Japan International Cooperation Agency (JICA)
National Council for Climate Change and Clean Development Mechanism (CNCCMDL)

The Study for the Promotion of CDM Projects in the Dominican Republic

THE DOMINICAN REPUBLIC NATIONAL ACTION PLAN FOR CDM PROJECT DEVELOPMENT

FINAL REPORT SUMMARY

December 2010

JAPAN INTERNATIONAL COOPERATION AGENCY
EX CORPORATION

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PREFACE

In response to a request from the Government of the Dominican Republic, the Government of Japan decided to conduct "The Study for the Promotion of CDM Projects in the Dominican Republic" and entrusted to the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Satoshi Sugimoto of EX Corporation from September 2008 to October 2010.

The Study, together with the Dominican Republic counterparts from the National CDM Office (ONMDL) of the National Council for Climate Change and Clean Development Mechanism (CNCCMDL), conducted a series of field surveys while providing capacity development assistance to the relevant stakeholders of CDM projects so that the country's overall capacity of CDM promotion can be further strengthened.

At this final stage, the Study Team prepared this final report including "The Dominican Republic National Action Plan for CDM Project Development" with various technical tools to support the project proponents in planning and implementing CDM projects.

I hope that this report will contribute to further development of CDM projects and further strengthening and sustaining of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to our study counterparts as well as all other public and private stakeholders who provided us precious input and opinions and close cooperation all through the course of the Study.

December 2010

Izumi Takashima
Vice President
Japan International Cooperation Agency

Vice President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

We are pleased to inform the completion of "The Study for the Promotion of CDM Projects in the Dominican Republic" with submission of this final report.

The Study was conducted to investigate the potential areas/sectors of GHGs emission reduction that can be realized into CDM projects while identifying the issues and barriers to be addressed to further promote CDM projects in this country. The results of these activities are incorporated into "The National Action Plan for CDM Project Development in the Dominican Republic", which identifies the priority areas and sectors of CDM project development with the course of actions to be taken by public as well as private sectors to realize the potentials GHGs emission reduction.

The Study also conducted various capacity development activities to strengthen the knowledge and capabilities of the Dominican Republic stakeholders in CDM with production of technical tools to support project planning and documentation required for official registration to obtain carbon credit (Certified Emission Reduction: CER). The Study Team is confident enough to say that the knowledge, capacity and motivation of the Dominican Republic people in CDM project development has been well strengthened during the past few years.

We would like to express our sincere gratitude to the Japan International Cooperation, the Ministry of Foreign Affairs and the Ministry of Environment of Japan for giving us the opportunity to conduct this Study and technical cooperation. We would also like to extend our deep appreciation to the Government of the Dominican Republic, the National Council for Climate Change and Clean Development Mechanism, and JICA Dominican Republic Office for generous support to the Study. We could not successfully complete the Study without your assistance.

Finally, we hope that the output and results of the Study will be well utilized for CDM project development and contribute to sustainable development nationwide in the Dominican Republic.

December 2010

Satoshi Sugimoto
Team Leader
JICA Study Team

List of the Reports

Summary (Japanese)

Main Report (Japanese)

Summary (English)

Main Report (English)

Summary (Spanish)

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ANNEX I: Tools for CDM Project Development

ANNEX II: Seminars and Workshops

This is the Summary(English)

The currency exchange rate used in this report is as follows.

U$1.00= JP¥91.10.

Dominican Republic

Source：MSN Encarta World Atlas

Executive Summary

1 Outline of the Study

1.1 The Study and Study Report

The Study for the Promotion of CDM Projects in the Dominican Republic was conducted between September 2008 and December 2010. The following is the concise digest of the reports produced in the Study, which are: Summary Report, Main Report, and Annexes in three languages, i.e. Espanol, English and Japanese.

1.2 Objectives of the Study

To develop the capacity of ONMDL/CNCCMDL and other relevant public and private stakeholders in promoting and managing CDM projects, the Study aimed at:

- Preparing "The Manual for CDM Project Formulation" for the use by potential CDM project stakeholders. It will include practical guidelines and know-how for preparation of PIN (Project Idea Note), and PDD (Project Design Document);
- Compiling the course of short-term actions (in 2 to 3 years) to be taken by the Government of Dominican Republic for promotion of CDM projects into "The Recommendation Paper on the Actions for CDM Promotion in the Dominican Republic"; and
- Promoting CDM project formulation and develop capacity of relevant stakeholders of CDM.

1.2.1 Organizational Structure for Study Implementation

The Study was jointly implemented by the JICA Study Team and the National Office of CDM (ONMDL) of the National Council for Climate Change and CDM (CNCCMDL), as the counterpart, under the supervision of the Steering Committee organized by the representatives from public and private sector organizations relevant to CDM project development.

1.2.2 Study Components

The Study mainly consists of the 5 (five) components mentioned below.

Component I	:	Preparation of PIN and Model PDDs
Component II	:	Formulation of National Action Plan for CDM Project Development
Component III	:	Capacity Development of the Relevant Stakeholders of CDM ♦ Seminars and Workshops ♦ Fact Finding Mission on CDM Projects in Neighboring Countries

	(Peru, Mexico, Costa Rica)
Component IV	Preparation of the Manual for CDM Project Formulation
Component V	Development of Supporting Tools for CDM Project Promotion ♦ National CDM Website ♦ National CDM Portfolio ♦ GIS-Based CDM Project Potential Map

2 Current CDM Project Development and Potentials in the Dominican Republic

2.1 Current CDM Project Development

There are currently only 2 registered CDM projects in the Dominican Republic. The number of CDM projects recognized by ONMDL, DNA of the Dominican Republic is 43 with 11 projects currently under validation. The list of CDM projects under validation are summarized as follows.

2.2 Potentials

The Study identified the potentials of CDM project development in the following sectors in the Dominican Republic.

Sector	Potential Area
Renewable Energy	▪ Wind ▪ Biomass ▪ Hydropower (mini and micro hydro) ▪ Solar
Waste Management	▪ Landfill methane capture and utilization (biogas) ▪ Methane avoidance by composting of organic waste
Industry	▪ Fuel switch ▪ Energy efficiency improvement ▪ Process-specific GHGs emission technologies
Agriculture	▪ Biogas collection and use from animal manure management systems
Transportation	▪ Fuel switch ▪ Energy efficiency improvement ▪ Mass transportation system
Forestry	▪ Carbon sequestration activities through afforestation/ reforestation

3 The Dominican Republic National Action Plan for CDM Project Development

3.1 Objective of the Action Plan

The Action Plan for CDM Project Development in the Dominican Republic is prepared for clarifying the course of actions to be taken for maximizing realization of CDM project development potential to serve for sustainable socio-economic development of the country.

3.2 CDM Project Development Priority

Based on the investigations and analysis of the potentials in the Dominican Republic, the CDM project development priority was determined by sectors, sub-sectors and GHGs emission reduction measures as follows.

Sector	Sub-Sector	Measures
Energy (Supply side)	Electricity	▪ Wind ▪ Hydropower ▪ Biomass
Energy (Demand side)	Industry	▪ Fuel switch (in industrial boilers/furnaces) ▪ Energy efficiency improvement (high efficiency boilers/furnaces, co-generation)
	Transport	▪ Fuel switch (collective application to public transport means) ▪ Energy efficiency (collective application of high efficiency engines to public transport means)
	Residential/Business /Commercial	▪ Energy efficiency (collective installation of energy efficiency device/measures in buildings and apartments, etc.)
Industrial Process		▪ Cement industry ▪ Iron and steel industry
Agriculture	Livestock	▪ Methane capture and flaring or energy utilization in livestock farms with bio-digesters
Waste	Solid Waste	▪ Methane capture and flaring or energy utilization at final disposal landfills ▪ Methane avoidance by composting of organic solid waste
Waste	Wastewater	▪ Methane capture and flaring or energy utilization in treatment of wastewater with high organic content (palm oil industry, distilleries, food and beverage, etc.)

3.3 Action Plan for CDM Project Development

3.3.1 Targets of CDM Project Development

Based on the determination of CDM project development priority and analysis of the sector-wise development strategies, the targets of CDM project development by the end of 2012, the 1st commitment period of Kyoto Protocol, are set as follows:

Priority Areas	CDM Project Development Targets by 2012
1. Energy Sector (Supply Side)	
Wind Power	▪ To register wind power CDM projects in the potential areas (Target Areas) - Monte Cristi - Puerto Plata - Barahona - Pedernales
Hydropower	▪ To register hydropower CDM projects in the potential areas identified by EGEHID ▪ To register hydropower CDM projects in the potential areas identified by INDRHI ▪ To formulate at least one programmatic CDM of mini-hydropower projects in cooperation with the relevant stakeholders
Biomass	▪ To register CDM projects of biomass power generation in the potential areas (Target Area) - Eastern part of the country (sugarcane bagasse) - Northern part of the country (rice husk) ▪ To register CDM projects of biomass energy utilization by industrial enterprises (for boiler fuels) in cooperation with the relevant stakeholders
2. Energy Sector (Demand Side)	
Industry	▪ Clear Identification of current fuel and energy consumption in industry sector. ▪ To register CDM projects of fuel switch or energy efficiency improvement in industry sector in cooperation with private industrial enterprises.
Transport	▪ To investigate the potentials of fuel switch and energy efficiency in transport sector through discussions with public transport and freight companies for collective application of GHGs emission reduction technologies and/or measures.
Residential/Business/ Commercial	▪ To develop programmatic CDM projects of energy efficient lighting in cooperation with the relevant stakeholders.
3. Industrial Process GHGs Emission (Non-Energy)	
Relevant Industries	▪ Facilitate development of CDM projects through direct discussions with the relevant industrial enterprises. - Cement industry - Iron & steel industry
4. Methane Emission Reduction	
Pig Farms	▪ To develop and register CDM projects of methane capture and utilization from animal manure management based on discussions with relevant stakeholders. (Target Stakeholders) - APORLI - COOPCIBAO
Solid Waste Management	▪ To develop and register CDM projects of landfill methane capture and utilization with its focus on the landfills in the big cities. ▪ To develop and register CDM projects of organic waste composting in cooperation with solid waste management authorities.
Waste Water Management	▪ To develop and register CDM projects of methane capture from waste water treatment (Target Stakeholders) - Industrial enterprises with a large amount of organic waste water discharge (food and beverage, palm oil, alcoholic products)

3.3.2 Short-Term Actions for CDM Project Development

The short-term actions to be taken for CDM project development are set for each priority areas as follows:

Priority Areas	Short-Term Action to be Taken
1. Energy Sector (Supply Side)	
Wind Power	▪ Discussions with potential wind power developers. ▪ Investigation of potential sites ▪ Coordination with relevant stakeholders - SENI (Technical issues related to grid connection) - CNE (Utilization of the incentives under Law 57-07) - CDEEE/EDE (Power purchasing agreement) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation by project proponents.
Hydropower	▪ Discussions with EGEHID and INDRHI about potential sites of hydropower generation CDM projects. ▪ Coordination with relevant stakeholders - SENI (Technical issues related to grid connection) - CNE (Utilization of the incentives under Law 57-07) - CDEEE/EDE (Power purchasing agreement) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
Biomass	**(Biomass Power Generation)** ▪ Discussions with potential developers of biomass power generation (private developers) ▪ Coordination with relevant stakeholders - SENI (Technical issues related to grid connection) - CNE (Utilization of the incentives under Law 57-07) - CDEEE/EDE (Power purchasing agreement) - Ministry of Agriculture (Procurement of biomass) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation. **(Biomass Energy Utilization)** ▪ Discussions with potential users of biomass as fuel for industrial heat production. (industries) ▪ Coordination with relevant stakeholders - CNE (Utilization of the incentives under Law 57-07) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
2. Energy Sector (Demand Side)	
Industry	▪ Discussions with potential project proponents ▪ Coordination with relevant stakeholders - CNE (Use of any incentives related to fuel switch and/or energy efficiency improvement) - MIMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
Transport	▪ Discussions with public transport and freight companies
Residential/Business/ Commercial	▪ Discussions with potential stakeholders (hotels, office buildings, resident communities, and other potential group of participants)
3. Industrial Process GHGs Emission (Non-Energy)	
Relevant Industries	▪ Discussions with potential project proponents (cement, rum, iron & steel industries) ▪ Coordination with relevant stakeholders - MIMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
4. Methane Emission Reduction	
Pig Farms	▪ Discussion with associations of pig farmers (APORLI, COOPCIBAO, etc.) ▪ Selection of participating farmers ▪ Determination of CME ▪ Preparation of PoA and CPA-DD and validation
Solid Waste Management	(Landfill methane capture) ▪ Discussions with the relevant solid waste management authorities (Santiago) (Organic waste composting) ▪ Discussions with the relevant solid waste management authorities (Dominican Municipal Leagues, Dominican Federation of Municipalities) ▪ Selection of participating municipalities ▪ Preparation of PDD (single or programmatic CDM) and validation.
Waste Water Management	▪ Discussions with potential project proponents (Industrial enterprises with a large amount of organic waste water discharge such as food and beverage,

Priority Areas	Short-Term Action to be Taken
	palm oil, alcoholic products) ▪ Coordination with relevant stakeholders - CNE (Utilization of the incentives under Law 57-07) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation

4 Conclusions and Recommendations

4.1 Conclusions

4.1.1 Status of CDM Project Development before and after the Study

At the time of starting the Study in 2008, there is only one registered CDM project on wind power, which was not implemented due to project owners' management issues, in the Dominican Republic. The CDM projects in the pipelines recognized by the DNA of the Dominican Republic remains at 15, of which the majority is still at the PIN or conceptual planning level. The only CDM project that was active in the process of validation was "Duequesa Landfill Methane Capture Project".

However, the collaborative efforts of CDM project promotion between the CNCCMDL and JICA Study Team, in cooperation with various public and private stakeholders for the past 3 years, the number of CDM projects in the pipelines reached more than 40 projects with 11 projects currently under validation. The Duquesa Landfill Methane Capture Project mentioned above has already been officially registered under CDM and started its operation to apply for the first issuance of CERs.

The interest and motivation of the Dominican Republic people on CDM has certainly grown with the increased knowledge and capacity of CDM project among public and private stakeholders. It is fait to say that the various promotion and capacity development activities on CDM carried out by CNCCMDL and the JICA Study Team somehow contribute to this progress of CDM project development in this country.

4.1.2 Barriers against CDM Project Development and Approach/Achievement of the Study

There were various barriers that hampered CDM project development in this country. Some of them have been removed or dramatically improved while the others still remain. The barriers that the Study identified and tried to remove include:

Lack of Information

The essential information required for CDM project formulation and development was not readily available anywhere in the Dominican Republic. Defining the ONMDL of CNCCMDL

as the information platform of CDM, the Study collected and compiled all the essential information and data required for CDM project formulation and disclosed them to the public through creation of "The Dominican Republic National CDM Website". The results and output of the Study are also uploaded for the use by potential CDM project stakeholders. The contents of this website was periodically reviewed and updated all through the Study period so that the users can always access the latest information on CDM. One of the CDM project developers visiting ONMDL from Mexico admired this website as one of the best CDM websites in the Caribbean countries.

Lack of Capacity

Lack of the capacity in CDM project development was serious among public as well as private stakeholders. The Study had to start with explaining the very essence of CDM in the seminars and workshops in its early period. To widely understand the benefits of CDM to the country, CNCCMDL and the JICA Study Team took every opportunity of public relations activities to disseminate CDM such as the meetings with private stakeholders, posting articles in the local media, and so forth. In October 2010, the CNCCMDL finally hosted the Latin American Carbon Forum in Santo Domingo successfully with a number of participation from domestic as well as overseas.

In the early stage of the Study, most of the public and private stakeholders of CDM in this country are the audience of the seminar or those who learned from the workshops. However, in the final seminar, they are the presenters to share their knowledge and experience with the other audience. One of the study counterpart members are surprised that the questions raised by the audience in the seminar became technical and specific, totally different from the questions raised in the early seminars and workshops. The capacity and knowledge of CDM has certainly grown among the public and private stakeholders.

Lack of Communication

At the time of starting the Study, mainly due to limited human resources, ONMDL's role is basically limited to assess the submitted PINs and PDDs for issuance of no objection letter for PIN or host country approval for PDD although some communications with the potential CDM project stakeholders are conducted individually by the staff members. In the course of the Study, however, the ONMDL counterpart members and the study members were working together to have meetings and discussions with various public and stakeholders while sometimes visiting the farms, factories or potential project sites with the stakeholders to facilitate CDM project development. Some of the PINs and model PDDs were formulated through a series of these communications. A considerable number of same members repeatedly participated in the

seminars and workshops held by CNCCMDL and/or the Study Team from public as well as private stakeholders. The final seminar of the Study was in fact led by these members as presenters or audience. In this respect, the DNA's communication with the relevant public and private stakeholders is truly strengthened to facilitate CDM projects in this country.

Lack of Motivation

Mainly Due to the limited knowledge and understanding, the interest of the public and private stakeholders for CDM was not high with some exceptions. However, with its enhanced knowledge and understanding, their interest for CDM has increased with the number of PINs and PDDs submitted to ONMDL. Because of the limited experience in actual operation of CDM projects in this country, many of them may be still skeptical about CDM. In this respect, there was a symbolic event in the course of the Study. Inviting several public and private CDM stakeholders, the Study conducted a study tour to the neighboring countries (Peru, Mexico, and Costa Rica) to understand the CDM project development in these countries. The tour included the visits to DNA of each country and CDM project sites with the discussions with project owners and operators. After this tour, many of the participants mentioned with one accord that it was totally different between learning the CDM from written information and directly observing the project in operation with hearings from the project owners/operators. Their motivations after this tour have been changed. Some of them have submitted their new PINs soon after this tour as the project proponents and tried to develop their own CDM projects.

This is a good example of how to motivate the potential project proponents. If the Dominican Republic has several forerunners of CDM projects, their experience will encourage the other stakeholders to formulate CDM projects.

4.2 Recommendations

4.2.1 The Tasks of CNCCMDL and ONMDL

The National Council for Climate Change and Clean Development Mechanism (CNCCMDL), as the national focal point, must take the initiative in promotion of CDM project development in the Dominican Republic. In addition to the roles of issuing host country approval of individual CDM projects as DNA, the National Office of CDM (ONMDL) has to play its active roles in CDM project promotion and marketing, technical and financial assistance to the potential CDM project developers, owners and participants. As the results of the Study, ONMDL/CNCCMDL has the following instruments/tools to support CDM project developers, owners, and participants:

- PINs and model PDDs of prospective CDM projects;
- CDM project formulation manual;

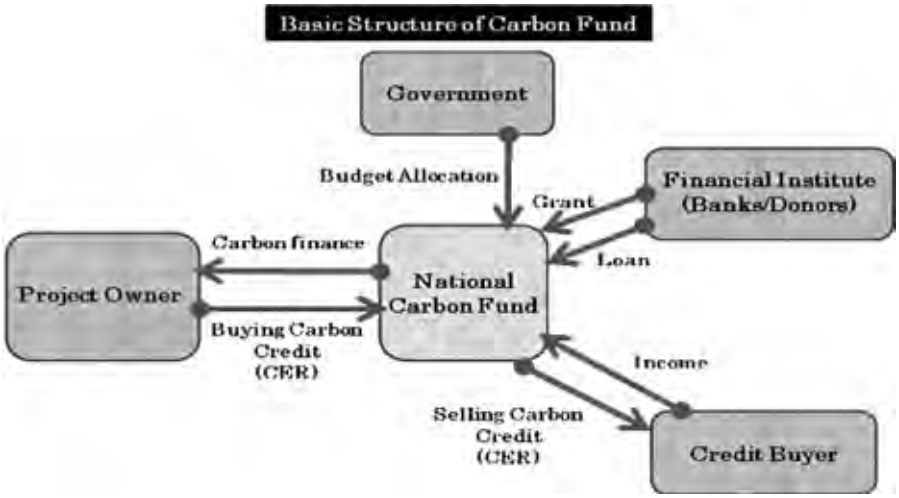
- GIS-based potential map of CDM projects;
- National CDM portfolio
- National CDM website

These tools are all developed for assisting CDM project proponents in terms of project documentation as well as promotion and marketing of potential projects to potential investors, developers and financial institutes. ONMDL/CNCCMDL has to utilize them at their maximum for CDM project development in this country.

On the other hand, without continuous update and improvement of their contents, all the above tools will soon be obsolete in the constantly changing world of CDM and climate change issues.

Therefore, the Study Team strongly recommends that ONMDL/CNCCMDL will continuously update and improve the contents of these tools by incorporating new data and information. ONMDL/CNCCMDL should appoint at least one person in charge of this task so that the contents of the tools can be timely updated and improved. The update and improvement of these tools will be carried out in accordance with the guidelines provided by the JICA Study Team.

The remaining important task to be further strengthened at government level is financial assistance to CDM project proponents. The currently planned "National Carbon Fund" is expected to take this role in accordance with the presidential decree on establishment of CNCCMDL. The basic structure of National Carbon Fund is illustrated as follows:



The initial fund required for establishment of National Carbon Fund should be determined on the basis of estimation of carbon credit produced from the CDM projects listed in the National CDM Portfolio. This portfolio is the only trading articles for raising the initial fund for CDM project development in this country.

The fund raising efforts should be made by CNCCMDL domestically and internationally through the following actions.

- Coordination with other governmental development funds (Environmental fund and renewable energy fund, etc.)
- Carbon credit purchasing agreement with ANNEX I countries.
- Negotiation with bilateral/multilateral carbon funds, e.g. Prototype Carbon Fund (PCF) of the World Bank, Andean Development Corporation (CAF), and so forth.
- Involvement of domestic banks/financial institutes in carbon financing.

4.2.2 Implementation of the National Action Plan

"The Dominican Republic National Action Plan for CDM Project Development" identifies the potentials and priority sectors of CDM project development in the country with strategies and actions to be taken by the relevant public and private sectors. Taking into account the limited time up until the end of the 1st commitment period of Kyoto Protocol on December 2012, this National Action Plan must be implemented immediately so that the country's opportunities of CDM project development can be maximized. To ensure implementation of the National Action Plan, the JICA Study Team recommended the following actions to be taken immediately by ONMDL/CNCCMDL.

a. Promotion of CDM project development in renewable energy sector

Among the priority sectors of CDM project development identified in the National Action Plan, CDM projects in renewable energy sector (especially for wind, hydropower and biomass) are currently on the fast track in terms of identified potential project locations, project developers and preparation of project documentation. Taking into account the limited time up until 2012, the procedure for CDM project preparation has to be accelerated so that they can be registered before the 1st commitment period comes. In this respect, the JICA Study Team strongly recommends that ONMDL/CNCCMDL should organize the special taskforce under its initiative to facilitate coordinated efforts among relevant public and private sectors in CDM project development in renewable energy sector. The special taskforce should consist of the following members:

- ONMDL/CNCCMDL
- CNE (National Energy Commission)
- SENI
- SIE (Superintendence of Electricity)
- MIMARENA
- EGE Haina (Wind)
- EGEHID (Hydropower)
- Ministry of Agriculture (Biomass)
- Other potential renewable energy developers (public/private sector)

The purpose of this special taskforce will jointly facilitate the development of CDM projects in renewable energy sector by coordinated actions for the following purposes:

- Review of on-going and planned renewable energy development projects to identify the potential CDM projects to be promoted for their registration by 2012;
- Facilitate (Speed up) the project preparation process (development permits, EIAs, and other related bureaucratic procedures);
- Providing solution to technical and administrative issues in relation to project development;

ONMDL/CNCCMDL is also strongly recommended to identify the potential CDM projects in other sectors for their promotion of registration by 2012 through reviewing the current status of progress of the projects listed in the National CDM portfolio.

b. Promotion of small-scale CDM projects through application of programmatic CDM

The Study has developed 4 types of PDDs for programmatic CDM projects, of which three PDDs address the following small scale projects respectively:

- Programmatic CDM projects of rural mini-hydropower
- Programmatic CDM projects of methane capture from animal manure management in pig farms
- Programmatic CDM projects of community organic waste composting.

Although the potential of GHGs emission reduction is rather small in amount for each individual project, they are all expected to produce various co-benefits in terms of socio-economic welfare of the people and improvement of living environment.

Taking the above into account, the JICA Study Team recommends that ONMDL/CNCCMDL should further promote these 3 (three) types of programmatic CDM projects under its initiative.

The potential project proponents of these 3 (three) projects are as follows:

Types of Programmatic CDM Project	Potential Project Proponents
Mini-hydropower	▪ INDRI (UNDP-INDRI project)
Methane capture from animal manure management in pig farms	▪ APORLI ▪ COOPCIBAO (USAID project)
Organic waste composting	▪ Provincial/City government ▪ League/Federation of Municipalities

As to the programmatic CDM projects in mini-hydropower and methane capture from pig farms, JICA Study Team recommends that ONMDL/CNCCMDL should continue further discussions with UNDP-INDRI and USAID-COOPCIBAO projects respectively. On the other hand, in organic waste composting, ONMDL/CNCCMDL should immediately start promoting the

concept of programmatic CDM to provincial/city governments to investigate the possibility of formulating organic waste composting CDM projects. ONMDL/CNCCMDL may hold a dissemination workshop and/or seminar for programmatic CDM of organic composting by inviting provincial/city government representatives to start discussions.

In any case of the programmatic CDM projects above, the project proponent needs technical as well as financial assistance in the following aspects:

- Preparation of project document and validation for registration under CDM;
- Organization of CDM project participants;
- Determination of Coordinating Management Entity of the programmatic CDM project;
- Financing the initial cost of the projects.

As to the fund for initial investment of the projects, their registration as CDM will provide the opportunities of carbon finance. However, the costs arising in the process of project registration (project design, PDD preparation, validation, and coordination of project participants, establishment of CMEs) still need to be covered by the project proponents. ONMDL/CNCCMDL does not have enough capacity to meet these entire technical and financial assistance requirements. There are the needs of external technical and financial assistance in developing programmatic CDM projects in accordance with this National Action Plan.

4.2.3 Preparation for the Post-Kyoto Framework of Climate Change

Considering the post-Kyoto framework of climate change convention in the international arena, promotion of CDM projects is not enough for non-Annex I countries including the Dominican Republic to address climate change mitigation issues in the mid and long-term. There are several new schemes of financial assistance such as NAMA (Nationally Appropriate Mitigation Action) and SCM (Sectoral Crediting Mechanism) to non-Annex I countries now under consideration. Most of these new schemes requires non-Annex I countries to formulate the national or sector level climate change mitigation plan in a verifiable and measurable manner. To effectively implement climate change mitigation measures, the Dominican Republic must prepare for formulation of such national or sector level climate change mitigation plans while promoting CDM projects. Coordinated efforts should be made by relevant public sectors to set the verifiable sectoral targets of GHGs emissions reduction with clearly defined measures and technologies. It is also required to establish the national mechanism for MRV (measurement, reporting and verification) of such actions so that the actual reduction of GHGs at national or sector level can be proved with clear evidence of information and data. The formulation of

such actions and plans will increase the opportunity of carbon credit at sector or national level through the new financial assistance schemes.

Current human resources in ONMDL/CNCCMDL are very limited to handling all of these works to prepare for post-Kyoto framework of climate change. There is a need of technical assistance in formulating these national and/or sector level climate change mitigation plans and actions in the Dominican Republic. The technical assistance in the form of dispatching a climate change expert and/or provision of technical cooperation for capacity development of ONMDL/CNCCMDL in formulating national/sectoral climate change plans and actions will help the Dominican Republic in strengthening its policy drive to fight with climate change issues as well as socio-economically and environmentally sound and sustainable development.

Meeting with APORLI
(Association of pig farmers)

Meeting with FONAFIFO (Forest Association)
in Costa Rica

Meeting with INOLASA (Palm oil mill) in
Costa Rica

Meeting with Fuel Change CDM Project
Owner in Peru

Meeting with DNA in Peru

Meeting with DNA in Costa Rica

Photo 1: Meetings with Key Stakeholders of CDM

 Pig Farm of APORLI member	 Wastewater treatment lagoon in pig farm
 Civil works in semi-anaerobic landfill (Santiago Province)	 Municipal waste collection (Santiago Province)
 Visit to rum brewery (BRUGAL)	 Gas flaring in rum brewery

Photo 2: Site Investigation/Visit 1

 Visit to Palm oil mill in Costa Rica	 Empty Fruit Bunch Fibre of Oil Palm
 Visit to landfill methane capture project (Peru)	 Visit to methane capture project from animal manure (Mexico)
 Visit to mini-hydro project (Peru)	 Mini-hydro project (Peru)

Photo 3: Site Investigation/Visit 2


First Seminar


Second Seminar


Group session in CDM workshop


Group session in CDM workshop


Final Seminar


Final Seminar

Photo4 : Seminars/Workshops

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List of Abbreviations

Abbreviation	English	Spanish
A/R	Afforestation/Reforestation	Aforestación/Reforestación
ABA	Banks Association of Dominican Republic	Asociación de Bancos Comerciales de la República Dominicana
ADOZONA	Free Zone Dominican Association	Asociación Dominicana de Zonas Francas
APORLI	Association of Pig Farmers	Asociación de Porcicultores de Licey al Medio
ASONAHORES	National Association of Hotels and Restaurants	Asociación Nacional de Hoteles y Restaurantes, Incoporada
BCRD	Central Bank of the Dominican Republic	Banco Central de la República Dominicana
BOD	Biological Oxygen Demand	Demanda de Oxigeno Biológico
CDEEE	Dominican Corporation of State Electric Companies	Corporación Dominicana de Empresas Eléctricas Estatales
CDM	Clean Development Mechanism	Mecanismo de Desarrollo Limpio
CEA	State Sugar Council	Consejo Estatal del Azúcar
CEDAF	Agro-Forestry Development Centre	Centro para el Desarrollo Agropecuario y Forestal
CEDOPEX	Dominican Centre of Promotion and Export	Centro de Exportación e Inversión de República Dominicana
CER	Certified Emission Reduction	Reducción de Emisión Certificada
CME	Coordinating/Managing Entity	Entidad de Coordinación de Gestión
CNCCMDL	National Council for Climate Change and Clean Development Mechanism	Consejo Nacional para el Cambio Climático y Mecanismo de Desarrollo Limpio
CNE	National Energy Commission	Comisión Nacional de Energía
CNG	Compressed Natural Gas	Gas Natural Comprimido
CNTU	National Centre of United Carriers	Central Nacional de Transportistas Unificados
COD	Chemical Oxygen Demand	Demanda de Oxigeno Químico
CODOPYME	Dominican Confederation of Small and Medium Industries	Confederación Dominicana de la Pequeña y Mediana Empresa
COGO	Government Committee for Ozon	Comité Gubernamental de Ozono
CONATRA	National Confederation of Carriers	Confederación Nacional de Organizaciones de Transporte
CONEP	National Council of Private Enterprises	Consejo Nacional de la Empresa Privada
CONIAF	National Commission for the Agro-Forestry Investigation	Consejo Nacional de Investigaciones Agropecuarias y Forestales
CPA	CDM Project Activity	Actividad de Proyecto de MDL
CPI	Consumer Price Index	Índice de Precio al Consumidor

Abbreviation	English	Spanish
CREP	Public Corporation Reform Commission	Comisión de Reforma de la Empresa Pública
DGA	General Directorate of Customs	Dirección General de Aduanas
DGII	General Directorate of Tax	Dirección General de Impuestos Internos
DGTT	Main Directorate of Terrestrial Transit	Dirección General de Transito Terrestre
DIGENOR	General Directorate of Standards and Quality System	Dirección General de Normas y Sistemas de Calidad
DNA	Designated National Authority	Autoridad Nacional Designada
DNA-CDM	Designated National Authority of Clean Development Mechanism	Autoridad Nacional Designada del Mecanismo de Desarrollo Limpio
DR	Dominican Republic	República Dominicana
EDE	Energy Distribution Company	Empresa Distribuidora de Electricidad
EGEHID	Dominican Hydropower Generation Company	Empresa de Generación Hidroeléctrica Dominicana
EIA	Environment Impact Assessment	Evaluación de Impacto Ambiental
ETED	Dominican Electric Transmission Company	Empresa de Transmisión Eléctrica Dominicana
GDP	Gross Domestic Product	Producto Interno Bruto
GHG	Greenhouse Gas	Gas de Efecto Invernadero
GIS	Geographical Information System	Sistema de Información Geográfica
GJ	Gigajoule	Gigajoules
GNI	Gross National Income	Ingreso Nacional Bruto
GODR	The Government of Dominican Republic	El Gobierno de República Dominicana
GWh	Gigawatt-hour	Giga vatios hora
IEA	International Energy Agency	Agencia Internacional de Energía
IEC	Information, Education and Communication	Información, Educación y Comunicación
IIBI	Institute of Biotechnology and Industry Innovation	Instituto de Innovación en Biotecnología e Industria
INDRHI	Dominican Institute of Hydraulic Resources	Instituto Dominicano de Recursos Hidráulicos
INESPRE	Institute of Price Stabilization	Instituto de Estabilización de Precios
ITBIS	Tax on the Transfer of Industrialized Goods and Services	Impuestos de Transferencias de Bienes Industrializados y Servicios
JAD	Dominican Agro-Enterprise Board	Junta Agro empresarial Dominicana
JCE	The Central Election Board	Junta Central Electoral
JICA	Japan International Cooperation Agency	Agencia de Cooperación Internacional del Japón
JOFCA	Japan Overseas Forestry	Asociación de Consultores Forestales

Abbreviation	English	Spanish
	Consultants Association	de Ultramar del Japón
LPG	Liquefied Petroleum Gas	Gas Licuado de Petróleo
MEPyD	Ministry of Economy, Planning and Development	Ministerio de Economía, Planificación y Desarrollo
MH	Ministry of Treasury	Ministerio de Hacienda
MIA	Ministry of Agriculture	Misterio de Agricultura
MIC	Ministry of Industry and Commerce	Ministerio de Industria y Comercio
MIMARENA	Ministry of Environment and Natural Resources	Ministerio de Medio Ambiente y Recursos Naturales
MITUR	Ministry of Tourism	Ministerio de Turismo
MJ	Megajoule	Megajoules
MSP	Ministry of Public Health and Social Affairs	Ministerio de Salud Publica
MW	Megawatt	Megavatios
NCA	National Carbon Account	Cuenta Nacional de Carbono
NG	Natural Gas	Gas Natural Comprimido
NGO	Non Governmental Organization	Organización No Gubernamental
ONCC	National Climate Change Office	Oficina Nacional de Cambio Climático
ONE	National Bureau of Statistics	Oficina Nacional de Estadísticas
ONMDL	CDM National Office	Oficina Nacional de Mecanismo de Desarrollo Limpio
OPI	Investment Promotion Office	Oficinas de Promoción de Inversiones y Tecnología
OPRET	Office for Transport Reordering	Oficina para el Reordenamiento del Transito
OTEC	Ocean Thermal Energy Conversion	Conversión de Energía Térmica Oceánica
OTTT	Technical Office of Terrestrial Transport	Oficina Técnica de Transporte Terrestre
PDD	Project Design Document	Documento de Diseño de Proyecto
PIN	Project Idea Note	Nota de Idea de Proyecto
PLD	The Party of the Dominican Liberation	Partido de la Liberación Dominicana
PoA	Programme of Activities	Programa de Actividades
PPA	Power Purchasing Agreement	Acuerdo de Compra de Energía
PRD	The Dominican Revolutionary Party	Partido Revolucionario Dominicano
PRSC	Social Christian Reformist Party	Partido Reformista Social Cristiano
RENAEPA	National Network of Enterprises Support to Environmental Protection	Red Nacional de Apoyo Empresarial para la Protección Ambiental
SENI	Coordinating Organism of the Interconnected National Electrical System of the Dominican Republic	Organismo Coordinador del Sistema Eléctrico Nacional Interconectado

Abbreviation	English	Spanish
SIA	Social Impact Assessment	Evaluación de Impacto Social
SIE	Superintendence of Electricity	Superintendencia de Electricidad
SWM	Solid Waste Management	Gestión de Residuos Sólidos
TOC	Total Organic Carbon	Carbón Orgánico Total
UASD	Autonomous University of Santo Domingo	Universidad Autónoma de Santo Domingo
UNDP	United Nations Development Programme	Programa de las Naciones Unidas para el Desarrollo
UNFCCC	United Nations Framework Convention on Climate Change	Convención Marco de las Naciones Unidas sobre el Cambio Climático

1 INTRODUCTION

1.1 Background

This Study, in response to the official request by GODR, aims at maximizing the use of CDM to help solving the national issues of energy and solid waste management through capacity development of CNCCMDL and other relevant public and private stakeholders, with respect to formulation, management, and implementation of CDM projects, whereby it also contributes to mitigation of climate change and sustainable development of the Dominican Republic.

1.2 Objectives of the Study

To develop the capacity of ONMDL/CNCCMDL and other relevant public and private stakeholders in promoting and managing CDM projects, the Study aimed at:

- Preparing "The Manual for CDM Project Formulation" for the use by potential CDM project stakeholders. It will include practical guidelines and know-how for preparation of PIN (Project Idea Note), and PDD (Project Design Document);
- Compiling the course of short-term actions (in 2 to 3 years) to be taken by the Government of Dominican Republic for promotion of CDM projects into "The Recommendation Paper on the Actions for CDM Promotion in the Dominican Republic"; and
- Promoting CDM project formulation and develop capacity of relevant stakeholders of CDM through the following activities in the course of the Study.
    - Holding of the seminars and workshops for capacity development of relevant stakeholders of CDM
    - Establishment of the national CDM website as the platform of CDM in the Dominican Republic
    - Technology transfer and capacity development of CDM project formulation and management to ONMDL/CNCCMDL through on-the-job training of PIN evaluation and preparation of model PDDs

1.3 Organizational Structure for Study Implementation

1.3.1 Steering Committee

CNCCMDL established the steering committee for the Study consisting of the representatives from the organizations shown below.

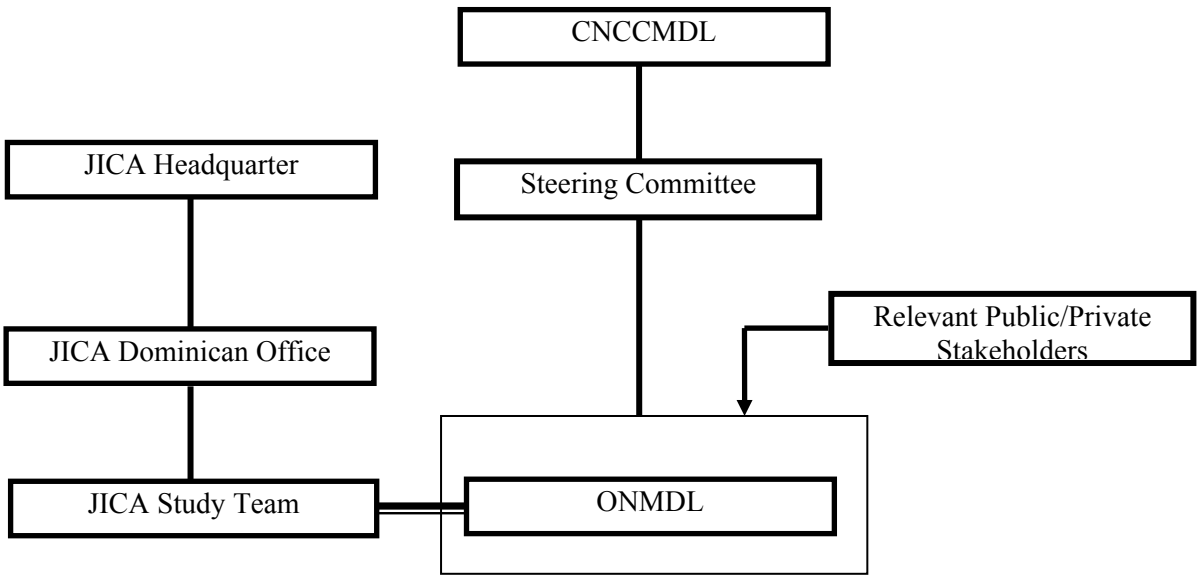
Country	Organization
Dominican Republic	♦ National Council for Climate Change and Clean Development Mechanism

Country	Organization
	♦ Ministry of Environment and Natural Resources ♦ Ministry of Treasury ♦ Ministry of Industry and Commerce ♦ Ministry of Agriculture ♦ National Energy Commission ♦ Super Intendancy of Electricity ♦ Coordination Body of Inter-connected National System of Electricity ♦ Ministry of Economy, Planning and Development ♦ Ministry of Public Works and Communication
Japan	♦ JICA Dominican Office

The Steering Committee played supervising and advisory roles in relation to implementation of the Study. The Steering committee meetings were held periodically to officially inform progress of the Study as well as to discuss the issues that need coordinated actions among the relevant government organizations.

1.3.2 Counterpart Team

The primary counterpart of the Study is ONMDL of CNCCMDL. It also invited participation from other public and private organizations in various activities to strengthen the institutional and human resource capacity of the potential stakeholders of CDM such as relevant government organizations, financial institutions, private enterprises, local governments, NGOs, and so forth.



1.4 Study Components

The Study mainly consists of the 5 (five) components mentioned below.

Component I	:	Preparation of PIN and Model PDDs
Component II	:	Formulation of National Action Plan for CDM Project Development
Component III	:	Capacity Development of the Relevant Stakeholders of CDM ♦ Seminars and Workshops ♦ Fact Finding Mission on CDM Projects in Neighboring Countries (Peru, Mexico, Costa Rica)
Component IV		Preparation of the Manual for CDM Project Formulation
Component V		Development of Supporting Tools for CDM Project Promotion ♦ National CDM Website ♦ National CDM Portfolio ♦ GIS-Based CDM Project Potential Map

1.4.1 Component I: Preparation of PINs and Model PDDs

Based on the analysis of CDM project potentials and a series of interviews and discussions with relevant public and private stakeholders of CDM projects, the Study produced various PINs and model PDDs to help potential project proponents in development of CDM project related document. Some of the public and private stakeholders also produced and submitted PINs by themselves in accordance with the discussions with the Study Team and ONMDL.

1.4.2 Component II: Formulation of Nation Action Plan for CDM Project Development

The Study prepared the National Action Plan for CDM Project Development in the Dominican Republic for clarifying the course of actions to be taken for maximizing realization of CDM project development potentials to serve for sustainable socio-economic development of the country. The Action Plan identifies the priority sectors of CDM project development with possible CDM project prototypes by sectors. Taking into the limited time up until the deadline of the 1st commitment period of the Kyoto Protocol, the Action Plan puts its priority on the sectors that have larger CDM project development potentials within the short-term. Such sectors include renewable energy, biomass, and waste management. It also specifies the actions to be taken by public and private stakeholders of CDM to strengthen the capacity of CDM project development in this country.

1.4.3 Component III: Capacity Development of the Relevant Stakeholders of CDM

To strengthen capacity of CDM project development in this country, the Study periodically held dissemination seminars of CDM. With its focus on potential CDM project proponents as the target participants, the Study also held a CDM project documentation workshop to enhance their understanding on the keys of CDM project documentation.

The Study also organized a fact find mission on CDM project development in the 3 (three) neighboring countries (Peru, Mexico, Costa Rica). The main purpose of this fact-finding mission for public sector participants is to investigate the current CDM project development in these countries and identify the keys of success in utilizing CDM for sustainable socio-economic development of the Dominican Republic. For the private sector participants, on the other hand, it aims at identifying the areas/sectors of the new business and investment opportunities that can be developed with the use of CDM (carbon credit) through visiting the sites of CDM project and intensive discussions with the CDM project developers, owners, and operators.

1.4.4 Component IV: Preparation of the Manual for CDM Project Formulation

Based on the joint works between ONMDL and JICA Study Team, the Study prepared the Manual for CDM Project Formulation for the use by potential CDM project planners, developers, and owners. Its contents will be periodically revised and updated by ONMDL of CNCCMDL. The current version is available in the ANNEXES to this Report.

1.4.5 Component V: Development of Supporting Tools for CDM Project Development

The Study has developed the following supporting tools for CDM project development in the Dominican Republic:

- National CDM Website (National Information Platform for CDM);
- National CDM Portfolio; and
- GIS-based CDM Project Potential Map.

ONMDL of CNCCMDL will maintain and update these tools to provide potential CDM project stakeholders with the latest information on CDM and its development in this country.

2 CURRENT STATUS OF CDM PROJECT DEVELOPMENT IN THE DOMINICAN REPUBLIC

2.1 Country Profile of the Dominican Republic

2.1.1 Natural Conditions

a. Location

The Dominican Republic is located at 68º 19´ to 72º 01´ longitude west and 17º 36´ to 19º 58´ latitude north[1].

Dominican Republic shares with Haiti the island called La Hispaniola, which forms jointly with Cuba, Jamaica, and Puerto Rico the so called Great Antilles. La Hispaniola has an area of approximately 77,914 km^2, out of this area 48,442 km^2 corresponds to the Dominican Republic.

b. Topography

The Dominican Republic is diagonally divided from Southeast to Northwest by the Central Mountain Range; at the lowlands of this range the Vega Real Valley extends and it is limited by Septentrional Mountain Range which runs next to the coastline from Southeast to Northwest. The main heights are located precisely in the Central Range, e.g., Monte Gallo (2,500 meters), La Pelona (3,168 meters), and Pico Duarte (3,175 meters); these heights represent the highest points in the orographic features of the Antilles[2].

c. Climate

The Dominican Republic has a year round tropical maritime climate. Sea breezes refresh the insular territory, evening out temperatures to average 23°C in the early mornings to 32°C at noon time year round. The lowest temperatures occur in the mountain areas near Constanza, where temperatures have dropped to 0°C, and record highs have been registered at the frontier with Haiti, 39°C in the summer. May through November is regarded as the rainy season. The hurricane season lasts from June through November, with August-September being the peak months.[3]

In 100 years of hurricane events in the Dominican Republic, approximately 20 hurricanes have landed on the coasts of the country; the most important hurricanes in view of their effects and

[1] República Dominicana en Cifras 2007, ONE (Oficina Nacional de Estadística)
[2] República Dominicana en Cifras 2007, ONE (Oficina Nacional de Estadística)
[3] http://www.southtravels.com/america/dominicanrepublic/weather.html

intensity include Lilis (1894), San Zenón (1930), Inés (1966), David (1979), George (1998)[4] and Noel y Orga (2007).

2.1.2 Administrative Division

The territory of the Dominican Republic is politically divided into 31 provinces and a national district. The national district, where the capital city of the country is located, is similar with other provinces in its basic administrative powers and roles while having its own characteristics.

The provinces are political/administrative units that facilitate delegation of the authority of the central government at intermediate level. Every province has a civil governor appointed by the President, with an exception of the National District where the mayor is elected by popular vote. Each province has its own capital city with the main City Hall of the province. The regional offices of the central government are also usually located at capital cities of the provinces.

The administrative area of the National District covers 104.44 km^2, provided by the Law 163-01. The "Ayuntamiento del Distrito Nacional de Santo Domingo de Guzman" (The name of the City Hall) is in charge of its administration.

2.1.3 Population

According to the latest population estimation and projection done by the National Bureau of Statistics (ONE in Spanish) in April 2010, the total population of the Dominican Republic in 2009 was 9,755,954. It is also estimated that it will increase up to 11,055,080 in 2020 with the annual average population growth rate of 1.14% during 2009-2020.

2.1.4 Government Administration

The Dominicans constitute a Nation organized as an independent state, by the name of the Dominican Republic (Republica Dominicana). (Art.1 Constitution of the Dominican Republic.)

The Dominican Republic adopts civil, republic, democratic and representative government system with separation of the three powers of legislation, administration and judicature.

The Legislative power is exercised by the Congress of the Republic, consisting of a Senate and a House of Representatives (Camara de Diputados).

The Administrative (Executive) Power is exercised by the President of the Dominican Republic, who is elected every four years by direct vote. The President can be reelected for the second term, but not for the third term even for Vice-Presidency of the Republic.

The Judicial Power is exercised by the Supreme Court of Justice and the other tribunals of the judicial order created by the Constitution and laws. Judicial system holds its administrative

[4] Meteorological National Office of Dominican Republic

and budgetary autonomy. The Supreme Court judges are appointed by the National Council of the Magistrates. The Prosecutor General represents the government in the Supreme Court of Justice.

2.1.5 Economic Situation

a. Overview of the Dominican Economy

A World Bank document, "World Bank List of Economies" (July 2010), classified the Dominican Republic, of which GNI per capita was US dollar 4,510 in 2009, as the upper middle-income country[5] same as Panama, Mexico, and Costa Rica.

b. Sector Structure and Growth

According to the latest data of GDP in the Dominican Republic, the percentage distribution of GDP among economic sector are approximately 6% in the primary sector, 30% in the secondary sector, and the remaining 64% in the tertiary sector (Central Bank of the Dominican Republic 2009). The gross domestic product (GDP) at current price by economic sectors of the Dominican Republic over the period 2005-2009 is shown in the table below.

Table 2-1: Dominican Republic Gross Domestic Product 2005-2009

Unit: million RD$ at current price

Sector	2005	2006	2007	2008	2009
Agriculture	70,092.2	77,702.7	81,161.7	92,297.4	96,366.8
Industries	277,900.9	326,061.4	359,620.5	436,897.4	467,270.1
Mining	3,642.5	5,955.4	9,284.2	5,415.1	2,184.3
Local Manufacture	165,635.6	189,814.5	209,860.0	282,660.4	328,550.6
Free Trade Zone Manufacture	49,395.8	53,296.3	51,917.0	56,084.6	50,939.1
Construction	59,227.0	76,995.1	88,559.2	92,737.3	85,596.0
Services	592,347.2	697,135.5	794,305.1	933,739.0	987,082.6
Value Added	940,340.3	1,100,899.6	1,235,087.3	1,462,933.8	1,550,719.4
Taxes less Subsidies on Products	79,661.7	88,902.2	129,123.1	113,229.0	128,043.2
Gross Domestic Product	**1,020,002.0**	**1,189,801.9**	**1,364,210.3**	**1,576,162.8**	**1,678,762.6**

c. Economically Active Population Employed by Economic Sector

Out of the total population of 9,529 thousand in 2008, the Dominican Republic has totally about 7,628 thousand population of 10 years and over, in which 4,246 thousand are economically active. The number of employed workers is about 3,650 thousand with the employment rate of 86% of the economically active population while the unemployment rate is 14%, improved by 2% from the previous year.

[5] The World Bank classified income categories on the basis of the 2009 per capita gross national income, into *low income:* less than US$935, *lower middle income:* US$936-3,705, *upper middle-income:* US$3,706-11,455, and *high income:* US$11,456 or more.

d. Foreign Trade

d.1. Exports

The export value of the Dominican Republic was US$5,737 million in 2000 but declined slightly in the following 3 years, to rebound in 2004 to US$5,936 million, US$6,145 million in 2005, US$6,610 million in 2006 and US$7,160 million in 2007, which gives a cumulative yearly growth rate of 4.8% between 2004 and 2007, and slight decrease in 2008 to 6,949 million. The relative importance of the exports from the free trade zones has been on a declining trend, from around 80% in 2000-2004, to 63% in 2007. On the other hand, mineral products increased their importance from around 3% in 2000-2003, to 7% in 2004-2005, 10% in 2006 and 15% in 2007, but reduced to 7.1% in 2008.

d.2. Imports

Total imports of the Dominican Republic amounted to around US$6,000 million between 2000 and 2002, declined to around US$5,000 million in 2003, but continued increasing since 2004 to reach US$13,500 million in 2008. This jump in imports between 2003 and 2008 was equivalent to the average annual growth of 21.6%.

50% of the total import accounts for consumer goods, followed by raw materials (around 30%) and capital goods (around 20%).

d.3. Trade Balance

The trade balance has been negative in all years during 2000-2008. The trade deficit amounted to around US$ 6,500 million in 2007 and around US$ 9,150 million in 2007, as illustrated in the table below. The export originated from non-free zones have been steadily increasing during this period (2000-2008) with the annual average growth of 12% while free zone export has been kept between 4,000 and 5,000 million US$.

Table 2-2: Dominican Trade Balance 2000-2008 (Million US$)

ITEM	2000	2001	2002	2003	2004	2005	2006*	2007*	2008**
TRADE BALANCE	**-3,741.8**	**-3,503.0**	**-3,672.7**	**-2,156.0**	**-1,952.1**	**-3,724.7**	**-5,563.7**	**-6,436.8**	**-9,146.5**
EXPORTS	**5,736.7**	**5,276.3**	**5,165.0**	**5,470.8**	**5,935.9**	**6,144.7**	**6,610.2**	**7,160.2**	**6,948.9**
NATIONAL	966.1	794.7	847.7	1,064.0	1,250.7	1,395.1	1,931.4	2,635.1	2,404.1
FREE ZONES	4,770.6	4,481.6	4,317.3	4,406.8	4,685.2	4,749.6	4,678.8	4,525.1	4,544.8
IMPORTS	**-9,478.5**	**-8,779.3**	**-8,837.7**	**-7,626.8**	**-7,888.0**	**-9,869.4**	**-12,173.9**	**-13,597.0**	**-16,095.4**
NATIONAL	-6,416.0	-5,952.9	-6,237.3	-5,095.9	-5,368.1	-7,366.3	-9,558.8	-11,097.3	-13,569.9
FREE ZONES	-3,062.5	-2,826.4	-2,600.4	-2,530.9	-2,519.9	-2,503.1	-2,615.1	-2,499.7	-2,525.5

Source: Central Bank of the Dominican Republic

d.4. Inflation and Exchange Rate

The annual increase of consumer price index (CPI on average of 12 months) remained below 10% between 1996 and 2002, but jumped to 27.5% in 2003 and shot up to 51.5% in 2004.

These extremely high inflation were tamed in 2005, which recorded 4.2%, followed by 7.6 % in 2006, 6.1% in 2007 and 10.4% in 2008.

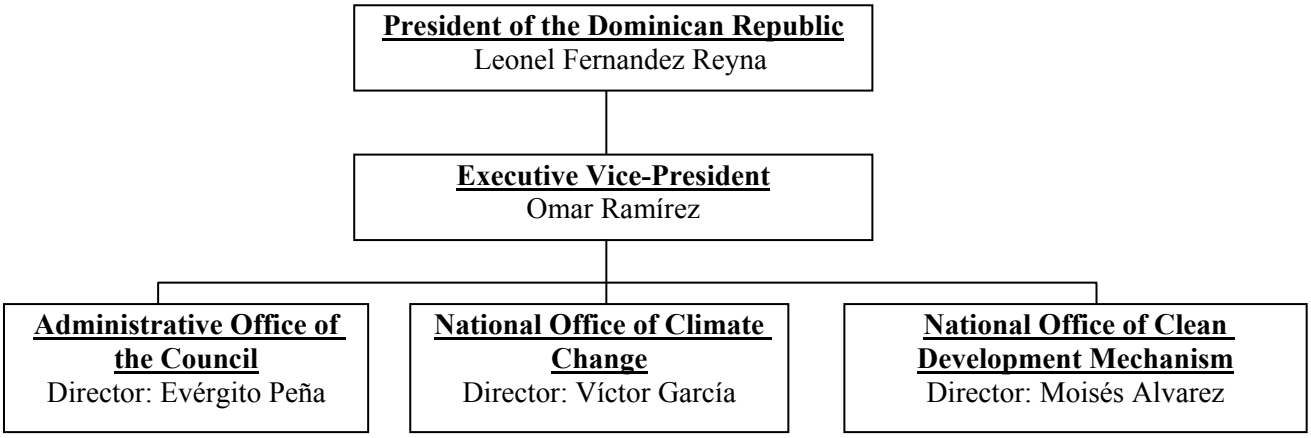
The exchange rate between the Dominican currency RD$ and the US$ has changed gradually from 12.9 RD$ per US$1.00 in 1996 to around 17.5 RD$ per US$1.00 in 2002, when divergent rates began to be reported for the sellers and buyers of foreign currency. In 2003 and 2004, the economic downturn caused the exchange rate of the RD$ to worsen drastically to around 29 RD$ per US$, and to about 41 RD$ per US$ in 2004. Later, as the economy recovered, the Dominican currency strengthened in 2005, and achieved a relative stability at around 33 RD$ per US$ between 2005 and 2007, and 34 RD$ per US$ in 2008.

2.2 National Mechanism for CDM Project Development in the Dominican Republic

2.2.1 The National Council for Climate Change and Clean Development Mechanism (CNCCMDL)

In the Dominican Republic, the Designated National Authority of Clean Development Mechanism (DNA-CDM) had been temporarily established at the National Office of CDM (ONMDL) of the former Secretariat of State of Environment and Natural Resources (SEMARENA). In September 2008, in accordance with the President Decree No. 601-08, the Dominican Republic newly established the National Council for Climate Change and Clean Development Mechanism (CNCCMDL) under which ONMDL was officially authorized to be the DNA of CDM.

CNCCMDL is the Council under direct control of the President of the Dominican Republic with the following organizational structure as of December 2010.



Council Members:
Ministry of the Environment and Natural Resources
Ministry of Economy, Planning and Development
Ministry of Agriculture
Ministry of Foreign Affairs
Ministry of Treasury
Ministry of Industry and Commerce
Ministry of Public Health and Social Affairs
Governor of the Central Bank of the Dominican Republic
National Energy Commission
Superintendent of Electricity
Vice-President of Dominican Corporation of State Electric Companies

Figure 2-1: Members and Administrative Structure of CNCCMDL

2.2.2 Key Roles of Government and Private Sector Organizations

a. Key Public and Private Sector Organizations

There are various key public and private sector organizations in promoting CDM projects in the Dominican Republic. The table below shows the potential key public and private organizations by potential sectors of CDM project development.

Table 2-3: Key Public and Private Organizations by Potential Sectors of CDM Projects

Relevant organizations by Sector	
Sector	**Organizations**
Energy	• **National Energy Commission (CNE)** • **Dominican corporation of State Electric Companies (CDEEE)** • **Coordinating organism of the Interconnected National Electrical System of the Dominican Republic (SENI)** • **Dominican Hydropower Generation Company (EGEHID)**
	• National Council of Private Enterprise （*CONEP)* • ***Private generators of the National Power Sector*** • *Electrical Distribution Companies, EDE (North, South and East)* • ***Renewable Energy Producers Association***
Solid wastes	• **Ministry of Environment and Natural Resources (SEMARENA)** • **Dominican Municipal League** • **Dominican Federation of Municipalities** • City Hall • Institute of Innovation for Biotechnology and Industries (IIBI)
	• *National association of Hotels and Restaurants ASONAHORES* • ***Wastes Management Companies***
Agriculture	• **Ministry of Agriculture (SEA)** • Dominican Agrarian institute • Dominican agricultural loan bank • National commission for the Agro forestry Investigation • Agro forestry Development Center • **Council State of Sugar**
	• ***Dominican Agro-enterprise Board JAD*** • *Cattle's Association of the Licey al Medio* • *Cattle's Association of Cibao*
Industry	• **Ministry of Industry and Commerce (SEIC)** • Institute of Innovation for Biotechnology and Industries (IIBI) • Exportation and Investment Center of the Dominican Republic
	• *Industries Association of the Dominican Republic* • ***Dominican Confederation of Small and Medium Industries (CODOPYME)*** • ***Free Zones Dominican association (ADOZONA)***
Transport	• Office for the Transportation Reordering (OPRET) • Technical Office of Terrestrial Transport (OTTT) • Main Directorate of Terrestrial Transit (DGTT)
	• National Council of Private Enterprise（*CONEP)* • *METRO Bus* • *National Center of United Carriers (CNTU)* • *CARIBE Tours* • *National Confederation of Carriers (CONATRA)*
Forest	• **Ministry of Environment and Natural Resources (SEMARENA)** • National Commission for the Agro forestry Investigation (CONIAF) • Agro forestry Development Center (CEDAF)
	• *National Forest Chamber*
Tourism	• Ministry of Tourism (SECTUR)
	• National Council of Private Enterprise（*CONEP)* • *National Association of Hotels and Restaurants (ASONAHORES)*
Organizations of Support	
Public	• Ministry of Foreign Affairs • Ministry of Public Health and Social Affairs (SESPAS) • Ministry of Treasury (SHE) • Ministry of Economy, Planning and Development (SEEPyD) • Central Bank of the Dominican Republic (BCRD) • **National institute of Hydraulic Resources**
Private	• **National Council of Private Enterprise （*CONEP)*** • *National network of Enterprise Support to Environmental Protection (RENAEPA)* • *Banks Association of Dominican Republic (ABA)*

Remark: Organizations shown in bold fonts are the key actors of great importance in CDM project development. Organizations above are identified based on the discussions with the counterpart members and confirmed in the Steering Committee of the Study.

2.2.3 Laws and Regulations Relevant to CDM Project Development

There are a number of laws and regulations relevant to development of CDM projects in the Dominican Republic. The table below shows the list of such laws and regulations by sectors.

Table 2-4: Relevant Laws and Regulations to Promotion of CDM Project Development

Relevant Laws and Regulations	
Specific aspect	**Content**
Political constitution of the Dominican Republic 2002	♦ Article 67, Protection of Environment provides that the pollution should be prevented to protect the environment for current and future generations.
Climatic Change - International Conventions and Protocols - - Laws and Regulations	♦ **The United Nations Framework Convention on Climatic Change (The international convention on climate change that the Dominican Republic has ratified in 1998.)** ♦ **Kyoto Protocol of the Convention framework of the United Nations on Climatic Change (The international protocol that provides CDM. The Dominican Republic has ratified in 2002.)** ♦ 02-2002 Resolution SEMARENA creating the National Climate Committee ♦ **601-08 Decree on establishment of the National Council for the Climate Change and Clean Development Mechanism (Presidential decree on establishment of CNCCMDL.)** ♦ **582-08 Decree on the appointment of the high rank officers of the National Council for the Climatic Change and Clean Development Mechanism (The decree that appoints the Chairman and directors of CNCCMDL)**
Energy	♦ **125-01 General Law of Electricity (The basic law on electricity that all the power generation activities are required to comply with.)** ♦ Regulation for the Application of the Law 125-01 General Law of Electricity ♦ 186-07 Law that modifies the General Law of Electricity ♦ **Resolution that establishes the procedures and requirements to participate in the market of the natural gas (NG) (The resolution that provides the procedures and requirements for participation in natural gas market that are relevant to the fuel switch projects to convert from coal or oil to natural gas for GHGs emission reduction.)**
Water, Air and Solid Waste	♦ **NA-RS-001-03 Standard for the Environmental Management of non-Dangerous Solid wastes (The standard specifies the technical criteria for treatment and disposal of non-dangerous solid waste that should be taken into consideration in formulating SWM related CDM projects.)** ♦ Environmental norm on Quality of Ground Waters and Discharge to the Subsoil (The CDM projects that deal with effluent control must comply with this norm.) ♦ AG-CC-01 Standard for Water Quality and Effluent Control (The CDM projects that deal with effluent treatment must comply with this standard.) ♦ AR-CA-01 Standard for Air Quality and Atmospheric Emissions Control (The CDM projects that influences air quality must comply with this standard.)
Environmental	♦ **64-00 General Law on Environment and Natural Resources (All the CDM projects must comply with this law.)** ♦ 42-01 General Law on Health ♦ **Procedure for Environmental Impact Assessment (All the CDM projects are screened by this procedure to identify their necessity of environmental impact assessment. If they are necessary, EIA has to be properly implemented in accordance with this procedure.)** ♦ **Guidelines for the Accomplishment of the Social Impact assessment (SIA) within the Environment Impact Assessment Process (EIA) (All the projects are encouraged to conduct SIA in accordance with this guidelines although it is not compulsory.)** ♦ Procedure for the Elaboration of Instruments of Environmental Regulation ♦ **Procedure for the completion of the Environmental Permission of**

Relevant Laws and Regulations	
Specific aspect	**Content**
	Existing Facilities (If the existing facilities conducts some improvement for CDM purpose, it should go through this procedure to obtain environmental permission.) ♦ **Regulation on the Permissions System and Environmental Licenses (All the new project activities including CDM projects must comply with this regulation to obtain environmental license.)**
Tributary Financing and Incentives	♦ **57-07 Law of Incentive to the Renewable Energies and Special Regimes (The law provides the scheme of incentives to be given to the development and utilization of renewable energy resources, that are relevant to renewable energy CDM projects.)** ♦ Implementation rules and regulations of Law 57-07

Remark: Laws and Regulations with bold font indicates stronger relevance to CDM project development

2.2.4 Host Country Approval of CDM Projects

a. Procedure

Issuance of host country approval for CDM project in the Dominican Republic is conducted by ONMDL, CNCCMDL in accordance with the procedure illustrated in the figure below.

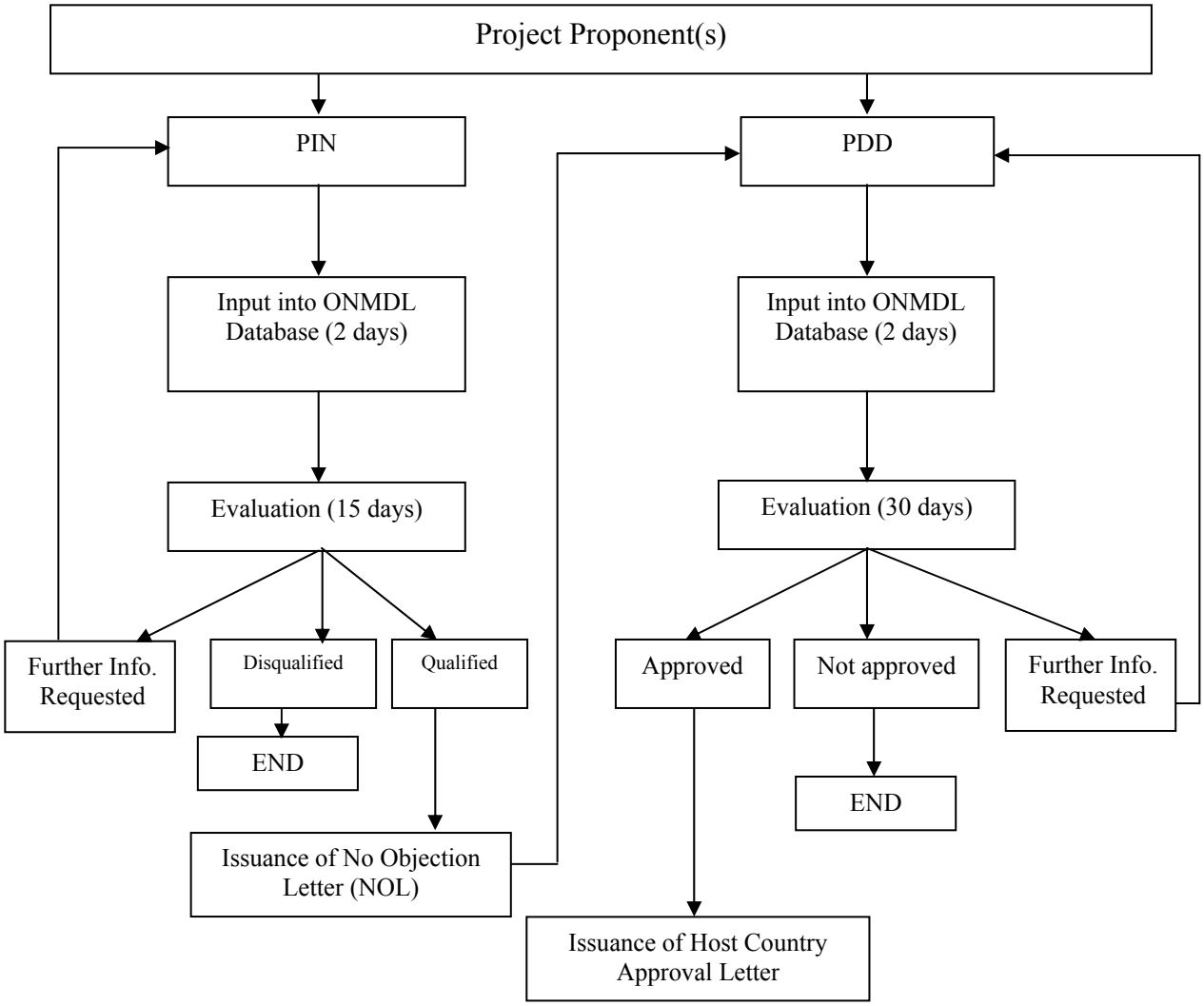


Figure 2-2: Procedure for CDM Project Approval in the Dominican Republic

PIN (Project Idea Note) submission before PDD (Project Design Document) production is optional for project proponents. They can apply for host country approval of the CDM project with submission of PDD without prior screening of PIN.

b. National Criteria for Evaluation of CDM Projects

ONMDL, CNCCMDL currently adopts the following "Sustainability Criteria" for assessment of CDM projects in PIN and PDD approval procedure:

Table 2-5: Sustainability Criteria adopted by DNA of the Dominican Republic

Types of Criteria	Criteria
1.Environmental Sustainability Criteria	♦ Environmental protection
	♦ Conservation of biodiversity
	♦ Sustainable land use
	♦ Protection of maritime coastal resources
	♦ Reduction of air, water and soil pollution
	♦ River basin/watershed protection
2.Socio-Economic Sustainability Criteria	♦ Reduced import of fossil fuels
	♦ Increased use of renewable energy resources
	♦ Improved energy efficiency
	♦ Transfer of cleaner technology
	♦ Employment generation
	♦ Improvement of the quality of life of the community

The above sustainability criteria are specifically reflected to the evaluation procedure for CDM projects by preparing the detail PIN/PDD evaluation form (See ANNEXES).

2.3 Sector-Wise Potentials and Barriers of CDM Project Development in the Dominican Republic

2.3.1 Renewable Energy

a. Wind Power

a.1. Potential

The Wind Atlas developed in 2001 indicated the approximate total installed capacity of 3,200 MW and 9,000 GWh/year of wind power generation with the wind resources evaluated as "excellent", which would further increase to 10,200 MW or 24,600 GWh/year if including those evaluated as "good", as shown in the table below.

Table 2-6: Good-to-Excellent Wind Resource at 30 m (Utility Scale)

Wind Resource (Utility Scale)	Wind Power (W/m^2)	Wind Speed (m/s)	Total Area (km^2)	Total Capacity Installed (MW)	Total Power (GWh/yr)
Good	300-400	7.0-7.7	1,022	7,000	15,600
Excellent	400-600	7.7-8.9	377	2,600	7,100
Excellent	600-800	8.9-9.8	61	400	1,400
Excellent	800-1,000	9.8-10.5	22	200	500
Total			1,482	10,200	24,600

Source: Wind Energy Resource Atlas of the Dominican Republic (2001).

a.2. Current Development of Wind Power Generation

There are currently 3 (three) wind power CDM projects now under final stage of validation as outlined in the table below.

Table 2-7: Outline of the Wind Power CDM Projects under Validation (as of 30 Nov.2010)

Project Title	Project Participants	Location	Planned Installed Capacity (MW)	Estimated GHGs Reduction (tCO_2/yr)
Los Cocos Wind Farm Project	▪ EGE HAINA	The Province of Pedernales (between the communities of Juancho and Los Cocos)	25.2	55,987
Matafongo Wind Farm	▪ Grupo Eólico Dominicano, C. por A. ▪ CO2 Global Solutions International S.A.	The Province of Peravia (Villa Fundación, Matanzas District)	30.6	70,316
Quilvio Cabrera Wind Farm Project	▪ CEPM (Consorcio Energético Punta Cana-Macao)	The Province of Pedernales (between the communities of Juancho and Los Cocos)	8.25	11,394
		Total	64.05	127,697

Source: National CDM Portfolio of the Dominican Republic

In addition, there are several wind farm CDM project pipelines as shown in the table below.

Table 2-8: Wind Farm CDM Projects in Pipeline (as of 30 Nov. 2010)

Project Title	Project Participants	Location	Planned Installed Capacity (MW)	Estimated GHGs Reduction (tCO_2/yr)
Granadillos Wind Power Generation	▪ Grupo Eólico Dominicano, C. por A	The Province of Montecristi (Villa Vásquez Municipality)	34	65,178
Puerto Plata-Imbert Wind Farm	▪ Jasper Caribbean Wind Power	The Province of Puerto Plata	115	236,000
Madrileña Wind Farm	▪ MDL Cubaenergia	The Province of Altagracia	10	19,600
		Total	159	108,378

Source: National CDM Portfolio of the Dominican Republic

a.3. Barriers

a.3.1 Access to the grid electricity

Connection to the national grid electricity is of great importance for the wind power to develop and operate with stable income from selling the electricity based on the power purchasing agreement (PPA) with the grid electricity suppliers. Independent power supply by wind power may only be possible for rural electrification with its installed capacity less than 5MW. Therefore, the wind farms have to be located in due consideration of the access to the grid electricity.

a.3.2 Potential conflict with the current and/or competing land use

Significant potentials of wind power in the Dominican Republic are found along the coastline where there is a strong sea breeze, hilltops and ridge crests of mountainous areas. Significant conflict of land use with tourism development may arise in the areas along the coastline while hilltops and mountainous areas have stricter land use regulations in relation to nature/forest reserve and environmental protection. Proper coordination needs to be made at national level to solve these land use conflict for actualization of wind power potentials.

a.3.3 Technological issues

The wind power facility must be well designed to put up with extreme weather events arising in the Dominican Republic such as hurricanes and floods. The project insurance may also increase against hurricane risk areas. The installed capacity may also need to be discounted, taking into account such risks. Incorporation of these risks may increase the investment and operation cost of wind power in this country. Instability of power supply from wind farms due to dependence upon weather conditions may also create another risk when connecting to the national grid.

b. Biomass

b.1. Potential

Based on the data available in the Dominican Republic, the Study estimated the amount and their energy potentials for the following biomass residues:

- Rice husk
- Coconut shells
- Coffee residues
- Sugarcane bagasse

The results of estimation for each biomass residue are shown in the following tables.

Table 2-9: Amount and Energy Potential of Rice Husk (2009)

Rice husk	2009			
Region	Crop Area (ha)	Production: w hite rice (MT/yr)	Production: Residues (Rice husk) (MT/yr)	Energy in Residues (GJ)
NORTE	1,902	5,840	1,577	22,705
NORDESTE	82,708	230,024	62,106	894,333
NOROESTE	49,004	166,543	44,967	647,521
NORCENTRAL	27,951	94,214	25,438	366,302
CENTRAL	3,466	12,554	3,390	48,809
SUR	566	0	0	0
SUROESTE	13,237	33,781	9,121	131,342
ESTE	3,178	8,410	2,271	32,697
TOTAL	182,012	551,365	148,869	2,143,709

Source: SEA, Departamento de Seguimiento, Control y Evaluación

Note: Residue Production Ratio (Residue/product ratios/Mid-range) of Rice husk is 0.27 (Source: Koopmans & Koppejan 1998)

Note: Lower heating value (MJ/kg or GJ/ton) of Rice hulls is 14.4 (Source: Biomass: based on Leach & Gowen 1987; Fossil fuel: IEA 2003a; Natural gas: BP2003)

Table 2-10: Amount and Energy Potential of Coconut Shells (2009)

Coconut shell	2009			
Region	Crop Area (ha)	Production: Coconut (MT/yr)	Production: Residues (coconut shell) (MT/yr)	Energy in Residues (GJ)
NORTE	1,140	170	90	1,612
NORDESTE	54,181	2,911	1,543	27,621
NOROESTE	284	57	30	543
NORCENTRAL	842	100	53	947
CENTRAL	6,501	532	282	5,050
SUR	3,185	384	203	3,639
SUROESTE	482	60	32	568
ESTE	22,444	1,220	647	11,575
TOTAL	89,059	5,434	2,880	51,555

Source: SEA, Departamento de Seguimiento, Control y Evaluación

Note: Residue Production Ratio (Residue/Product ratio/Mid-range) of Coconut Shell is 0.53 (Source Koopmans & Koppejan 1998)

Note: Lower heating value (MJ/kg or GJ/ton) of Coconut shells is 17.9 (Source: Biomass: based on Leach & Gowen 1987; Fossil fuel: IEA 2003a; Natural gas: BP2003)

Table 2-11: Amount and Energy Potential of Coffee Residues (2008)

Coffee Residues	2008			
Region	Crop Area (ha)	Production: Coffee Beans (MT/yr)	Production: Residues (Coffee residues) (MT/yr)	Energy in Residues (GJ)
NORTE	24,813	11,343	15,880	260,432
NORDESTE	5,289	1,745	2,443	40,065
NOROESTE	8,073	3,199	4,479	73,456
NORCENTRAL	15,178	5,718	8,006	131,298
CENTRAL	31,694	5,411	7,575	124,230
SUR	27,636	5,845	8,182	134,185
SUROESTE	18,869	3,562	4,987	81,787
ESTE	1,790	1,528	2,139	35,080
TOTAL	133,342	38,351	53,691	880,532

Source: Division de Estadisticas e Informacion, Dpto. De Planificacion, CODOCAFE

Note: The residue potential would be 1.4 times the mass of green beans produced (Source: UNDP Biomass Energy for Cement Production Opportunities in Ethiopia 2009)

Note: Lower heating value (MJ/kg) of coffee husk is 16.4 (Source: UNDP Biomass Energy For Cement Production Opportunities in Ethiopia 2009)

Table 2-12: Amount and Energy Potential of Sugarcane Bagasse (2009)

Sugarcane Bagasse	2009			
Sugar refinery (Municipalities)	Plant Area (ha)	Production: Sugarcane (MT/yr)	Production: Residues (Bagazze) (MT/yr)	Energy in Residues (GJ)
Central Romana	65,497	3,178,881	1,049,031	8,602,052
Cristal Colon	18,298	825,452	272,399	2,233,673
Barahona	8,176	616,942	203,591	1,669,445
TOTAL	91,971	4,621,275	1,525,021	12,505,170

Source: Instituto nacional del Azúcar (INAZUCAR)

Note: Residue Production Ratio (Residue/Product ratio /Mid-range) of Sugarcane is approximately 0.33 of Sugarcane (Source: MEMORIA DEL INSTITUTO AZUCARERO DOMINICANO 1995)

Note: Lower heating value (MJ/kg or GJ/ton) of Bagasse (wet) is 8.2 (Source: Biomass: based on Leach & Gowen 1987; Fossil fuel: IEA 2003a; Natural gas: BP2003)

On the other hand, potential demand of biomass residue as an alternative to fossil fuels is expected in the industry sector, that mainly utilizes imported heavy fuel oil or diesel oil to meet their heat and electricity demand if the fuel switch to biomass residue can produce additional income from CERs under CDM. Depending upon the potential of efficient logistical development, small to medium scale (1MW to 10MW) biomass fuel conversion potential can be realized for some manufacturing industries (distillers, food production, textiles, etc.)

b.2. Current Development of Biomass Energy

There are currently 3 CDM project proposals under validation are summarized in the fllowing table.

Table 2-13: Biomass Energy CDM Projects under Validation (as of Nov. 2010)

Project Title	Project Participants	Location	Biomass Used	Estimated GHGs Reduction (tCO_2/yr)
CEMEX Dominicana: Alternative fuels and biomass project at San Pedro Cement Plant	▪ CEMEX Dominicana, S.A. ▪ CEMEX International Finance Company ▪ CO_2 Global Solutions International, S.A.	The Province of San Pedro Macoris (San Pedro Cement Plant)	▪ Biomass residues (bagasse, rice husk, etc.) ▪ For heat production	148,889
Steam Generation Using Biomass	▪ Gildan Activewear Dominican Republic Textile Company Inc. ▪ One Carbon International B.V.	The Province of Santo Domingo Este (Zona Franca Industrial Bella Vista)	▪ Agroforestry residues (rice husk/straw, coconut shell, bagasse, etc.) ▪ Switch of boiler fuels	79,557
Textile Offshore Site Dominicana Biomass Residues Cogeneration Project (TOS-2RIOS)	▪ Hanesbarands Dos Rios Textiles Inc. ▪ One Carbon International B.V.	The Province of Monseñor Nouel (Bonao)	▪ Agricultural residues ▪ Biomass-based co-generation	32,780
			Total	261,226

Source: National CDM Portfolio of the Dominican Republic

On the other hand, there also several biomass energy CDM projects in pipelines as illustrated in the table below.

Table 2-14: Biomass CDM projects in pipeline (as of Nov. 2010)

Project Title	Project Participants	Location	Biomass Used	Estimated GHGs Reduction (tCO_2/yr)
RJS Group-Grid Connected Electricity Generation from Biomass Residues	▪ RJS Group	The Provinces of Monte Cristi, Valverde Mao, Santiago, Rodriguez y Dabajon	▪ Bagasse produced in an new ethanol plant ▪ 285GWh/yr of electricity is planned to generate.	220,000
Programmatic Project of electricity generation from renewable synthesis gas energy: KOAR Dominican Energy	▪ Dominican KOAR Energy	To be identified	▪ Agricultural residues ▪ 10 units of 10MW capacity plans to be developed in the first phase.	595,000
Cogeneration plant in Bioethanol Boca Chica	▪ Bioethanol Boca Chica	The Province of Santo Domingo/San Pedro de Macoris	▪ Sugarcane Bagasse ▪ 40MW installed capacity planned	180,000
			Total	995,000

Source: National CDM Portfolio of the Dominican Republic

"The programmatic CDM project of electricity generation from renewable synthesis gas" mentioned in the table above is promoted by KOAR with close cooperation with ONMDL and JICA Study Team.

b.3. Barriers

b.3.1 Geographical dispersion of biomass resources

Most of the biomass residues are generated from agricultural activities that are extensively found in sub-urban and rural areas in the country. Due to their area-wide dispersion, stable procurement of biomass resources require extensive logistic network for their collection that may increase the cost of biomass energy utilization for industries. Seasonal fluctuation of biomass residue supply due to climate-dependent agriculture is also a problem for stable procurement of resources.

b.3.2 Potential conflict with conventional use and treatment of biomass residues

Some of the biomass residues are currently utilized for other purposes as fertilizers, soil improvers, and so forth. In the procurement of biomass residues, the potential conflict with such current use of biomass needs to be avoided not to disturb sustainable agriculture in the country. On the other hand, there is also another concern that a large amount of biomass residue was uncontrollably burned on site with no use, resulting in environmental pollution and nature degradation. Proper use of biomass as alternative energy resources can potentially solve this issue while meeting the energy demand in the industry sector. The project must identify such win-win scenario of biomass energy development that can create socio-economic and environmental co-benefits in addition to GHGs emission reduction.

c. Hydropower

c.1.Potential

EGEHID (Dominican Hydropower Generation Company) has already identified potential locations of hydropower development at large, medium, and small-scale levels. It also has its own hydropower development plan. The total planned capacity of hydropower including all scales is 119.2MW, with the estimated annual power generation of 403.48 GWh annually. EGEHID also estimated that the average annual CERs of 338,923 tons of CO_2 could be obtained if all these projects were developed as CDM.

Table 2-15 Planned Hydropower Projects and Estimated CER

Location	Province/ Municipality	Generation Capacity (MW)	Estimated Annual Generation (GWh/year)	Estimated Annual CERs (tonCO_2/year)
La diferencia	Rancho Arriba, San Jose de Ocoa	11	30.4	25,536
Arroyo Gallo	Moncion, Santiago	13.2	48.6	40,824
Hondo Valle	Hondo Valle, Elias Piña	13.5	47.5	39,900

Location	Province/ Municipality	Generation Capacity (MW)	Estimated Annual Generation (GWh/year)	Estimated Annual CERs ($tonCO_2$/year)
Los Jaimenes	La Hilguera, San Juan de la Maguana	6.4	27.1	22,764
El Torito-Los Veganos	Piedra Blanca, Monseno Nouel	14.9	67.05	56,322
Artibonito	El Corte I/Pedro Santana, Elias Piña	45	124.83	104,857
La Hilguera	La Hilguera, San Juan de la Maguana	15.2	58	48,720
	Total	**119.2**	**403.48**	**338,923**

In addition to the above planned hydropower development, the Dominican Republic has further potentials of developing mini-hydropower at rural areas with its design install capacity of less than 5MW. There are also the needs of supplying electricity by developing independent micro-hydro (less than 1 MW) plants at remote rural areas.

c.2.Current Development of Hydropower

Currently, there is one hydropower project under validation and another in the pipelines, both of which are developed by EGEHID as shown in the next table.

Table 2-16: Hydropower CDM Projects (under validation and in the pipelines)

Project Title	Project Participants	Location	Planned Installed Capacity (MW)	Estimated GHGs Reduction (tCO_2/yr)
Palomino Hydropower Project (under Validation)	▪ EGEHID ▪ CNO (Constructora Norberto Odebrecht)	The Province of San Juan de la Maguana	80 (40MW x 2)	122,833
Pinalito Hydropower Project (in the pipelines)	▪ EGEHID ▪ CNO (Constructora Norberto Odebrecht)	The Province of Santo Domingo Norte (Bonao)	50 (25MW x 2)	97,820
		Total	130	220,653

Source: National CDM Portfolio of the Dominican Republic

In addition to the above projects, the Study, in cooperation with UNDP, developed a model PDD of the programmatic mini-hydropower CDM project, targeting the rural non-electrified communities.

c.3.Barriers

In general, EGEHID has already well identified hydropower potential of the country and formulated the plan for its implementation. The only and biggest barrier is the investment cost required for its implementation. Without the grant or preferential financial scheme, hydropower development cannot be realized. Therefore, if we can well demonstrate such economic/financial barriers, the hydropower development projects can be promoted as CDM with the acquisition of CER.

d. Solar Energy

d.1. Potential

Although the physical potential of solar energy is abundant in the country, solar system applications at medium and large scale are difficult due to comparatively high cost of installation and its maintenance. Solar system application may be focused on small scale applications such as:

- Application of small-scale solar system (solar panel, solar home system, solar cookers, etc.) for the rural areas distant from available national power grid; and
- Application of small-scale solar technology for residential and commercial sector as alternative energy to fossil fuels and electricity (solar water heating, etc.)

Therefore, solar energy CDM projects need to be developed as the bundled or programmatic CDM projects in which homogenous technology or system is applied with a large number of areas, residences, or buildings to obtain enough CER to partially cover their initial investment.

d.2. Current Development of Solar CDM Project

There are two PINs submitted to the DNA on solar CDM projects as outlined in the table below.

Table 2-17: Solar Energy CDM Project in the Pipelines

Project Title	Project Participants	Location	Planned Installed Capacity (MW)	Estimated GHGs Reduction (tCO_2/yr)
60MW Photovoltaic park in La Victoria	Elctrotex del Caribe, S.A.	The Provice of Santo Domingo Norte (La Victoria)	60MW	89,693
Electricity Generation through photovoltaic modules	Investment S.C.S.A	Not specified	Not specified	14,000

Source: National CDM Portfolio of the Dominican Republic

d.3. Barriers

The major barrier against promotion of solar energy is that the scale of solar energy CDM project is too small as a single project in comparison with the high cost of its installation. High cost of installation device also hinders dissemination of solar system in the country. Due to its high value of solar device, there is also the risk of robbery especially for the stand-alone solar system.

2.3.2 Waste Management

Along with renewable energy sector, waste management sector also has a big potential of developing CDM projects. The major prototypes of CDM projects in this sector are:

- Methane capture and flaring/energy utilization from final disposal landfills; and
- Methane avoidance/reduction by composting of organic waste

a. Landfill Gas Capture and Utilization

a.1. Potential

In the case of the Dominican Republic, the potential of landfill gas capture mainly exists in the big cities dealing with larger amount of waste, such as Santo Domingo, Santiago and so forth. Considering the required investment cost for landfill gas capture and utilization facilities, the project is only applicable to the medium or big cities with the average daily waste disposal amount of more than 300 tons. Assuming that the per capita waste generation is ranging from 0.6 to 1.0 kg/day, the cities with the population ranging from 300,000 to 500,000 is required at its minimum to implement the landfill gas capture project. The table below shows the provinces with more than 300 thousand populations in the Dominican Republic.

Table 2-18 Population of the provinces with more than 300 thousand population in the Dominican Republic

Province	Population
National District of Santo Domingo	1,026,239
Province Santo Domingo	2,042,003
San Cristobal	601,593
Santiago	966,869
Puerto Plata	332,958
Duarte	342,948
San Pedro de Macoris	311,878
La Vega	421,771

Source: Estimaciones y Proyecciones de la Poblacion Dominicana por Regiones, Provincias, Municipios y Distritos Municipales, 2008

a.2. Current Development of Landfill Gas Capture CDM Projects

There is one CDM project that has been officially registered and operated as outlined in the table below.

Table 2-19: Landfill Gas Capture CDM Project in Operation

Project Title	Project Participants	Location	Estimated GHGs Reduction (tCO_2/yr)
Bionersis Project on La Duquesa Landfill	Bionersis Dominicana, S.A.	National District of Santo Domingo	392,870

Source: National CDM Portfolio of the Dominican Republic

a.3. Barriers

a.3.1 Lack of Essential Data

Many of the provinces and municipalities do not have enough data on waste amount and composition and landfill operation that are essential for screening the possibility of developing landfill gas capture CDM project.

a.3.2 Lack of Technical and Financial Capacity

Many of the provinces and municipalities do not have enough capacity of waste management including collection, haulage and final disposal landfill operation. It will be difficult for them to properly develop and manage landfill gas capture project that also requires continuous monitoring of the project under CDM.

b. Methane Avoidance by Composting

b.1. Potential

Composting CDM project has wider applicability regardless of its scale. Various technologies are also available ranging from simple and low cost manual technology to advanced mechanical ones. Considering the high content of organic materials in solid waste in the Dominican Republic, composting of organic waste has high potential of methane emission reduction and CDM project development. Although small-scale composting may produce small amount of methane emission reduction, it can be developed as a Programmatic CDM under a common technology application in wider areas. Large or intensive organic waste generators need to be targeted to efficiently collect organic waste for composting such as wet market, restaurants, hotels, and so forth.

b.2. Current Development of Composting CDM Projects

There are two CDM projects in the pipelines related to composting of organic waste as outlined in the table below.

Table 2-20: Current Composting CDM Projects in the Pipelines

Project Title	Project Participants	Location	Estimated GHGs Reduction (tCO_2/yr)
Co-composting of EFB (Empty Fruits Bunch) and POME (Palm Oil Mill Effluent) PIN submitted	Induspalma Dominicana, S.A.	Monte Plata	12,252
Production of Compost from Solid Waste and Agricultural Residues (Concept plan)	Fundacion Agricultura y Medio Ambiente (FAMA) y Bioliga	Not identified	Not estimated

Source: National CDM Portfolio of the Dominican Republic

b.3. Barriers

b.3.1 Lack of Essential Data

As is the case of landfill gas capture project, lack of data on waste amount and composition is one of the critical barriers against promotion of composting CDM project. Current waste amount and composition data with current waste collection system have to be identified for each province and municipality. It is also important to identify the large generators of organic waste to efficiently collect organic waste for composting.

b.3.2 Limited technical and management capacity

The local capacity of SWM will be limited in many provinces and municipalities to further increase their daily works by conducting composting. Taking into account that composting requires some educational and training works of the people for proper handling of organic waste in addition to the management of composting facilities; the project cannot be carried out only by the initiative of local government.

c. Other Waste Related CDM Projects

There is another waste management CDM project proposing introduction of waste-to-energy facility, as outlined in the table below.

Table 2-21: Other Waste Related Projects in the Pipelines

Project Title	Project Participants	Location	Planned Installed Capacity (MW)	Estimated GHGs Reduction (tCO_2/yr)
Biofuturo Plant of Industrial Recycling of MSW in Santo Domingo	▪ Consorcio Empresarial Biofuturo, SRL	National District of Santo Domingo	6.0	175,705

Source: National CDM Portfolio of the Dominican Republic

2.3.3 Industry

a. Fuel Switch and Energy Efficiency Improvement

a.1. Potential

Most of the factories in the Dominican Republic, regardless of its products and scale, depend upon the imported fuels (especially liquid fuels such as heavy fuel oil or diesel oil) for energy production and consumption. The Dominican Republic is also characterized by heavy dependence upon independent back-up diesel power generators owned by each large electricity consumers including not only factories, but also buildings, commercial facilities, even independent houses, mainly due to instable supply of national grid power supply.

This current situation indicates large potential of GHGs emission reduction by fuel switching as well as energy efficiency improvement at each factory level.

The potential fuel switch and energy efficiency improvement measures include:

- Fuel switch to less carbon fuels (coal>oil>natural gas>biomass) in boilers, furnaces, and back-up power generators;
- Introduction of combined heat and power system (cogeneration or waste heat recovery);
- Introduction high efficiency boilers; and
- Application of in-process (elemental) technology (cleaner production technology with less energy consumption).

a.2. Current Development of CDM Projects on Fuel Switch and Energy Efficiency Improvement

There are several CDM projects at the early stage of project formulation without any preparation of PINs and PDDs. The table below shows the list of such projects.

Table 2-22: Current Fuel Switch/Energy Efficiency Improvement CDM Projects under Validation and in the pipelines

Project Title	Project Participants	Location	Project Information
METALDOM Fuel Switch in Furnaces	▪ METALDOM Dominicana	Not Specified	▪ The project aim to switch the actual consumption of fuel oil from the furnaces to Natural Gas
Fuel switch from heavy fuel oil (HFO) to natural gas	▪ Seaboard Dominicana	Not specified	▪ Replacement of HFO by natural gas ▪ GHGs reduction of 200,000tCO2/yr is estimated
Fuel switch from diesel oil to natural gas in industry and hotel sector	▪ AES Dominicana	Not specified	▪ Programmatic project of switching diesel by natural gas in heat production and electricity in industry and hotel sector.
Energy efficiency by smart devices or replacing high consumption appliances	▪ T & S Energia	Not specified	▪ Energy efficiency measures in hotels through installation of smart devices in rooms and replacement of A/C units. ▪ GHGs reduction of 40,000tCO2/yr is estimated.
Improvement of the efficiency of electricity distribution	▪ CDEEE	Not specified	▪ GHGs reduction of 50,000tCO_2/yr is estimated.

Source: National CDM Portfolio of the Dominican Republic

a.3. Barriers

a.3.1 Lack of energy and power consumption data by sub-sector of industries

To assess the potential and financial feasibility of fuel switch as well as energy efficiency improvement, it is indispensable to clearly identify the current energy and power consumption patterns for each type of industry or even each factory. Such data needs to be collected and compile by each sub-sector of industries with its production data so that the energy efficiency can be estimated in the form fuel/power consumption per unit product to compare with the other county's data. Such efforts have to be led by the government organizations in energy and

industry sector (CNE, Ministry of Industry and Commerce) in cooperation with industry associations.

a.3.2 Cost/benefit of fuel switch or energy efficiency improvement projects for industries

Cost and benefit of fuel switch or energy efficiency improvement needs to be carefully assessed based by comparing the total energy cost including the cost of procurement, transportation, storage, and fuels themselves as well as potential benefits to be obtained from CERs. Likewise, switching fuel to biomass may also be carefully considered since it may increase the cost of fuel in total due to high cost of transportation and other relevant expenses depending on the geographical locations of biomass sources. Real cost estimation needs to be carefully conducted for each specific project scenario.

b. Process-Specific GHGs Emission Technologies

b.1. Potential

b.1.1 Blended Cement Production with Reduced Content of Clinker

Cement industry can reduce the emission of CO_2 by reducing the amount of clinker (calcium oxide) content of the produced cement by utilizing alternative materials. So-called blended cement production may have a significant impact upon GHGs emission reduction from cement production. In relation to this, CEMEX Dominicana had been trying to develop a CDM project to reduce its clinker content in the cement manufacturing before, but due to strict national quality standard that requires high content of clinker in the cement, the project was halted. However, the project has been reactivated with the deregulation of the above standard. The project is currently under validation.

b.1.2 Methane Capture and Utilization from Industrial Wastewater

As is the case of solid waste, the wastewater of high organic matters content also produces methane in the anaerobic environment. The factories that discharge wastewater of high organic matters content have potentials of developing methane capture and utilization project under CDM. Such industries may include food and beverage and agricultural/livestock product processing factories. To identify the potential factories, the following data and information have to be collected:

- Wastewater discharge amount and flow rate;
- Quality of wastewater (BOD, COD, TOC, etc)
- Current wastewater treatment measures

These parameters are the key factors of determining methane emission from wastewater.

There are mainly two types of methane collection technologies, i.e. covered lagoon and the use of digesters.

b.2. Current Development of Process Specific CDM Projects

There are several process-specific CDM projects under validation and in pipelines as outlined in the table below.

Table 2-23: Current Process Specific CDM Projects in the Pipelines

Project Title	Project Participants	Location	Estimated GHGs Reduction (tCO_2/yr)
CEMEX Dminicana: Blended Cement Project (under validation)	CEMEX Dominicana, S.A.	The Province of San Pedro Macoris	138,297
Co-composting of EFB (Empty Fruits Bunch) and POME (Palm Oil Mill Effluent) PIN submitted	Induspalma Dominicana, S.A.	Monte Plata	12,252

Source: National CDM Portfolio of the Dominican Republic

b.3. Barriers

Since the process-specific GHGs emission reduction potentials depend upon the unique industrial production process and technologies applied by each factory, they should be investigated by each type of industrial sub-sector. In this respect, the efforts by each industrial enterprise in identifying the potentials of GHGs emission are the key of realizing this type of CDM projects.

As to the potential of methane capture from industrial wastewater, on the other hand, it can be identified by collecting the information and data mentioned above (wastewater discharge amount and flow rate, BOD, COD, and current wastewater treatment system).

2.3.4 Agriculture

a. Potential

The largest potential of CDM project in agricultural sector is the use of biomass for energy purpose, as mentioned in the previous section. Another potential area of CDM project development is in animal manure management in livestock sector. Because of its high content of organic matters, animal manure produces a considerable amount of methane in an anaerobic condition, where there is a potential of capturing methane for energy use.

b. Current Development of Animal Manure Management CDM Project

There are currently 4 CDM projects in the pipelines related to methane capture from animal manure management as outlined in the table below.

Table 2-24: Current Animal Manure Management Related CDM Projects in the Pipelines

Project Title	Project Participants	Location	Estimated GHGs Reduction (tCO_2/yr)
Methane capture and its applications in pig farms' self-consumption and in associative activities (Programmatic CDM)	▪ APORLI (as CME) ▪ Member pig farmers of APORLI	Licey al Medio and Moca (Cibao Central)	116,202 (average of 10 years)
Methane capture and power generation in the pig farms in Moca	▪ Rancho Zafarraya, C.A.	Moca (Cibao Central)	Not estimated
ICC-Co-digestion and co-composting of animal waste and mud	▪ Confidential	Confidential	7,814
BIoenergias Dajabon	▪ RENTEC	Dajabon	30,000

Source: National CDM Portfolio

In addition to the project in the pipelines above, the Study produced model PDDs of the programmatic CDM project on methane capture and utilization from pig farms, in cooperation with COOPCIBAO, an Association of pig farmers in Cibao.

c. Barriers

c.1.Lack of Essential Data

To assess the potential of animal manure management CDM project, the potential methane emission in the current treatment system has to be estimated. The factors that determine the potential of methane capture from the treatment system of animal manure include:

- Type and number of livestock (The manure from cattle and swine has larger potential of methane emission than other livestock); and
- Current animal manure treatment system (The higher the anaerobic condition of treatment lagoon is, the higher the potential of methane emission.).

However, these key data and information is not readily available at each livestock farm level. Such baseline information and data need to be collected and monitored on site to correctly identify the potentials.

c.2.Limiting Factors of methane capture potential

There are several limiting factors of methane capture potential from animal manure management in the Dominican Republic. One of such factors is the limited number of livestock per farm that reduces the potential of methane capture from animal manure. Another limiting factor is the uncontrolled treatment of animal manure on site. If animal manure is not treated in anaerobic condition before its final discharge to the environment, methane emission will be minimized, so is the potential of methane capture. Uncontrolled discharge of animal manure found in small-scale livestock farmers in this country may reduce the potential of methane capture from animal manure.

2.3.5 Transport

a. Fuel Switch and Energy Efficiency Improvement

a.1. Potential

The potentials of fuel switch and energy efficiency improvement largely exist in collective introduction of such measures to public transport (buses, taxis) or freight transport where, similar technology or measure can be collectively applied. There are 3 (three) relevant CDM projects in the pipelines, but only at concept level without no PINs or PDDs. The table below outlines these plans.

Table 2-25: Fuel Switch/Energy Efficiency CDM Projects in the Pipelines

Project Title	Project Participants	Location	Project Information
Fuel switching in inter-urban transport unit of passengers	▪ Caribe Tours	Not Specified	▪ Fuel switch in vehicle units using diesel to another less carbon-intensive fuel.
Fuel switching in passenger transport means	▪ Central Nacional de Transportistas Unificados (CNTU)	Not specified	▪ Fuel switch in taxis and buses of the urban transport from gasoline/diesel to natural gas.
Incorporation of hydrogen in the combustion chambers of the transport vehicles	▪ New Energy Dominicana	Not specified	▪ Incorporation of hydrogen in the combustion chambers of the internal combustion engines of vehicles for fuel saving and emission control ▪ Reduction of 60,000tCO_2/yr is estimated.

Source: National CDM Portfolio

a.2. Barriers

The existing barriers against promotion of fuel switch and energy efficiency improvement may include:

- Development of infrastructure for stable supply of alternative fuels (e.g. CNG stations, etc.)
- Quality control of alternative fuels
- Adequacy of service facilities against the security standards in the handling of alternative fuels like ethanol
- Secured supply of alternative fuels
- Procurement of equipment (gas engines)
- Limited capacity for monitoring of the project by project owner(s).

b. Mass Transit System

Although the Metro subway project is trying to prepare the PDD for registration as CDM project in cooperation with CAF (Corporacion Andina de Fomento), no documented information has been submitted to the DNA so far. Since the prior examples of CDM project of this sort is very limited (only 3 projects with two on mass transit system), it is not certain whether this type of project can be developed as CDM. For this moment, we should prefer to wait for the progress and result of the above effort.

2.3.6 Afforestation/Reforestation

a. Potential

According to the preliminary study on A/R CDM potential area carried out by JOFCA (Japan Overseas Forestry Consultants Association) in 2007 with the cooperation by SEMARENA, the total potential area of A/R CDM in the country is 10,256,773 hectare. The details of this analysis is available in "The Study on the Baseline for Afforestation and Reforestation CDM", which is available on the CDM website.

b. Current Development of A/R CDM Project

There are several concept level plans on A/R CDM projects as outlined in the table below.

Table 2-26: Current A/R CDM Projects in the pipelines

Project Title	Project Participants	Location	Project Information
RainTree Corp. Reforestation Project	▪ RainTrtee Crop.	Not specified	▪ Reforestation of deforested zones of the country with agroforestry cooperatives and nursery
Reforestation of the Blanco River basin	▪ TNC	The Province of Monsenor Nouel (Bonao)	▪ Reforestation for 6,071ha ▪ Estimated sequestration of GHGs at 40,181tCO_2/yr on average.

c. Barriers

The existing barriers against A/R CDM in the Dominican Republic are as follows:

- Potential high risk of leakage arising from conflictive land use scenarios and the country's deficit on forestry products.
- High incidence of hurricanes and floods.
- Potential risk of arising land tenure issues.
- Risks of registration in terms of proving the eligibility of the project area as A/R CDM (mainly due to the limited proper record keeping of land use history in the country.).

3 THE DOMINICAN REPUBLIC NATIONAL ACTION PLAN FOR CDM PROJECT DEVELOMENT

3.1 Objectives of the Action Plan

The Action Plan for CDM Project Development in the Dominican Republic is prepared for clarifying the course of actions to be taken for maximizing realization of CDM project development potential to serve for sustainable socio-economic development of the country.

3.2 CDM Project Development Potentials and Priority

3.2.1 Decision Tree for determining the priority sectors/areas of CDM Project Development

The Study takes the 3 steps to determine the priority of CDM project development for this Action Plan as shown in the figure below.

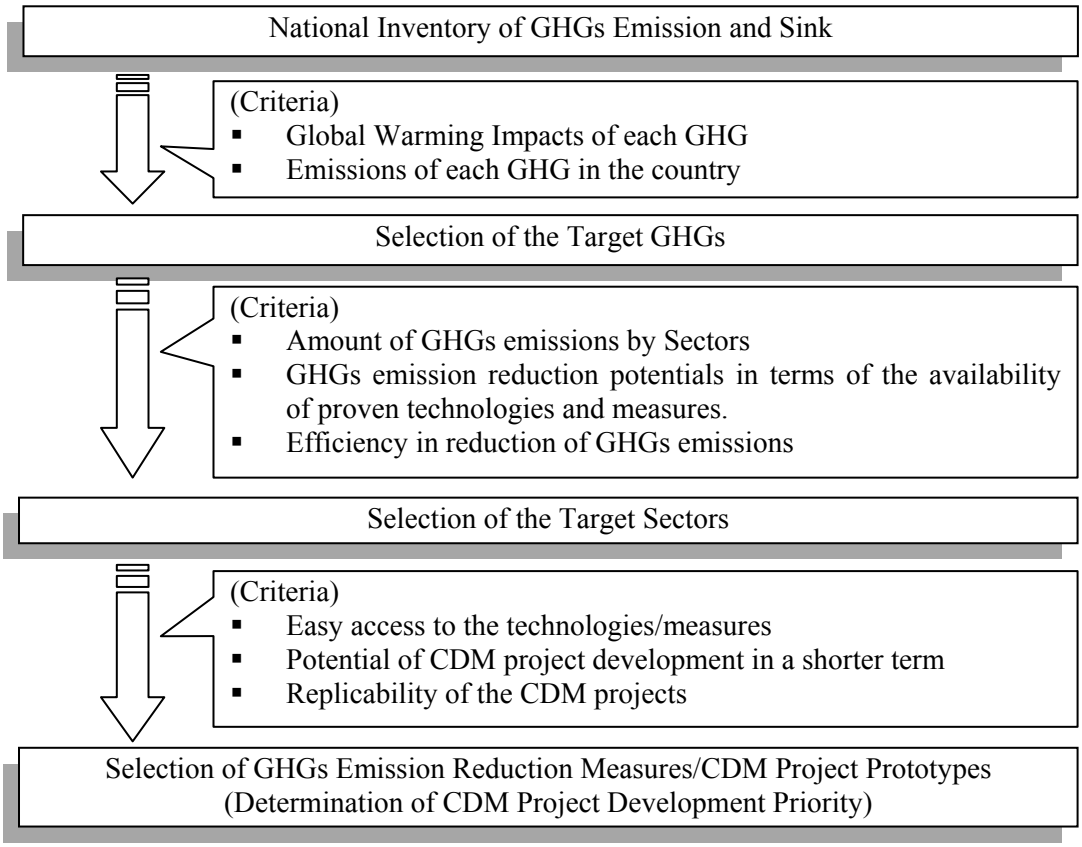


Figure 3-1: Decision Tree for Determination of CDM Project Development Priority

3.2.2 Selection of the Target GHGs and Sectors

CO_2 and CH_4 totally cover 88% of the country's GHGs emission while the remaining 12% originates from N_2O. Taking into account that there are no prior registered CDM projects

targeting the major sources of N_2O emission from flooded paddy fields, the target GHGs in this country will be CO_2 and CH_4.

3.2.3 Selection of Target Sectors

a. Selection of the Target Sectors and Measures

a.1. CO_2 emission by Sector

Approximately 50% of CO_2 emission in the Dominican Republic comes from energy industry (mainly for power generation). Transport sector is the second largest sources of CO_2 emission, occupying about 33% of the country total. The remaining 17% is divided into other sectors including manufacturing/construction, residential/institutional/commercial, and so forth.

a.2. CH_4 emission by Sector

Although the enteric fermentation from livestock is the largest emission source of CH_4, there is virtually no measure available for its emission reduction. Therefore, the remaining 50% is the target of CH_4 emission reduction. In this respect, the major target sources of emission reduction are found in waste management sector including animal manure, solid waste and wastewater

Based on the above distribution of GHGs emission by sector and the further analyses made by sub-sectors in the previous sections of this chapter, the target sectors of CDM project development are identified as shown in the table below.

Table 3-1: Target Sources and Sectors of GHGs Emission Reduction

Types of GHGs	Sector	Sub-Sector
CO_2	Energy (Supply side)	▪ Electricity
	Energy (Demand side)	▪ Industry (manufacturing & construction) ▪ Transport ▪ Other sectors (Residential/ Business/ Commercial/Institutional
	Industrial Process	▪ Mineral Production (Cement Industry) ▪ Metal Production
CH_4	Agriculture	▪ Manure management
	Waste	▪ Solid Waste Disposal ▪ Wastewater Treatment

3.3 Target GHGs Emission Reduction Measures and CDM Project Prototypes

3.3.1 Energy (Supply Side)

According to the latest energy balance of the Dominican Republic of 2007 available in the International Energy Agency, the percentage of renewable energy sources in the total primary energy supply is approximately 20% in the Dominican Republic while the remaining 80% is covered by fossil fuels. As most of these fossil fuels are imported, the economy in this country is seriously influenced by the international trend of fossil fuels market.

Table 3-2: Total Primary Energy Supply in the Dominican Republic (2007)

Unit: ktoe (thousand tons of oil equivalent)

Sources	Coal and Peat	Crude Oil	Petroleum Products	Gas	Hydro	Combustible Renewables and Waste	Total
TPES	520	1,772	3,694	366	120	1,419	7,892
%	6.6	22.5	46.8	4.6	1.5	18.0	100

Source: 2007 Energy Balance for Dominican Republic (IEA)

In terms of GHGs emission reduction, the opportunities exist in increasing the use of low carbon-intensive fuels (coal>oil>natural gas) or renewable energy sources. However, in view of facilitating energy independence of the country through promotion of utilizing domestic energy sources, the priority of CDM project formulation should be given to development of renewable energy sources. Among the types of renewable energy sources, on the other hand, the priority of CDM project formulation should be given to wind, hydropower and biomass to make the best of their comparative advantages for short-term development as identified below.

Table 3-3: Comparative Advantages for Short-Term CDM Project Development in Wind, hydropower, and Biomass in Renewable Energy Sector

Renewables	Advantages
Wind	▪ Registered CDM project available (fast track for project documentation). ▪ National-wide map of wind power potential and other necessary data are available (fast track for identification of potential project locations). ▪ There are several key developers and stakeholders.
Hydropower	▪ Clear development plan is available (EGEHID). ▪ There are several key developers and stakeholders. ▪ Fast track for document preparation (Simple methodology for emission reduction calculation).
Biomass	▪ There are various on-going initiatives by private sector for biomass-related CDM projects. ▪ Baseline information on biomass energy potential is available (fast track for project identification). ▪ High interest of public and private sector stakeholders.

Remark: The information about the on-going initiatives, developers and stakeholders in relation to the renewable energy sources above is provided in the National CDM portfolio in the ANNEXES to this report.

Therefore, the target GHGs emission reduction measures in the energy supply sector should be focused on development of renewable energy-based power generation of wind, hydropower and biomass.

3.3.2 Energy (Demand Side)

According to the 2007 Energy Balance for Dominican Republic, the energy consumption by each energy demand sector is as shown in the table below.

Table 3-4: Energy Consumption by Sectors and Fuel Sources (2007)

Unit: ktoe (thousand tons of oil equivalent)

Energy Types / Sectors	Coal/Peat	Petroleum Products	Natural Gas	Combustible Renewables and Waste	Electricity	Total
Industry	71	362	0	358	453	1,244
Transport	0	2,009	0	0	0	2,009
Residential	0	831	0	859	375	2,065
Business/ Commercial/ Public Services	0	49	0	0	163	211
Total	**71**	**3,251**	**0**	**1,217**	**991**	**5,529**

From the table above, industry sector is the only consumer of coal, the most carbon intensive fossil fuels. The conversion of this coal consumption to the lower carbon intensive fuels such as natural gas or biomass fuels will have significant impacts upon reduction of greenhouse gases emission.

As to the petroleum products, transport sector is the largest consumer, followed by residential sector. If total fuel conversion from oil to other lower or no carbon fuels such as compressed natural gas (CNG) can be made for the fuels for vehicles, its impact upon GHGs emission reduction will be enormous. However, due to their dispersed number of small emission sources, it is difficult to conduct collective GHGs emission reduction measures for the privately owned vehicles. The potential collective measures to be taken for GHGs emission reduction in the transport sector includes fuel switching and energy efficiency for public transport means such as bases and taxis. Such collective measures can be developed under the scheme of the programmatic CDM.

As to residential as well as business/commercial/public services sectors, collective GHGs emission measures can be conducted by applying common energy efficiency technologies or devices to the buildings and/or apartments. Introduction of efficient lighting device, e.g. conversion from incandescent to fluorescent bulbs is an example of such measures that can be promoted under the scheme of programmatic CDM.

In the industry sector, since the scale of individual GHGs emission source is much bigger than the sectors above, the CDM project potentials can be investigated for each individual source, namely factory or industrial premise. A large potential of GHGs emission reduction exists in fuel switch and energy efficiency improvement in industrial heat production process, more specifically boilers and furnaces. Introduction of cogeneration will also contribute to reduction of GHGs emission through simultaneous efficiency improvement in fuel and electricity consumption.

From the discussions above, the target GHGs emission reduction measures and CDM Project prototypes can be outlined as follows:

Table 3-5: Target GHGs Emission Reduction Measures and CDM Project Prototypes

Sector	Types GHG Emission Reduction Measures	CDM Project Prototypes
Industry	▪ Fuel switch	▪ Conversion to low or no carbon intensive fuels (coal>oil>natural gas>biomass) in industrial boilers/furnaces.
	▪ Energy efficiency	▪ Conversion to high efficiency boilers/furnaces ▪ Introduction of co-generation system
Transport	▪ Fuel switch	▪ Collective application of fuel switch to public transport means (buses, taxis)
	▪ Energy efficiency	▪ Collective application/renewal of high efficiency engines for public transport means
Residential/ Business/ Commercial	▪ Energy efficiency	▪ Collective installation of energy efficiency device in buildings and apartments.

3.3.3 Industrial Process

The major sources of GHGs emission from industrial process in the Dominican Republic are cement and iron and steel industries. Since the number of these industries is limited, the potentials of GHGs emission reduction measures and CDM project development should be individually investigated and promoted. The table below shows the sources of process-based CO_2 emissions and potential reduction technologies and measures.

Table 3-6: Process-Based Emission Sources of CO_2 and Potential Reduction Technologies and Measures in Cement and Iron and Steel Industries

Industry	Process CO_2 emission sources	Potential CO_2 Reduction Technologies and Measures
Cement Industry	▪ Thermal cracking of lime ($CaCO_3 \rightarrow CaO+CO_2$)	▪ Blended Cement (with blast-furnace slag, fly ash, etc.)
Iron and Steel Industry	▪ Blast furnace reduction of iron ore with cokes (iron making process)	▪ Increased use of scrapped iron

As to the cement industry, process-based CO_2 emission can be reduced by lowering the use of lime in clinker production through conversion by alternative materials such as blast-furnace slag, fly ash, and so forth.

In the case of iron and steel industry, the use of coke for reduction of iron ore in the blast furnace inevitably produces CO_2. The use of scrapped iron can reduce the use of iron ore, thereby reduce this CO_2 emission. Although there are other emission reduction technologies and measures, they are still under the process of research and development.

3.3.4 Methane Emission Reduction in Agriculture and Waste Management Sector

Target CH_4 emission reduction measures and prototypes of CDM projects in agriculture and waste management sector is limited to the options as shown in the table below.

Table 3-7: Target Measures and Prototypes of CDM Projects in Methane Reduction

Sector	CH_4 emission Reduction Measures	CDM Project Prototypes
Agriculture (Manure management)	▪ Methane capture	▪ Methane capture and flaring or energy utilization in livestock farms with bio-digester (applicable for large, medium and small scale)
Solid Waste Disposal (Landfill)	▪ Methane capture	▪ Methane capture and flaring or energy utilization at final disposal landfills
	▪ Methane avoidance	▪ Composting of organic solid waste for methane avoidance - Mechanical composting for large-scale application - Manual/semi-manual composting for small-scale application
Wastewater treatment	▪ Methane capture	▪ Methane capture and flaring/energy utilization in treatment of the domestic and industrial wastewater with high organic content (palm oil industry, alcoholic industry, etc.)

3.3.5 CDM Project Development Priority

As the result of a series of selection processes above, the CDM project development priority sectors, sub-sectors and measures are identified as shown in the table below.

Table 3-8: CDM Project Development Priority by Sectors/Sub-sectors and Measures

Sector	Sub-Sector	Measures
Energy (Supply side)	Electricity	▪ Wind ▪ Hydropower ▪ Biomass
Energy (Demand side)	Industry	▪ Fuel switch (in industrial boilers/furnaces) ▪ Energy efficiency improvement (high efficiency boilers/furnaces, co-generation)
	Transport	▪ Fuel switch (collective application to public transport means) ▪ Energy efficiency (collective application of high efficiency engines to public transport means)
	Residential/Business /Commercial	▪ Energy efficiency (collective installation of energy efficiency device/measures in buildings and apartments, etc.)
Industrial Process		▪ Cement industry ▪ Iron and steel industry
Agriculture	Livestock	▪ Methane capture and flaring or energy utilization in livestock farms with bio-digesters

Sector	Sub-Sector	Measures
Waste	Solid Waste	▪ Methane capture and flaring or energy utilization at final disposal landfills ▪ Methane avoidance by composting of organic solid waste
Waste	Wastewater	▪ Methane capture and flaring or energy utilization in treatment of wastewater with high organic content (palm oil industry, distilleries, food and beverage, etc.)

3.4 Sector-Wise Strategies and for CDM Project Development

3.4.1 CDM Project Development Strategy for Energy Sector

a. Strategy for Development of Wind Power Projects

a.1. Identification of potential project areas based on GIS-based potential map

In accordance with the baseline geographical information on physical potentials of wind and national grid electricity network, significant potentials of wind power exist in the northern part of the country including the Province of Monte Cristi and Puerto Plata. Since the national grid electricity network is available at nearby area of wind power potentials, grid connected wind power development can be developed as CDM project. On the other hand, in the case of wind power potential area in the southwestern part of the country such as Barahona and Pedernales, independent wind farm can be developed to supply electricity to nearby residents.

a.2. Policy coordination and consensus among the relevant public sector organizations

The development of wind power projects involves various public sector policies formulated by the relevant ministries and public sector organizations. Policy coordination and consensus among the relevant ministries and public sector organizations are important actions to facilitate the investment in this area. The key ministries and public sector organizations and their relevance to the development of wind power are illustrated in the table below.

Table 3-9: Key Ministries and Public Sector Organizations in Wind Power Projects

Key Ministries/organizations	Relevance to Wind Power Projects
National Energy Commission	▪ Support of wind power projects in view of National Energy Policy ▪ Provision of financial incentives based on Law 57-07 on Renewable Sources of Energy Incentives and its Special Regimes
Coordinating Organism of the Interconnected National Electrical System of the Dominican Republic (SENI)	▪ Technological coordination for connection to national grid from wind power plant/farm.
Dominican Corporation of State Electric Companies (CDEEE)	▪ Contract partners of power purchase agreement
Electrical Distribution Companies (EDE)	▪ Contract partners of power purchase agreement
Ministry of Environment and Natural Resources (MIMARENA)	▪ Evaluation on the compliance of the project with the relevant environment laws and regulations.

Key Ministries/organizations	Relevance to Wind Power Projects
National Office of CDM (ONMDL), CNCCMDL	▪ Issuance of host country approval for CDM projects.

b. Strategy for Development of Hydropower Project

b.1. Identification of potential project areas based on GIS-based potential map

With the data of potential dam sites with their potential pondage and grid electricity network, the potential hydropower development areas in this country can be geographically identified by utilizing GIS.

In the case of hydropower projects, we can basically consider two options in the same way as of wind power, i.e. the medium and/or large scale grid connected hydropower and small-scale independent hydropower projects especially in the rural areas with no grid electricity supplied.

b.2. Policy coordination and consensus among the relevant public sector organizations

In the case of hydropower projects, the key ministries and public sector organizations with their relevance are as follows:

Table 3-10: Key Ministries and Public Sector Organizations in Hydropower Projects

Key Ministries/organizations	Relevance to Hydropower Projects
National Energy Commission	▪ Support of wind power projects in view of National Energy Policy ▪ Provision of financial incentives based on Law 57-07 on Renewable Sources of Energy Incentives and its Special Regimes
Coordinating Organism of the Interconnected National Electrical System of the Dominican Republic (SENI)	▪ Technological coordination for connection to national grid from hydropower plant/farm.
Dominican Corporation of State Electric Companies (CDEEE)	▪ Contract partners of power purchase agreement
Electrical Distribution Companies (EDE)	▪ Contract partners of power purchase agreement
Dominican Hydropower Generation Company (EGEHID)	▪ Potential Developers of hydropower projects
National Institute of Hydraulic Resources (INDRHI)	▪ Provision of data on hydropower potentials (observation of river flow and collection of river water data)
Ministry of Environment and Natural Resources (MIMARENA)	▪ Evaluation on the compliance of the project with the relevant environment laws and regulations.
National Office of CDM (ONMDL), CNCCMDL	▪ Issuance of host country approval for CDM projects.

c. Strategy for Development of Biomass Project

c.1.Identification of potential project areas based on GIS-based potential map

Since the biomass data is only available at region level, the amount of biomass can only be estimated by each region. However, we can still identify the current distribution of various biomass resources at regional level to identify their potential energy use. A large amount of

sugarcane bagasse is produced in the eastern part of the country while rice husk is the major biomass source in the northern part of the country. Taking into account these distribution of biomass sources, we can formulate biomass energy development plan of the country.

There are two options of utilizing biomass sources for energy purpose. One is for biomass power generation and the other is the use of biomass as the fuel for heat production. Depending upon the distribution of grid electricity network and biomass sources, proper locations of biomass power generation projects can be determined from the potential map above.

As to the use of biomass sources as fuel, we have to identify the heat demand distribution over the country. As the major heat demand comes from industrial boilers and furnaces, the locations of factories with significant heat demand has to be identified for development of biomass fuel development projects.

In addition, further data collection is also required for other types of biomass, such as woodchip and residues, cacao husks, and other agricultural residues. Such data accumulation will increase the potentials and opportunities of developing biomass energy utilization in this country.

c.1.1 Policy coordination and consensus among the relevant public sector organizations

Biomass energy utilization projects involve various public sector organizations as shown in the table below. Proper policy coordination and consensus are a lot more important than other renewable projects.

Table 3-11: Key Ministries and Public Sector Organizations in Biomass Projects

Key Ministries/organizations	Relevance to Biomass Power Projects
National Energy Commission	▪ Support of biomass power projects in view of National Energy Policy ▪ Provision of financial incentives based on Law 57-07 on Renewable Sources of Energy Incentives and its Special Regimes
Coordinating Organism of the Interconnected National Electrical System of the Dominican Republic (SENI)	▪ Technological coordination for connection to national grid from biomass power plant/farm.
Dominican Corporation of State Electric Companies (CDEEE)	▪ Contract partners of power purchase agreement
Electrical Distribution Companies (EDE)	▪ Contract partners of power purchase agreement
Ministry of Agriculture	▪ Policy coordination for efficient use of biomass residues
Dominican Agrarian Institute	▪ Cooperation for development of biomass energy utilization technologies and measures
State Sugar Council	▪ Coordination for efficient use of sugarcane bagasse for energy purpose
Ministry of Industry and Commerce	▪ Coordination for matching the heat demand of industry with biomass energy utilization
Ministry of Environment and Natural Resources	▪ Evaluation on the compliance of the project with the relevant environment laws and regulations.

Key Ministries/organizations	Relevance to Biomass Power Projects
(MIMARENA)	
National Office of CDM (ONMDL), CNCCMDL	▪ Issuance of host country approval for CDM projects.

d. Demand Side in Energy Sector

d.1. Strategy for development of fuel switch and energy efficiency improvement projects in industry sector

The first step of identifying the potentials and opportunities of fuel switch and energy efficiency improvement in industry sector is to identify the current fuel and energy consumption in the industry sector of this country. Such activity needs to be carried out in cooperation with the Ministry of Industry and Commerce as well as key industry groups of the country. Based on the results of such investigations, we can target the types of industries and technologies/measures of fuel switching and/or energy efficiency improvement in the industry sector.

Considering the potentials of biomass and the importance of energy independence by promoting domestic energy sources in the country, fuel switch to biomass energy should be given the first priority of application to the industry sector in the form of electricity as well as fuel for heat production and supply. Depending upon its price competitiveness and availability, fuel switch to natural gas will also need to be considered as another option of GHGs emission in the industry.

As to the energy efficiency improvement, more opportunities exist in energy intensive industries represented by basic industrial material production such as iron and steel, mineral products, textiles, pulp and papers and so forth.

d.2. Strategy for development of fuel switch and energy efficiency improvement projects in transport sector

Due to dispersed sources of GHGs emission in transport sector, the opportunities of efficient GHGs emission are limited to collective application of fuel switch and energy efficiency improvement measures to public transport means such as buses and taxis. In this case, the involvement of public transport service companies is indispensable. However, due to the limited number of registered CDM projects and approved methodologies, it is difficult to target transport sectors as a short term action of CDM project development.

d.3. Strategy for development of energy efficiency improvement projects in residential/business/commercial sector

The CDM projects that have already been developed in residential/business/commercial sector are limited to several lighting energy efficiency improvement projects and a few energy-saving projects in buildings. Since there is an on-going initiative of introducing energy efficiency lighting in this country, expansion of this initiative is an option in this sector. In addition, application of efficient lighting can also be collectively introduced to office and commercial buildings. In any case, the opportunity of CDM project development in this sector is limited unless the GHGs emission technologies and measures are collectively introduced to multiple buildings. Involvement of multiple stakeholders is a critical factor of developing the CDM projects in this sector.

3.4.2 CDM Project Development Strategy for Industrial Process GHGs Emission Reduction

As previously mentioned in Section 3.3, the major sources of industrial process GHGs emission are limited in number and types of industry. Therefore, the basic strategy in this sector is to pinpoint the industries and sources of emission and discuss directly with the owners of industry about the possibility of implementing GHGs emission reduction as CDM projects. Such industry includes iron & steel and cement industries. Since the sources of GHGs emission are unique depending upon the types of industry, piece-meal approach is required to investigate the opportunities of its reduction for each industry.

3.4.3 CDM Project Development Strategy for Methane Emission Reduction

a. Strategy for development of methane capture project from livestock manure management

In the agriculture sector, the major potential of methane emission reduction exists in animal manure management in cattle and swine farms in this country. However, due to the limited number of pigs owned by individual livestock farmers, the amount of methane that can be captured from individual farm is not enough (Usually multiple thousands of cattle or swine are at least required.) to cover the cost required for methane capture project under CDM. Therefore, the CDM project in this area has to involve multiple farmers to maximize the amount of methane reduction obtained. In this respect, application of a bundled or programmatic CDM needs to be developed in this sector. Bundling and programmatic CDM project needs a managing entity which coordinates the project activity carried out by each participating farmer so that methane emission reduction can be properly achieved to obtain carbon credit. The involvement of the entity that has the capacity of controlling and managing the pig farmers is the key of implementing the bundling and/or programmatic CDM project in this specific sector.

b. Strategy for development of methane capture and avoidance project in solid waste management

In the sector of solid waste management, there are basically two options of GHGs emission reduction that can be developed as CDM projects, i.e. methane capture from landfill and methane avoidance by composting of organic waste.

The potential of methane emission reduction depends upon the amount of organic waste currently treated in anaerobic condition. The significant potentials of methane reduction exist in the big cities with a large number of populations such as the National District, Santo Domingo, Santiago, and so forth. However, further investigation is required for estimating the exact potential of methane emission reduction based on the identification of detailed composition of waste and current waste management and disposal practices.

b.1. Selection of the CDM projects

As to the landfill methane capture projects, due to comparatively high cost of initial investment required for civil works and facilities, it can only be applied to the big cities as previously mentioned.

On the other hand, organic waste composting project can be applied at various scales if utilizing programmatic CDM scheme. The following figures show conceptual design of composting projects at small (less than 10 tons/day), medium (less than 100 tons/day) and large scale (over 100 tons/day) that can be discriminatively applied depending upon the amount of organic waste treated.

Figure 3-2: Conceptual Design of Small and Medium Scale Composting

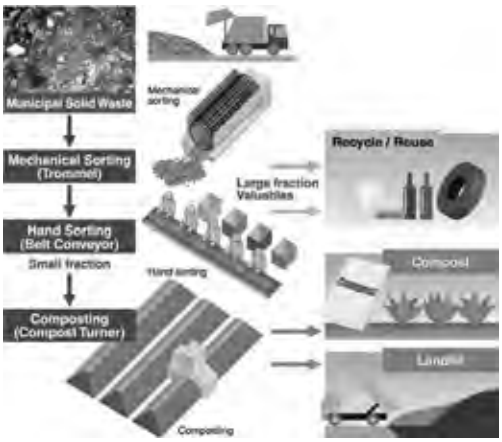


Figure 3-3: Conceptual Design of Large-Scale Composting

Based on the amount and types of waste handled as well as the current practice of solid waste disposal, the most suitable CDM projects should be identified in cooperation with the waste management authorities.

c. Strategy for development of methane capture project in waste water management

The potential of methane capture also exists in treatment of waste water with high organic content. Domestic as well as industrial waste water can be the subject of GHGs emission reduction by applying the methane capture methodology if the water has a high organic content.

In the case of industrial effluent, the factories that discharge high organic content of waste water can be identified based on the type of products they manufactured. In the Dominican Republic, such industries include food/beverage industries and agricultural/livestock product processing. To more specifically identify the potentials of methane emission reduction in these factories, the following data and information need to be collected as previously mentioned:

- Wastewater discharge amount and flow rate;
- Quality of wastewater (BOD, COD, TOC, etc.); and
- Current wastewater treatment practice.

3.5 The Dominican Republic Action Plan on CDM Project Development

3.5.1 Targets of CDM Project Development and Short-Term Actions

Based on the determination of priority sectors of CDM project development and strategies mentioned in the previous sections, the Study sets the targets of CDM project development by the end of 2012, the 1st commitment period of Kyoto Protocol as shown in the table below.

Table 3-12: Targets of CDM Project Development in the Dominican Republic

Priority Areas	CDM Project Development Targets by 2012
1. Energy Sector (Supply Side)	
Wind Power	▪ To register wind power CDM projects in the potential areas (Target Areas) - Monte Cristi - Puerto Plata - Barahona - Pedernales
Hydropower	▪ To register hydropower CDM projects in the potential areas identified by EGEHID ▪ To register hydropower CDM projects in the potential areas identified by INDRHI ▪ To formulate at least one programmatic CDM of mini-hydropower projects in cooperation with the relevant stakeholders
Biomass	▪ To register CDM projects of biomass power generation in the potential areas (Target Area) - Eastern part of the country (sugarcane bagasse) - Northern part of the country (rice husk) ▪ To register CDM projects of biomass energy utilization by industrial enterprises (for boiler fuels) in cooperation with the relevant stakeholders
2. Energy Sector (Demand Side)	
Industry	▪ Clear Identification of current fuel and energy consumption in industry sector. ▪ To register CDM projects of fuel switch or energy efficiency improvement in industry sector in cooperation with private industrial enterprises.
Transport	▪ To investigate the potentials of fuel switch and energy efficiency in transport sector through discussions with public transport and freight companies for collective application of GHGs emission reduction technologies and/or measures.
Residential/Business/ Commercial	▪ To develop programmatic CDM projects of energy efficient lighting in cooperation with the relevant stakeholders.
3. Industrial Process GHGs Emission (Non-Energy)	
Relevant Industries	▪ Facilitate development of CDM projects through direct discussions with the relevant industrial enterprises. - Cement industry - Iron & steel industry
4. Methane Emission Reduction	
Pig Farms	▪ To develop and register CDM projects of methane capture and utilization from animal manure management based on discussions with relevant stakeholders. (Target Stakeholders) - APORLI - COOPCIBAO
Solid Waste Management	▪ To develop and register CDM projects of landfill methane capture and utilization with its focus on the landfills in the big cities. ▪ To develop and register CDM projects of organic waste composting in cooperation with solid waste management authorities.

Priority Areas	CDM Project Development Targets by 2012
Waste Water Management	▪ To develop and register CDM projects of methane capture from waste water treatment (Target Stakeholders) - Industrial enterprises with a large amount of organic waste water discharge (food and beverage, palm oil, alcoholic products)

The short-term actions to be taken for CDM project development in each priority area above are recommended as follows:

Table 3-13: Short-Term Actions for CDM Project Development by Priority Areas

Priority Areas	Short-Term Action to be Taken
1. Energy Sector (Supply Side)	
Wind Power	▪ Discussions with potential wind power developers. ▪ Investigation of potential sites ▪ Coordination with relevant stakeholders - SENI (Technical issues related to grid connection) - CNE (Utilization of the incentives under Law 57-07) - CDEEE/EDE (Power purchasing agreement) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation by project proponents.
Hydropower	▪ Discussions with EGEHID and INDRHI about potential sites of hydropower generation CDM projects. ▪ Coordination with relevant stakeholders - SENI (Technical issues related to grid connection) - CNE (Utilization of the incentives under Law 57-07) - CDEEE/EDE (Power purchasing agreement) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
Biomass	**(Biomass Power Generation)** ▪ Discussions with potential developers of biomass power generation (private developers) ▪ Coordination with relevant stakeholders - SENI (Technical issues related to grid connection) - CNE (Utilization of the incentives under Law 57-07) - CDEEE/EDE (Power purchasing agreement) - Ministry of Agriculture (Procurement of biomass) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation. **(Biomass Energy Utilization)** ▪ Discussions with potential users of biomass as fuel for industrial heat production. (industries) ▪ Coordination with relevant stakeholders - CNE (Utilization of the incentives under Law 57-07) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
2. Energy Sector (Demand Side)	
Industry	▪ Discussions with potential project proponents ▪ Coordination with relevant stakeholders - CNE (Use of any incentives related to fuel switch and/or energy efficiency improvement) - MIMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
Transport	▪ Discussions with public transport and freight companies
Residential/Business/ Commercial	▪ Discussions with potential stakeholders (hotels, office buildings, resident communities, and other potential group of participants)
3. Industrial Process GHGs Emission (Non-Energy)	
Relevant Industries	▪ Discussions with potential project proponents (cement, rum, iron & steel industries) ▪ Coordination with relevant stakeholders - MIMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
4. Methane Emission Reduction	

Priority Areas	Short-Term Action to be Taken
Pig Farms	▪ Discussion with associations of pig farmers (APORLI, COOPCIBAO, etc.) ▪ Selection of participating farmers ▪ Determination of CME ▪ Preparation of PoA and CPA-DD and validation
Solid Waste Management	(Landfill methane capture) ▪ Discussions with the relevant solid waste management authorities (Santiago) (Organic waste composting) ▪ Discussions with the relevant solid waste management authorities (Dominican Municipal Leagues, Dominican Federation of Municipalities) ▪ Selection of participating municipalities ▪ Preparation of PDD (single or programmatic CDM) and validation.
Waste Water Management	▪ Discussions with potential project proponents (Industrial enterprises with a large amount of organic waste water discharge such as food and beverage, palm oil, alcoholic products) ▪ Coordination with relevant stakeholders - CNE (Utilization of the incentives under Law 57-07) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation

4 Conclusions and Recommendations

4.1 Conclusions

4.1.1 Status of CDM Project Development before and after the Study

At the time of starting the Study in 2008, there is only one registered CDM project on wind power, which was not implemented due to project owners' management issues, in the Dominican Republic. The CDM projects in the pipelines recognized by the DNA of the Dominican Republic remains at 15, of which the majority is still at the PIN or conceptual planning level. The only CDM project that was active in the process of validation was "Duequesa Landfill Methane Capture Project".

However, the collaborative efforts of CDM project promotion between the CNCCMDL and JICA Study Team, in cooperation with various public and private stakeholders for the past 3 years, the number of CDM projects in the pipelines reached more than 40 projects with 11 projects currently under validation. The Duquesa Landfill Methane Capture Project mentioned above has already been officially registered under CDM and started its operation to apply for the first issuance of CERs.

The interest and motivation of the Dominican Republic people on CDM has certainly grown with the increased knowledge and capacity of CDM project among public and private stakeholders. It is fait to say that the various promotion and capacity development activities on CDM carried out by CNCCMDL and the JICA Study Team somehow contribute to this progress of CDM project development in this country.

4.1.2 Barriers against CDM Project Development and Approach/Achievement of the Study

There were various barriers that hampered CDM project development in this country. Some of them have been removed or dramatically improved while the others still remain. The barriers that the Study identified and tried to remove include:

Lack of Information

The essential information required for CDM project formulation and development was not readily available anywhere in the Dominican Republic. Defining the ONMDL of CNCCMDL as the information platform of CDM, the Study collected and compiled all the essential information and data required for CDM project formulation and disclosed them to the public through creation of "The Dominican Republic National CDM Website". The results and output of the Study are also uploaded for the use by potential CDM project stakeholders. The contents of this website was periodically reviewed and updated all through the Study period so

that the users can always access the latest information on CDM. One of the CDM project developers visiting ONMDL from Mexico admired this website as one of the best CDM websites in the Caribbean countries.

Lack of Capacity

Lack of the capacity in CDM project development was serious among public as well as private stakeholders. The Study had to start with explaining the very essence of CDM in the seminars and workshops in its early period. To widely understand the benefits of CDM to the country, CNCCMDL and the JICA Study Team took every opportunity of public relations activities to disseminate CDM such as the meetings with private stakeholders, posting articles in the local media, and so forth. In October 2010, the CNCCMDL finally hosted the Latin American Carbon Forum in Santo Domingo successfully with a number of participation from domestic as well as overseas.

In the early stage of the Study, most of the public and private stakeholders of CDM in this country are the audience of the seminar or those who learned from the workshops. However, in the final seminar, they are the presenters to share their knowledge and experience with the other audience. One of the study counterpart members are surprised that the questions raised by the audience in the seminar became technical and specific, totally different from the questions raised in the early seminars and workshops. The capacity and knowledge of CDM has certainly grown among the public and private stakeholders.

Lack of Communication

At the time of starting the Study, mainly due to limited human resources, ONMDL's role is basically limited to assess the submitted PINs and PDDs for issuance of no objection letter for PIN or host country approval for PDD although some communications with the potential CDM project stakeholders are conducted individually by the staff members. In the course of the Study, however, the ONMDL counterpart members and the study members were working together to have meetings and discussions with various public and stakeholders while sometimes visiting the farms, factories or potential project sites with the stakeholders to facilitate CDM project development. Some of the PINs and model PDDs were formulated through a series of these communications. A considerable number of same members repeatedly participated in the seminars and workshops held by CNCCMDL and/or the Study Team from public as well as private stakeholders. The final seminar of the Study was in fact led by these members as presenters or audience. In this respect, the DNA's communication with the relevant public and private stakeholders is truly strengthened to facilitate CDM projects in this country.

Lack of Motivation

Mainly Due to the limited knowledge and understanding, the interest of the public and private stakeholders for CDM was not high with some exceptions. However, with its enhanced knowledge and understanding, their interest for CDM has increased with the number of PINs and PDDs submitted to ONMDL. Because of the limited experience in actual operation of CDM projects in this country, many of them may be still skeptical about CDM. In this respect, there was a symbolic event in the course of the Study. Inviting several public and private CDM stakeholders, the Study conducted a study tour to the neighboring countries (Peru, Mexico, and Costa Rica) to understand the CDM project development in these countries. The tour included the visits to DNA of each country and CDM project sites with the discussions with project owners and operators. After this tour, many of the participants mentioned with one accord that it was totally different between learning the CDM from written information and directly observing the project in operation with hearings from the project owners/operators. Their motivations after this tour have been changed. Some of them have submitted their new PINs soon after this tour as the project proponents and tried to develop their own CDM projects.

This is a good example of how to motivate the potential project proponents. If the Dominican Republic has several forerunners of CDM projects, their experience will encourage the other stakeholders to formulate CDM projects.

4.2 Recommendations

This development study, under the JICA's technical cooperation programme, will end with submission of the Final Report to the Government of the Dominican Republic on December 2010. The Study formulated the "Dominican Republic National Action Plan for CDM Project Development", while it produced various technical tools for promoting CDM project development for the use by potential project proponents in public as well as private sectors.

To efficiently utilize these results of the Study for accelerated realization of CDM projects in the Dominican Republic, the Study Team made the following recommendations.

4.2.1 The Tasks of CNCCMDL and ONMDL

The National Council for Climate Change and Clean Development Mechanism (CNCCMDL), as the national focal point, must take the initiative in promotion of CDM project development in the Dominican Republic. In addition to the roles of issuing host country approval of individual CDM projects as DNA, the National Office of CDM (ONMDL) has to play its active roles in CDM project promotion and marketing, technical and financial assistance to the potential CDM project developers, owners and participants. As the results of the Study, ONMDL/CNCCMDL

has the following instruments/tools to support CDM project developers, owners, and participants:

- PINs and model PDDs of prospective CDM projects;
- CDM project formulation manual;
- GIS-based potential map of CDM projects;
- National CDM portfolio
- National CDM website

These tools are all developed for assisting CDM project proponents in terms of project documentation as well as promotion and marketing of potential projects to potential investors, developers and financial institutes. ONMDL/CNCCMDL has to utilize them at their maximum for CDM project development in this country.

On the other hand, without continuous update and improvement of their contents, all the above tools will soon be obsolete in the constantly changing world of CDM and climate change issues.

Therefore, the Study Team strongly recommends that ONMDL/CNCCMDL will continuously update and improve the contents of these tools by incorporating new data and information. ONMDL/CNCCMDL should appoint at least one person in charge of this task so that the contents of the tools can be timely updated and improved. The update and improvement of these tools will be carried out in accordance with the guidelines provided by the JICA Study Team.

The remaining important task to be further strengthened at government level is financial assistance to CDM project proponents. The currently planned "National Carbon Fund" is expected to take this role in accordance with the presidential decree on establishment of CNCCMDL. The key roles of National Carbon Fund are as follows:

- Providing carbon finance or loan guarantee to CDM projects;
- Brokerage and intermediation of carbon credit purchasing agreement/contract between CDM project owners and carbon buyers;
- Taking the roles of CME (Coordinating Management Entity) of programmatic CDM projects as well as the bundling center of small-scale CDM projects to make smooth transaction of small carbon credit with potential buyers; and
- Promotion of the country's CDM potential to foreign CDM developers, investors, financial institutes, donors and consultants to facilitate project development.

The basic structure of National Carbon Fund is illustrated in the figure on next page.

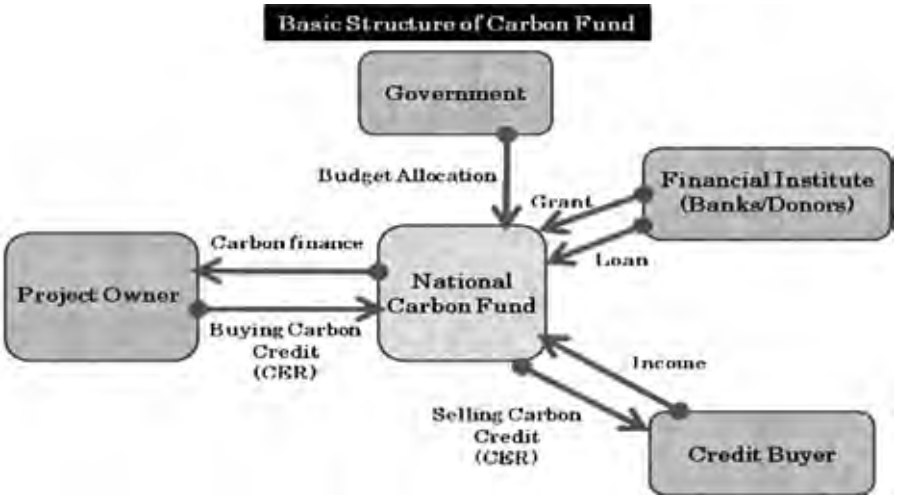


Figure 4-1: Basic Structure of National Carbon Fund

The initial fund required for establishment of National Carbon Fund should be determined on the basis of estimation of carbon credit produced from the CDM projects listed in the National CDM Portfolio. This portfolio is the only trading articles for raising the initial fund for CDM project development in this country.

The fund raising efforts should be made by CNCCMDL domestically and internationally through the following actions.

- Coordination with other governmental development funds (Environmental fund and renewable energy fund, etc.)
- Carbon credit purchasing agreement with ANNEX I countries.
- Negotiation with bilateral/multilateral carbon funds, e.g. Prototype Carbon Fund (PCF) of the World Bank, Andean Development Corporation (CAF), and so forth.
- Involvement of domestic banks/financial institutes in carbon financing.

4.2.2 Tasks of Other Key Public Stakeholders by Sectors of CDM Project Development

Other key public stakeholders and their recommended tasks in CDM project development are specified by sectors in the table below.

Table 4-1: Key Public Stakeholders and Their Roles in CDM Development by Sectors

Sector	Key Public Stakeholders	Roles
Common in sectors	Ministry of Treasury	▪ Government budget allocation to the National Carbon Fund
	Ministry of Environment and Natural Resources (MIMARENA)	▪ Environmental impact assessment/ evaluation of CDM projects and issuance of environmental permits ▪ Co-financing CDM projects from the environmental fund
Energy	National Energy Commission	▪ Use of financial/tax incentives under the

Sector	Key Public Stakeholders	Roles
(Supply Side)	(CNE)	Law 57-07 (Renewable sources of Energy Incentives and its Special Regimes)
	Coordinating Organism of the Interconnected National Electrical System of the Dominican Republic (SENI)	▪ Technical coordination for connection to national grid electricity
	Dominican Corporation of State Electric Companies (CDEEE) Electrical Distribution Companies (EDE)	▪ Power purchasing agreement/ contract under the Law 57-07
	Dominican Hydropower Generation Company (EGEHID) National Institute of Hydraulic Resources (INDRHI)	▪ Hydropower Plant Development and Operation
	Ministry of Agriculture	▪ Coordination with farmers for procurement of biomass
	Ministry of Industry and Commerce	▪ Coordination with industrial enterprises as the user of biomass fuels
Energy (Demand Side)	National Energy Commission (CNE)	▪ Coordination with the national policy related to energy saving
	Ministry of Industry and Commerce	▪ Identification of priority industry sub-sectors of fuel switch and energy saving ▪ Coordination with relevant industry associations and groups ▪ Coordination with commercial establishments for investigation on the possibility of collective application of GHGs emission reduction measures
	Ministry of Transport	▪ Coordination with public transport authorities for investigation on GHGs emission reduction potentials.
	Ministry of Tourism	▪ Coordination with tourism industry (hotels) for investigation on the possibility of collective application of GHGs emission reduction measures
Industrial Process	Ministry of Industry and Commerce	▪ Coordination with relevant industries for further investigation of applying GHG emission reduction measures as CDM.
Agriculture (Livestock)	Ministry of Agriculture	▪ Coordination with associations of livestock farmers for organizing programmatic CDM projects.
	National Energy Commission (CNE)	▪ Use of financial/tax incentives under the Law 57-07 (Renewable sources of Energy Incentives and its Special Regimes)
Solid Waste Management	Municipal Government Dominican Federation of Municipalities	▪ Identification of potential participating cities for CDM projects. ▪ Coordination with the relevant local authorities for organizing programmatic CDM.
Wastewater Management	Ministry of Industry and Commerce	▪ Identification of potential industries for conducting methane related CDM projects. ▪ Coordination with relevant industrial associations and groups for investigation on the potentials of GHGs emission reduction.

4.2.3 Implementation of the National Action Plan

"The Dominican Republic National Action Plan for CDM Project Development" identifies the potentials and priority sectors of CDM project development in the country with strategies and actions to be taken by the relevant public and private sectors. Taking into account the limited time up until the end of the 1st commitment period of Kyoto Protocol on December 2012, this

National Action Plan must be implemented immediately so that the country's opportunities of CDM project development can be maximized. To ensure implementation of the National Action Plan, the JICA Study Team recommended the following actions to be taken immediately by ONMDL/CNCCMDL.

a. Promotion of CDM project development in renewable energy sector

Among the priority sectors of CDM project development identified in the National Action Plan, CDM projects in renewable energy sector (especially for wind, hydropower and biomass) are currently on the fast track in terms of identified potential project locations, project developers and preparation of project documentation. Taking into account the limited time up until 2012, the procedure for CDM project preparation has to be accelerated so that they can be registered before the 1st commitment period comes. In this respect, the JICA Study Team strongly recommends that ONMDL/CNCCMDL should organize the special taskforce under its initiative to facilitate coordinated efforts among relevant public and private sectors in CDM project development in renewable energy sector. The special taskforce should consist of the following members:

- ONMDL/CNCCMDL
- CNE (National Energy Commission)
- SENI
- SIE (Superintendence of Electricity)
- MIMARENA
- EGE Haina (Wind)
- EGEHID (Hydropower)
- Ministry of Agriculture (Biomass)
- Other potential renewable energy developers (public/private sector)

The purpose of this special taskforce will jointly facilitate the development of CDM projects in renewable energy sector by coordinated actions for the following purposes:

- Review of on-going and planned renewable energy development projects to identify the potential CDM projects to be promoted for their registration by 2012;
- Facilitate (Speed up) the project preparation process (development permits, EIAs, and other related bureaucratic procedures);
- Providing solution to technical and administrative issues in relation to project development;

ONMDL/CNCCMDL is also strongly recommended to identify the potential CDM projects in other sectors for their promotion of registration by 2012 through reviewing the current status of progress of the projects listed in the National CDM portfolio.

b. Promotion of small-scale CDM projects through application of programmatic CDM

The Study has developed 4 types of PDDs for programmatic CDM projects, of which three PDDs address the following small scale projects respectively:

- Programmatic CDM projects of rural mini-hydropower
- Programmatic CDM projects of methane capture from animal manure management in pig farms
- Programmatic CDM projects of community organic waste composting.

Although the potential of GHGs emission reduction is rather small in amount for each individual project, they are all expected to produce various co-benefits in terms of socio-economic welfare of the people and improvement of living environment.

Taking the above into account, the JICA Study Team recommends that ONMDL/CNCCMDL should further promote these 3 (three) types of programmatic CDM projects under its initiative.

The potential project proponents of these 3 (three) projects are as follows:

Types of Programmatic CDM Project	Potential Project Proponents
Mini-hydropower	▪ INDRI (UNDP-INDRI project)
Methane capture from animal manure management in pig farms	▪ APORLI ▪ COOPCIBAO (USAID project)
Organic waste composting	▪ Provincial/City government ▪ League/Federation of Municipalities

As to the programmatic CDM projects in mini-hydropower and methane capture from pig farms, JICA Study Team recommends that ONMDL/CNCCMDL should continue further discussions with UNDP-INDRI and USAID-COOPCIBAO projects respectively. On the other hand, in organic waste composting, ONMDL/CNCCMDL should immediately start promoting the concept of programmatic CDM to provincial/city governments to investigate the possibility of formulating organic waste composting CDM projects. ONMDL/CNCCMDL may hold a dissemination workshop and/or seminar for programmatic CDM of organic composting by inviting provincial/city government representatives to start discussions.

In any case of the programmatic CDM projects above, the project proponent needs technical as well as financial assistance in the following aspects:

- Preparation of project document and validation for registration under CDM;
- Organization of CDM project participants;
- Determination of Coordinating Management Entity of the programmatic CDM project;
- Financing the initial cost of the projects.

As to the fund for initial investment of the projects, their registration as CDM will provide the opportunities of carbon finance. However, the costs arising in the process of project

registration (project design, PDD preparation, validation, and coordination of project participants, establishment of CMEs) still need to be covered by the project proponents. ONMDL/CNCCMDL does not have enough capacity to meet these entire technical and financial assistance requirements. There are the needs of external technical and financial assistance in developing programmatic CDM projects in accordance with this National Action Plan.

4.2.4 Preparation for the Post-Kyoto Framework of Climate Change

Considering the post-Kyoto framework of climate change convention in the international arena, promotion of CDM projects is not enough for non-Annex I countries including the Dominican Republic to address climate change mitigation issues in the mid and long-term. There are several new schemes of financial assistance such as NAMA (Nationally Appropriate Mitigation Action) and SCM (Sectoral Crediting Mechanism) to non-Annex I countries now under consideration. Most of these new schemes requires non-Annex I countries to formulate the national or sector level climate change mitigation plan in a verifiable and measurable manner. To effectively implement climate change mitigation measures, the Dominican Republic must prepare for formulation of such national or sector level climate change mitigation plans while promoting CDM projects. Coordinated efforts should be made by relevant public sectors to set the verifiable sectoral targets of GHGs emissions reduction with clearly defined measures and technologies. It is also required to establish the national mechanism for MRV (measurement, reporting and verification) of such actions so that the actual reduction of GHGs at national or sector level can be proved with clear evidence of information and data. The formulation of such actions and plans will increase the opportunity of carbon credit at sector or national level through the new financial assistance schemes.

Current human resources in ONMDL/CNCCMDL are very limited to handling all of these works to prepare for post-Kyoto framework of climate change. There is a need of technical assistance in formulating these national and/or sector level climate change mitigation plans and actions in the Dominican Republic. The technical assistance in the form of dispatching a climate change expert and/or provision of technical cooperation for capacity development of ONMDL/CNCCMDL in formulating national/sectoral climate change plans and actions will help the Dominican Republic in strengthening its policy drive to fight with climate change issues as well as socio-economically and environmentally sound and sustainable development.