A DETAILED ANALYSIS OF CDM POTENTIAL IN THE THERMAL POWER GENERATION SECTOR OF SRI LANKA

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By

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DEDICATION

This Research Report is dedicated to my loved mother, Sunethra, my beloved wife Anuradha and to my daughters Sasini and Isini

DECLARATION

I hereby declare this submission is my own work and that, to the best of my knowledge and behalf, it contains no material previously published or written by another person nor material, which to substantial extent, has been accepted for the award of any other academic qualification of a University or any other Institute of higher learning expect where acknowledgement is made in the text.

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INTRODUCTION

Global warming and climate change represent one of the greatest challenges for today's governments and organizations. The increased concentrations of greenhouse gases (GHGs) in the atmosphere, caused by the human activities in the modern industrialized world, are considered as the main causes. However, to tackle this problem needs the participations of both developed and developing countries.

The Clean Development Mechanism (CDM), created under the Kyoto Protocol, can act as the bridge to link the industrialized countries and developing countries. The CDM intends to assist developing countries achieve sustainable development by providing incentives for industrialized countries to invest cost-efficient GHGs reductions projects in these countries. The developed countries can receive some credits by investing and implementing GHGs emission reductions projects in the developing countries, then use these credits to fulfil their legally binding quantitative obligations laid down in the Kyoto Protocol. Although the Clean Development Mechanism (CDM) does not have an explicit technology transfer mandate, it may contribute to technology transfer by financing emission reduction projects using technologies currently not available in the host countries. Roughly 39% of all CDM projects accounting for 64% of the annual emission reductions claim to involve technology transfer. Technology transfer is more common for larger projects and projects with foreign participants. Technology transfer is very heterogeneous across project types. Technology transfer usually involves both knowledge and equipment with equipment imports accounting for most of the remaining transfer. The technology originates mostly from Japan, Germany, the USA, France, and Great Britain. The rate of technology transfer is significantly higher than average for projects in Ecuador, Honduras, Mexico, Sri Lanka, Thailand and Vietnam and significantly lower than average for projects in India.

ABSTRACT

The objective of this study is to analyse potential technology possibility under the CDM in power generation sector. This study is a theoretical study focused on the survey of the current state of the art of CDM and related issues. The climate and energy policy, the energy market and the status of energy technology in Sri Lanka. The results show that the potential of CDM opportunities in thermal power sector of Sri Lanka, and ten methodological areas are recommended as areas of potential CDM projects origins.

In order to further investigate the opportunities for implementation of CDM in thermal power sector in Sri Lanka and to identify the potential problems, two case studies were conducted. First case study is the construction and operation of 600 MW super critical coal fired grid power plant (CoP: 0.065 USD/kWh). Electricity generated by the project activity will supply to Sri Lanka national grid replacing sub-critical coal power plant what would have been implemented in the absence of the project activity since sub-critical coal power plant (CoP: 0.063 USD/kWh) is more economically attractive than the project activity. The emission reduction of the first case study is 160,000 tCO2/annum. There are some barriers associated with installation of super-critical coal power plants such as investment barriers (high investment compared to the investment what would have been made to a sub-critical coal power plant), prevailing practice barriers (the project activity is the first super-critical coal power plant in Sri Lanka, there are no super-critical coal power plants implemented at the time of the investment decision) and technological barriers (there are no super-critical coal power plants in Sri Lanka which leads to have lack of skilled labour). Second case study is the construction and operation of new natural gas fired power plant (CoP: 0.263 USD/kWh). Electricity generated by the project activity will supply to Sri Lanka national grid replacing sub-critical coal power plant what would have been implemented in the absence of the project activity since sub-critical coal power plant (CoP: 0.063 USD/kWh) is more economically attractive than the project activity. The emission reduction of the first case study is 82,200 tCO2/annuam. There are some barriers associated with installation of natural gas based power plants such as investment barriers (high investment compared to the investment what would have been made to a sub-critical coal power plant), prevailing practice barriers (the project activity is only one natural gas project in Sri Lanka, which has been developed by the government) and technological barriers (natural gas based power plants are not common in Sri Lanka, which leads to have lack of skilled labour, further there is no proper natural gas pipe line constructed in the country to distribute the natural gas). However there are some barriers to be resolved in order to achieve the CDM status.

It is concluded that Sri Lanka not only can achieve credits to earn some extra revenue, but also can maintain its leading position in international cooperation and competence on the climate change issues, moreover, Sri Lankan expert can involve in international climate change process. Further, the CDM projects can help Sri Lanka to realize sustainable development, while reducing its GHGs emissions, which could be a great contribution in addressing climate change.

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Abbreviations

ADB	Asian Development Bank
CDM	Clean Development Mechanism
CEA	Central Environmental Authority
CEB	Ceylon Electricity Board
CER	Certified Emission Reductions
CHP	Combined Heat and Power
COP	Conference of the Parties
GDP	Gross Domestic Product
GHG	Greenhouse Gas
IEA	International Energy Agency
IISD	International Institute for Sustainable Development
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
L.A.D.	Lanka Auto Gas
LNG	Liquefied Natural Gas
MACs	Marginal Abatement Costs
OECD	Organization for Economic Co-operation and Development
SAR	Second Assessment Report
SLEMA	Sri Lanka Energy Managers Association
SME	Small and medium enterprise
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WHO	World Health Organization
WTO	World Trade Organization