

BARRIERS TO ENERGY EFFICIENCY UNDER THE CLEAN DEVELOPMENT MECHANISM

Binu Parthan, REEEP, VIC D1732, Wagramerstrasse 5, Vienna, A-1400, Austria – bp@reeep.org
Udo Bachhiesl, IEE, Graz University of Technology, Inffeldgasse, 18, Graz, A-8010 – Austria,
bachhiesl@TUGraz.at

ABSTRACT

Climate change is one of the biggest challenges facing the humanity today. The Intergovernmental Panel on Climate Change (IPCC) highlights energy efficiency in energy supply, buildings, transport, industry and agriculture as key climate change mitigation opportunities. The Clean Development Mechanism (CDM), one of the flexibility mechanisms under the Kyoto Protocol provides a good opportunity to develop the markets for energy efficiency and address climate change. However the share of energy efficiency in the CDM has been quite limited thus far and this paper seeks to identify the barriers that are preventing a larger share of energy efficiency projects in the CDM.

1. CLIMATE CHANGE AND ENERGY EFFICIENCY

The Intergovernmental Panel on Climate Change (IPCC) in its fourth assessment report concluded that global atmospheric concentrations of greenhouse gases have increased markedly as a result of human activities and that warming of the climate system is unequivocal. The impacts of this change in climate include changes in precipitation pattern – resulting in increased incidences of floods and droughts as well as threats to small islands and coastal areas from sea level rise. The McKinsey Quarterly global survey on business and society¹ shows that business executives expect that environmental issues including climate change will attract more public and political attention and will affect the shareholder value more than any other current societal issue. The IPCC fourth Assessment report recognizes that it is often more cost effective to invest in energy efficiency improvements than in increasing energy supply to satisfy the demand for energy services. There exist several opportunities for energy efficiency such as supply side energy efficiency, fuel efficient vehicles, efficient lighting, efficient electrical appliances, efficient heating and cooling devices, improved insulation, passive and active solar design for heating and cooling, efficient end-use electrical equipment, heat and power recovery and improved energy efficiency in agriculture and agro-processing. The potential for energy savings from these energy efficiency opportunities is quite significant.

¹ A global survey conducted in September 2007 with responses from 2687 executives around the world with 36% of them CEOs.

2. CLEAN DEVELOPMENT MECHANISM

The Clean Development Mechanism (CDM) along with Joint Implementation (JI) are two of the project based flexibility mechanisms available for compliance under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC). The CDM offers an opportunity for host countries² to implement greenhouse gas mitigation projects such as energy efficiency projects and offers a framework to estimate, quantify, validate, register, trade and redeem the associated emission reductions. These emission reductions can be acquired for a consideration by industrialised country governments and entities and can be used to meet the emission reduction commitments of these countries under the Kyoto Protocol. The revenues from the sale of these emission reductions result in additional sustainable development project activities being carried out in the developing countries.

Currently³ there are more than 800 CDM projects registered by the CDM Executive Board that are expected to result in more than one billion tonnes of emission reductions by 2012. The CDM Executive Board has already issued over 90 million of these emission reductions. According to the World Bank, in 2006 the size of the CDM market was \$ 5.25 billion and the size of the market is expected to increase considerably in the future. A total of more than 2700 projects are in the pipeline including the projects that are at the validation stage. However only 97 energy efficiency projects have so far been registered by CDM Executive Board, which accounts for 4.94 % of the emission reductions. A closer examination of the registered projects indicate a dominance of industrial energy efficiency projects and very low share of end-use, building, transportation and agricultural energy efficiency, key areas specified by IPCC.

The development of CDM projects is also dependent on the methodologies for baseline setting and monitoring. The CDM Executive Board has so far approved 115 methodologies. Out of this 21 methodologies deal with energy efficiency project activities but 11 of which have never been applied to CDM projects.

3. BARRIERS

The barriers to energy efficiency projects can be classified into two groups. The first group consists of barriers that affect energy efficiency projects in general and inhibit the development of this sector and the second group consists of barriers that are specific to energy efficiency under CDM. These are explained below:

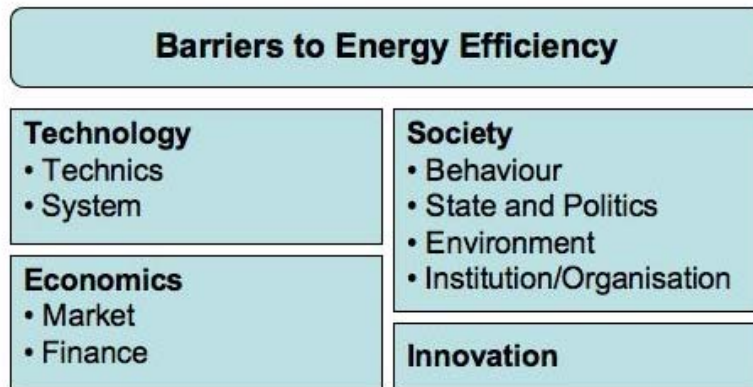
3.1. General Barriers

In general a barrier can be defined as a mechanism, which prevents investments or measures in order to increase energy efficiency. The barriers are manifold and therefore a systematic approach is reasonable. Figure 1 shows a classification method for barriers to energy efficiency.

² Usually developing countries

³ As on 1st November 2007

Fig 1: Classification of Barriers to Energy Efficiency



(Source: Bachhiesl, 2004)

A deeper view shows that barriers additionally depend on different parameters like regional or cultural aspects and therefore have to be investigated for every single case. Nevertheless a further assignment of barriers to different branches of trade is meaningful. Regarding the economic structure at least three divisions can be defined:

- Households
- Small and medium enterprises and agriculture
- Industry

Concerning households – which contribute most to the energy demand – especially the consideration of the human dimension in combination with the provision of appropriate information is the most relevant aspect. Most of the needed energy services like heating/cooling or lighting could be provided in an energetically and economically more efficient way, but often lack of information and the necessary stimulation.

In the case of small and medium enterprises as well as the agricultural sector also a lack of information and according support prevents the diffusion of energy efficient measures. In most of the cases the core business of the firm is not directly related to energy or electricity and therefore energy efficiency measures are not regarded appropriately although significant savings in terms of energy and money could be gained.

Regarding the industry most of the relevant enterprises act on a globalised level and therefore have to fulfil global benchmarks. Most of the economically viable energy efficient measures have to be done in order to remain competitive, although it has to be considered that the claimed time levels for the return on investment are very strict within the industrial sector.

Summarizing it can be stated that in general barriers to energy efficiency are very multifarious. Although there are different main focuses within the several branches the barriers have to be investigated on a single level in order to understand the underlying prevention mechanism and to identify appropriate solutions.

3.2. Barriers under CDM

All CDM projects have to demonstrate additionality⁴ before the projects are validated and registered. It was recently noted that 86% of the small-scale CDM projects use removal of investment barrier as the justification to demonstrate additionality. The demonstration of additionality is usually done by classical investment analysis and an examination of the pay back periods. Energy efficiency projects and opportunities offer very short payback periods despite the lack of actual investments. This limits the ability of energy efficiency projects to demonstrate additionality.

The CDM modalities and procedures are generally geared towards single site and large-scale emission reduction opportunities implemented over a shorter period of time. This emphasis suits industrial projects, renewable energy projects and waste management projects but is not conducive to end-use, transportation, buildings and agricultural energy efficiency projects which are generally smaller interventions, over larger geographical span and implemented over different time periods and over a longer period

A key factor in development of CDM projects is the availability of methodologies. As stated earlier, only about 10% of methodologies available currently are being used for energy efficiency technologies or measures. The success rate of methodologies submitted on energy efficiency category has been only 30% compared to the 50% average for all methodologies. The problems for methodologies for energy efficiency projects include difficulties in developing monitoring methodologies that are practical and cost effective for dispersed energy efficiency applications, considerations relating to equipment lifetime of retrofit and replacement energy efficiency projects as well as the lack of consistency in considering upstream emissions⁵. The current approach of the methodology development and approval process is on project-specific methodologies and when the methodologies for programmes are considered, there will be a need to move towards methodological frameworks that can be applied to a number of component project activities. The existing small-scale CDM methodologies do offer some elements of a programmatic approach.

4. BARRIER REMOVAL INITIATIVES

The CDM Executive Board has recognised the limited share of energy efficiency projects in the CDM and since the June 2007 meeting the CDM Executive Board has asked the secretariat to take measures to improve the share of energy efficiency in CDM and report on the progress. It is understood that more attention and resources would be devoted towards examining how CDM modalities and procedures and methodologies can be improved to support more energy efficiency projects under CDM.

A major action by the CDM Executive Board during 2007 was to develop and approve the modalities and procedures for CDM Programme of Activities (PoA). The PoAs will have a maximum duration of 28 years and it will be possible to add Component Project Activities (CPAs) to a registered PoA. This is an important step that should facilitate the development of energy efficiency projects that are smaller

⁴ Justification that the project activity would not have happened in the absence of CDM.

⁵ Emissions that are associated with the development, production and pre-processing of the fuel which normally happens outside the project boundary.

interventions, over larger geographical span and implemented over a longer period of time.

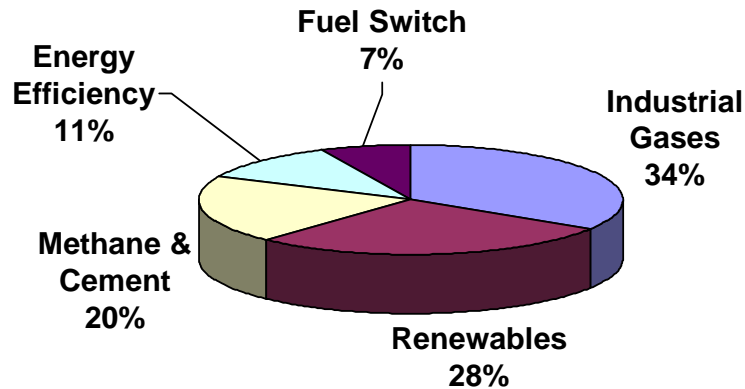
The World Bank, IEA, GEF, UNDP, UNEP, UNIDO, UNFCCC and REEEP have established an Expert Group on Energy Efficiency and Carbon Finance. The objective of the Expert Group is to bring together practitioners from key agencies who are working on energy efficiency and carbon finance. The network will provide technical contributions that will scale-up energy efficiency using incentives provided by the CDM and other carbon finance markets. It is expected that expert group will focus on technical issues such as methodologies, technical guidance and capacity building.

REEEP has also established the Energy Efficiency Coalition (EEC), which brings together policy makers, industry and development agencies to work on areas of advocacy, global assessments, sharing of best practice. The EEC will be focusing its initial efforts on energy efficiency in buildings followed by energy efficiency in industry and then expand into all energy efficiency sectors. The EEC will also issue a global status report on energy efficiency in 2008 focusing on energy efficiency in the G8 and the rapidly emerging economies of Brazil, China, India, Mexico and South Africa.

REEEP also supports the CDM Gold Standard that provides a tool for buyers looking for premium quality emission reductions. The Gold Standard procedures are only applicable to renewable energy and energy efficiency projects and the Gold Standard reports that the prospective buyers are willing to pay a premium in the range of 5 to 25% for emission reductions certified according to Gold Standard criteria. If this premium market segment were able to attract enough buyer and seller interest, it would help energy efficiency projects under CDM to improve their financial attractiveness.

REEEP is also supporting several energy efficiency initiatives which have the potential to serve as examples of some of the initial energy efficiency initiatives under the PoAs. Some of these include the London-Beijing Olympic Games CDM project which will develop a CDM PoA focusing on household energy efficiency, the Indian cities street lighting energy efficiency project which focuses on efficient lighting and the Efficiency Power Plant project in Jiangsu in China.

Fig 2: Sectoral Break-up of Emission Reductions till 2012 from the CDM Pipeline



(Source: UNEP, 2007)

These initiatives are beginning to influence the energy efficiency market under CDM. When one considers over 2700 CDM projects under development, the energy efficiency projects now account for 11% of total emission reductions more than doubling their current share. The share of different types of CDM projects is shown in Fig 2. However it will take more time and effort from these and other initiatives to develop the energy efficiency market under the CDM to a level comparable to that of renewable energy.

5. CONCLUSIONS

Awareness and concern about the climate change is rising in the political, public and business space. There is also a clear recognition acknowledged by scientific bodies such as IPCC that energy efficiency measures and technologies provide some of the most cost effective opportunities to manage and mitigate greenhouse gas emissions.

Energy efficiency faces several barriers at a general level and specific to the CDM. There is also recognition at the policy level of barriers to energy efficiency under carbon finance. These barriers will need to be addressed at policy, regulatory and institutional levels to improve participation of this sector under CDM.

There are a number of initiatives to address the barriers to energy efficiency under CDM, the most important one being at the policy level by CDM Executive Board and the parties to the protocol. There have also been other initiatives at the institutional level by World Bank, UN and IEA and at the programmatic level by several others including REEEP. These initiatives are expected to have a long term impact and are beginning to have an effect on the share of energy efficiency under CDM. More

barrier removal initiatives and time is needed to ensure that energy efficiency projects fulfill their climate change mitigation potential under the CDM.

REFERENCES

Bachhiesl, Udo, 2004: Successful Energy Innovation Processes – Framework and Methodology based on a comprehensive Analysis of Barriers and Success Factors

Bosi, Martina, 2007: Proposal for supporting the establishment of an international carbon finance-energy efficiency network;

IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Policy Solutions: 2007: Public input to the CDM Executive Board on Non-binding best practice examples on the demonstration of additionality.

Schiller Consulting, 2007: Analysis of Energy Efficiency Project Activities and Key Methodological Issues;

The McKinsey Quarterly, 2007: Assessing the impact of societal issues: A McKinsey Global Survey

UNEP Risoe, 2007: CDM/JI Pipeline Analysis and Database

World Bank, 2007: State and Trends of the Carbon Market;

Intergovernmental Panel on Climate Change	www.ipcc.ch
Renewable Energy and Energy Efficiency partnership	www.reeep.org
Clean Development Mechanism	www.unfccc.int/cdm