites.

The LLDA will have performance contracts with these municipalities to produce a quantity of compost necessary to meet emissions reduction targets and to undertake associated monitoring. Payment to the municipalities will be based on the achieved CERs.

B. Profile of the Project Proponents

a. The Laguna Lake Development Authority

The Laguna Lake Development Authority was transferred from the Office of the President to the Department of Environment and Natural Resources by virtue of Executive Order 149 signed by the President on 28 December 1993. In 1996, LLDA became a quasi government agency that leads, promotes and accelerates sustainable development in the Laguna de Bay region. It has three (3) key functions namely: (a) policy and planning, (b) regulatory, and (c) infrastructure and resources development.

b. The Municipality of Teresa, Rizal

The Municipality of Teresa, Rizal is one of the seven municipalities participating in the LLDA project. Teresa is a 3rd class municipality in the province of Rizal with an internal revenue allotment of P11.0M annually. Based on 2000 census, Teresa has a population of 29,475 with 6,374 households. It has nine (9) barangays.

c. Financial Mechanisms Used in the Project

The LISCOP Project funded by the Japan Trust Fund for Climate Change Initiatives provided the financial support for the feasibility study, technical assistance and the equipments of the CDM project. Additional funds came from a loan from World Bank amounting to USD5.0 million, a grant from the Netherlands Government amounting to USD5.0 million and USD2.0 million from the Philippine Government and LLDA counterpart

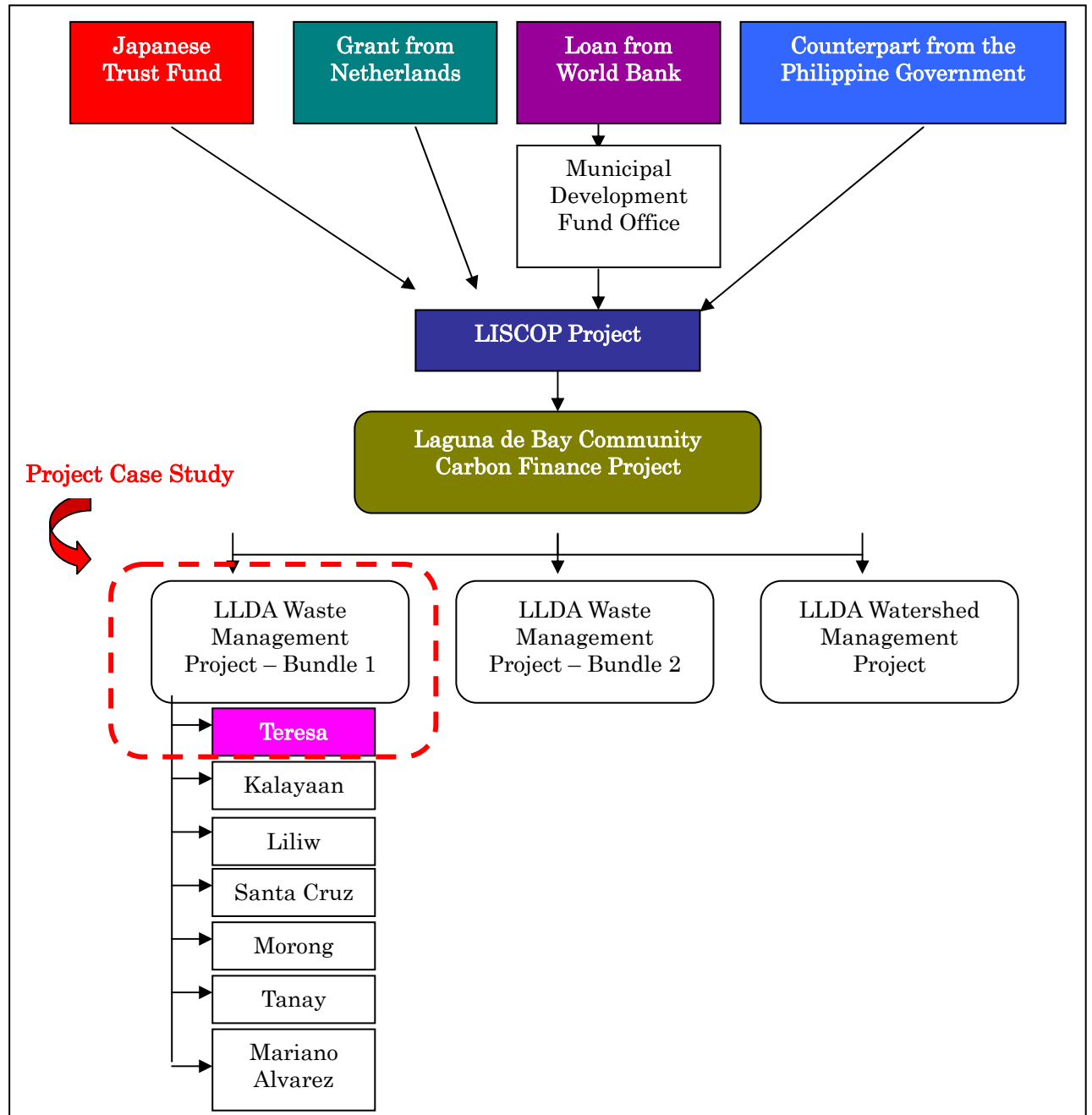
LISCOP provided the funds necessary to develop the CDM project depending on the need of the municipality. The participating municipalities would have different project costs. For the Municipality of Teresa, the total cost of the composting facility was PhP8.2 Million broken down as follows:

- Loans = P 3.435 M (45%)
- Grants = P 3.053 M (40%)
- Equity Requirement:
 - i. From LLDA = P.572 (7.5%)
 - ii. From LGU = P.572 (7.5%)

However, the Municipality of Teresa added P1.6 M to complete the electricity infrastructure of the project. They will amortize the loan in 15 years at 12.00% interest per annum. It has a 3-year grace period on the principal payment.

The revenue stream includes sales from compost and concrete products from the residual waste. Total revenue for 3 years is P1.0 million. Thirty percents (30 %) came from the sale of compost. Annual operating cost is PhP300,000.

Financial Mechanism Diagram of the Carbon Financed Project of the LLDA:



Barriers Encountered in Financing the Project

Financing for this composting project was not very difficult to secure because of the existing LISCOP project which provided most of the funds for project development including the CDM transaction costs. LLDA was also able to sign an Emissions Purchase Agreement

(ERPA) with the Community Development Carbon Fund and Bio Fund of the World Bank for the purchase of the carbon credits.

However, in the case of the municipality of Teresa, an additional investment of Php1.6 Million was necessary to complete the project.

Role of LGUs and other players to facilitate/support the project

A. The Municipality of Teresa

The Municipality of Teresa, especially the commitment of the Mayor made the project possible. The Office of the Sanggunian Bayan issued the following ordinances on waste management:

Municipal Ordinance No 13-2003 – prohibiting throwing, dumping of any waste matter in public places such as, roads, sidewalks, canals, esteros, rivers, parks and public premises within the municipality. This was adopted in 28 July 2003

Sangguniang Panlungsod Ordinance No. 09 – an ordinance prescribing environmental inspection fees for all industrial, commercial, and private entities whose activities are potential sources of land, air and water pollution and for other purposes. This was approved in 19 March 2003

Municipal Ordinance No. 01-2006 – An ordinance adopting and creating guidelines and procedures of consolidated municipal ecological solid waste management program. Ten (10) year municipal solid waste management plan, and municipal solid waste section, respectively for other purposes and appropriating funds thereof. This was approved in 9 January 2006.

B. The Laguna Lake Development Authority

The Laguna Lake Development Authority through the LISCOP Program initiated and coordinated the implementation of the CDM project. Ms. Lennie Borja of the LLD has also attended various conferences locally and internationally regarding climate change mitigation and CDM. Ms. Borja has been sharing the LLDA experience to various forums as a model for small scale climate change mitigation initiative.

C. The Japanese Trust Fund-Special Program for Climate Change Initiatives

The Japanese Trust Fund-Special Program for Climate Change Initiatives that provided the initial funds to LISCOP to undertake the feasibility study of the CDM project.

D. Government of Netherlands

Government of Netherlands that provided the grant for the implementation of the CDM project.

E. The World Bank

The World Bank that provided the loan through the Municipal Development Fund Office for the CDM Project. They also provided the CDM consultants who helped developed the CDM documents and conducted the training for the project proponents.

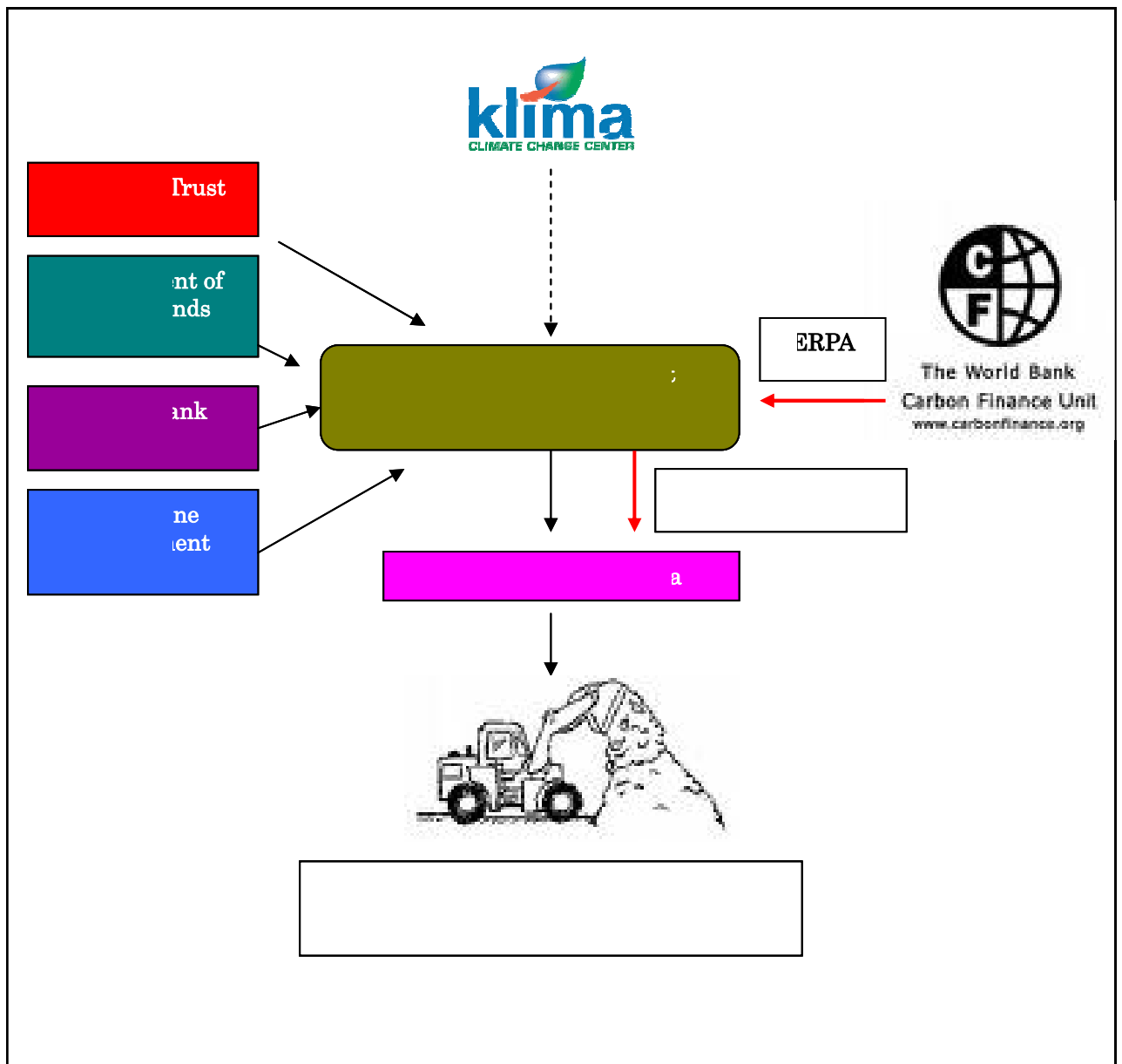
F. Community Development Carbon Fund and Bio Fund

Community Development Carbon Fund and Bio Fund who executed an Emission Purchase Agreement with LLDA for the purchase of the carbon credits.

G. klima Climate Change Center

klima Climate Change Center who provided information on climate change and CDM. klima conducted a CDM training workshop for the LLDA personnel.

Role of LGUs and other players to facilitate/support the project



A1.4: Bolinao methane recovery project

The project is located in the western part of Pangasinan, Luzon Island of the Philippines

Background of the Project

A. Project description

Bolinao municipality started implementing a solid waste management plan anchored on a municipal landfill that was established by the community in 2005. With the conditions of RA 9003, open dumpsites have become illegal since February 2006; cities and municipalities are encouraged to use landfills instead of open and even controlled dumpsites. Solid waste disposal remains to be a major environmental problem in urban as well as rural areas that may have no facilities available for the proper disposal of MSW. Pangasinan province has a population of 2,650,312 and Bolinao, one of its municipalities has a population of 67,671 based on the latest survey of NSO. A build up of MSW is

expected from neighboring towns like Anda which has a population of 34,000.

The project activity shall minimize the usual problems arising with closed dumpsites and landfills which include uncontrolled emissions of greenhouse gas emissions (GHG) and volatile organic compounds (VOC) into the atmosphere, undesirable odours, and fires due to instantaneous combustion, among others.

The Bolinao Local Government Unit (LGU) is planning to install a landfill gas (LFG) collection system at the Bolinao Landfill site. Collected LFG will be flared in order to mitigate the above-mentioned environmental and social problems that GHG emissions usually bring about. Over the 10-year crediting period, it will reduce GHG emissions by approximately 68,000 tCO₂e by combusting collected methane gas in an efficient high temperature flare.

When implemented, the Project will be the first in the province of Pangasinan to mitigate landfill gas (LFG), a GHG and potentially claim credits for the GHG reduction. As a pioneering effort by the Bolinao LGU, the Project will serve as a model to similar sized municipalities and contribute significantly to the sustainable development of the Philippines. The following environmental, economic, and social benefits can be attributed directly to the Project:

1. Environmental benefits - assist in mitigating uncontrolled GHG emission from the landfill, help to prevent on-site fires, control the release of volatile organic compounds.
2. Economical benefits – technology transfer and training in the operation of a gas collection and flaring system that will generate foreign revenue through the sale of CERs.
3. Social benefits – improved health conditions due to mitigation of gaseous emissions; improved safety around the site due to stabilizing the waste pile; jobs for locals and staff training to improve skills of locals.

It is hoped that the Project will become a model in the Philippines for other dumpsite/landfill owners and operators of other cities and municipalities.³²

B. Profile of the project proponent

Municipality of Bolinao is a third class municipality which depends on the tourism and fishing as their main sources of income. In the northern part of Bolinao, most lands are converted to beach resorts where tourists can relax and enjoy the beach. In the inner part of the municipality, most people depend on fishing. They built fish pens to grow “Bolinao Bangus” which they sell to surrounding municipalities and to Manila.

In addition, the municipality of Bolinao also receives Php58.5M internal revenue allotment. This money is for the projects that will sustain the municipality’s growth.

C. Financial scheme to be used by the project proponent

Since the methane recovery project does not have any revenue stream, the municipality of Bolinao together with their CDM consultant (United Clean Development and Energy Consulting) are having difficulties in finding a local or international financial institutions that will give them a grant to finance the methane recovery project.

Another reason for the methane recovery project’s struggle to secure project financing is current volume of waste of the Bolinao Landfill. The current waste volume is too low and generating very little amount of methane emission to be flared and sold as CER.

³² Bolinao methane recovery project PDD

- D. Chronological events of the project
- 2006 Municipality of Bolinao attended a CDM workshop sponsored by IGES – CDM programme
 - 2006 IGES-CDM programme and United Clean Development and Energy Consulting (UCDEC) developed the PDD for the municipality of Bolinao methane recovery project.
 - 2008 The municipality of Bolinao and IGES - CDM programme presented the CDM project - methane recovery project to the stakeholders in Bolinao

Financial Barriers Encountered by the Project

- A. Risk associated with securing underlying finance
Being the first of its kind in the province of Pangasinan, the municipality of Bolinao is having difficulties in finding local financial institutions to finance the methane recovery project because the methane recovery project does not have any revenue stream, except for the CERs it will generate.

For foreign financial institutions, they want a high volume of emission reduction project which the municipality of Bolinao cannot deliver due to its current volume of waste. With that, most foreign financial institutions reject the Bolinao's methane recovery project.

- B. Lack or the absence of specific regulations to address the complex nature of the project
There are no specific regulations in place that require local government units (LGUs) in capturing the methane for landfill sites. However, LGUs based on RA 9003 are required to convert their open dumpsite into landfill.

- C. CDM- specific barriers
The municipality of Bolinao with the assistance of klima and IGES-CDM programme was able to partner with UCDEC for the PDD development. In the PDD, the CDM consultant used AMS.III.G. under the approved methodology for small scale project activity. The methodology is suited for the project because the methodology is for landfill methane recovery.

For the methane recovery project, the landfill is already in place but the methane recovery facility is not initiated due to insufficient waste. To get more wastes, the municipality of Bolinao must haul waste from surrounding municipality. The municipality of Bolinao must invest in vehicles that will haul the waste from other municipalities to their landfill. Without these vehicles, the Bolinao landfill will not be able to generate sufficient emission reduction to compensate the methane recovery facility and CDM transaction costs of the project.

- D. Socio-cultural and political barriers
By converting the open dumpsite to landfill, communities surrounding the site are affected since most of them are dependent on the waste for their livelihood.

To generate more methane emission, the municipality of Bolinao has to accept waste from other municipalities in Pangasinan. However some communities surrounding the landfill are hesitating due to the foul odor of waste and the disease it could bring.

Roles of the LGUs and other Players to facilitate/support the project

- A. Municipality of Bolinao
With the municipality of Bolinao handling the waste collection and landfill site, they will

be the facilitator and implementer of the project.

Climate change initiatives of the Municipality of Bolinao

The municipality of Bolinao passed an ordinance in 2004 to ensure waste is properly handled. In Ordinance No.2004-02 also known as “The comprehensive solid waste management ordinance”, the objectives are:

- To ensure round the clock cleanliness through orderly waste management
- To cease and desist from utilization of open garbage dumps which serve as breeding places of insects causing disease, foul odors and harmful fumes; emit “greenhouse gases” which contribute to global warming and thinning of the ozone layer; generate pollution in soil and water resources; and creates unhealthy scavenging activities in the vicinity
- To eradicate unsightly, uncovered and overflowing waste containers in streets, public places, and open spaces
- To maximize and optimize sanitary resource recovery for feeds, fuel, materials, energy, etc. and
- To minimize pollution arising from harmful gases, smoke, particulate products by needless burning/dumping, polluted runoffs into water sources/supply, and hazardous substances.

The municipality of Bolinao also complied with RA 9003 also known as “Ecological solid waste management”. This republic act requires local government units (LGUs) like municipality of Bolinao to convert their open dumpsite into landfill for better waste management. However, methane recovery is not a component of RA 9003.

B. Klima Climate Change Center

MO-klima is one of the organizations that gave technical assistance to the municipality of Bolinao. They helped in identifying the project and was able to assist the municipality of Bolinao in drafting the project idea note (PIN).

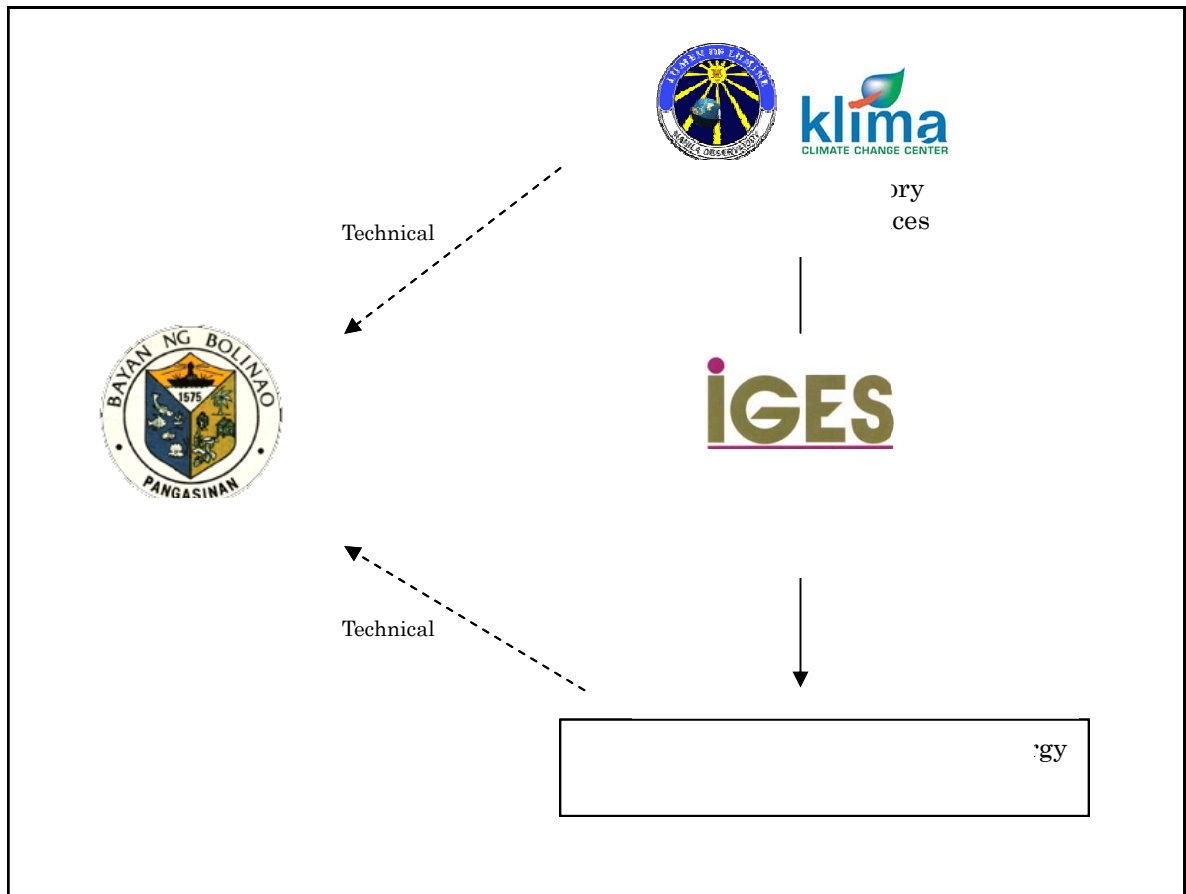
C. United Clean Development and Energy Consulting (UCDEC)

UCDEC is a CDM consultant that developed the municipality of Bolinao methane recovery project PDD. They calculated and estimated emission reduction of the project by analyzing the waste characteristics of the Bolinao landfill.

D. Institute for Global Environmental Strategies (IGES)-CDM Programme

IGES-CDM programme is the organization that funded the technical assistance given to the municipality of Bolinao. IGES-CDM programme partnered with MO-klima to give assistance to proponents like municipality of Bolinao in creating their PIN. IGES-CDM programme also partnered with UCDEC in developing a complete PDD for proponents that have potential projects which can be applied for CDM.

Role of LGUs and other players to facilitate/support the project



A1.5: PDRC biogas for sustainable development project

Background of the Project

A. Project Description

The CDM: Biogas for Sustainable Development Project is a community-based project that promotes the use of the biogas digester by hog, cattle and poultry raisers for their livelihood activities. The short- and medium-term objective of the project is to enhance the profitability and sustainability of farm enterprises in less advantaged rural communities through the use of an environment-friendly technology, the biogas digester, which taps renewable energy sources, specifically animal and farm wastes. The long-term objective is to promote the sustainable development of rural communities, lessen the country's dependence on imported fossil fuels, and contribute to the worldwide effort in mitigating global warming.

To be established in Cebu province, the project targets the construction of 728 units of biogas digesters with a combined capacity of 13,000 cubic meters to service approximately 60,600 head of combined hogs and cattle stock (poultry will be on a case-to-case basis). Intended beneficiary-participants are primarily small- and medium-scale hog, cattle and poultry farmers who will be organized and trained to own, use and maintain the biogas digesters. Farmers with large stock (1000 head) will also be mobilized on a case-to-case basis.

Project activities include organizing the project team, establishing the project office in Cebu, organizing the beneficiaries, training the construction teams, constructing the

biogas digesters, capability building of owner-beneficiaries to use and maintain the biogas system, organizational and values formation training, and other farm development training related to the by-products of the biogas digester. With a time frame of 27 months, the project is envisioned to be a pilot activity which may be replicated in other parts of Cebu and other provinces in the Philippines.

Due to the non-implementation of the Biogas Project in Cebu Province, the operation of PDRC has been temporarily suspended until such time that a new project funder can be identified.

B. Profile of the Project Proponent

Founding: 1990

Start of Activities: 1991

The Philippine-China Development Resource Center (PDRC) is a private non-profit organization that was established to foster closer relations and mutual understanding between the peoples of the Philippines and China. Through its programs – Exchange Visits, Technology Training, Asian Traditional Medicine, Research and Conferences, and Publications and Databank – PDRC has promoted technology and information exchanges among Filipino and Chinese development organizations.

Under the Technology Training Program, special training activities on renewable energy (i.e., micro-hydro energy and biogas) were conducted for Filipino participants. National and international conferences, seminars and roundtable discussions were conducted among Filipino and Chinese participants on poverty alleviation, food security, environmental protection and renewable energy, and other social development issues. These activities helped in forging enduring ties and partnerships, both local and international.

PDRC has adopted the use of biogas as its main development advocacy in the Philippines. In the late 1990s, it sent two batches, consisting of ten Filipinos, to learn the technology at the Biogas Training Center in Chengdu, Sichuan in China. It has helped construct biogas digesters at the PRRM Center in San Leonardo, Nueva Ecija, Management and Organizational Development for Empowerment (MODE) farm in Carcar, Cebu, and Southern Christian College in Midsayap, Cotabato.

Also, PDRC staff members participated in several training programs on CDM in the Philippines in 2005 organized by Klima, a capacity-building project for CDM based at the Manila Observatory of the Ateneo de Manila University.

In undertaking the project, PDRC will own the Certificates of Emission Reduction (CERs). It will undertake the process of accreditation to obtain the CERs. PDRC will then use the funds from selling the CERs to build more biogas digesters and assist rural communities in undertaking more sustainable development activities.

C. Financial mechanism to be used in the Project

PDRC assumed that Mitsubishi UFJ Securities will provide assistance in securing project financing and will get the carbon credits. However, there is no formal agreement regarding this matter.

The project cost is Php 110,641,964.00. It has a projected annual savings (in terms of fuel reduction, sale of Certificates of Emission Reduction, non-use of wood for fuel, use as septic tank, labor from gathering of firewood, and non-use of chemical fertilizer) of Php 251,324,209.00. It has an annual net benefit of Php 140,682,245.

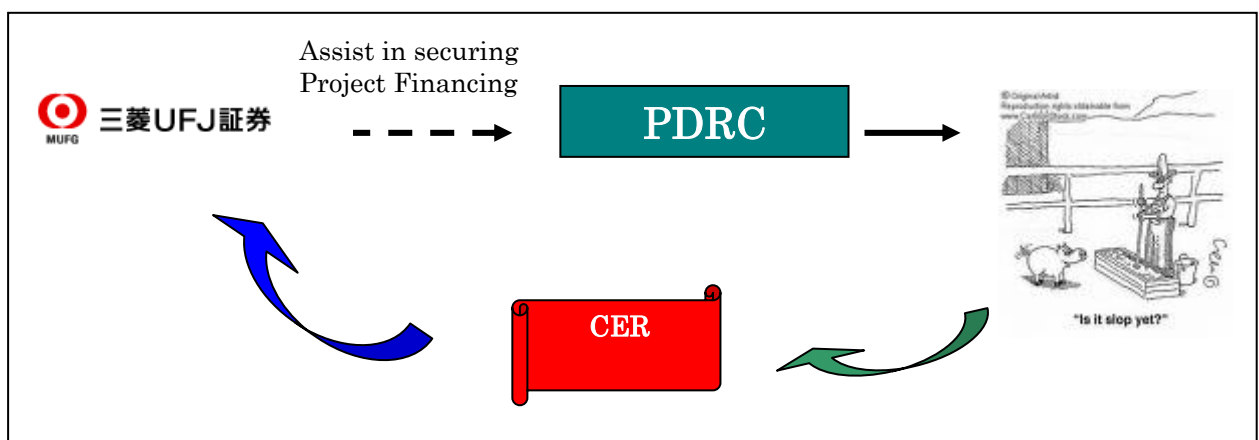
Computation of biogas production annually is based on the given assumptions:

$$\begin{array}{l}
 \text{Hogs:} \quad 135,000,000 \text{ kgs} \times .065 \text{ m}^3 \text{ biogas/kg} = 8,775,000 \text{ m}^3 \\
 \text{Cows:} \quad \underline{4,428,000 \text{ kgs}} \times .04 \text{ m}^3 \text{ biogas/kg} = \underline{177,120 \text{ m}^3} \\
 \text{Total} \dots 8,952,120 \text{ m}^3
 \end{array}$$

The 728-biogas digesters of various sizes and volumes involving the wastes of 60,000 hogs and 600 cows will provide annually about 8,952,120m³ of methane gas. When divided by 21 tons, this volume of methane gas equals 426,291 tons of CO² for the Clean Development Mechanism. This carbon credit when converted to cash, at a conservative rate of \$ 3/ton CO², is equivalent to \$1,278,874/year, or Php 62,025,402 (at the exchange rate of \$1:Php 48.50).

With this carbon credit of Php 62,025,402 and the Php 31,200,000 fuel savings, the project in a year's period will provide a cash benefit value of Php 93,225,402.

Financial Mechanism Diagram



Barriers Encountered in Financing the Project

A. Risks associated with securing underlying finance

Small swine farms will have difficulty securing financing for the implementation of the biogas wastewater management project because local banks would hesitate to finance these projects because of lack of knowledge and experience with the technology.

B. CDM- specific barriers

- Funders and carbon buyers are normally looking for projects that deliver high volume of emissions reduction. Small-scale projects find it difficult to source financing for project development and CDM transaction costs.
- Bundling concerns – To make the project economically feasible in terms of CDM registration, several project owners must be bundled. This will require coordination and commitment of all the participating project owners.
- CDM transactions costs- The high CDM transaction cost will make it very difficult for this type of project to be registered unless financial assistance is provided.
- Monitoring of emissions reduction – Considering the number of project owners participating in the project and the new technology being used, it is important to conduct training in the proper handling of the biogas and the monitoring requirement prescribed in the Project Design Document to ensure that emissions reductions are properly recorded.

C. Prevailing Practice

- Current Practice – The current pond-based treatment is considered standard operating practice in the Philippines. For the project owners, the current pond system is extremely financially attractive, given that it works to required specification and requires little management or investment .
- Lowest cost – The current system represents the lowest cost option.
- General culture – The project requires investment capital into a business that may not be the main focus of the farmer.

Role of LGUs and other players to facilitate/support this project

A. PDRC

PDRC will be the project implementer assisted by technical consultants. They will also oversee and validate the monitoring reports prepared by the designated personnel.

B. University of San Carlos -Affiliated Non-Conventional Energy Center (ANEC)

University of San Carlos -Affiliated Non-Conventional Energy Center (ANEC) will provide technical assistance in the implementation of the biogas project.

C. Provincial Board Member Atty. Victor Maambong, Chairperson of the Cebu Provincial Committee on Environment

Provincial Board Member Atty. Victor Maambong, Chairperson of the Cebu Provincial Committee on Environment and other provincial officers, town and city mayors will be tapped for the identification of local beneficiaries and to help solicit local support and resources for the project.

D. Related Provincial Line Agencies

Related Provincial Line Agencies (PLAs), NGOs, POs, media, schools and civic organizations will be tapped to widen the delivery of support services to client beneficiaries.

E. Mitsubishi UFJ Securities

Mitsubishi UFJ Securities provided technical expertise in evaluating the CDM potential of the project and a possible source or conduit for project financing.

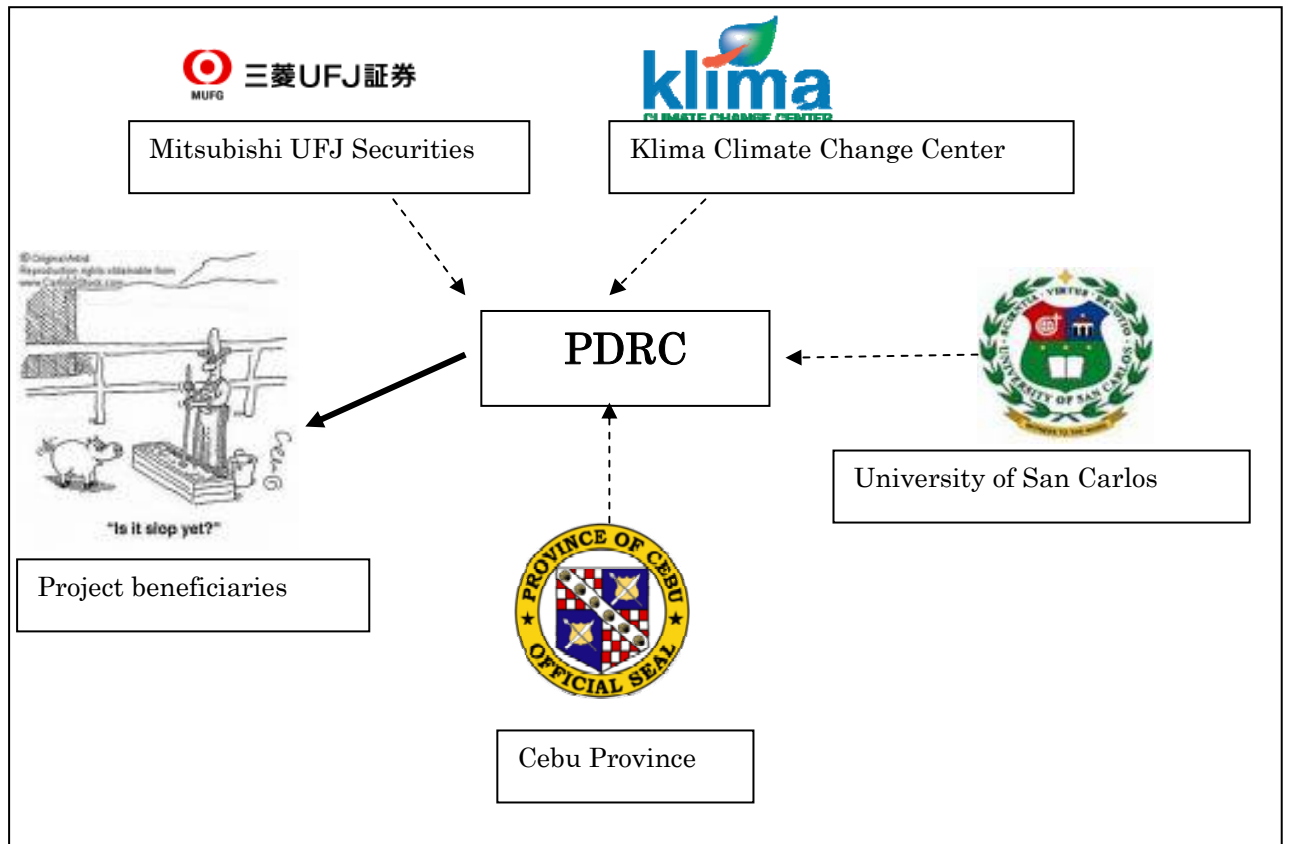
F. klima Climate Change Center

klima Climate Change Center provided capacity building seminars on climate change and CDM

G. Project beneficiaries

Project beneficiaries are primarily small- and medium-scale hog, cattle and poultry farmers who will be organized and trained to own, use and maintain the biogas digesters. Farmers with large stock will also be mobilized on a case-to-case basis

Role of LGUs and other players to facilitate/support the project



A1.6: Sipangpang hydro power project

The project is located along the Eyamjo River within the Municipality of Cantilan, Surigao Del Sur in Mindanao, Philippines.

Background of the project

A. Project description

The proposed Project activity will be a 1 MW run-of-the-river hydropower facility, which is to be constructed on the Eyamjo river. The facility is expected to generate an estimated 6,132 MWh of electricity per year for export to the Mindanao grid. It will achieve CO₂ emission reductions of approximately 2,471 tCO₂/yr by displacing electricity that would otherwise be generated by fossil fuel fired power plants.

As part of the Project, a small rubble masonry type dam will be built approximately three hundred (300) meters from the top of the Sipangpang Falls. This offers additional head to generate power while taking advantage of the minimal cost of aggregates that can be sourced from the nearby river bed. The water from the dam will go straight to the powerhouse through a six hundred (600) meter pipeline and then be brought back to the Eyamjo River. Power will be supplied to the Cantilan Municipality which presently has a 400 kW power demand and to two other neighboring towns.

In addition to power generation and greenhouse gas (GHG) emission reduction, the Project will contribute to sustainable development by:

- Generating significant income for the Municipality of Cantilan;

- Providing jobs and training for semi-skilled and skilled workers during and after construction;
- Providing assistance and a livelihood to the host Barangay and Indigenous People (IP) in the area;
- Preserving the areas watershed through continuous tree planting with funds coming from a percentage of the power plant's annual gross revenues;
- Improving access to the surrounding Barangays; encourage investors to the Municipality, especially small and medium-scale enterprises (SMEs);
- Providing assistance in the development of potential tourist attractions;
- The incorporation of other productive water use projects such as water supply, irrigation, tourism and recreation.

B. Profile of the project proponent

a. Municipality of Cantilan

The Municipality of Cantilan is located in the province of Surigao del Sur in Mindanao. The municipality has an approximate 30,000 inhabitants which mostly rely on fishing, agriculture, and logging as their main livelihood.

The municipality of Cantilan is also a fourth class municipality and is the last municipality that get electricity from the Mindanao grid.

Based on 2007 data, the municipality of Cantilan has an estimated Php5.0M income from fishing, agriculture, and logging. The municipality also received a Php40.1M in 2007 as their annual internal revenue allotment.

b. Carbon Finance Solutions (Cafis)

Carbon Finance Solutions (Cafis) is the CDM consultant based in the Philippines. They help project proponent in identifying projects that can be applied for CDM. In addition, Cafis also assists proponents in developing required documents like Project Design Document (PDD) for Clean Development Mechanism (CDM).

c. Mitsubihsi-UFJ

Mitsubihsi-UFJ is a part of a business group that assists project proponents in developing CDM projects. They compute for the emission factor of the grid, estimate emission reduction of the project, and evaluate if the project is feasible or not.

d. UPP Associates

UPP Associates is a hydro electric power consultant. They develop feasibility study for proponents that are interested in developing hydro electric power plant. They can estimate the electricity production of a hydro site and evaluate if the project is financially viable or not.

e. Land Bank of the Philippines

The Land Bank of the Philippines is a government financial institution that strikes a balance in fulfilling its social mandate of promoting countryside development while remaining financially viable.

f. Czech Republic

The Czech Republic is located in Central Europe and is part of European Union (EU). Based on World Bank information, the Czech Republic is a developed country due to its high-income economy.

C. Financial scheme to be used by the project proponent

Grant

The Sipangpang hydro power project initially received a grant amounting to USD250,000 of electro-mechanical equipment from the Czech Republic. This equipment will be used in generating the required hydro power of Cantilan. The grant is part of official development assistance (ODA) of the Czech Republic. Czech Republic will not get any CERs from the project.

LGU counterpart

The municipality of Cantilan will construct the roads, build the temporary facilities, pay interest of the loan during construction, get all the necessary permits, service vehicle during construction, prepare a feasibility study, and develop engineering design.

Loan

The municipality of Cantilan applied for a Php60.0M loan from Landbank of the Philippines. The loan will have an interest rate of 10-11% for 15 years and will have a grace period on principal for 3 years.

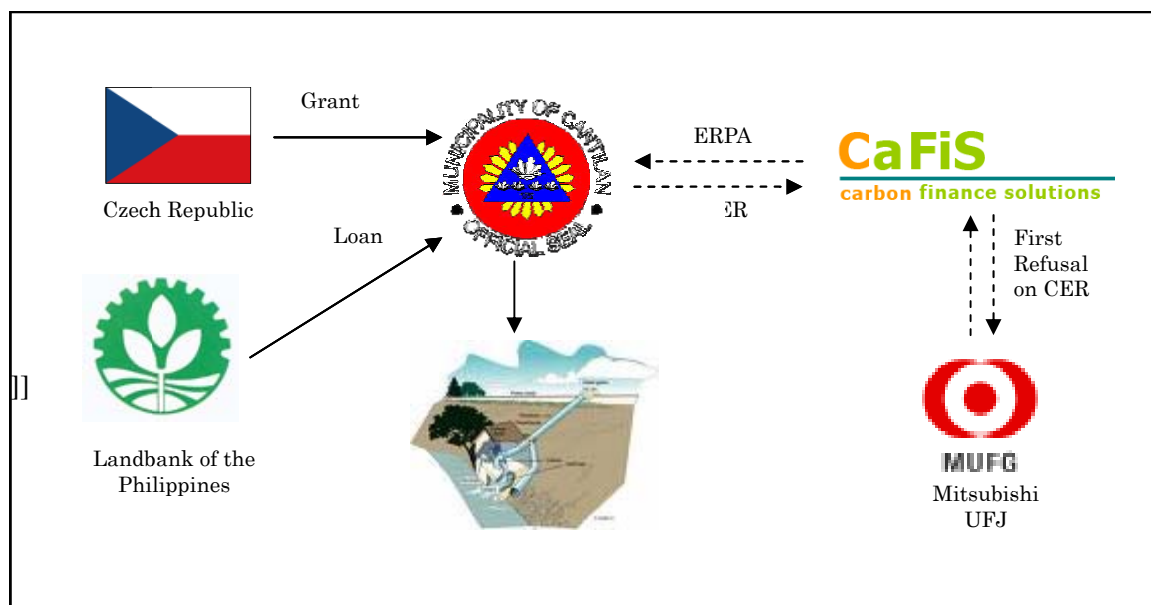
Emission Reduction Purchase Agreement (ERPA)

If the project is implemented, the municipality of Cantilan will sell the generated emission reduction to Cafis.

Right of First Refusal

If the project successfully generates emission reduction, Mitsubishi-UFJ will have the right of first refusal of the project's CERs.

Financial Mechanism Diagram of the project



D. Chronological events of the project

- 2005 The municipality of Cantilan commissioned UPP Associates to prepare the feasibility study of Sipangpang hydro power project
- 2005 UPP Associates attended a training workshop of klima Climate Change Center regarding Clean Development Mechanism (CDM)
- 2006 UPP Associates partnered with Cafis for Project Design Document (PDD) development
- 2006 UPP Associates partnered with Mitsubishi for validating the Sipangpang hydro power project
- 2007 Designated National Authority (DNA) issued a Letter of Approval (LOA) for

2007	Sipangpang hydro power project The municipality of Cantilan applied for a loan in Landbank for financing the hydro power project
2008	The Lanbank loan got approved

Financial barriers encountered by the project

A. Risk associated with securing underlying finance

Based on the computation of UPP Associates, the total cost of the hydro power plant in Cantilan is Php86.3M. This includes the equipment and construction materials needed to build the hydro power plant.

Despite having a grant of USD250,000 of electro-mechanical equipment, the municipality of Cantilan encountered difficulties in finding an investor or securing a loan for the Sipangpang hydro power project. The reason for this is the 13% IRR of the project. Similar hydro power project should have an IRR of more than 20%.

B. Lack or the absence of specific regulations to address the complex nature of the project

Thru the initiative of Department of Energy (DOE), a memorandum of agreement (MOA) was signed with the Department of Natural Resources and Environment (DENR) to simplify the requirements needed to implement hydro projects that have a capacity of 1,000kW.

In the Memorandum of Agreement (MOA), it exempts mini hydro projects like Sipangpang in getting an Environmental Compliance Certificate (ECC) however a Certificate of Non-Coverage (CNC) is still needed.

C. CDM- specific barriers

At first, the Municipality of Cantilan and UPP Associates did not have any knowledge about CDM. MO-klima, a non government organization focusing on climate change provided them training on Clean Development Mechanism (CDM).

With the assistance of MO-klima, the municipality of Cantilan and UPP Associates were able to partner with CaFis as the CDM consultant.

CaFis used AMS.I.D under the approved methodologies for small scale project activity. The methodology is suitable for the project because it is under 15MW and the electricity generated will be given to the Mindanao grid.

D. Socio-cultural and political barriers

In the beginning, there are no socio-cultural and political barriers in the project. But when the project was about to get the loan approval, the municipality beside Cantilan argued that they too should have a part in the project.

This incident prompted the local financial institution suspended the processing of the loan and let the municipalities settle the problem first before approving the loan.

Roles of LGUs and other players to facilitate / support the project

A. Municipality of Cantilan

The municipality of Cantilan will be the facilitator and implementer of the Sipangpang hydro power project because they are the ones that will sell the generated electricity and they will also be responsible in paying the Php60.0M loan.

B. Czech Republic

The Czech Republic gave a grant worth USD250,000 to the Municipality of Cantilan. The grant was for the electro-mechanical equipment needed to generate power for the river. Without the grant, the Municipality of Cantilan would not be able to implement the project.

C. Landbank of the Philippines

Landbank is a financial institution based in the Philippines. They gave the Municipality of Cantilan a loan amounting to Php60.0M. The loan will be used to construct the main power plant facility.

D. Carbon Finance Solutions (Cafis)

Cafis is the CDM consultant for the Sipangpang hydro power project. They developed the PDD for the CDM application. The PDD development is free of charge but Cafis has an Emission Reduction Purchase Agreement (ERPA) with the Municipality of Cantilan.

E. Mitsubishi-UFJ

Mitsubishi-UFJ is also a CDM consultant that helped Cafis in developing the Sipangpang hydro power project PDD. They assisted in calculating the emission factor and estimated the potential emission reduction of the project.

Mitsubishi-UFJ will also shoulder the CDM validation cost of the Sipangpang hydro power project. In return, Mitsubishi will have the right of first refusal for the CERs.

F. klima Climate Change Center

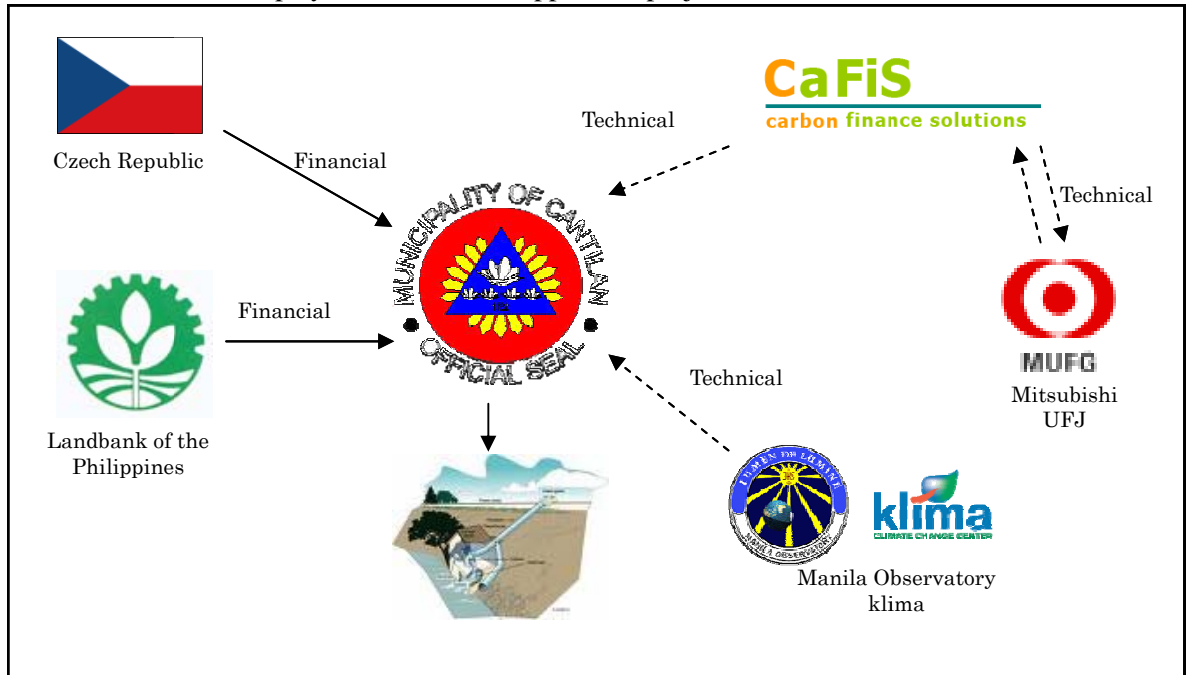
MO-klima is a non government organization funded by international organization to conduct CDM capacity building activities for the project proponents in the Philippines

G. National Government

The municipality of Cantilan took advantage of the Republic Act No. 7156 – “An act granting incentives to mini hydroelectric power developers and other purposes”. This act was made to give proponents incentives on developing hydro power project in the Philippines. Below are the following incentives available to proponents:

- Special privilege tax
- Tax and duty-free importation
- Tax credit on domestic capital equipment
- Special realty tax rates
- Value added tax exemption
- Income tax holiday

Role of LGUs and other players to facilitate/support the project



A1.7: Makati electric jeepney project

Background of the Project

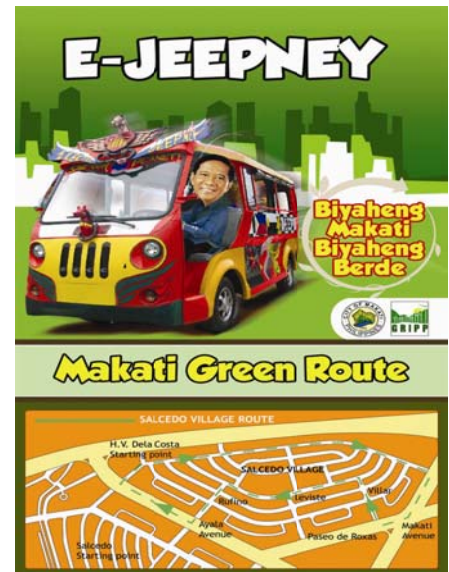
A. Project Description

The E-jeep Project is part of the Climate Friendly Cities Program of the Green Renewable Independent Power Producer (GRIPP). This program promotes the utilization of electric engine jeepneys (e-jeeps) as a climate-friendly means of public transportation. GRIPP tapped an international NGO, the DOEN Foundation based in the Netherlands to fund the project. Although GRIPP owns the e-jeep units, they have partnered with selected LGUs that would be responsible for the implementation and maintenance of the units.

The three LGUs selected were: (1) Makati City, (2) Puerto Princesa, and (3) Bacolod City.

The project study will focus on the operation of the e-jeeps in Makati City.

With the full support of the community where the e-jeep would be operating, the Belair Village in Makati City became the pilot testing area of the project. Two (2) units were deployed in the village and are running on a defined route. Patrons of the e-jeep rode for



free as they are not yet operating commercially due to the licensing requirements needed from the different government agencies. Many residents preferred to use the e-jeep as a means of transportation. Because of the satisfaction of the residents, they purchased the two (2) e-jeep units from the Makati City Government.



Source: E-jeep powerpoint of Makati City

The City Government has identified two (2) more routes for the e-jeep. These routes are not being serviced by the existing public jeepneys.

The detailed specifications of the project are as follows:

Number of passengers	14
Dimensions (LxWxH)	4,324 x 1,524 x 1,929
Wheelbase	2,548 mm
Front Track	1,200 mm
Minimum Ground Clearance	150 mm
Net Wt.	1,360 mm
Gross Wt. (w/ Passenger)	2,340 mm
Top speed	30 km/hr
Max gradeability (full load)	20 kg
Parking ability (empty load)	15 kg
Breaking distance	≤ 9m
Mini Turing Diameter	< 14 m
Rated Power	5 kw
Voltage/ Batteries	72V (6V x 12)
Consumption time (per one full charge)	8-10 hours
Max. continuous mileage of recharging one time batteries (full load plain road condition)	110 (12 units)

At present, only one (1) e-jeep is being operated by the LGU and is servicing the Salcedo Village route. According to the man in-charge of the e-jeep, an 8-hour charged battery can be used for 5 hours. There is a gauge that will indicate if charging is needed. The e-jeep can make 10 round trips per day with 12 passengers per one-way trip. Each round trip is about 4 kilometers. Two (2) more e-jeep units are scheduled for registration. GRIPP plans to provide 7-8 units more.

Since the electric jeepney is a new technology, the Land Transportation Office (LTO) needed to provide classification type for this vehicle prior to registration. LTO classified the e-jeep as a Low Speed Vehicle (LSV) for private or public use, for commercial or non-commercial purposes or to be hired to transport goods and passengers subject to all applicable rules and regulations for transport vehicles. It is restricted to a limited speed of up to 40 kph and should be operated only in Central Business Districts, provincial roads, municipal/city roads and barangay/subdivision roads. It is prohibited along main thoroughfares, highways and national roads except to cross roads. Main thoroughfares, highways, or national roads may be designated and posted as open for travel for Electric Jeepney by concerned government agencies.

(Source: e-jeep powerpoint of Makati City)

B. Profile of the Project Proponents

a. Green Renewable Independent Power Producer (GRIPP)

Green Renewable Independent Power Producer (GRIPP) initially grew out of cooperation between the International Institute for Energy Conservation (IIEC) and Greenpeace-Southeast Asia aimed at initiating a multi-stakeholder input to develop Greenery. This is a package of lower cost energy efficiency resources and higher cost renewable energy resources delivered to the grid that can compete with traditional fossil-fuel power resource options, as a power sector solution for developing countries. GRIPP eventually became a collaborative undertaking of various local and international stakeholders like the GERMANWATCH, Preferred Energy Incorporated, Greenpeace-Southeast Asia Energy Campaign, Philippine Rural Reconstruction Movement and Solar Electric Company, Inc. (Philippines)

b. The City Government of Makati

The City Government of Makati is the Business and Financial Capital of the Philippines which houses 50% of the Top 10 highest earning, most profitable and largest corporations. It has around 60,551 registered business establishments, 86 embassies and consulates as well as 12 international organizations. It has been recognized as a political entity since 1670 and has been a city since 1995.

C. Financial mechanism to be used in the Project

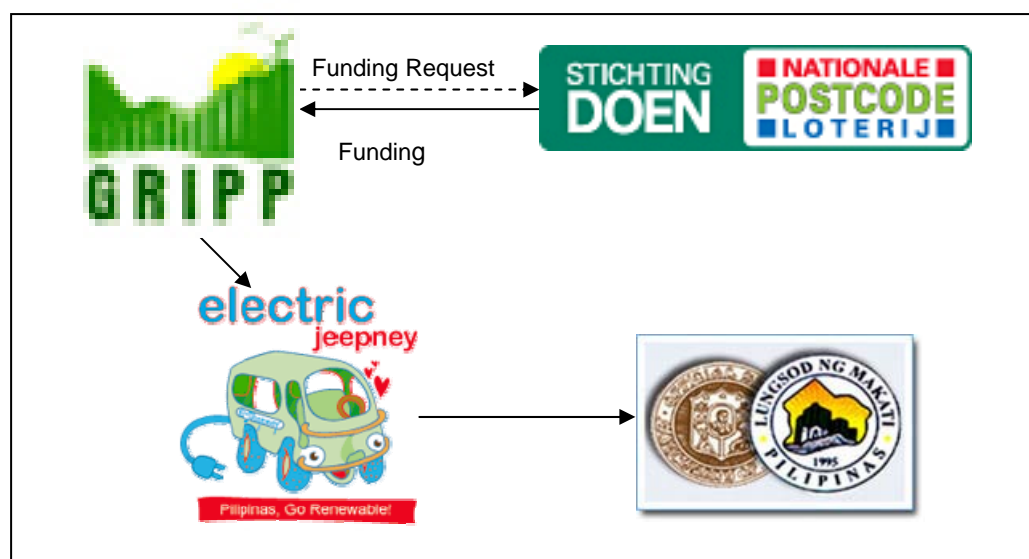
GRIPP sourced the grant used for the acquisition of the e-jeep from the DOEN Foundation. Three (3) cities were selected to implement the project including Makati City. As this is grant, the city governments did not pay anything for the e-jeep. However, as counterpart, the city governments need to provide for the cost of operation, like the driver of the e-jeep, maintenance and charging of the batteries.

The electric jeepney costs around Php550,000 (without transmission) per unit or Php 595,000 (with transmission) per unit. Based on the results of the pilot testing, the e-jeep can run up to 75 km on a non-stop operation, with a single full charge. The e-jeep power consumption is around Php 107 (10.7 kwh at Php 10 per kwh Meralco rate) or Php 1.42 per km. (Php 107 divided by 75 kms) as compared to Php 5.00 for a conventional jeepney powered by diesel.

A typical public utility jeepney's estimated fuel mileage is at 8km per liter. At Php40 per liter price, it will consume around Php375 or about Php 5 per km.

The e-jeepney battery costs around Php 60,000 and has a 2 year lifetime, therefore, it has an additional cost of Php 96.00 per day if it operates for 26 days per month. With these computations, the total cost per km is Php2.70 (Php 107.00 + Php 96.00 = Php 235 divided by 75 km). There is a need to update the study of the costs and savings if the e-jeep is implemented because of the changing prices of electricity and fuel.

Financial Mechanism Diagram



Barriers Encountered in Financing the Project

A. Risks associated with securing underlying finance
Each e-jeep unit would cost Php 550,000 – 595,000, which is almost double the price of a diesel engine jeepney. There is therefore a need to source funding for the purchase of the units. Considering that the technology is new in the country, the project proponents may find it difficult to secure financing from the traditional sources, like, local banks.

B. Institutional barriers
Since the electric jeepney is a new technology, the Land Transportation Office (LTO) needed to provide classification type for this vehicle prior to registration. Makati City experienced several challenges in the issuance/securing of necessary permits before the units can be used commercially.

The technology is presently imported from China. Local accreditation of the suppliers and assemblers also presented some barriers.

C. Prevailing Practice
The e-jeep is not commonly used in the Philippines. Some passengers are still hesitant to patronize the e-jeep due to perceived risk.

Role of LGUs and other players to facilitate/support this project

There are three (3) main parties involved in the project:

- a. DOEN Foundation provides funding to organizations and projects in the fields of Sustainable Development, Culture, Welfare and Social Cohesion. DOEN Foundation achieves its objective through the revenues it receives from the Dutch Postcode Lottery, the Sponsor Bingo Lottery and the BankGiro Lottery.

DOEN Foundation supported GRIPP Foundation and its Jeepney project in order to provide a sustainable solution for transportation. Providing environmentally friendly Jeepneys shows that it is possible to be mobile and still reduce the amount of air pollution caused by traffic, including greenhouse gas emissions.³³

³³ www.doen.nl

- b. GRIPP – a local NGO who started the Climate Friendly-Cities Program through which the e-jeep project is part of. GRIPP was responsible for identifying recipient LGUs to implement the project. It facilitated the training of personnel who would be operating the e-jeep courtesy of the technology provider.
- c. Makati City Government (LGU) – the LGU is responsible for the implementation and maintenance of the project. The LGU is currently doing a feasibility study for the project as it is plans to continue this project.

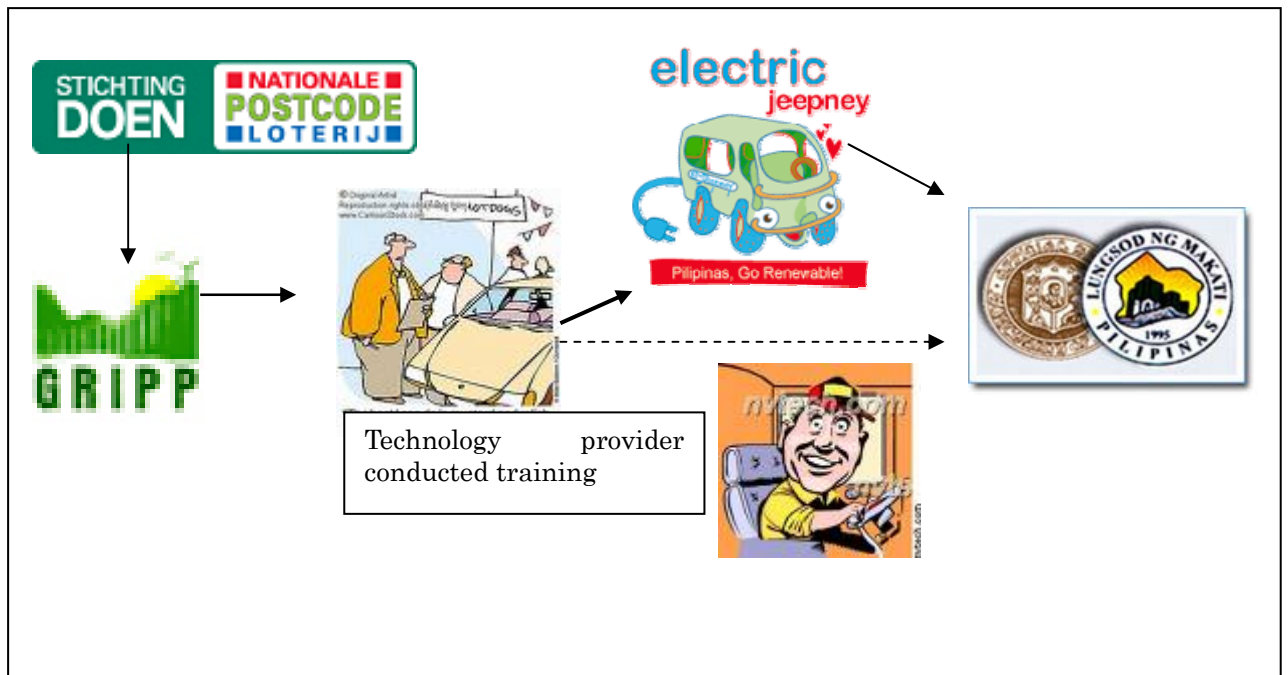
Climate change initiatives of Makati City Government

The Makati City government is very active in implementing climate change initiatives. It is part of the International Council for Local Environmental Initiatives (ICLEI) under its Cities for Climate Protection Campaign in March 2004. It has created special environmental bodies such as the Makati City Environmental Protection Council, Makati Solid Waste Management Board, Clean and Green Committee, and the Clean Cities Makati Coalition.

Makati has set a target to reduce the emissions of the city of up to 20% from 2003-2010. Measures to achieve this target include the following:

1. Proper solid waste management
 - Makati has set waste reduction targets for the following years
 - 2002: base year
 - 2003: 5%
 - 2004: 10%
 - 2005: 15%
 - 2006: 20%
 - 2007: 25%
 - 2008: 30%
 - a. Programs and IEC activities targeting different relevant sectors are initiated by the city for proper waste management
 - b. Enforcement of City Ordinance 2003-095: City Solid Waste Management Code
2. Reduced electricity consumption
 - a. City lighting projects
 - b. Conservation measures in City-owned buildings
3. Urban Greening
 - a. City-wide tree planting
4. IEC activities on climate change adaptation and mitigation
 - a. Module writing of teachers on climate change mitigation and adaptation
 - b. Orientation seminar for City Government personnel
5. Transportation
 - a. E-jeep
 - b. Bus Rapid Transit
 - c. Anti-Smoke Belching Campaign via City Ordinance no. 2004-32

Role of LGUs and other players to facilitate/support the project



A1.8: Selecta Gawad Kalinga Green Village

Background of the Project

A. Project Description

The housing project is sitting on a 3,000 square meters area with 94 household beneficiaries. Some 17 households purchased their land from the Diocese of Antipolo for P18,000.00. The remaining land is still being negotiated through the Community Mortgage Program (CMP) between Gawad Kalinga (GK), the Municipality of Cainta, National Housing Authority (NHA) and the GK Kapitbahayan Neighborhood Association. Part of the remaining lot is covered by the usufruct agreement between the local government unit of Cainta, Rizal and GK. Under this agreement, the property is used for free for a minimum of 25 years. The average land area per household is 25 square meters.

The (CMP) is a mortgage financing program of the National Home Mortgage Finance Corporation (NHMFC) which assists legally organized associations of underprivileged and homeless citizens to purchase and develop a tract of land under the concept of community ownership. The primary objective of the program is to assist residents of blighted areas to own the lots they occupy, or where they choose to relocate to and eventually improve their neighbourhood and homes to the extent of their affordability.

The sources of livelihood of the people are farming, sewing, construction working, driving and doing laundry.

On the other hand, the urban farm which is adjacent to the housing project is a 3,500 square meter lot on lease for free from the Diocese of Antipolo for 5 years renewable. The MOA was signed on March 2007 between GK, the Diocese of Antipolo and the neighbourhood association. Selecta, which is located just 10 meters away from the village donated P 1 million pesos worth of farm input/farm implements during the start up of the project as part of their corporate social responsibility to help the poor people of the

village to have livelihood and to promote sustainable urban farming.

B. Profile of the Project Proponents

a. Gawad Kalinga (GK)

Gawad Kalinga (GK) translated in English means to “to give care”, is an alternative solution to the blatant problem of poverty not just in the Philippines but in the world. GK’s vision for the Philippines is a slum-free, squatter-free nation through a simple strategy of providing land for the landless, homes for the homeless, food for the hungry and as a result providing dignity and peace for every Filipino.

What started in 1995 as a daring initiative by the Couples for Christ to rehabilitate juvenile gang members and help out-of-school youth in Bagong Silang, Caloocan City, then the biggest squatters’ relocation area in the Philippines, has now evolved into a movement for nation-building. Together with its partners, Gawad Kalinga is now in the process of transforming poverty stricken areas with the goal of building 700,000 homes in 7,000 islands in 7 years (2003-2010). To date Gawad Kalinga is in over 900 communities all over the Philippines and in other developing countries.

Gawad Kalinga is more than about building houses for the poorest of the poor. Providing a decent home is just the beginning of the transformation of the people and the community. It has also evolved to a more integrated community building to include environmental concerns such as climate change mitigation due to increased/heightened awareness on the issue of climate change.

b. Selecta

Selecta is a joint venture between two Philippine Corporations, namely the RFM Corporation and Unilever. It manufactures ice cream, milk and chocolate products.

c. Archdiocese of Antipolo

Archdiocese of Antipolo - The Diocese of Antipolo was created on January 24, 1983 and was canonically erected on June 25, 1983 at the Shrine Parish of the Immaculate Conception in Antipolo, Rizal. It was carved out of the Archdiocese of Manila, taking mostly the eastern part of Rizal. It includes under its jurisdiction 16 municipalities, among them Antipolo, Angono, Baras, Marikina, Montalban. It is a suffragan of the Archdiocese of Manila. The Diocese of Antipolo has a land area of 1,859 square kilometers. In 1983, upon its creation, the estimated population of the area was about 900,000 of which 83 per cent were Catholics. The diocese then had 21 parishes. Today, over the same land area, the population has grown to over 2,000,000 of which 85 per cent are Catholics.

d. Municipality of Cainta

Municipality of Cainta, Rizal - The Municipality of Cainta (Filipino: *Bayan ng Cainta*) is a first-class urban municipality in the province of Rizal, Philippines. It is the province's most prosperous town, one of the oldest (originally founded in August, 1571), and the town with the smallest land area (43.00 km²). Cainta serves as a gateway to the rest of Rizal province from Metro Manila. It is one of Rizal's most urbanized towns because of its proximity to Manila.

e. National Housing Authority (NHA)

National Housing Authority (NHA) – NHA is a Government-owned and -controlled corporation under the administrative supervision of the Housing and Urban Development Coordinating Council and classified under the Infrastructure Utilities Group.

NHA Charter Presidential Decree No. 757 dated 31 July 1975

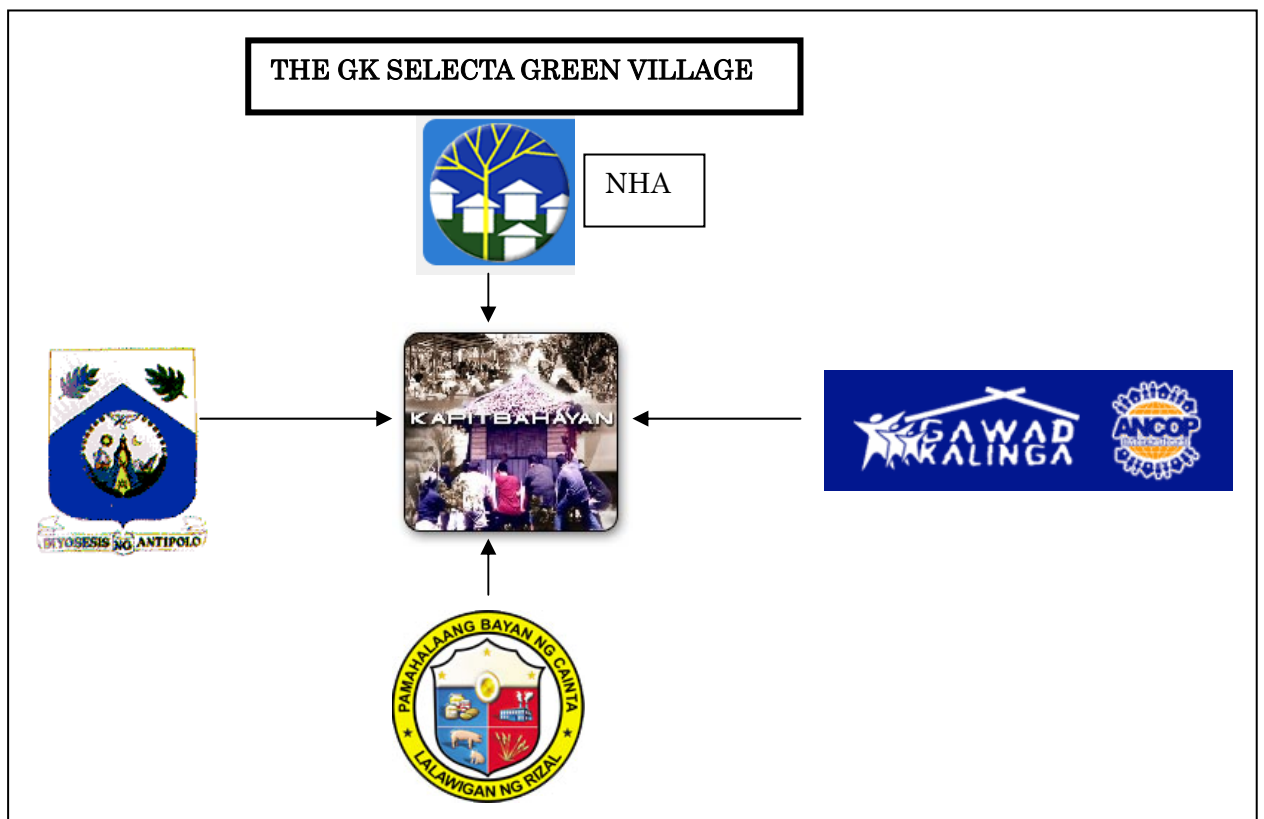
Mandates Under PD 757 dated 31 July 1975. NHA was tasked to develop and implement a comprehensive and integrated housing program which shall embrace, among others, housing development and resettlement, sources and schemes of financing, and delineation of government and private sector participation. Under EO 90 dated 17 December 1986. NHA was mandated as the sole national government agency to engage in shelter production focusing on the housing needs of the lowest 30% of the urban population.

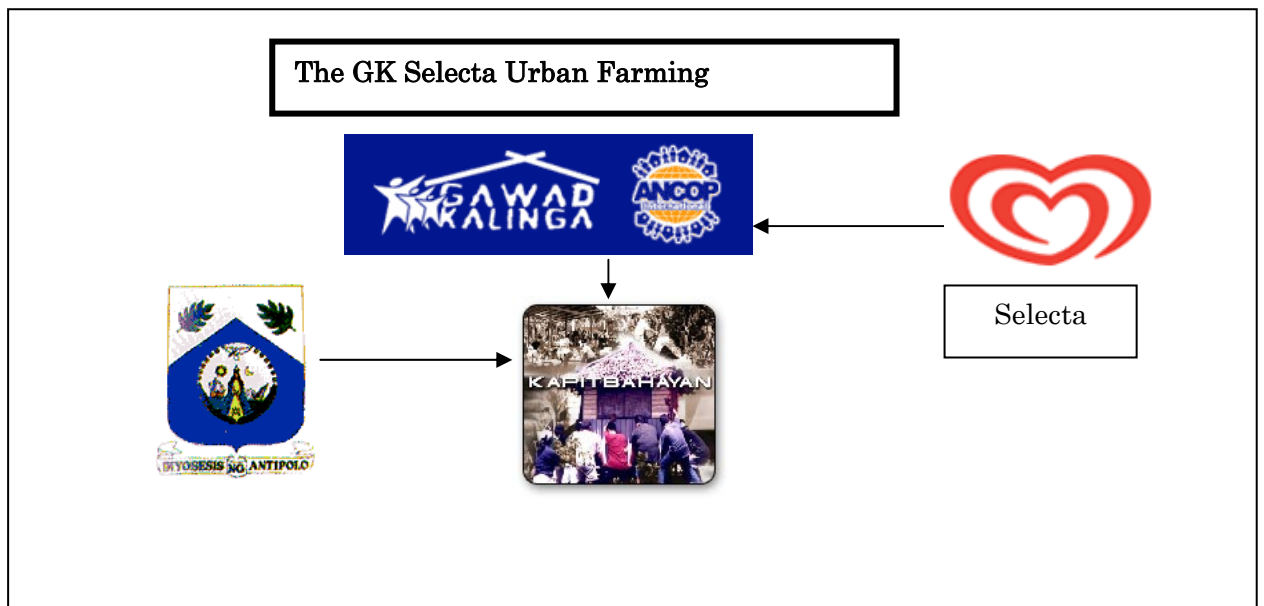
Under RA 7279 (UDHA) dated 24 March 1992. NHA was tasked to provide technical and other forms of assistance to local government units (LGUs) in the implementation of their housing programs; to undertake identification, acquisition and disposition of lands for socialized housing; and to undertake relocation and resettlement of families with local government units.

Under RA 7835 (CISFA) dated 08 December 1994. NHA was tasked with the implementation of the following components of the National Shelter Program - the Resettlement Program, Medium Rise Public and Private Housing, Cost Recoverable Programs and the Local Housing Program.

Under EO 195 dated 31 December 1999. NHA was mandated to focus on socialised housing through the development and implementation of a comprehensive and integrated housing development and resettlement; fast-tracking the determination and development of government lands suitable for housing; and ensuring the sustainability of socialized housing funds by improving its collection efficiency, among others.

C. Financial Mechanisms Used in the Project (e.g. grants, loans, etc.)





Gawad Kalinga has always promoted the “bayanihan” concept of building houses. “Bayanihan” means physically moving one house from another with the help of local folks. All money used in the project were donations or “padugo” as coined by Gawad Kalinga itself. No loans were involved in this project.

D. Chronological Events/ Milestones of the Project (history)

- 2003 – negotiation for the CMP and usufruct agreement between the Municipality of Cainta and Gawad Kalinga started.
 - 2004 – usufruct agreement was finalized while CMP negotiation is still on going
 - 1st quarter of 2004 – start of construction of houses
 - 2006 – completion of construction of houses
 - March 2007 – start of urban farming operation
- The village is just one of the many villages of Gawad Kalinga.

Barriers Encountered in Financing the Project

No financial barriers were identified since project financing was available.

Risks associated with securing underlying finance

Since the project involves only donations or “padugo, there was no risk identified with securing finances for this type of project.

A. Socio-cultural and political barriers (acceptance, political will)

At first, the people of the village were reluctant to do urban farming because they were not sure if their produce would be marketable. Only a few of the villagers dared venture into farming. But because their produce are organic, many people within and outside the area started patronizing their product. Because of this development, more people from the village are now helping in the urban farm.

Institutions Involved in Financing of the Project

A. Gawad Kalinga

Gawad Kalinga provided the financing from donations to the green village.

- B. Selecta
Selecta donated the amount of P1 million pesos for farm inputs/implements and construction of infrastructures to start up the urban farming where the compost facility is located.
- C. The National Housing Authority
The National Housing Authority through its CMP is facilitating the acquisition of the land.

Role of LGUs and other players to facilitate/support to this project

- A. The Municipality of Cainta
The Municipality of Cainta, Rizal provided the lot for the village through the community mortgage program or CMP and usufruct agreement. Building permit fee was waived to support this program. The local government through its municipal health office also extends medical services to the people living in the village.

Climate Change initiatives of the municipality of Cainta, Rizal

An interview with Atty. Bardon C. Mallari, the Secretary to the Sangguniang Bayan, the municipality of Cainta is “in the process of addressing various environmental issues including the issue of climate change”, and that they are “open to possible partnership” with other organizations in this regard.

Below are some of the environmental ordinances of the municipality:

Ordinance No. 2000-09 – An ordinance prohibiting spitting, urinating, defacating, and/or littering of paper and other rubbish in public buildings, streets, plazas and other public places in Cainta, Rizal, and providing penalties for violation thereof.

Ordinance No. 2008-018 – An ordinance regulating and monitoring garbage collection within the territorial jurisdiction of Cainta, Rizal and prescribing penalties thereof.

Ordinance No. 2008-003 – An ordinance prohibiting scavenging of garbage (waste) open up or scatter stored waste in any waste bag or container for any purpose whatsoever and prescribing penalties for violation thereof.

- B. The National Housing Authority
The National Housing Authority facilitated and has been facilitating the CMP between the neighborhood association and the municipality of Cainta, Rizal.
- C. Gawad Kalinga
Gawad Kalinga monitors the status and maintenance of its housing project under its shelter program and also monitors the sustainability of its urban farming project under its productivity program. A volunteer from GK also donated the shredder for use in the urban farm.
- D. Selecta
Selecta supervised the construction of the facilities in the urban farm and also provided the farm inputs.
- E. The Diocese of Antipolo
The Diocese of Antipolo provided the land for urban farming for free for a period of 5 years which is renewable.

A1.9: PRRM micro hydro project

Background of the Project

A. Project Description

Access to electricity is a problem for the people in the province of Ifugao because some of its barangays including Bokiawan are very far from the electric grid. This, plus the presence of sufficient water supply to generate electricity encouraged the construction of this micro hydro project.

This 15 KW micro-hydro plant is located in Barangay Bokiawan, Kiangon, Ifugao. The plant which was inaugurated in September 2002 is a joint project of a local people's organization in the area, Save the Ifugao Terraces Movement (SITMo), the Philippine Rural Reconstruction Movement (PRRM), a non-governmental organization and the municipality of Kiangon, Ifugao. In 2002, 28 out of 150 households were beneficiaries of the micro hydro power plant. This went down to 16 households in 2004 when another electric company provided a more reliable although more expensive electricity. It is estimated that this micro hydro plant can power one (1) bulb, a refrigerator and a television set per household.

B. Profile of the Project Proponents

a. The Philippine Rural Reconstruction Movement

The Philippine Rural Reconstruction Movement (PRRM), is the oldest Philippine NGO. It was founded in 1952. PRRM labors to show a different way of doing development and have it adopted into government policy and practice. Its community-based programmes cover agriculture, fisheries, energy, health, environment and entails a great deal of community organizing and capability building to enable the rural poor and local citizens find their way out of poverty and get government to do its part and deliver. It operates on the principle that the key to sustainable development is the effective participation by, and cooperation among, the local people, the local government unit, and the local business sector, in local development.

b. The Save the Ifugao Terraces Movement (SITMo)

The Save the Ifugao Terraces Movement (SITMo) was launched in March 2000 under the auspices of the Sustainable Rural District Development Program (SRDDP) undertaken by PRRM. The renewable energy program of SITMo was an offshoot of PRRM's pioneer works on sustainable energy development.

SITMo aims to increase access of rural people to basic energy services. Its objectives are to tap local resources especially micro-hydro for electrification, milling, the promotion of income generating projects and encourage the local adoption of clean energy and demonstrate viable alternatives to large energy projects (large hydro and geothermal) that threaten some Ifugao villages. This is done by using local resources to pilot renewable energy projects in remote villages and advocate for more of these developments across the province.

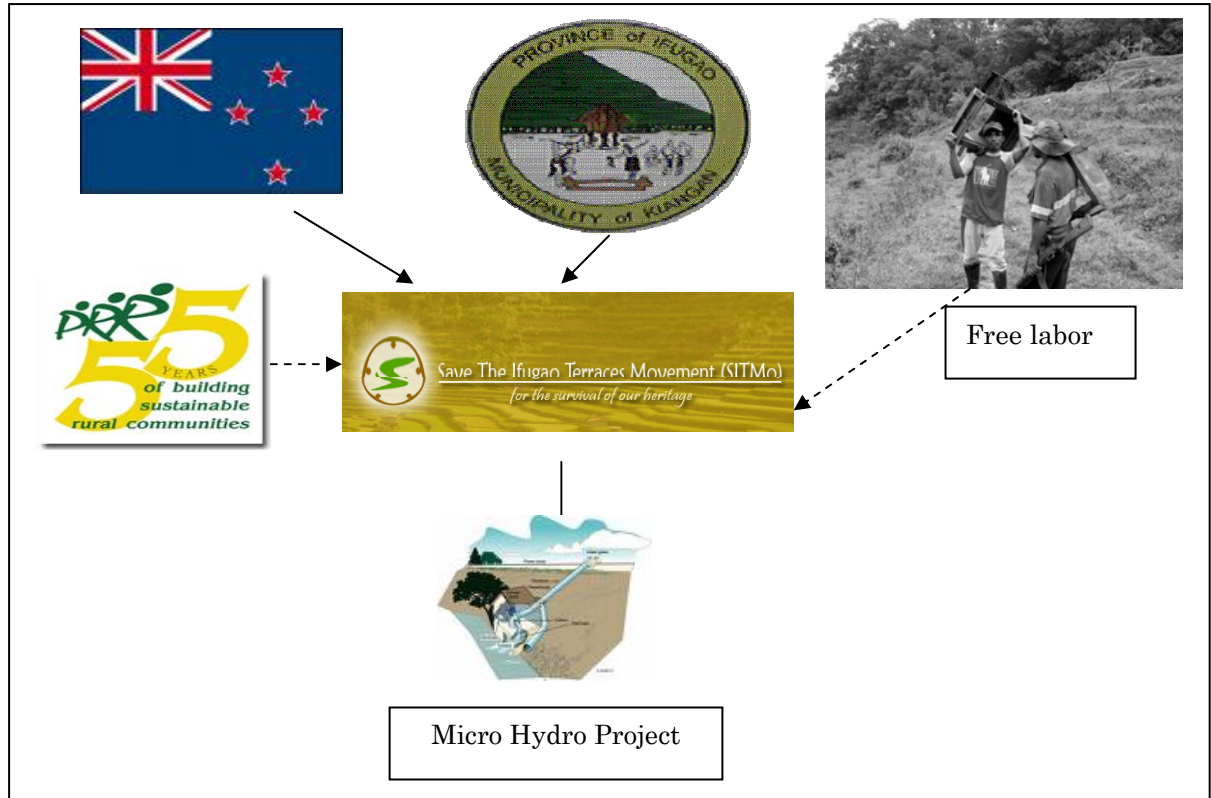
C. Financial Mechanism/s Used in the Project (e.g. grants, loans, etc.)

The project was funded by the New Zealand Embassy for P450,000.00 through the efforts of then U.S. Peace Corps volunteer Jordan Ermilio, who was assigned to the Municipality of Kiangon. The Municipality of Kiangon, provided as counterpart P250,000.00 to initiate the project. SITMo member Teddy Baguilat was the municipal mayor of

Kiangan at that time, and he was fully supportive of this endeavor.

The residents of the barangay provided free labor for the project.

Financial Mechanism Diagram



D. Chronological Events/ Milestones of the Project (history)

- 1988 – PRRM opened branch in Ifugao with a Sustainable Rural District Development Program (SRDDP)
- 1992 – Renewable energy was integrated into PRRM’s program
- 2000 – SITMo was launched
- June 2001 - start of construction of the plant
- 2002 – Inauguration of the plant

Since 2002, the plant has been managed and maintained by the local cooperative in the barangay, the Bokiawan Electricity Cooperative (BELCO).

Barriers Encountered in Financing the Project

No financial barriers were identified since the project has financing even at the beginning.

A. Socio-cultural and political barriers (acceptance, political will)

Some of the barriers encountered in the course of running this project were: 1. The lack of skilled people in the community to become officers of the cooperative. 2. Officers felt burdened with too much responsibility. 3. Location of the plant is not favourable for transport, requires time and effort to reach. 4. Maintenance of the plant is too costly. 5. Lack of interest to learn how to handle mechanical problems.

SITMo, PRRM and the local government worked and has been working hand in hand to address these problems. They adopted the following measures: 1. Officers now have

fixed positions. 2. Rotate the operation of the plant per household per week. 4. They are considering raising the fee. 5. The provincial government encourages people to enrol in Technical Education and Skills Development Authority (TESDA) under a subsidized education program.

Role of LGUs and other players to facilitate/support to this project

A. Municipality of Kiangan

Aside from the financial counterpart given by the Municipality of Kiangan in 2001 in the amount of P250,000.00, the provincial government also encourages people to enrol in the government's Technical Education and Skills Development Authority (TESDA) under a subsidized education program. TESDA was established through the enactment of Republic Act No. 7796 otherwise known as the "Technical Education and Skills Development Act of 1994", which was signed into law by President Fidel V. Ramos on August 25, 1994. This Act aims to encourage the full participation of and mobilize the industry, labour, local government units and technical-vocational institutions in the skills development of the country's human resources.

Climate Change Initiatives of the province of Ifugao

The Sangguniang Panlalawigan of the province recently passed a resolution creating the Provincial Technical Working Group (PTWG) to assist in the production of a Provincial Environment Code.

Authored by Board Member Samson Atluna, Chairman of the Committee on Environment, Agriculture and Natural Resources, the said resolution was amended in consonance with the Philippine Agenda 21, or the so-called Rio Declaration on Environment and Development, as adopted by several governments of the United Nations.

The Environment Code will operationalise the powers and responsibilities of the Provincial Local Government Units in Ifugao in the attainment of sustainable development goals by instituting legislative measures and reforms that will facilitate the effective implementation of local environmental management programs.

B. SITMo

SITMo organized the community and formed the Bokiawan Electric Cooperative (BELCO). It took SITMo 3 months to organize the community which included social preparation, workshops and trainings on community organizing, basic electricity matters and housewiring, as well as specific knowhow on the operation of the plant. SITMo's Renewable Energy Center solves technical problems which could not be addressed by BELCO.

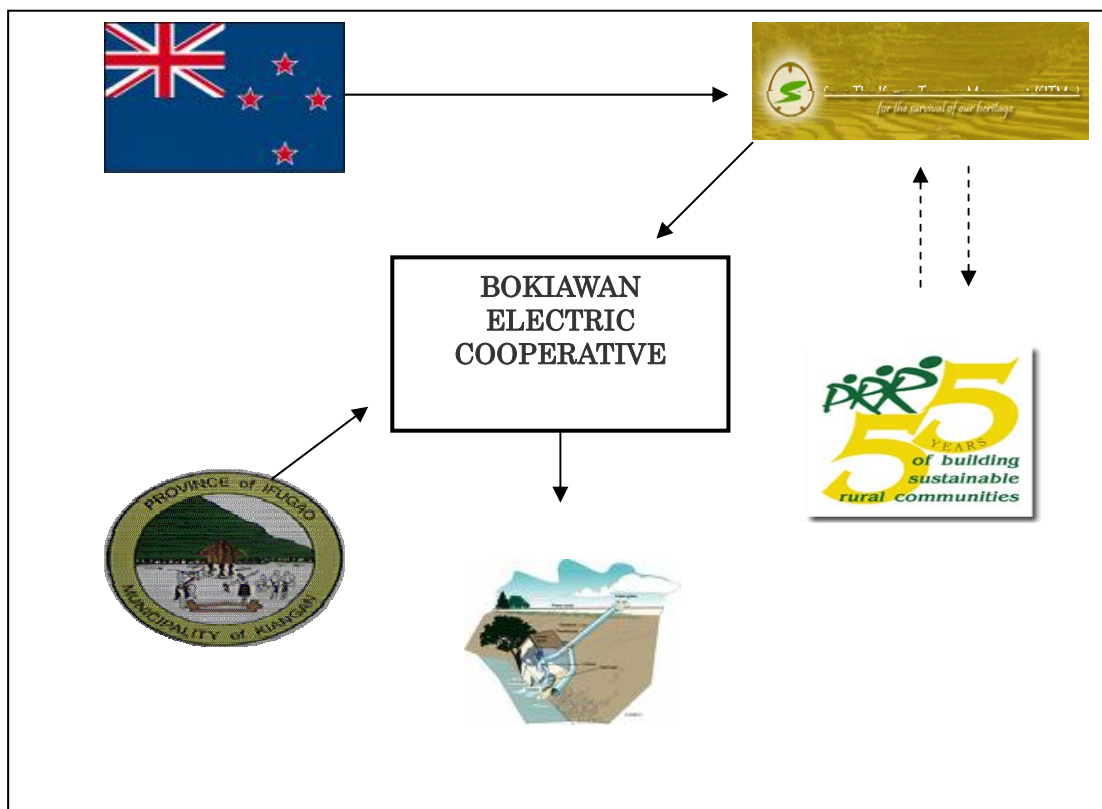
C. PRRM

PRRM is the partner NGO of SITMo in carrying out the integrated area development program in Ifugao.

D. The New Zealand Embassy

The New Zealand Embassy released P450,000.00 for the construction of this plant in 2001.

Role of LGUs and other players to facilitate/support to the project



A2 Cases in Indonesia³⁴

A2.1. 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: No data available

Total Investment: IDR 15,000,000,000 80% in the form of loan from Bank Syariah Mandiri 20% from PT. Mulya Tiara Nusa

Summary

Project activity is installation of 3000 units of biodigesters which capture and utilise methane from cattle 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.

Currently, cattle and pigs manure from small scale farms are discharged to an open space without any treatment. Through this project activity, cattle 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.

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).

The 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.

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.

³⁴ Adopted from CER Indonesia (2008)



Biodigester used in the Bali Biogas Program

A2.2. 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.

A2.3. 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

PT. Rimba Partikel Indonesia (RPI) is a manufacturing company located in Kendal - Central Java that produces particleboard.

The proposed project activity is the construction and operation of new heat (steam boiler) and power generation system (± 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.

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.

A2.4. 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

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 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 Transportasion as local company. Trans Pakuan is one of business unit on PD Jasa Transportasion 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.

Thirty (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 Engeri 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. The total current cost equals 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.

A2.5. 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: 405.827

passengers x Rp 2,500 = 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 behaviour. 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

A2.6. 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

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.

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.

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. In 2006, BALIFOKUS role was 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.

The activities implemented were:

- 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.1,000/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-CO₂e /year
- Total investment cost of project's infrastructure was about US\$ 150,000 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
- Technology 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



One of the illegal dumpsite in Gianyar



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



Composting process using forced aeration technique

A2.7. 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

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.

The project activity is estimated to produce emissions reduction of 12,798 tCO₂e / year.

A2.8. Micro Hydro Power Plant at Garung District – South Garut

Name of the Project: Micro Hydro Power Plant at Garung District-South Garut

Project participant: 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

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.

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.

PLTMH unit construction was started at January 2002, and the local community was actively participated on, not only in providing labour but also in providing materials for the construction. The PLTMH was fully operated and by April 2002.

Below is information regarding costs and funding in developing PLTMH Garung unit.

Table A2-1 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

PLTMH 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 houses.

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 Committee (DKM) and local house group committee. 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.

A2.9. 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.

A3 Cases in China³⁵

A3.1. Shandong Weihai 69 MW Wind Power Project

1) General information of the project

The Project is sited in the north of Weihai City, Shandong Province. The Project involves of installation of 46 sets of turbines, each of which has a capacity of 1500 kW, providing a total installed capacity of 69 MW. According to the anemometry data collected during the past years, the Project site has excellent wind resources with an average wind speed about 6.6 m/s at the height of 70 m and the estimated electricity output supplied to the North China Grid from the 46 sets of turbines of the Project is 140.033 GWh per year. The Project will reduce 2,882,019tCO₂e GHG emissions in a 7x3 crediting period.



2) Financial analysis of the project

This project is owned by Huaneng Zhongdian Weihai Wind Power Co. Ltd, the total investment of the project is 705.1141 million RMB. The financial analysis of the project is as follows:

TableA3-1 Financial Parameters for Calculation of IRR of Total Investment of the Project

NO.	Parameters	Value
1	Installed capacity (MW)	69
2	Electricity supplied to NCG (GWh/y)	140.033
3	Bus-bar tariff (RMB / KWh)	0.70 (excluding VAT); 0.76 (including VAT)
4	Project lifetime (yrs)	22.5 (Construction period 1.5 yrs; Operational period 21yrs)
5	Total investment (Million RMB)	705.1141 (equity/debt ratio:1:2)
6	Debt rate	6.39%
7	Circulating fund (Million RMB)	1.5

³⁵ Adopted from Sun, Liu and Qu (2008)

8	Investment of transmission line (Million RMB)	14.8
9	Income tax rate	33%
10	Sales tax (Including tax of city construction and education, Million RMB)	13.28
11	O&M cost (RMB/MWh)	128.5

Based on the data, without CERs sales revenues, the IRR of total investment of the Project is 6.72%, which is lower than the benchmark (8%). The Project is not financially attractive. With CDM, CERs revenue will improve IRR of total investment by up 1.94% above the benchmark scenario.

Therefore, the proposed project, with the CDM revenue, can be considered as financially viable to the investors. Table6- 2 shows the IRR of the Project with and without CDM revenues.

TableA3-2 Financial indicators of the Project

IRR (total investment)	benchmark=8%
Without CDM	6.72%
With CDM	8.66%

This CDM project is consulted by Huaneng New Energy Company, the consulting fee is about 0.8 million RMB.

The buyer of the CERs produced from this project is Endesa Generación S.A Spain.

3) Benefits for the local development

Though this project is invested and owned by the Huaneng Zhongdian, a state owned power giant, but also gave a big contribution to the sustainable development of the local economy, society and environment:

- (1) Creating revenue to the local government in the form of land purchase and tax payment;
- (2) Creating local employment opportunities during the project construction and operation period;
- (3) Improving the environment by reduce the coal consumption and pollutants emissions. Now the wind power takes around 10% of the total power consumed in Weihai.

4) The local government and community involvement of this project

Because the project is benefit to local development, so the local governments are thirsty to invite the project to be constructed in Weihai. They assist the investor to complete the format, simplify the process, quicken its progress; they provide the land to the wind power plant with top priority and cheapest price though the land usage quota is limited strictly; they actively adjust the relationship of the investor with other stakeholders, make the project goes smoothly.

5) The success factor of the project

- (1) The strong background of the investor. Huanneng Zhongdian is a state owned power giant, they have money, have the experience on power project.
- (2) The strong support from the local government and communities.

6) Information sources:

United Nations Framework Convention on Climate Change,

<http://cdm.unfccc.int/index.html>

Weihai Development & Reform Bureau

Ms. Lv Xiaohong, Huaneng Zhongdian Weihai Wind Power Co., Ltd

A3.2 Xiaohe Small Hydropower Project

1) General information of the project

The Xiaohe Small Hydropower Project, a run-of-river hydropower project, is located on Daxia River in Gansu Province. It does not construct barrage, and directly utilize the tail water of Toudaohe Hydropower Station, through diversion sluice, penstock, forebay, pressure pipelines and powerhouse to generate electricity. When this project is put into operation, it will be connected to the Northwest Power Grid (NWPG) of China through Gansu Provincial Grid. Total installed capacity is 9.6MW, provided by three (3) 3.2MW turbines, and annual output is expected to 51,030MWh. The project had started construction on April 26, 2005, and started operation in the end of 2007.

The proposed project activity will expand the capacity of NWPG, and further alleviate the tension of regional electricity supply; on the other hand it will displace part electricity of coal-based electricity generation, consequently reduce the emissions of anthropogenic greenhouse gas (GHGs) by sources.

Total estimated reduction is 291,123 tons of CO₂e in 7 crediting years. This project was registered in EB in October 23, 2006.

2) Financial analysis of the project

Xiaohe Small Hydropower Project is owned by Gansu Xiahe Hengfa Hydropower Co., Ltd, it is a limited liability company owned by several private companies. According to the “Economic Evaluation Code for Small Hydropower Projects”, which was issued by Ministry of Water Resources in 1995 (Document No.SL16-95) and is the most important reference for small-scale hydropower projects (SHP) assessment in China, a project will be financially acceptable when IRR is better than the sector benchmark IRR. The benchmark IRR on total investment for small hydro power projects is 10%.

Table A3-3 The calculation factors

NO.	Parameters	Unit	Value
1	Annual Export to NWPG	MWh	51,030
2	Power Tariff Rate (including VAT)	Yuan /kWh	0.18
3	Project Lifetime	years	22
4	Total Investment	million Yuan	68.4776
5	VAT	%	6
6	Income Tax	%	33
7	Additional Tax to VAT	%	8
8	Operation and Maintenance Expenses	million Yuan	1.34
9	Expected CERs Price	Yuan / tCO ₂	60
10	CERs Crediting Period	Year	7*3

The IRRs with and without CDM revenues are listed below. Without CDM revenues, the IRR is 7.24%, lower than the financial benchmark rate of return (10%). Calculated investment is 7,025

RMB /KW, which is higher than the weighted average investment in China (about 600RMB/KW). Therefore the proposed project activity is not a financial attractive. With CDM revenues, the IRR is increased to above the benchmark and financial acceptable.

Table 6-4 The IRR with and without CDM of Xiaohu Hydropower

Item	Without CDM revenues	Benchmark rate	With CDM revenues
IRR of total investment	7.24%	10.00%	10.89%

3) Benefits for local development

Xiaohu County where the proposed project located had been recognized as one of State Key Poverty Alleviation Counties by the Chinese government. Being a renewable energy project, this project will produce positive environmental and economic benefits, and contribute to the local sustainable development.

- (1) This project activity act as a direct supplement to local power capacity, change the power shortage situation;
- (2) Pay some tax revenues to local government during the operation;
- (3) Bring 30 job opportunities for the local minority nationalities ,promote their living standard ;
- (4) Play an active role in protecting and improving regional environment through avoiding environmental pollution caused by coal burning.

4) The involvement of local government and communities

Because this project benefits the local development, so it was welcomed by local government and communities. The local government propaganda the benefits of the project to the farmers, adjust the relationship between the investor and the local communities, made the land transfer smoothly, during the public hearing, no one opposite this project. Combined the hydropower project, the local government constructed a running water project, providing running water to the nearby people. Local government strictly supervise the ecosystem conservation of the project, make sure it follows the guides given by the environmental impact assessment, give enough water to farmland irrigation, all the land affected is restored, specially pay respect to the religion of local Tibetans, moved the project location. All the involvement of local government and communities made the project goes smoothly.

5) Success factors of the project

- (1) Combine the CDM project with the local development.
- (2) Pay more attention to the local minority.

6) Information sources:

United Nations Framework Convention on Climate Change,

<http://cdm.unfccc.int/index.html>

《Clean Development Mechanism --Project Development and Practice in China》 ,China 21 Agenda Administration Centre, Global Environmental Research Centre of Tsinghua University 2008

Mr. Ma Shuyuan, Xiaohu Hengfa Hydropower Co., Ltd

A3.3 Hebei Jinzhou 24MW Straw-fired Power Project

1) General information of the project

The Hebei Jinzhou 24MW Straw-fired Power Project is located in Zhangcun, Dongsu Town, Jinzhou City, Hebei Province. It occupies about 6.7 hectare lands with capacity of two 75t/h straw-fired boilers and12 MW heat-supplying units. During the operation period, it use about 176,000 tons of corn and wheat straw annually to generate about

132 GWh of power and supply 530,000 GJ of heat, which could satisfy the heating demand of 1million M² buildings. The total investment of the project is 259.42 million RMB.

The expected emission reduction in the first 7 year crediting period (January 2007-December 2013) is 1,250,381 tons of CO₂.

2) Financial analysis of the project

The project is owned by Hebei Jiantou Biomass Power Co., Ltd. This company is a joint venture invested by Construction Investment Company of Hebei Province and Shijiazhuang Energy Development Center. According the calculation, the IRR of the total investment is 5.47% in absence of CDM revenues which is much lower than the benchmark rate of 8%. With the CDM revenue (6 Euro/ tCO₂e, 21- year crediting period) the IRR of the total investment will increase by 5%, which shows that the CDM revenue has significant influence on IRR.

	NPV (Total investment) (million) i= 10%	IRR (Total investment) Benchmark rate = 8%
Without CDM revenue	58.34	5.47
With CDM revenue	25.24	11.82

The project is consulted by the Chinese Renewable Energy Industries Association; the consulting fee is 200,000 Yuan.

3) Benefits to local development

This project carries lots of benefits to the local government and communities: reduce greenhouse gas emissions, improve the environment, increase household incomes, and alleviate poverty in the rural areas.

(1) According to a survey conducted by the project developer, the total production of biomass straw in Jinzhou City is 352,100 tons per year, currently 50,000 tons is utilized for forage, over 85% are left to decay or sometimes burned in open air, that waste the resource, pollute the environment and emission the GHG, cause the global warming. The straw-fired power could solve this problem.

(2) There is not central heating system in Jinzhou City before the project established, they use small boilers to provide heat and steam for the factories and buildings, which are in low efficiency and lack maintenance, leading to energy waste and air pollution.

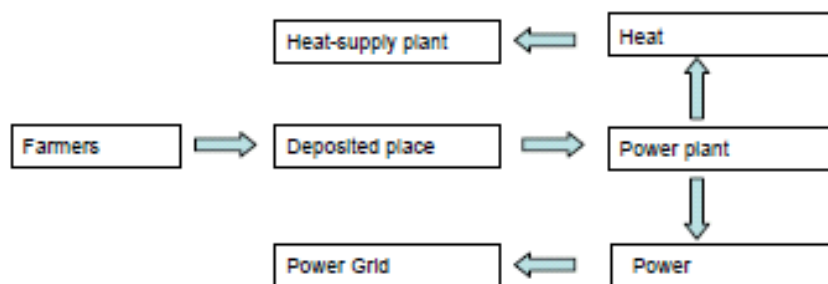
(3) In Jinzhou City, the farmers is poor, construct the strew-fired power project, purchase strew from the farmers, can increase their income, alleviate the poverty.

4) The involvement of local governments and communities

Because this project brings a lot of benefits to local development, so the local governments and communities strongly support this project.

To establish a straw-fired power project, one important thing is to collect and transport straws. The Jinzhou government gives a lot of support to the project and has set up an efficient organization to supply straws to the power station. Another important thing is to eliminate the small boilers, let all the factories and buildings use the centre heating system. The government issued a regulation, held a public hearing, give the small owners of the boilers preferential policies and subsidies, let them follow the general arrangement, make the project goes smoothly. If there is no the local governments and communities' support, there will be no this project.

The detailed straw-supply process and project activities are as following:



5) The success factors of this project

- (1) Local governments and communities' support
- (2) win-win design for farmers and the project investor.

6) Information sources:

United Nations Framework Convention on Climate Change, <http://cdm.unfccc.int/index.html>
 《Clean Development Mechanism --Project Development and Practice in China》 ,
 China 21 Agenda Administration Centre, Global Environmental Research
 Centre of Tsinghua University 2008
 Ms. Ma Lingjuan, Chinese Renewable Energy Industries Association

A3.4 Rizhao Luxinjinhe Methane Power Project

1) General information of the project

Rizhao Luxinjinhe Biochemical co., Ltd is located in Rizhao, Shandong Province, its main production is citric acid, the capacity is 150,000t/a, the number one in China. During the citric acid process, discharge 1500 t/d organic waste water in high concentration. In 2006, they tried to use anaerobic method treating the waste water, produce methane, use the methane generate power. According to the calculation, there are 42,000t/a COD in the waste water that can produce 9,000t/a CH₄, generate 23.4 million KW/a.

Total estimated GHG emission reductions is 1.47 million tones of CO_{2e} in 7 crediting Years

2) Financial analysis of the project

Rizhao Luxinjinhe Biochemical co., Ltd is a private owned company. The total investment of the methane power project is \$20 million. According the calculation, if 80% of the investment comes from loan with debt rate 8%, and the project life time is 14 years, no CDM, the IRR is 0%; with CDM and the CERs is \$7/t, the IRR is 2%.

From the analysis, this project is not a business attractive, even with CDM.

3) Benefit for the local development

- (1) Reduce the pollutants discharged to environment, improve the water quality.
- (2) Reduce the odour H₂S emission, improve the air quality.
- (3) Save the electricity consumption 20 million KWh reduce cost of 10 million Yuan in its lifetime.
- (4) Provide 50 job opportunity for the local people, improve their living standard.
- (5) Increase the local government revenue because the cost saving then more tax can be paid by the company.

4) The involvement of local government and communities

- (1) Provide land for the project.
- (2) Assess the environmental impact of the project, issue permit for the company.
- (3) Public gives their comments and suggestions during the public survey before the government issues the permit.

5) Progress of the project

In the early of 2006, the project was initiated under the pressure of environmental pollution. In June 2006, the company realized this project can apply for CDM and invited the CDM Project Center of Shandong Province as consultant to do the PIN and PDD. But CDM applying procedure usually takes around one year till it get registered in EB. Before the PDD completed, the project was finished in the end of 2006 under the command and pressure of environmental authority. In this case, the project is very hard to meet the additionality of CDM, so they give it up.

6) Lessons learned from this project

In China, the CDM knowledge still limited in the relative government departments and research institutes, most of the entrepreneurs and project managers do not know it. So lots of the projects were not considered for CDM at the early stage though they might qualify. Until they know it can apply for CDM, some time it is too late, because the procedure for a project to be registered as CDM in EB usually takes around one year, and according the practice, if a project is completed will difficult to verify its additionality.

This lesson tells us, strength the CDM knowledge spread, start the CDM consideration as early as possible.

7) Information sources:

Mr. Liu Xiangpeng, Rizhao Luxinjinhe Biochemical co.Ltd
Mr. Liu Zhaosheng, CDM Project Center of Shandong Province

A3.5 Daba Cement Works Waste Heat Recovery and Utilization for Power Generation Project

1) General information of the project

Daba Cement Works is located in Dezhou City, Shandong Province. The Daba Cement Works has two clinker production lines with capacity of 2500 t/d and 5000t/d. The main objectives of the project activity are to meet the increasing electrical supply needed by the cement works and to reduce greenhouse gas emissions through the recovery and use of waste heat from the clinker production lines. The waste heat currently is vented to atmosphere mainly, with a portion re-circulated within the clinker process to pre-heat input fuel and raw materials. The project activity will capture the waste heat and use it in a power generation plant, the exhaust heat from the power generation plant can still be re-circulated to the clinker process. This power generation plant is rated at 12MW and can produce 50419 MWh annually; 49540 tons of CO₂emission can be avoided.

2) Financial analysis of the project

The Daba Cement Works owned by Dezhou Jinghua Group, this project invested by the group.

The total investment of the project is 81.73 million RMB 52.15 million use loan from the bank. According the experience of similar project, the IRR is around 11%.

3) Benefit to the local development

(1) This project could ease the power shortage in the local area. During the last several years, the economic development in Shandong was very fast, power shortage is an obstacle of the development. The 12 MW power project can improve the situation.

(2) Provide 36 job opportunities for the local people; increase their income, improve their living standard.

(3) Increase the local government revenue through more tax paid by the Daba Cement Works due to its cost reduction and energy efficiency improvement.

(4) Improve the local environment through avoiding the expansion of coal power generation.

4) The involvement of the local government and communities

The local government is a facilitator of the project, provides the land for the project, issues the permit, and adjusts the relationship between the project owner and other stakeholders.

The local communities will formally participate the project during the environmental impact assessment, give their comments and suggestions.

5) Progress of the project

In May 2006, the manager of the project asked the CDM Project Center of Shandong Province as consultant preparing the PDD. In July, when the consultant finished the draft of PDD, an accident happened to the boss of the Daba Cement Works, he died. The company was under a big reform since then. The project was delayed until now.

6) Lessons learned

To some extent in China, the president directs everything for a private company. When the president changes, everything would change, too

7) Information sources:

Mr. Zhao Xu, Daba Cement Works

Mr. Liu Zhaosheng, CDM Project Center of Shandong Province

A3.6 Qingdao Fulai Biomass Power Project

1) General information of the project

Qingdao Fulai Biomass Power Project is located in Chengyang District, Qingdao City. The project plan to purchase crop strews from the farmers as fuel to produce heat and power. The project consist of 2*75t/h boilers with 1*12MW steam generator. After it is established, it will use about 85,000 tons of corn and wheat straw annually to generate about 72 GWh of power and supply 260,000 GJ of heat, which could satisfy the heating demand of buildings with an area of 0.5million M². The estimated emission reduction is 65,000 tCO_{2e}/a.

2) Financial analysis of the project

Total investment of the project is \$7.5 million that includes \$2 million development cost, \$4 million equipment cost and 1.5 million others. The revenue comes from the electricity is \$4.4 million, comes from the heat supply is \$0.9million. According the calculation, the IRR without CDM is 5.4%, with CDM is 10.8%.

3) The benefits for the local development of the project

(1) Provide more electricity to the power grid; ease the tension of the power shortage in

east part of Shandong Peninsula. These years the manufacture industry developed very fast in this area, the energy demand goes high very quickly, some time the power grid can not meet the demand, the power supply became the bottleneck of development. This project can alleviate the situation for the local area.

(2) Increase the income for the farmers. In the east part of Shandong Peninsula, agriculture is one of the main industries, there are abundant wheat and corn straw in this area. Some of the crop straws are used for the animal raising, some are used for farmland fertilizer, and some are just left to decay or even open burning. This project will purchase the crop straw from the farmers, that will increase the income of the farmers significantly.

(3) Improve the environmental quality. The crop straw left to decay or open burning causes severe environmental pollution, from the odour and smoke. Use the straw to generate heat and power, can avoid the air pollution.

(4) Provide the revenue to the local government. This project will purchase land, stimulating the transportation sector and pay the VAT to the local government that will improve the development in this area.

4) The involvement of the local government and communities.

(1) Provide land for the project.

(2) Assistant the company to organize the straw collection and transportation.

(3) Assess the environmental impact of the project, issue permit for the company.

(4) Public gives their comments and suggestions during the public survey before the government issues the permit.

(5) Assistant the company to get their electricity on the power grid.

(6) Assistant the company to establish the heating system in the local area and adjust the relationship of the company with the heating consumers.

5) The progress of the project

The manager of the project start to consider the CDM in the early of 2006, the consultant, CDM Project Center for Shandong Province, create the PIN for this project in June, 2006. But later, the manager changed his idea, left the CDM progress idle. The reasons are:

(1) This project is not a total new construction, it is planning to reform the existed coal boilers to straw boilers that will cost extra money and has some technical barriers.

(2) The project is located in the urban area; it is difficult to expand land occupation for straw storage and fly ash disposal. The straw transportation also causes environmental concerns.

6) Lessons learned

CDM project need to consider its location and environment, in one site it is feasible, but in another site it may be not.

7) Information sources:

Mr. Zhang Kangzhao, Qingdao Fulai Biomass Power Project

Mr. Liu Zhaosheng, CDM Project Center of Shandong Province

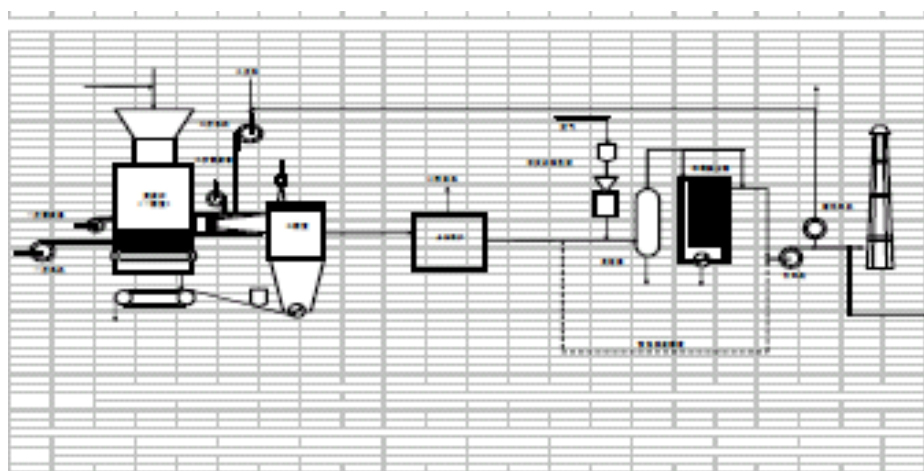
A3.7 The Weihai Waste Incineration Project

1) General information of the project

Until now, Weihai use the landfill method to treat the solid waste. The last sanitary landfill site was constructed in 2000, total investment is RMB 75 million, its volume is 4.467million cubic meters, can serve for 26 years according the feasibility study at that time. But along the rapid urbanization and economic development, the solid waste

generated increased very fast, it is less than 500 t/d in 2000, now is around 700 t/d. the lifetime of the landfill site has only 8 years left, short 11 years than estimated at beginning. And because the land limitation, the environmental problem of the landfill, it is very difficult to choose another landfill site. So the government decided to construct an incineration plant.

The construction site of the incineration plant is located near the landfill site. The capacity of the incineration plant is 700 t/d. The incinerator we chosen is mechanical double grate, incineration temperature is 850—1100°C, use limestone solution treat the acid gas emission, use active carbon treat the organic gas emission, use bag filter treat the dust, the residual from the incinerator goes to the landfill site. The heat will be recovered and supply to the factories and buildings nearby. The process is show in the chart.



This project does not produce CERs, but has significant mitigation effect, because it avoid the methane generation in landfill and the CO₂ emission from coal-burning heating facilities.

2) Financial analysis of the project

Weihai government use BOT method construct this project, through biding, Shanghai Environment Group is the winner. The total investment is 280 million, the incineration fee is 45 Yuan/t that will be adjusted for every two years and the operation period is 25 years, then the project will be transferred to the local government.

The government allocates the land for this project, responsible for the heat selling and payment for the incineration fee.

3) Benefit for the local development

- (1) Improve the environment in Weihai
- (2) Provide heat for the nearby area, ease the power shortage problem.
- (3) Provide 30 work opportunities for the local people, increase their income, improve their living standard.

4) Involvement of the local government and communities

Solid waste management is the responsibility of local government. Though this project uses the BOT method, but the incineration fee is paid by the government. After the operation period, the project will be transferred to the government. So actuary local

government is the implementer of the project. Solid waste is one of the important environmental issues that concerned by every resident. Good waste management encourages all the residents participate, reduce, reuse and recycle. The cost of the waste treatment actuary is paid by the residents directly or indirectly because the government revenue also comes from the tax paid by the residents.

A special issue for this project is the environmental impact for nearby people. This project has noise, dust, odour pollution during its construction and operation period, there are farmers nearby, and they strongly protest this project located there, even blocked the road, rally in the front of city hall. After the government improved the environmental protection measure, provide more work opportunities for them, they reached agreement with the government.

5) The engagement of international organizations.

The Kitakyushu Initiative Network (KIN) has sent consultants two times visited the landfill site, gave comments and suggestions. The Asia Urban Information Center of Kobe (AUICK), sent consultants two times visited the landfill site, gave suggestions. There are 6 person from Weihai has attended the training course provided by KIN, AUICK and Ube, the sister city of Weihai in Japan, that focuses on the waste management, three of them directly involved in the project. Chosen the BOT method and using the incineration process, is affected by the engagement of the international organizations in some extent.

6) Information sources:

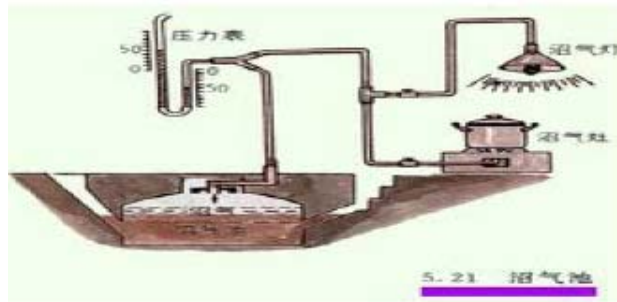
Weihai Environmental Protection Bureau
Weihai Construction Bureau
Weihai Landfill Site Administration Office

A3.8 Rural Methane Project in Weihai

1) General information of the project

In rural area, use the livestock residual and crop straw to produce methane is an environmental friendly, energy saving and climate change mitigation programme. But because the construction cost, the inconvenient maintains, makes it not easy to be spread in the rural area.

Weihai began the rural Methane programme in the early 1980s, its development fluctuated in different period. In 2006, along with the establishment of scientific development conception in the country, the government put the methane programme on the top priority of rural development again. From the national government to the local level, created rural methane development plan, issued regulations on technology, provide subsidies and service to encourage the rural methane development. The central government takes the rural methane development as one of the indicators for the achievement of the governors and mayors. So the mayors pay much attention on this programme. The government takes some towns, villages and farmers as pilots, use new material and advanced technology, construct the methane tanks, use the methane for cooking, heating and lighting, shows it to the farmers; organize training course for the farmers; provide trunks for the methane tanks' residual remove; establish technical service station in the rural area, make the methane tank construct and operation more convenient for the farmers.



Until the end of October 2008, there are 26928 methane tanks was constructed in the rural area of Weihai, total volume is 250000 m³, can produce 12 million m³ methane annually, that substituted the coal, wood and crop straw burning, reduced the CO₂ emission. According the estimation, the methane tanks in Weihai rural area can reduce the GHG emission 40000 t CO₂e annually.

2) Financial analysis of the project

In Weihai area, the average cost for one methane tank for a farmer household is 2,780 Yuan that is a big burden for a farmer. In order to encourage farmers to 34 construct the methane tank, the central government allocated some national treasure bond foundation to the rural methane programme, that takes about one third of the cost; the local government subsidies one third; so the farmer only pay about one third of the total construction cost.

3) Benefits of the project for the local development

Except the climate change mitigation effect, the rural methane programme brings many benefits for the local both from the development, social and environmental aspects.

(1) Improve the living standard of the farmers. If there is no methane, most of the farmers use wood, crop straw or coal for cooking that is not convenient, not sanitary and harmful for their health.

(2) Protect the environment. If there is no methane, the farmers use wood, crop straw and coal for cooking that emit a lot of dust, smoke and other air pollutants, and the methane programme avoided the trees cutting, conserved the eco system.

(3) The residual from the methane tanks will be used for farmland that will enrich the organic content of the land, avoiding use chemical fertilizer, improve the capacity of the land and make its production organically.

(4) The livestock raising farmers use the livestock's dejects as feeding material of its methane tank, use the tank's residual for farming, use the farm production for the livestock raising, it became a eco circle.

4) Involvement of local government and communities

The local governments is the initiator and facilitator of the rural methane programme, they provide the information, the training course, the subsidies and free service for the farmers. In Weihai city, the government takes the rural methane programme as one of the main task to improve the rural development, a vice mayor is in charge of this programme, the Weihai Agriculture Bureau is responsible for the programme, under the bureau, there is Weihai Rural Energy Station, which is responsible for the technical service. In the town level cities also have the similar organizations.

The communities in the rural area are the organizers of the methane programme. In China, the villages have their own organization, called villagers committee, all the villagers are members of the committee, and the head of the committee are elected by

the villagers. The committee is responsible for all the things that related the villagers. They spread the information, organizing farmers participate the training course, let farmers learn from each other and help each other. The communities are the bridge between the government and the farmers.

The farmers are the implementers and direct beneficiaries of the programme.

5) The engagement of international organizations

The rural methane programme in China has great benefit for the environment both globally and locally, so many international organizations interested in it, through different channel provide technical and financial assistance. But because the programme spread around the vast rural area and operated by the farmers individually, it is very difficult to organize. Until now there is no success CDM project in this field. During the rural methane development in Weihai, the local government and the design institute keep in touch and cooperated with several international organizations, got some new ideas and advanced technologies, but have not get the financial support from them now.

For the small methane tank that used for the farmers' household, the Weihai Rural Energy Station has the licence to provide the design service; for the larger methane tank, the design needs to be done by professional institute. The institutes that provide the large methane tank design service are Beijing Ringheri Environment Co.Ltd, Qingdao Tianren Group and Rizhao Hongye Group, mainly Beijing Ringheri Environment Co.Ltd. Beijing Ringheri Environment Co.Ltd follows the development of methane tank design closely, has a good relationship with C.S.T. Industries, Inc in USA, Sattler in Austria and NIRAS in Denmark.

6) Information sources:

Weihai Development & Reform Bureau
Weihai Agriculture Bureau
Weihai New Rural Energy Station

A3.9 Urban Greening Project in Weihai

1) General information of the project

Urban greening is an urban construction project, environmental project and also a climate change mitigation project. Along with the economic development, urbanization and increasing demand of the residents, urban greening is become a big issue for the local government. The local governments pay more and more attention on the urban greening. The central government also takes urban greening as one of the important indicators for the urban development. Weihai government has paid much attention on the urban greening in very beginning. The greening land in the urban area increase steadily, from 1965 hectare in 1993 up to 8,823 hectares in 2007, increased by 4.5 times.

Weihai got the award of Garden City from the national government; got the International Award as the Best Practice for Comprehensive Management of the Living Environment by UN-HABITAT in 1996 and 2000; got the UN-Habitat Scroll of Honor Award in 2003.

2) Financial analysis of the project

The investment on urban greening increased very fast during the last 15 years. From 42 million in 1993 up to 838 million in 2007 that takes about 29% of the total investment of urban public construction and maintenance fee of Weihai City.

The urban public construction and maintains fee mainly comes from urban public construction and maintains tax, public affairs plus, allocation from national and local government revenue, water resources fee, public facility connection fee, public facility using fee, land transfer fee and others.

The urban public construction and maintains fee mainly goes to water supply, gas supply, heating, public transportation, roads and bridges construction, drainage, waste water treatment, urban greening, sanitary and others.

3) Benefits of the urban greening

(1) Global warming mitigation. The trees, the grasses and the flowers in the urban area can absorb the CO₂ in the atmosphere; it is a carbon sink project.

(2) Environmental protection. The green land can trap the dust, absorb some of the pollutant gases, obstruct the noise and alleviate the heating island of the urban area, make the urban area environmental friendly.

(3) Aesthetics improvement. The trees, the grasses and the flowers make the urban area more beautiful, let the people feel pleasant.

(4) Create job opportunities for local residents especially for the disadvantaged group. In Weihai, there are thousands of people worked in the urban greening, some are full time workers but most of them are part time workers come from the villages nearby or the urban area that have no skill.

4) The involvement of local government and communities

The local governments is the in the main investor and implementer of the urban greening project. They are responsible for the planning, planting, irrigation and other maintains.

The local communities and residents are the stakeholders of the urban greening, They pay the cost indirectly through tax, participate the greening activities and enjoy the improvement of the environment.

5) The engagement of the international organizations.

Weihai is an open city, for the urban planning, large urban construction projects, the government will hold a international bidding for most of them. The government officers and technicians worked in the urban planning and greening field, most of them have the experience of visiting abroad, collaboration with foreigners, so the greening programme in Weihai has foreign spirit in side.