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Implementation of the Clean Development Mechanism in APO Member Countries

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1.0 BACKGROUND

In the last century, with scientific development fueling economic growth and social progress, the utilization of natural resources in one form or another has increased rapidly. The release of greenhouse gases (GHGs) due to these activities has also increased. The impact of uncontrolled resource usage and increasing resource contamination are negative environmental impacts. In the 1950s and early 1960s, the negative impacts of industrial activity were perceived to have local impacts, but with increasing expansion of industrial activity, globalization of trade, etc., the footprint of environmental problems has crossed national and regional boundaries. The phenomenon of climate change attributed to global warming is one such problem, calling for the attention of all with unprecedented urgency. The atmospheric concentrations of GHGs like carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) have by far exceeded the usual range of the last 650,000 years.

However, the results of the increased concentration of GHGs due to anthropogenic emissions as the leading cause of global warming and as a result of changes in climatic patterns were recognized much earlier. To stabilize the levels of GHGs in the atmosphere and thus mitigate climate change, the United Nations Framework Convention on Climate Change (UNFCCC) was signed in 1992. Subsequently, the parties to the convention agreed at the third Conference of Parties held in Kyoto, Japan, on 11 December 1997, on a framework for initiating steps to curtail or even possibly reverse increasing GHG emissions, which became known as the Kyoto Protocol.

The Kyoto Protocol set binding targets for reductions by the Annex I countries (industrialized countries and those in transition). To achieve the GHG reduction targets by the Annex I countries, various Kyoto mechanisms were promulgated, including:

- International emissions trading (IET),
- Joint implementation (JI), and
- the Clean Development Mechanism (CDM).

These mechanisms are based on the fact that the generation or reduction in emissions of GHGs affects the climate change phenomenon beyond the

geographic boundaries of the implementer. These Kyoto mechanisms enable Annex I countries to find solutions outside their geographic boundaries, which have lower implementation costs while satisfying their collective reduction targets.

Under Article 12 of the Kyoto Protocol, the Clean Development Mechanism (CDM) was established as one such mechanism. The CDM allows industrialized countries to earn emission credits from their investments in emission-reducing projects in developing (non-Annex I) countries and simultaneously promotes sustainability in developing countries. To earn credits under the CDM, the project proponents must be able to verify that GHG emissions reductions are real, measurable, and additional to what would have occurred in the absence of the project. The non-Annex I country also benefits in terms of the transfer of cutting-edge, climate-friendly technologies, mainly energy-efficient and renewable energy technologies (RETs).

The concept of Green Productivity (GP) promoted by the Asian Productivity Organization (APO) aims at enhancing productivity and environmental performance for overall socioeconomic development. The GP strategy has some elements in common with the additional requirements of the CDM and is therefore an apt tool for promoting and supporting CDM initiatives.

2.0 CATALYZING THE CDM THROUGH GP

In response to the 1992 Earth Summit recommendations that both economic development and environmental protection were key strategies for sustainable development, in 1994 the APO created the Office for the Environment. Under this, the Special Program for the Environment (SPE) and future directions and activities related to GP were organized. The concept of GP is drawn from the integration of two important development strategies:

- Productivity improvement and
- Environmental protection.

Productivity provides the framework for continuous improvement and environmental protection provides the foundation for sustainable development. Sustainability is the vision or driving force of GP. Furthermore, GP is applicable to all sectors including agriculture, transportation, retail and service

establishments, governments, and schools, as well as industry. GP is a holistic approach to achieve sustainable development in APO member countries.

GP aims to ensure environmental protection while making business profitable. This is necessary if development is to be sustainable. Neither environmental protection nor development can occur at the cost of the other. GP recognizes that the environment and development are two sides of the same coin. Extending this recognition, the concept of GP shows that for any development strategy to be sustainable, it needs to have a focus on the environment, quality, and profitability, the so-called triple focus of GP.

Project activities under the CDM are expected to promote sustainable development and the interventions would logically improve productivity and environmental performance. This is in line with the concept of GP. Therefore, the CDM can be embraced as the logical extension of many GP activities. Many GP measures that otherwise could not be implemented due to economic or technological barriers can now be evaluated with the possibility of CDM activities. The benefits of this synergetic relationship are many (Figure 1).

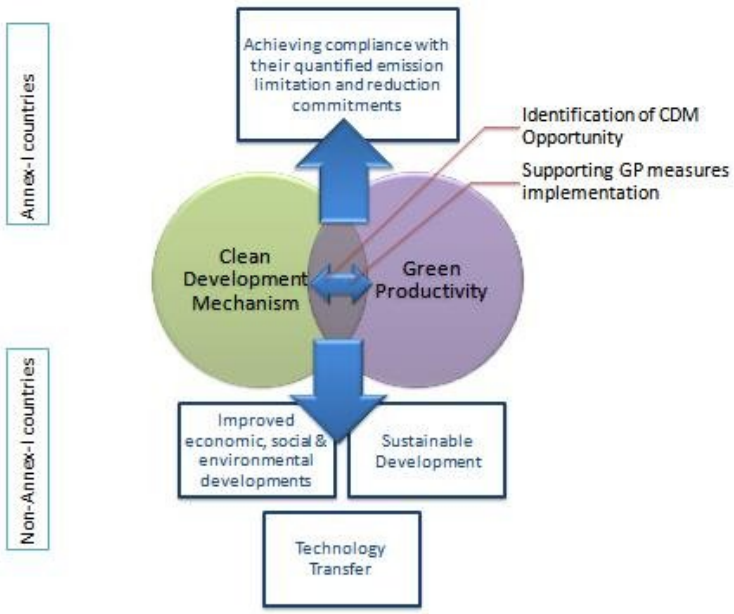

Figure 1: Benefits of GP–CDM synergy

In promoting the concept of the CDM, the unique feature of the APO's close relationship with the national productivity organizations (NPOs), which are either branches of the government or statutory bodies established by legislation, can

be used. The strong SME focus of the GP concept also allows NPOs to explore CDM project opportunities in this sector of the economy, which not only will provide them an opportunity to benefit from this global opportunity but also strengthen them economically.

3.0 CDM REQUIREMENTS

The CDM, conceived as an instrument for cost-effective climate change mitigation, also aims to promote sustainable development in developing countries. The mechanism matches the need for Annex 1 countries to invest in carbon emission reductions, with the opportunities for low-cost carbon emission reductions available in developing countries (non-Annex I countries). CDM projects require that carbon emission reductions are "…additional to any that would occur in the absence of certified project activity." This implies that technologies and practices that are well established, have well-developed markets, or are financially viable alternatives would not qualify as CDM interventions. In other words, "business as usual" opportunities are not acceptable as CDM activities. The requirements were elaborated on and established at the seventh Conference of Parties (COP7) held in Marrakech in 2001. Popularly known as the Marrakech Accord, several key issues regarding the CDM were agreed on under the Kyoto Protocol. Some key features in the Marrakech Accord for CDM projects are:

- Annex I countries' domestic mitigation efforts should be supplemented by the CDM.
- CDM applicability must be confirmed by the host country (a non-Annex I country).
- The CDM should contribute to the transfer of environmentally safe and sound technology and know-how.
- Projects under official development assistance (ODA) funds cannot qualify for the CDM.
- Nuclear power projects cannot be used for the CDM.
- Equitable geographic distribution of CDM projects should be promoted.

All CDM projects must meet the above requirements. Such projects then allow the enterprises involved to enhance their competiveness due to the selection of efficient technologies and implementation of energy efficiency measures not

viable in the absence of the CDM. Urban infrastructure development could benefit by utilizing the CDM for measures that reduce GHG generation but are either technologically innovative or financially unattractive in scenarios without the CDM.

Certified emission reductions (CERs)[1] are issued by the CDM Executive Board for the quantified GHG emission reduced by the projects meeting the CDM requirements and procedures. These CERs acquired under the Kyoto Protocol by Annex I countries contributes to their compliance in the first commitment period (2008–2012). Therefore, while Annex I countries will attempt to obtain the maximum possible CERs, the non-Annex I countries have the opportunity to benefit economically as well as technologically due to the interventions.

4.0 THE CDM IN APO MEMBER COUNTRIES

The Kyoto Protocol came into force on 16 February 2005, with no less than 55 Parties to the Convention, incorporating parties included in Annex I which ratified the convention by which a total of 55% of the total carbon dioxide emissions for 1990 of the parties included among the countries in Annex I was accounted for. As of February 2006, 162 countries had ratified the protocol internationally, including all APO member countries except for the Republic of China, and therefore it is essential for them to reduce GHG emissions.

APO member countries, except for Japan, do not have targets for emission reductions. For these countries, the CDM has offered an unprecedented opportunity to speed up the development process through access to technologies and finances previously unavailable. The process therefore affects overall performance and productivity standards. However, the rapid strides made must be sustained and this could be possible with management practices that support the productive use of technology and resources.

The Kyoto Protocol underlines the following basic criteria for CDM projects to be accepted:

i. Voluntary participation;

[1] *A CER is a unit of emission reduction equal to the verified amount of reduction of anthropogenic emissions achieved in a CDM project.*

ii. Real, measurable, and long-term benefits related to the mitigation of climate change; and
iii. Reductions in emissions that are additional to any that would occur in the absence of the certified project activity.

Among APO member countries, only Japan is an Annex I country. However, to benefit from the CDM, countries should have ratified the Kyoto Protocol. While in some APO member countries, CDM activities show steady growth, in others the realization of their necessity is setting in. The countries exhibiting increased CDM activities are those that have a level of preparedness and institutional framework in place.

5.0 CDM INITIATIVES IN APO COUNTRIES

Since February 2005, when the Kyoto Protocol came into force, there have been varied responses from APO member countries. Those that ratified the protocol had to provide a conducive environment for development of CDM projects, besides having opportunities for GHG emission reductions or enhanced emission removal by decreases in GHGs in any sector of the economy. All countries wishing to participate in the CDM must designate a National CDM Authority to evaluate and approve projects and serve as a point of contact.

In India, the government facilitated the CDM process through various measures and initiatives, and project developers capitalized on the government initiatives to move ahead in implementing CDM projects. At the other extreme are countries like Lao PDR and Singapore, which ratified the protocol in 2006 and are in the process of providing the appropriate platform. The initiation of CDM activities among APO member countries is presented in Figure 2.

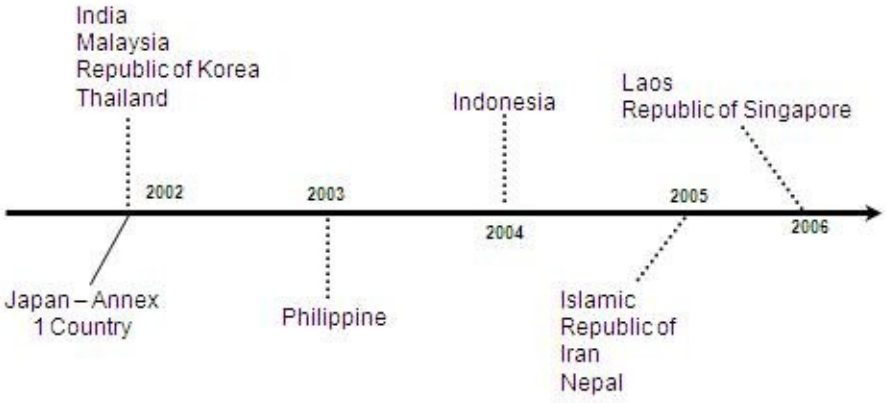

Figure 2. Initiation of CDM activities among APO countries

After India ratified the Kyoto Protocol in August 2002, the Designated National Authority (DNA) was established in 2004. The Indian DNA is chaired by the Secretary, Ministry of Environment and Forests (MoE&F) and has eight members from various ministries and departments. A fast-track, simplified CDM project clearance system for the issuance of "host country" approval was also initiated. As a result, rapid clearance of CDM projects by the DNA has been feasible and system has facilitated a well-established CDM market in India.

Thailand also ratified the Kyoto Protocol in August 2002. The Office of Natural Resources and Environmental Policy and Planning (ONEP) established the Thailand Greenhouse Gas Management Organization (TGM) that acts as the DNA for CDM projects in Thailand. The Ministry of Natural Resource and Environment is the Kyoto Protocol National Focal Point. The TGM facilitates comments on the projects proposed by experts and relevant ministries, reviews them, and if deemed appropriate issues a Letter of Approval (LOA). The National Committee on the UNFCCC is also notified simultaneously.

Malaysia ratified the Kyoto Protocol as early as September 2002. Subsequently, the Government established the DNA for CDM under the Ministry of Natural Resources and Environment (MNRE). Malaysia has well-defined national criteria in line with the requirements underlined by the CDM executive board.

Separate national criteria for small-scale energy projects have also been promulgated.

The Republic of Korea also acceded to the Kyoto Protocol in October 2002. Subsequently, the DNA was established, which is guided by the Inter-Ministerial Committee on the UNFCCC, the Vice Ministerial Working Group, and the Coordination Working Group of Director-Generals on the UNFCCC. The DNA has various internal committees and expert pools for review of project activities.

In 2003, the Philippines ratified the Kyoto Protocol and in June 2004 the Department of Environment and Natural Resources (DENR)–Environmental Management Bureau became the DNA. The DENR initiates the formulation of policies and the design of the DNA approval process for CDM projects. The CDM national approval criteria and approval process are explicitly defined and adhered to.

Subsequently, Indonesia ratified the Kyoto protocol in 2004. In October 2005, the DNA or *Komisi Nasional Mekanisme Pembangunan Bersih* (KN-MPB) was launched. The DNA is chaired by the Deputy III–KLH and consists of nine members. Indonesia has promulgated various elements of the legal framework supporting the CDM. These include the Indonesian Sustainable Development Criteria and Indicators comprising environmental, economic, social, and technological requirements, National Energy Policy, and Green Energy Policy on Renewable Energy and Energy Conservation. The national project approval process is well defined in Indonesia, and CDM project approvals take about 11 weeks.

The Islamic Republic of Iran ratified the Kyoto Protocol in 2005. The Department of Environment and National Climate Change Office have been recognized as the country's DNA. Besides these organizations, the Ministry of Oil, Energy, Industries and Mines, Jihad for Agriculture, Ministry of Foreign Affairs, Ministry of Management, and Planning Organization are directly or indirectly involved in CDM projects.

Nepal ratified the Kyoto Protocol on 14 December 2005 and went on to establish the DNA under the Ministry of Environment, Science and Technology (MoEST). Activities like training and exposure, preparation of guidance on CDM projects and the approval process are being undertaken to strengthen the DNA.

In Lao PDR, CDM activities were initiated in 2005 and in 2006 the DNA (DNA Board of Directors and Executive Secretariat) was established. The DNA is chaired by the Minister and President of the Science, Technology and Environment Agency. The DNA of Lao PDR determines the measurement and procedures for operation of the CDM framework and ensures that there is a transparent, participative, credible, efficient, and effective process for national approval.

Among the last countries to have ratified the protocol is Singapore (April 2006). The National Environment Agency of Singapore (NEA) has been identified as the DNA. For the Singapore government, the carbon services industry is one of the core elements in its clean energy strategy. With reference to tangibles, CDM project development in Singapore is still in its early stages. No CDM project has been submitted for validation to the UN-EB and no host country approval has been issued.

Japan, the only Annex I country among the APO membership, has a quantified emission reduction commitment of 6% of the base year. The Liaison Committee for utilization of the CDM/JI was established as the DNA in 2002. Subsequently, Guidelines for Approving CDM/JI Projects were stipulated in October 2002.

Based on the 2005 GHG emission quantum, Japan must reduce about 13–14% from the total volume of GHG emissions to meet its commitment. To achieve this, Japan expects to reduce by around 2% using Kyoto mechanisms.

6.0 INSTITUTIONAL SET-UP & SUPPORTING FRAMEWORK

APO member countries that ratified the Kyoto Protocol went ahead to establish their DNAs. Although the Kyoto Protocol gives general guidelines on baselines and additionality, each developing country has the responsibility to determine the national criteria for project approval keeping sustainable development, among other criteria, in focus. To facilitate CDM activities, every country engages various institutions from within or is supported by international agencies. International organizations like the World Bank, Asian Development Bank, GTZ, Institute for Global Environment Strategies (IGES), DANIDA, etc. have been involved in project development and capacity-building activities in APO member countries.

Available expertise within the countries is also channelized, and the policy framework and guidelines already existing are reoriented to facilitate the CDM. In some countries, additional policies or guidelines are developed keeping this in view.

The institutional arrangements for operationalizing the CDM in India involve various organizations with specific functions. While the National CDM Authority provides the final approval of project activity, technical clearances of projects for sustainable development and other criteria are done by the Technical Advisory Committee at the MoEF and forestry research institutions. The Nodal State Forest Department Functionary provides clearance of afforestation and reforestation projects at the state level, particularly on land proposed for the projects.

In Thailand, international agencies like the IGES, Energy for Environment Foundation, and Royal Danish Embassy are involved in capacity-building activities. Thailand is also going to set up the Fund to Support the Working of Climate Change. The revenue for the fund comes from selling 2% of national carbon credits, or a percentage specified by the committee of the organization.

To support CDM activities in Malaysia, two technical committees were formed. The Technical Committee on Energy is chaired by the Ministry of Energy and Multimedia and the Technical Committee on LULUCF (Afforestation and Reforestation) is chaired by the Ministry of Primary Industries. Besides these, based on the requirements ad hoc committees are also formed. International agencies have also been involved in facilitating the CDM through development of project activities. The MARDI and DANIDA projects are two such activities.

In Malaysia, institutional arrangements are in place and the institutional processes are clear and transparent. The 8th and 9th National Plans included energy policies. As a result, emphasis has been directed toward efficient production and utilization while meeting environmental objectives. The development of renewable energy as the fifth fuel resource under the country's fuel diversification policy has formulated a roadmap conducive to the adoption of the CDM.

The Republic of Korea established the "Inter-Ministerial Committee on the UNFCCC" in 1999. It consists of related ministries and government agencies and is chaired by the Prime Minister. In 1999, the Comprehensive Action Plan

(CAP) started and has been revised every three years. The present third CAP directives include active participation in international efforts to respond to climate change, preparation for a low GHG-emitting economy, and minimization of the adverse effects of climate change such as in agriculture, public health, natural disasters, etc. Besides this committee, there are working groups under the chairmanship of the deputy minister of government policy coordination called the Vice Ministerial Working Group and the Coordination Working Group of Director-Generals on the UNFCCC chaired by the economic policy coordinator of the Office for Government Policy Coordination. The CDM approval procedure is well defined and involves the Industrial Policy Coordination and Energy Division and the competent ministry in the decision-making process. The Korea Energy Economics Institute (KEEI), Korea Energy Management Corporation (KEMCO), and Department of Global Environment of the Environmental Management Corporation (EMC) are other institutions involved in the CDM process.

The major CDM players in the Philippines, besides the DENR where the DNA is based, include government institutions supporting the Philippine DNA in ensuring that projects meet the criteria for national CDM approval, such as the Department of Energy (DOE), National Solid Waste Management Commission (NSWMC), Forest Management Bureau (FMB) of the DENR, and Department of Science and Technology (DOST). Development banks and international development and financing institutions are also involved, as are the Klima–Climate Change Information Center and other nonprofit groups (such as the Philippine Business for the Environment and Philippine Network on Climate Change) that promote the CDM.

The preparatory studies in the Philippines for CDM implementation have been systematic and provided the basis for project activities. The Inter-Agency Committee on Climate Change (IACCC) has conducted several studies like the Capacity Building Study on CDM (funded by the UNDP in 1999); GHG Mitigation Assessment under the Asia Least Cost GHG Abatement Strategy; Institutionalization of Training for GHG Emissions Inventory (2001); Capacity Development for Clean Development Mechanism (CD4CDM), assisted by the UNDP, and Establishment of the Designated National Authority for CDM and Operational System, assisted by the Netherlands government through the UNDP.

Several of these programs are in partnership with the Klima–Climate Change Information Center, PBE, and other groups.

The Indonesian government has been encouraging projects under the CDM. Various international organizations are involved, including the World Bank, Asian Development Bank, GTZ, and NEDO. Various NGOs, research organizations, professional associations, etc. have also been involved in some form.

In Nepal, the DNA is supported by a CDM Steering Committee established in April 2006 for intersectoral coordination. A Technical Advisory Committee assists the DNA in technical reviews on a case-by-case basis. Nepal is preparing to launch the National Capacity Self-Assessment Project (NCSAP) under the assistance of the UNDP/GEF and has submitted a proposal for the preparation of a national adaptation program of action.

Nepal has received support from international agencies for various projects like the PREGA project funded by the Netherlands government. The project, implemented by the Asian Development Bank, has been instrumental in furthering the CDM process through capacity building as well as through project development and assistance. Under the Community Development Carbon Fund of the World Bank, an alternative energy promotion center supports renewable sources of energy of biogas projects, developing micro hydroplants and improved watermills.

Internally, in Nepal a number of government agencies/centers and NGOs are working in CDM-related areas. The Center for Energy Studies and other relevant departments of Tribhuwan University are involved, as are departments of Kathmandu University. The Federation of Nepalese Chambers of Commerce and Industry (FNCCI) have also contributed to the promotion of the CDM in Nepal.

Singapore has a “Green Plan 2012,” established in 2002, which includes a target of improving “carbon intensity.” However, there is criticism of this mechanism because any target/measurement should be based on a per capita basis, not on GDP. The Singapore government has been taking a proactive approach to climate change by implementing its National Climate Change Strategy (NCCS).

The NEA, the DNA of Singapore, together with the Ministry of the Environment and Water Resources, will head the international discussions. Other ministries and agencies (i.e., Ministry of Trade and Industry, Economic Development Board, IE Singapore) will also be involved in the discussions.

IE Singapore is the government agency spearheading the trading aspect of the carbon cluster. This includes outreach to financiers, traders, and potential project owners. IE Singapore is working with the various chambers of commerce to explore opportunities in carbon trading. The Sustainable Energy Association of Singapore (SEAS) has signed a memorandum of understanding with the International Emissions Trading Association (IETA) and *Koelnmesse* to bring Carbon Forum Asia to Singapore.

The Economic Development Board (EDB) is the agency promoting inward investment in Singapore. This includes attracting carbon-related services to Singapore as well as technology providers and R&D centers in related fields. One notable initiative is the establishment of the Renewable Energy Exchange (REEX) in Singapore. Managed by the Renewable Energy & Energy Efficiency Partnership (REEEP), an international partnership of governments, multinational organizations, businesses, and NGOs, REEX addresses the gap between project developers who see no sources of finance and financiers who see no source of bankable projects.

Singapore is hosting the Greenhouse Gas Emission Reduction Group (GHGER), which consists of nine member companies from various trades and services. Asia Carbon, the anchor company, is providing CDM consulting services, and most importantly the Asia Carbon Exchange, the world's first CDM-focused exchange, through an on-line auction process.

Japan, the only Annex I country in the APO, regards the Kyoto mechanisms as ways to achieve compliance targets. The Japanese Ministry of Environment (MOE) started a subsidiary program on CDM and JI in 1999, besides various other initiatives on climate change. Under this program, many projects were implemented. The Japanese government shifted the focus of support for GHG mitigation from indirect to direct in 2004. The objective is to obtain actual credit for GHG emissions by completing specific CDM and JI projects. The Ministry of Economy, Trade and Industry (METI) and MOE began a new support system to carry out concrete CDM and JI projects in 2004. This system is expected to

provide more opportunities to develop CDM and JI projects for the private sector. It subsidizes part of the investment cost to introduce facilities and equipment needed to implement those CDM and JI projects.

METI set up a Help Desk for Kyoto mechanisms in November 2001. This is a consultation desk for designing and undertaking CDM and JI projects. METI also published a guidebook for utilization of the Kyoto mechanisms. The MOE hosts a Web site for guidance in using the Kyoto mechanisms. METI, MOE, and the Ministry of Foreign Affairs cooperate to implement the new Japan Kyoto Mechanism Acceleration Program.

The Japanese government also considers that there are key points in capacity building like consultancy and support for drawing up project design documents and developing baseline approaches, finding and supporting reliable partners in host countries, and providing financial incentives to implement CDM projects in the private sector. Based on these points, the Japanese government is taking various measures to clear these issues with a corporation of 12 institutions involved in the JKAP program.

In Japan, major players in the CDM field are in electricity production, electric machinery manufacturing, construction, and other heavy industries. Large trading companies are also involved.

7.0 CDM PROJECT ACTIVITIES

After the Kyoto Protocol came into force in February 2005, there has been a rapid increase in the number of CDM projects developed every year. All APO member countries that have ratified the Kyoto Protocol have various levels of CDM activities. While biomass and renewable energy projects are the most common, others include those reducing GHGs with high global warming potential are being developed. The 344 registered CDM project activities reported in APO member countries are presented in Figure 3.

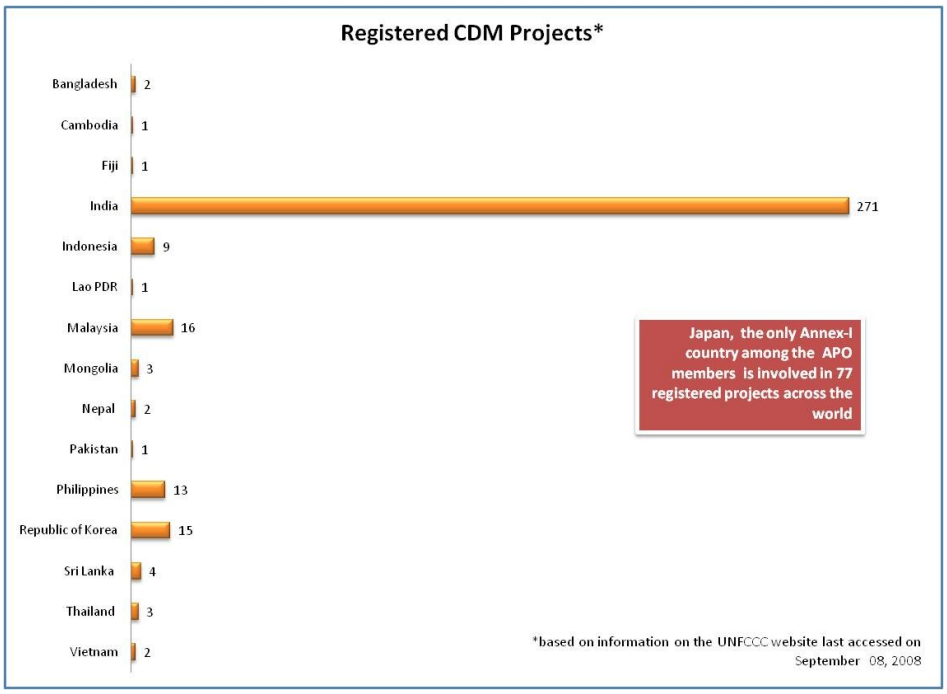

Figure 3. Registered projects in APO member countries

India has the most CDM projects, with about 270 registered. Most are biomass- and renewable energy-related projects, followed by energy efficiency, fuel switching, industrial processes, waste management, and forestry. The project proponents belong to both the public and private sectors. India hosts most of the projects in Asia in terms of number but the CERs expected are not the highest.

The other APO member countries lag behind in terms of the number of CDM projects. Malaysia and the Republic of Korea are the next in terms of number. In Malaysia as of September 2007, there were 16 registered CDM projects. In Malaysia, high priority is accorded to energy efficiency and renewable energy projects, while low priority is given to forestry projects. With 15 registered projects, the Republic of Korea ranks fourth worldwide in terms of prospective CERs. Among the registered projects, eight are in the field of renewable energy, three in chemical industries, and one each in fuel switching, hydrofluorocarbons, and sulfur hexafluoride.

In Philippines there are thus far 13 registered CDM projects and about 38 projects under validation. The main project types are renewable energy, fuel switching, biomass, and waste management.

In Indonesia, nine projects have been registered with the CDM Executive Board. Five more have been approved by the DNA, while another eight are in the

approval process.[2] Among the registered project activities, the majority involve renewable energy. A project on geothermal energy has also been registered, while others are in alternative fuels and blended cement.

Among the 42 CDM projects proposed, three have been registered and a few more have been approved in Thailand, while in Nepal two projects are already registered with the EB. With the MoEST in Nepal raising awareness and developing skills, CDM projects are being developed and readied for registration. Biogas projects will be the first CDM projects in Nepal.

A small-scale CDM project has been approved by the Lao PDR DNA in the brewery sector which was developed with assistance from Japan. Sri Lanka has four project activities registered, Mongolia has three, Bangladesh and Vietnam each have two, and Fiji, Cambodia, and Pakistan have one each.

There were 130 projects related to the CDM approved by the Japanese government as of May 2007. Biomass, water power, and energy efficiency are the predominant project activities for this annex I country.

8.0 BARRIERS TO CDM ADOPTION

While the CDM has been promulgated as a mechanism that promotes sustainable development and yields financial and technological benefits to the project proponents and the host country, the development of projects that ultimately achieve CERs has been slower than that expected. The issues range from a lack of understanding of the mechanism or the capacity to develop CDM projects to country-specific financial issues. The lack of transparency in the buyer/seller market has created a situation where opportunistic buying of cheap CERs has remained a possibility from APO member countries. The current trends in projects and the interest of buyers lie in big projects that can generate a large volume of CERs in a short time. For countries where industrial activities are low and the projects developed have lower CER values, the trend toward larger volumes of CER purchases make CDM project activities unviable.

Some of the country-specific barriers that have emerged are outlined below.

[2] *As of May 25, 2007.*

- In India, while CDM projects have been increasing steadily, investment has remained an issue. A lack of clarity on taxation issues and lack of preparedness in the insurance sector have been major impediments to larger CDM project activities.
- In the Islamic Republic of Iran, the major barriers to implementing CDM projects include the small size of the projects as well as the lack of experience in developing CDM projects.
- The barriers in Lao PDR include the lack of clarity on roles and responsibilities of the concerned agencies and lack of information dissemination on the CDM.
- In Nepal, the political and economic situation poses difficulties for the implementation of CDM projects. In addition, securing financing for unilateral development of projects is risky. The available capacity within the country for CDM project development is an issue, as is the lack of full comprehension by national financing institutions.
- In spite of strong governmental support and established mechanisms in the Philippines, risks have been recognized. Project financing has also been recognized as a challenge. At the institutional level, there are certain CDM-related risks such as policy risks and market risks. The former refers to the risk that the host country will not comply with its obligations, and the risk that specific baselines and procedures used in the project will not be approved. Market risks include the price of CERs, which are presently highly speculative, and uncertainties about the CER market despite the Kyoto Protocol.

9.0 POTENTIAL OF CDM

Among the APO membership, countries like India and the Republic of Korea rank high as CDM project hosts. Realizing the advantages and potential of the CDM, various initiatives are being taken in India. The National Tariff Policy Guidelines for CDM have been published. The Ministry of Power/Central Electricity Authority has instructed public-sector units to examine the CDM potential in all new power projects. In the private sector, companies are establishing in-house CDM cells. The new sectoral CDM projects in India include the following project types:

- Gas flaring (12)
- Fugitive emissions from wastewater treatment plants (five)
- Projects in the petrochemical sector (14)
- Railways (six)
- Transportation projects/switch from petrodiesel to biofuel
- Forestry on a large scale

Carbon asset financing is no longer attractive as "cheap bait" for sourcing projects. This is due to the increase in the number of informed Indian CDM developers.

In the Republic of Korea, 16 projects are in the validation process, with the largest number in renewable energy (eight) and landfill gas capture (four). The other projects are in energy efficiency, waste energy reuse, and N_2O reduction sectors.

In Indonesia, the total volume of CERs is expected to be 2% of the CDM global market, generating about 125–300 million CERs. From the projects on LULUCF, another 53 million CERs are expected. About 34 potential CDM projects have been proposed in Indonesia. The sectoral project activities having CDM potential are:

- Biomass, biogas, and biofuels (23 mt/year)
- Utilization of agricultural waste (palm oil, rice husk, cassava residue)
- Geothermal (5 mt/year)
- Hydropower (15–26 mt/year)
- Agriculture methane capture (435,000 tonnes)
- MSW and landfills (720,000 tonnes)
- Gas flaring (7.5–10 mt/year)

In the Islamic Republic of Iran, the transitional agricultural methods and practices provide potential areas to be explored for CDM project activities. Biomass energy, renewable energy, flare gas utilization, and N_2O abatement in nitric acid plants are other potential areas in the country.

In Lao PDR, projects in hydropower and reforestation are being pursued.

In Nepal, various CDM project activities are in the offing. These include projects from micro hydropower projects, improved watermills, landfill gas to energy,

vertical-shaft brick kilns, renewable energy, cement production, and transportation.

In the Philippines, priority projects consistent with national priority development areas include renewable energy, energy efficiency, fuel switching, fugitive emissions, chemical industry, transport, waste management and land-use change, and forestry.

In Thailand, electricity from biomass, landfill gas capture, waste management, and fuel switching are the main CDM project types expected in the future.

Singapore, which has yet to give host country approval to any project, offers potential for local CDM projects on waste to energy, fuel switching, and energy efficiency. However, the potential for CDM projects to be implemented in Singapore is limited due to its relatively small size and limited number of heavy and polluting manufacturing industries. Nevertheless, there is potential in waste-to-energy projects, in line with Singapore's "zero-landfill" strategy, as well as in fuel switching and energy efficiency.

For APO member countries, there appears to be an urgent need to develop capacities at the national level. While many have CDM potential, it has not yet been converted into projects and the registration process has not begun. NPOs could catalyze the process. Based on national mandates, NPOs could on one hand harness the potential of the CDM and on the other convert it into project activities. The APO could also support the spread of the CDM concept as well as help in capacity building to provide the requisite platform for information sharing.

10.0 CONCLUSIONS

With the advent of the CDM, APO member countries have an opportunity to address the problem of climate change as well as to gain in terms of the transfer of cutting-edge, climate-friendly technologies. Individual countries have initiated activities that could benefit gain from the CDM but the level of effort and number of projects show wide variation. The concept of GP as promoted by the APO has a synergistic relationship with the CDM. Therefore, utilizing the established GP methodology to develop CDM projects appears to be a unique opportunity.

The internal capacity of APO member countries also varies. The DNAs could be strengthened, particularly for countries with less capacity, in terms of policy support and working guidelines.

Therefore it is necessary to strengthen information campaigns for government units and the private sector to encourage more CDM project proponents in APO member countries. Assistance for project proponents to develop PDDs should be initiated through the APO. CDM financing should also be promoted since conventional funding sources are still hesitant to enter this domain. In-house capacity building of larger corporations, public-sector units, institutions, chambers of commerce, industry associations, etc. should be encouraged through demonstration projects.

The APO can bring together Japanese companies interested in investing in CDM projects and potential projects of other APO member countries for collaboration. From the APO platform, the promotion of the CDM concept, capacity building, and information sharing would help the less active APO member countries.

Although there have been few CDM activities in most APO member countries, with the exception of India, which has the world's most numerous CDM-related projects, APO member countries could use the GP strategy to develop CDM projects. Such an approach, along with capacity building, will help in developing CDM projects among all APO member countries, thus contributing to the core objective of sustainable socioeconomic development.