

# The Role of CDM Post-2012

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## Carbon Pricing for Low-Carbon Investment Project

Alexander Vasa and Karsten Neuhoff  
Climate Policy Initiative / DIW Berlin

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Contact: Dora Fazekas, [dora.fazekas@climatestrategies.org](mailto:dora.fazekas@climatestrategies.org), Ruby Barcklay,  
[ruby@climatepolicyinitiative.org](mailto:ruby@climatepolicyinitiative.org)

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## Executive Summary

Installations covered by the European Emission Trading Scheme (EU ETS) can use credits from the Clean Development Mechanism (CDM) to cover a share of their emissions. The CDM credits are generated by low-carbon projects in developing countries that require the CDM support to become financially viable.

We review the objectives that are pursued by the EU and by CDM host countries with the CDM, and assess the performance of the mechanism in reaching these objectives:

### Additionality

Additionality is a key premise of the CDM – only projects that would not have been possible otherwise should be supported by the CDM. Studies have found, however, that between one-fifth<sup>1</sup> and two-thirds<sup>2</sup> of registered projects are non-additional; reasons include insufficient demonstration criteria and the ineffectiveness of Designated Operational Entities (DOE)<sup>3</sup> in filtering non-additional projects. Assuming these estimates are valid, non-additionality could have contributed 30 to 106 million tons of CO<sub>2</sub>eq to global emissions increases through the use CDM credit in the EU ETS in 2008-2009.

### Efficient use of EU mitigation funds

CDM may not be a cost-effective mechanism for mitigation. For example, yearly costs for abating all developing HFC-23 would cost about €26 million, but through the CDM, Annex I buyers pay between €250 and €750 million in total.<sup>4</sup>

### Sustainable Development

The definition of sustainable development is controversial and there is no agreement on how it should be measured. Within this context, it is difficult to determine whether CDM aids sustainable development or not. Some CDM experts go so far as to suggest – using their sustainable development criteria - that the additionality requirements of CDM actually reduce the number of sustainable projects available for CDM investment.

### Low-carbon development – In developing countries

In developing countries, the authors find that the CDM has not facilitated technology transfer, does not support a shift to low-carbon technologies, can discourage the development of domestic low-carbon policies such as Nationally Appropriate Mitigation Actions (NAMAs), does not achieve sustainable development criteria, and, in fact, can support carbon-intensive activities.

### Low-carbon development – in Europe

Overall, the CDM negatively impacts EU ETS abatement. This study shows that with an EU ETS target of 20%, the CDM decreases the required GHG emissions reductions from 13.8% to 7.5% by 2020 (relative to 2005).<sup>5</sup> The right to use CDM has been extended to the period 2013-2020. As a result, averaged over the period 2008-2020, EU ETS emissions can exceed the EU ETS cap by 7.3%.

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<sup>1</sup> Michaelowa & Purohit, 2007

<sup>2</sup> Wara and Victor, 2008

<sup>3</sup> In the CDM context, the term DOE stands for validators of CDM project proposals. In the US, the term DOE stands for Department of Energy.

<sup>4</sup> Wara, 2008

<sup>5</sup> EU Community Independent Transaction Log (CITL) data. See section 2.1 and Annex 1

Thus the degree of abatement undertaken in Europe is heavily influenced by the use of CDM credits. With a 30% target, the effects are even more pronounced, with emission reductions delivered domestically of 23.9% without CDM use to 12.6% with CDM use.<sup>6</sup> Even without the use of CDM, the current 20% emissions trajectory results in emissions abatement of 51% below 1990 levels by 2050, which falls well short of the commitment of 80-95%, formulated by the EU and its Member States at the EU Summit in October 2009.<sup>7</sup>

Future volumes of CER inflows are determined by various factors inherent in the choice of project and technology, and are also determined by political decisions made at the UN, EU, and project host country level. This makes the volumes of CERs generated difficult to predict, despite careful monitoring by market participants and analysts of international carbon market developments.

### **CDM in the case of a 30% EU emissions reduction target**

If the EU moves to a 30% target, the Directive currently envisages that half of the additional emissions reductions could be covered with CDM credits. Policy makers may consider, whether the performance of the CDM mechanism to date justifies such an expansion, or the focus should be shifted on alternative mechanisms for international climate cooperation.

Should the increased use of CDM still proceed, this might trigger a discussion about who receives the right to use the CDM credits and can capture the rents from the price spread between EU allowances and CERs. This could repeat the lengthy debate between industry and the European Commission on the definition of benchmarks for free allowance allocation. This paper explores and discusses different options for how market-based mechanisms could be used instead, to allocate the right for the use of CER credits.

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<sup>6</sup> CPI Analysis, Annex 2

<sup>7</sup> This sentence and the corresponding Graph 1 have been updated on 4<sup>th</sup> February 2011 - initially 47% instead of 51% total EU emission reductions were projected for 2050. EU Presidency Conclusions EU October 2009: [http://www.consilium.europa.eu/uedocs/cms\\_data/docs/pressdata/en/ec/110889.pdf](http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/110889.pdf)

## 1 Introduction

In its Climate and Energy Package, decided in 2008, the EU unilaterally committed to reduce greenhouse gas emissions by 20% by the year 2020, relative to 1990 levels, with a further plan to reduce emissions by 80%-95% by 2050 (Council of the EU, 2009). The emissions reductions needed to meet this target can be achieved through domestic abatement and through abatement in developing countries through the Clean Development Mechanism (CDM).<sup>8</sup> The CDM is an offset mechanism that allows for the crediting of emissions-reduction projects in developing countries and the subsequent sale of credits to actors in developed countries. These actors are then permitted to increase their emissions by the volume of credits used. Each credit, called a Certified Emissions Reduction (CER), gives its holder the right to emit one tonne of CO<sub>2</sub>. Thus, emissions reductions in CDM host countries are offset by increases in emissions in the EU.

The EU offset policy, therefore, has an impact on abatement strategies in EU economies and in the developing countries that host CDM projects. This paper reviews the objectives of including CDM in the EU abatement strategy from the perspectives of both EU and CDM host countries. It then analyses whether these objectives have been achieved in practice. Where the results deviate from the goals, this paper explores options to realign goals with desired results. The paper is organized as follows:

- Section 1 reviews objectives of the CDM for the EU and for host (developing) countries;
- Section 2 describes the CDM framework and CDM design;
- Section 3 reviews CDM performance;
- Section 4 discusses options for realigning the CDM's performance with its objectives; and
- Section 5 concludes.

### 1.1 Objectives of the CDM for the European Union

The European Union allows the use of CERs from CDM projects in order to increase the cost-effectiveness of abatement under the EU ETS (European Commission, 2004; Michaelowa, 2004). Preamble 3 of the Linking Directive states that access to CERs “increase[s] the diversity of low-cost compliance options [...] leading to a reduction of the overall costs of compliance with the Kyoto Protocol.”<sup>9</sup> The access to the use of CERs is subject to “safeguarding the [CDM]’s environmental integrity.” That means that the use of CERs should not harm the environment. Furthermore, the stimulated demand for CDM credits assists “developing countries hosting CDM projects [...] in achieving their sustainable development goals.” Following Article 12 of the Kyoto Protocol, emissions reductions through the CDM should only be a part of total emissions reduction efforts. The EU interpreted this to mean that, at most, half of all European emissions reduction commitments could be delivered through project mechanisms such as the CDM and Joint Implementation, so the EU accordingly introduced a limit on the use of CDM credits.<sup>10</sup>

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<sup>8</sup> Abatement through Joint Implementation (JI) projects in European Union Member States is another option. JI can be used from 2008 onwards. Joint implementation projects are projects conducted in developed countries.

<sup>9</sup> Linking Directive 2004/101/EC (Council of the EU & European Parliament, 2004).

<sup>10</sup> The use of CDM is governed in the EU ETS according to consolidated EU ETS Directive 2003/87/EC, as amended through the Linking Directive (2004/101/EC) and Directive 2009/29/EC. The use of offsets in the non-ETS sector is governed through Decision 406/2009/EC. The detailed regulations can be found in Annex 1 of this paper.

In addition to the Kyoto requirement, the following motivations justify the constraint: a) equity considerations, b) minimizing the impact of large volumes of low-cost credits on carbon prices in the EU, and c) providing incentives for developing countries to take on targets in a second commitment period. For a discussion see Akita (2003), Narain and van’t Veld (2008) and Woerdman (2004).

*Thus, the objectives of the EU offset policy are to achieve a) cost-effectiveness, b) environmental integrity and c) a momentum towards a long-term decarbonisation of the EU economy.*

## **1.2 Objectives of the CDM for host countries (developing countries)**

For CDM host countries (i.e. developing countries not listed in Annex I<sup>11</sup> of the Kyoto Protocol), the goal of the CDM is to help them “achieve sustainable development and to contribute to the ultimate objective of the Convention” (UNFCCC, 1997: Article 12(2)).<sup>12</sup> The first mentioned goal – sustainable development – has not been formally defined and is subject to the interpretation and the development priorities of the respective countries. It is an important criterion, however, which triggered the acceptance of the CDM as an instrument by developing countries. Generally sustainable development goals include economic, social, and environmental aspects (Olsen, 2007). The latter goal – contributing to the ultimate objective of the Convention – can be interpreted to mean helping developing countries transition to a low-carbon development path, with the ultimate objective of decreasing global GHG reductions in the range of 50-85% relative to 2000 levels (IPCC, 2007; UNFCCC, 1992). Such a transition demands a low-carbon infrastructure as well as an institutional structure that encourages investors to invest in low-carbon technologies such as renewables and energy-efficient production facilities. While not explicitly a goal of the CDM, the Convention and the Kyoto Protocol stipulate that in order to achieve the decarbonisation objective, developed countries should support developing countries via the transfer of financial and technological resources to promote low-carbon development in Non-Annex I countries (UNFCCC, 1992: Art. 4.3&4.5; UNFCCC, 1997: Art. 10(c)&11.2).

*To summarize, the CDM objectives for CDM hosts are a) sustainable development, b) technology and financial transfers, and c) a contribution to a low-carbon path.*

## **2 The current framework for CDM under the EU ETS and CDM Design**

The CDM is a voluntary, market-based mechanism. Demand for CDM projects is dependent upon the stringency of emissions-reduction commitments in developed countries. The deeper the emissions-reduction commitments in Annex I countries, the higher the price of domestic emissions reductions and the higher the demand for CDM credits. This section first illustrates the current CDM policy within the EU ETS and then explores key attributes of CDM design, including additionality and the sustainable development criterion.

### **2.1 The current framework for CDM under the EU (ETS)**

The EU has committed to reducing emissions by 20% in 2020 relative to 1990. Following a linear trajectory the cap is reduced by a factor of 1.74% each year beyond 2020. This factor is subject to a review in 2025. Companies in the EU ETS can achieve up to half of this reduction through the use of CDM or Joint Implementation offsets (EU Directive 2009/29/EC: Article 11a).<sup>13</sup>

<sup>11</sup> Annex I includes all OECD countries.

<sup>12</sup> “Convention” is short for the United Nations Framework Convention on Climate Change (UNFCCC).

<sup>13</sup> In the following, we refer to credits from the CDM as offsets and do not include JI credits.

The maximum EU demand for CDM credits was fixed through the Linking Directive, making the CDM part of the compliance regime and thereby giving CDM credits the necessary credibility to attract private investment. In Phase II of the EU ETS, each participating firm has the right to use the CDM up to a certain percentage of their allocated EU Allowances (EUAs) (2008-2012).<sup>14</sup> In total, EU ETS firms are allowed to use about 1. billion CERs in this five-year period<sup>15</sup>, which amounts to an average of 13.8% of CERs as a share of freely allocated EUAs. The percentage allowed varies by EU Member State because of different emission reduction commitments of individual Member States. German EU ETS participants, for example, can use up to 22% in CDM credits, while Slovakian EU ETS companies can use up to 7%. Most EU Member States (14 out of 27) have a CDM limit of 10% of EUA allocation.

In the period 2008-2012, all project types allowed by the CDM Executive Board (EB)—except nuclear, land use, land use change, and forestry projects—are eligible for use in compliance with reductions targets (Council of the EU & European Parliament, 2009: Art. 11a (3)). Large hydroelectric projects under the CDM must comply with the World Commission on Dams guidelines, which are subject to Member State interpretation, in order to be acceptable for compliance purposes.

For the period 2008-2020, the limit on CDM use has been extended to a total of about 1.53 billion CERs (for calculations, see Annex 1). For the period after 2012, if no satisfactory international agreement increases the EU emissions reduction target to 30%, eligible credits from CDM projects will be limited to CERs from projects registered before 2012 by a CDM host country or, if registered after 2012, only from projects in Least Developed Countries (LDCs). Furthermore, the European Parliament is currently discussing the ban of CER use generated from industrial gas, specifically HFC-23 and N<sub>2</sub>O projects. This ban, if approved, would be effective from May 2013.

In addition to the limit in the EU ETS, EU Member States may use CDM credits to cover emissions in sectors that are not covered by the EU ETS. The total amount of CERs that can be used for non-EU ETS sectors is 782 million tonnes in the period 2013-2020.<sup>16</sup> Of these, 78.2 million tonnes can exclusively be provided from LDCs. Potential CDM supply currently in the pipeline from LDCs is 112 million tonnes until 2020, of which 5.1 million tonnes is already registered. Of these, less than 20,000 tonnes' worth of CDM credits had been issued before 2010.

## Implications for EU abatement

Table 1, based on data from the EU Community Independent Transaction Log (CITL) and the individual National Allocation Plans of EU Member States, summarizes how the use of CDM credits reduces the emission reductions that need to be achieved within the European Union.

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<sup>14</sup> EU ETS Phase I was a trial phase running between 2005 and 2007. Ellerman & Buchner (2008) provide an in-depth analysis of the experience in Phase I.

<sup>15</sup> Including extended coverage added in Phase II.

<sup>16</sup> However, should a Member State have more stringent national targets, “the limitation imposed by this Decision on the use of greenhouse gas emissions reduction credits should not apply to the additional emissions reductions to attain the national objective.” Council Decision, paragraph 17

Table 1 Emissions reduction with and without the CDM

EU-27 Reductions in 2020, relative to 2005	...with 20% target	...with 30% target
...with CDM	-7.5%	-12.6%
...without CDM	-13.8%	-23.9%

As the table indicates, the use of the CDM limits the emissions reduction effort needed for compliance.

The CDM substantially reduces the emissions reduction ambition relative to 2005 GHG emissions. In the 20% reduction case, the actual reduction with full use of the CDM is a 7.5% reduction in GHG emissions, relative to 2005 levels. Under the 30% target, full CDM use leads to a 12.6% GHG emissions reduction, relative to 2005 levels. The target stringency under the 20% target without CDM use is 1.2 percentage points higher than the 30% target with full CDM use scenario. The European Commission recognizes in Directive 2009/29/EC that the increased use of CDM credits in the absence of an international agreement, could undermine the EU renewables target and the incentives for energy efficiency, innovation, and technological development (den Elzen & Höhne, 2008).

## 2.2 CDM Design

The project cycle for the registration and subsequent issuance of CDM credits involves multiple steps, which are required by the CDM Executive Boards and supporting institutions such as the Designated National Authority (DNA), the Designated Operational Entity (DOE), and the supporting panels (Methodology and Review and Issuance panel) of the EB. Two key criteria for successful CDM registration are additionality and the sustainable development benefits of the respective CDM project.

### 2.2.1 Additionality

Additionality safeguards the environmental integrity of the system and prevents Annex I (e.g. EU) buyers from paying for emission reductions that would have happened anyway. By using CERs from emissions reduction projects in developing countries, emitters in industrialized countries can increase their emissions output beyond their individual-country carbon constraints. The emissions reductions in developing countries are thus offset by an increase in Annex I country emissions. It is therefore important for environmental integrity that only emissions reductions are credited that would not have occurred anyway, i.e. that are additional. Otherwise, the CDM would contribute to an increase in global emissions (Greiner & Michaelowa, 2003; Schneider, 2007).

Every project must prove additionality according to the guidelines set by the CDM Executive Board using two tools: the 'Tool for the demonstration and assessment of additionality' and the 'Combined tool to identify the baseline scenario and demonstrate additionality'. The following four approaches or any combination of them can be used to demonstrate additionality: positive lists, investment analysis, common practice analysis, and barrier analysis (Schneider, 2009a).<sup>17</sup>

- Positive lists enable a whole project category to be additional. Up to now, this approach has only been used for HFC-23 projects (approved methodology AM0001), which are automatically additional if the project developer demonstrates that abatement exceeds regulatory requirements.

<sup>17</sup> For a review of the evolution of the additionality interpretation, see Michaelowa (2009).



- Investment additionality requires that the proposed project be at least economically or financially less attractive than an alternative, more carbon-intensive project and that the CDM change this situation.
- The common practice analysis assesses the extent to which the underlying project type has already been deployed in the respective region and sector.
- The barrier analysis requires demonstration that the underlying project faces barriers, and that the CDM is able to successfully address and overcome these barriers.

### 2.2.2 Sustainable development

In comparison to the additionality criteria, which were formally defined by the EB, the criteria for sustainable development are subject to CDM host country interpretation (UNFCCC, 2001). Each CDM host country DNA decides whether a project meets the country's sustainable development criteria. Project developers demonstrate in the Project Design Documents how the proposed CDM project activity contributes to sustainable development. If the criteria are met, the DNA issues a Letter of Approval (LoA). Sustainable development criteria generally include environmental, social and economic aspects.

## 3 CDM Performance Overview

The discussion begins with a review of the project pattern and regional distribution of the creation of CDM credits (Section 3.1) followed by a parallel exploration of the location and type of European installations using CDM credits (Section 3.2). Section 3.3 then reviews the performance of the mechanism according to the following criteria:

1. Additionality: How large is the share of non-additional projects?
2. Cost-efficiency: How much was spent on what amount of GHG abatement?
3. Sustainable development: What is the share of projects with sustainable development benefits?
4. Low-carbon development: How did the CDM support national policy development in developing countries and the EU?

### 3.1 Supply side

To date, the CDM has brought forward more than 2,500 registered projects, which are expected to deliver about 1.9 billion tonnes of CO<sub>2</sub>eq by the end of 2012 (UNEP Risoe, 2010).<sup>18</sup> However, according to UNEP Risoe calculations only about 1 billion CERs will be available for use in the period 2008-2012. The EU is the single largest demand market for CDM credits (Kossoy & Ambrosi, 2010). Registered projects can be divided into eight categories:

Table 2 gives an overview of the number of projects, emissions reductions to 2012, and already-issued credits in each project category.

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<sup>18</sup> CDM projects reducing GHG other than CO<sub>2</sub> can be expressed as CO<sub>2</sub>-equivalents (CO<sub>2</sub>eq) by multiplying the volume by the global warming potential (GWP) of the respective greenhouse gas. Methane, for example, has a GWP of 25 (IPCC, 2007).

Table 2 Overview registered project categories December 2010 (Source: UNEP Risoe, 2010)

	Registered projects	Emissions reductions 2012 in 000s tons of CO <sub>2</sub> eq	Issued emissions reductions in 000s tons of CO <sub>2</sub> eq
Renewables	1,563 - (61%)	550,205 - (29%)	65,512 - (14%)
Methane & Cement	578 - (23%)	360,158 - (19%)	26,851 - (6%)
Supply Side EE <sup>19</sup>	174 - (7%)	126,735 - (7%)	21,283 - (4%)
Industrial Gases	93 - (4%)	732,643 - (38%)	351,498 - (74%)
Demand Side EE	80 - (3%)	11,558 - (1%)	1,390 - (0,3%)
Fossil Fuel Switch	50 - (2%)	116,451 - (6%)	7,842 - (2%)
Afforestation & Reforestation	17 - (1%)	5,671 - (0,3%) <sup>20</sup>	0 - (0%)
Transport	3 - (0,1%)	1,978 - (0,1%)	201 - (0,04%)
<b>Total</b>	<b>2,558</b>	<b>1,905,398</b>	<b>474,577</b>

In total numbers, registered renewable CDM projects make up the largest share of all projects (61%), followed by projects reducing methane (23%). In terms of emissions reductions up to 2012, three project categories – industrial gases<sup>21</sup> (38%), renewables (29%), and methane projects (19%) – make up 86% of the total registered supply of emissions reductions to 2012. Issued credits are dominated by industrial gas projects (74%), with the second biggest category, renewables, covering 14%.

Table 3 Overview of the regional distribution of registered projects, December 2010 (Source: UNEP Risoe, 2010)

	Registered projects	Emissions reductions 2012 in 000s tons of CO <sub>2</sub> eq	Issued emissions reductions in 000s tons of CO <sub>2</sub> eq
Latin America	483 - (19%)	296,317 - (16%)	66,180 - (14%)
Brazil	179	136,649	44,013
Mexico	124	51,655	7,003
Asia & Pacific	1,973 - (77%)	1,513,094 - (79%)	400,390 - (84%)
China	1,065	1,071,064	250,304
India	568	253,132	80,922
South Korea	49	100,423	60,230
Europe and Central Asia	27 - (1%)	10,588 - (1%)	0 - (0%)
Uzbekistan	8	6,171	-
Africa	47 - (2%)	58,309 - (3%)	6,654 - (1%)
Nigeria	4	18,930	-
South Africa	17	15,717	1,794
Middle-East	28 - (1%)	27,091 - (1%)	1,354 - (0,3%)
Israel	18	8,670	553
Qatar	1	13,748	-
<b>Total</b>	<b>2,558</b>	<b>1,905,398</b>	<b>474,577</b>
Least Developed Countries	19	5,187	16
Small Island States	8	6,385	629

<sup>19</sup> Energy efficiency.

<sup>20</sup> Percentages here do not add up to 100% due to rounding.

<sup>21</sup> HFC-23 and N<sub>2</sub>O.

Table 3 illustrates that most projects are conducted in China, India, Brazil, Mexico, and South Korea. More than eighty per cent of CDM credits issued by 2012 are expected to have been generated in these countries. Many smaller and less developed countries fail to attract CDM projects, arguably because their institutional framework is not seen to be sufficiently robust by investors.

Least-Developed Countries are poorly represented by the CDM. Only nineteen projects have been registered in LDCs, with an additional nine projects achieving registration in Small Island Developing States (SIDS). In total, registered projects in LDCs account for less than 1% of expected 2012 credit supply (11.8 million tonnes, which is less than the credits from the only registered project in Qatar). Even if all 44 LDCs and 19 SIDS projects currently at the validation stage or in the registration process achieve registration, the 2012 expected credit supply will at most double. In terms of the number of projects, Cambodia (4), Cuba (2), and the Dominican Republic (2) have the most projects in the LDC and SIDS categories, respectively. In terms of CO<sub>2</sub>eq emissions reductions from the CDM expected by 2012, Bangladesh (1.1 million tonnes), Tanzania (1.1 million tonnes), and Cuba (2.4 million tonnes) are the most productive CDM host countries, with two, one and two registered projects, respectively. Four of these projects are landfill gas projects. The other is a Cuban energy-efficiency supply side project (UNEP Risoe, 2010).<sup>22</sup> For other LDCs and SIDS with lower expected credit supply, projects tend to come from the renewable sector (energy efficiency, bioenergy) and methane avoidance.

The findings imply that the CDM has been successful in finding low-cost abatement opportunities and, to a smaller extent, has addressed renewable energy projects. However, most of these projects occur in advanced developing countries. The CDM has failed to provide support at a larger regional scale.

### 3.2 Demand Side

The EU ETS is the largest demand market for CERs. In the first two years of Phase II of the EU ETS, companies have used nearly 164 million CERs. This is equal to 4.2% of allocated EUAs, well below the allowed average percentage of 13.8% of EUAs for the period 2008-2012. The use of CERs for compliance is distributed across nine sectors and one additional category (opt-in installations). Table 4 illustrates the use of CERs in absolute and relative terms for the period 2008-2009.<sup>23</sup>

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<sup>22</sup> The first sentence of the Cuban Project Design Document (PDD) reads that: “[t]he project activity converts an open cycle thermal generation facility into a combined cycle facility that adds approximately 75 MW of generating capacity to Cuba’s electric power grid with minimal incremental additions to greenhouse gas (GHG) emissions.” CDM Project 918: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13>

<sup>23</sup> An in-depth analysis of CER use by German companies in the EU ETS is provided by Hermann, Graichen, Gammelin & Matthes (2010). The authors find that profits to power producers – due to the interaction of free allocation, CER use, and the nuclear tax – amount to a total additional rent of up to €38 billion for the period 2005-2012. The total CDM arbitrage profits up to 2010 for German ETS are estimated to be approximately €1 billion. €42 million have already been earned in 2008-2009 from selling freely allocated EUAs and using cheaper CERs.

Table 4 Overview of CDM and JI credits use in EU ETS 2008-2009 in million tons (Source: CITL, 2010).

	Power	Refineries	Coke ovens	Metal Ore	Iron and steel	Cement and Lime	Glasses	Ceramics	Pulp and Paper	Opted-in	Total
CDM+JI in Mt.	115.2	9.2	1.8	0.4	14.6	15.3	1.3	1.6	4.2	0.1	163.7
Number of installations - % of total	1,744 - 22%	57 - 34%	6 - 27%	8 - 26%	39 - 16%	237 - 40%	64 - 14%	301 - 24%	231 - 26%	19 - 3%	2,706 - 22%
CER use as share of verified emissions	4%	3%	5%	1%	6%	5%	3%	7%	7%	0.2%	4.1%
CER use as share of allocated emissions	5%	3%	4%	1%	4%	4%	3%	4%	5%	0.2%	4.2%

Table 4 demonstrates that the Power, the Cement and Lime, and the Iron and Steel sectors together account for 88% of all CDM and Joint Implementation (JI) credits used for compliance. In terms of the share of EU ETS installations per sector, 40% of all ETS Cement and Lime installations (237 installations in total), 34% of all ETS Refineries, and 27% of ETS coke oven installations have used CDM and JI credits. In general, actual use of CDM and JI credits has fallen short of the allowed limit. In total, the EU ETS used about 44% of all CERs issued up to the end of 2009.<sup>24</sup>

The CDM use is concentrated in a small number of sectors and installations. These sectors have benefited largely from cost advantages. The right to use CERs also transferred substantial arbitrage rents to emitters, which could have been used for cost-effective mitigation domestically or in developing countries.

### 3.3 Performance

We now explore CDM performance against the four criteria of 1) additionality, 2) effective use of EU mitigation funds, and 3) sustainable and 4) low carbon development. If the performance does not match expectations, what is the impact on abatement in the EU and developing countries?

#### 3.3.1 Additionality

Various studies agree that a large share of registered CDM projects is non-additional (Michaelowa & Purohit, 2007; Schneider, 2009a; Wara & Victor, 2008). Based on a random sample of 93 of the 768 CDM projects registered by mid-2007, Schneider (2009a) finds that a large share of projects (up to 40%) would have happened without support from the CDM. In many cases, project developers' additionality demonstrations through investment analysis, common practice analysis, and barrier analysis, have not been credible. For the barrier and investment analyses, for example, project developers chose subjective, company-specific barriers or used company-specific investment hurdle rates, rather than a sectoral or national market rate, as suggested by EB guidelines. When using the common practice analysis, project developers frequently chose the technology narrowly and the

<sup>24</sup> Installations are subject to size thresholds for entering the EU ETS. Thus, a company can have multiple installations subject to EU ETS regulation. An example is a power producer that has different combustion installations in a country. Each is counted as a separate entity for the purpose of the EU ETS.

comparison group broadly (e.g. all national power producers) in order to demonstrate a low technology penetration rate for the technology in question.

Furthermore, the DOEs charged with validating projects' additionality have been ineffective in filtering non-additional projects. According to Schneider (2009), this results partly from a lack of guidance and partly from the misinterpretation of available guidance by both project developers and DOEs. With many projects, DOEs have not checked the credibility of the information provided by project developers in Project Design Documents, or they have simply restated the information given in the Project Design Document in the validation report. These findings are supported by various other scholars, who find a share of non-additional projects of between 20% (Michaelowa & Purohit, 2007) and two-thirds (Wara & Victor, 2008) in their analysis.

Other studies find evidence that the CDM is often the "icing on the cake," making already economically feasible projects more profitable (Ellis & Kamel, 2007; Haya, 2007). These authors find that projects have to be economically feasible without the CDM in order to attract investment capital in the first place. In addition, Purohit & Michaelowa (2007, p. 11) find that most wind energy projects in India pass the investment additionality test only if they omit tax benefits, which at least one project has done.

## **Impact on the EU and Developing countries**

### **EU ETS use of non-additional credits increases global emissions**

In general, for most EU ETS participants not involved in the development of CDM projects, non-additional projects are not distinguishable from additional projects—CER users trust in the UN certification process. Furthermore, individual EU ETS emitters do not have a particular incentive to check additionality, since a registered CER is the accepted currency for compliance. Their main aim is to reduce compliance costs. In contrast, non-additionality poses a serious challenge for the EU. If non-additional credits are used in the EU ETS, global emissions increase, and the investment in non-additional projects means a loss of investment for real emission reductions, both domestically and abroad. The influx of non-additional projects lowers the carbon price and decreases domestic incentives for abatement. This in turn undermines the momentum towards technological innovation and the associated cost reductions from increased low-carbon technology application. Thus, assuming non-additionality of between 20% and 66%, the use of CERs in the EU ETS in the period 2008-2009 increased global emissions by between 30 and 106 million tonnes of CO<sub>2</sub>eq.

### **Non-additional credits do not aid development and technology transfer in CDM host countries**

CDM host countries entered the CDM to achieve sustainable development and to be supported in reducing emissions by financial and technological transfers. Where projects are non-additional, the mechanism does not contribute to these objectives. By considering current policies when evaluating whether a project qualifies for additionality and for CDM credits, the process creates strong disincentives for countries to improve policy frameworks, since a share of the project cost would be paid for by CDM buyers instead of out of national tax revenues.

As a result of these analyses, the EB and DOEs have increased their scrutiny. Since the start of the CDM, 180 proposed projects have been rejected by the EB, 52 projects have been withdrawn, 165 received a negative validation by the DOE and 799 proposed projects have seen their validation terminated by the DOE. Despite this increased scrutiny, in the two-month period of October-November 2010, the EB registered a total of 131 projects, with an expected 2012 credit supply of 29.6 million CERs. While the majority (66%) of these new projects are in the renewables sector (Bioenergy, Hydro, Solar and Wind), 20% of the expected emissions reductions come from conventional, albeit more efficient, fossil fuel plants: Fugitive emissions (9%), Coal bed methane (8%) and Fossil fuel

switch (4%).<sup>25</sup> These latter projects subsidise conventional energy generation and use, and thus contribute to lock-in with carbon intensive activities.

## Summary

This section has shown that a large share of CDM projects display questionable additionality. The additionality criteria, while clearly defined as abstract criteria, it has been challenging to translate it into practice and to apply it consistently. The use of these non-additional credits leads to a global GHG emission increase. Moreover, part of the CDM funding still subsidises conventional fossil fuel use and supports carbon lock-in.

### 3.3.2 Efficient use of EU mitigation funding

European installations can choose to buy EU allowances, e.g. in an allowance auction, to cover CO<sub>2</sub> emissions, or alternatively, can buy CERs from CDM projects to cover CO<sub>2</sub> emissions. This suggests that raising finance with the CDM mechanism to support mitigation projects in developing countries is equivalent to auctioning EU allowances and using the revenues for mitigation projects. This equivalence does require that the EU ETS cap is tightened in line with the amount of CERs from CDM credits that are used. Thus, the CDM needs to be evaluated against the effectiveness at which it uses the finance made available for mitigation in developing countries.

### Industrial gas abatement projects

The CDM has been successful in terms of finding least-cost abatement opportunities. A small number (93) of industrial gas (HFC-23 and N<sub>2</sub>O) projects makes up 38% of total expected CERs by 2012 and made up 74% of issued credits to the end of 2010. Industrial GHG has a high global warming potential, acting as a multiplier to each tonne of the respective GHG destroyed, so such projects can provide a large number of certifiable emissions reductions at a low price. These projects are clearly additional, as the implementation of the project entails costs but no revenue—the CDM makes the project possible. However, the EUA price in the EU ETS leads to large rents created between primary CER prices and secondary CER prices. The rents accrue to the producers in developing countries, and thus create incentives to increase production. Thus the CDM subsidy can lead to carbon leakage caused by the shifting of production from the EU to CDM host countries induced by CER revenue (Schneider et al., 2010).

If the destruction of industrial gases had been implemented differently – for instance by national regulation – a large part of the cost of these projects could have been saved and reinvested in other mitigation projects. Wara (2008) has calculated that the yearly costs for abating all developing country HFC-23 would be about €26 million<sup>26</sup> while through the CDM, Annex I buyers paid between €250 and €750 million in total.<sup>27</sup> The Chinese government has recognized the large windfall profit from this project type and taxes CER revenues at 65% to create a sustainable development investment fund from the revenues. However, as Wara (2008) observes, the Chinese government has not taken steps to implement national legislation addressing HFC projects.<sup>28</sup>

<sup>25</sup> Fugitive emission projects involve the recovery and utilization of gas from oil fields instead of flaring. Coal bed methane projects capture methane and use it for energy generation instead of venting it to the atmosphere. A fossil fuel switch project usually involves switching from coal to gas. The latter two project types have been increasingly scrutinized, reviewed, and often rejected by the CDM Executive Board. However, some of these projects still achieve registration.

<sup>26</sup> Alternatives for abatement are: 1) through national policy in developing countries (e.g. standards or other alternatives), or 2) through direct financial support.

<sup>27</sup> At a mid-year 2008 Euro-US Dollar exchange rate of 1.19.

<sup>28</sup> Further analysis of the perverse incentive to increase the production of core product HCFC-22, only to increase revenue from HFC-23 credit sales, can be found in Wara (2008, p. 1783). Furthermore, Schneider, Lazarus, & Kollmuss (2010) show how production of (adipic acid) N<sub>2</sub>O has partially shifted from installations with installed

## Renewable energy projects

Renewable energy projects are the most numerous in the CDM (1,563 projects). They made up 14% of issued CERs by the end of 2010 and are expected to command a share of 29% of all CERs up to 2012. However, renewable energy projects have had a more difficult start than industrial gas projects (Ellis & Kamel, 2007; Ellis, Winkler, Corfee-Morlot, & Gagnon-Lebrun, 2007; Pearson, 2007). When evaluating CDM projects, banks discount expected CDM revenues because of the uncertainties around registration and issuance, future carbon prices, and potential import constraints. This reduces the contribution that CDM revenue can make to capital-intensive investment. Hence, CER cash flow is frequently only seen as an add-on to domestic support schemes (see discussion of Chinese support for wind in section 3.3.4.).

## Rents captured by European installations

European installations are only allowed to cover some fraction of their emissions using CER credits. Thus it is ensured, that some emission reduction remains to be pursued in Europe (supplementarity criteria under the Kyoto Protocol). It is assumed that mainly due to this limit, the secondary CER price has been consistently lower than the EUA price (Mansanet-Bataller, Chevallier, Hervé-Mignucci, & Alberola, 2010).<sup>29</sup> This price difference between secondary CERs and EU allowances (20-25% during January 2011) creates a rent for EU installations that are allowed to use a certain amount of CERs. The installations are under no obligations with regard to the use of this rent – thus it is unlikely to contribute to mitigation actions.

## Summary

The finance raised with the CDM mechanism is not used efficiently towards mitigation action. This results largely from the big discrepancy between EU ETS price and the costs incurred for mitigation actions. While very cheap mitigation options capture large rents, more transformational projects with potentially large scale carbon benefits cannot be initiated with the CDM mechanism, if up-front costs of initial projects are high relative to direct emission reductions.

The rents created with the CDM mechanism are shared between European installations, project developers, and traders. Some CDM host countries, such as China and India, tax part of the rents, and thus can also directly benefit (Liu, 2010). The significant amount of rents created by the system, contribute to a strong political dynamic towards a continuation of the mechanism.

## 3.3.3 Sustainable development

Developing countries made sustainable development a key condition of their agreement to the establishment of the CDM. The contribution that CDM can make to sustainable development, however, depends on how sustainable development is defined (Schneider, 2007), and the criteria used to define it currently vary between CDM host countries. For example, Ghana, India, Indonesia, South Africa, and Tunisia each use different combinations of environmental, social, and economic aspects, including poverty alleviation and technology transfer, through different weightings, numerical scoring systems, and a minimum average score thresholds that must be reached for approval (Schneider & Grashof, 2006). The choice of these parameters is by their nature subjective, and some country DNAs have approved a range of projects that comply with only one of the criteria. This is potentially the result of a “race to the bottom.” Countries that have more stringent sustainable development criteria compete with other CDM hosts that hold investors to less strict criteria, enabling

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abatement technologies to CDM plants, leading to carbon leakage rates of up to 20%, thereby increasing global emissions with the support of the CDM.

<sup>29</sup> Other explanations concerning transaction costs and regulatory risks are possible (see also Mansanet-Bataller, Chevallier, Hervé-Mignucci, & Alberola (2010)). However, these factors do not change the conclusion that the CDM lowers the stringency of the EU target.

the implementation of low-cost projects with larger rents and potentially lower risks (Schneider, 2007, p. 47).

Scholars and CDM experts analysing the sustainable development impact come to the conclusion that out of a sample of 200 (Olsen, 2007) and in-depth review of 16 projects (Sutter & Parreño, 2007) the CDM contributes only marginally to sustainable development. As international carbon markets do not attribute a price premium to sustainable development benefits (Nussbaumer, 2009; Olsen, 2007; Sutter & Parreño, 2007), Olsen & Fenhann (2008) argue for an international sustainable development standard in addition to national criteria.

Alexeew et al. (2010) argue that there is an inherent conflict between additionality criteria and expected sustainable development benefits. They derive their conclusion from an extensive review of 40 (31 of which are large-scale) Indian CDM projects, using multi-criteria analysis of the sustainable development claimed in the PDDs and the impact of the CER income stream on the internal rate of return (IRR) of the project.<sup>30</sup> In their sample, projects with an above-average sustainability performance were more likely to be non-additional, and vice versa. The authors conclude that any reform or minor change that addresses one of the goals of the CDM – additionality or sustainable development – must be undertaken with due regard for the impact of the other goal.

Sustainable development criteria vary between CDM host countries. This makes a pricing of the benefits into the carbon price difficult. Thus, investors will prefer cheap projects rather than sustainable projects priced at a premium.

### 3.3.4 Low-carbon development

The focus of international climate negotiations at Copenhagen and Cancun has shifted to low-carbon development strategies. While low-carbon development is just one aspect of sustainable development, we discuss it separately to highlight how it contributes to low-carbon development that has become the main strategy towards delivering mitigation objectives.

#### Technology Transfer

Achieving the CDM objective of facilitating technology transfer could make a significant contribution to low-carbon development. Experience from recent years suggests, however, that this vision has not materialized to any significant extent, and that projects have been mainly unilateral, with limited technology transfer. Technology transfer has primarily been found in large projects (Seres et al., 2009).

#### Support of domestic low-carbon policies

Only 29% of all CDM credits are generated with renewable energy projects (Table 2). The majority of these renewable energy projects are hosted in China and India. They are only viable because support from the CDM is complemented by additional support from domestic policies (Olsen & Fenhann, 2008). Without dedicated national support systems, CDM support has gone to conventional fossil fuels, industrial gases, and methane mitigation.

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<sup>30</sup> The sample used was chosen from the pool of 379 Indian projects registered in January 2009 and represents 90% of the main project types (number of projects): biomass (15), wind (12), hydro (7), energy efficiency (4) and HFC-23 (2). Sustainability benefits taken from Project Design Documents were assessed along economic development, environmental, and social dimensions, following the criteria in Olsen & Fenhann (2008). Economic criteria included sustainable and innovative technology, employment generation, financial benefits of the project, and cost-efficiency of GHG abatement. Social criteria analysed included stakeholder participation, social benefits for poorer parts of society, development support for poorer regions and impact on quality of life. Environmental criteria included project impact on air, soil, and water.



One factor that limits the effectiveness of the CDM in advancing and diffusing new low-carbon technologies and supporting projects in a wider set of countries are the regulatory risks incurred by investors in many developing countries. Teichmann (2010) analyses how risks have been shared between private and public partners in waste projects, using contractual structures. Her analysis suggests that public involvement in a project, through the provision of infrastructure for example, is needed but must be well designed in order to achieve economic and environmental efficiency. However, the involvement of public actors by itself might create a barrier to attain additionality status.

This need for public involvement was recognised at Copenhagen and Cancun, and developing and developed countries have submitted and are formulating Nationally Appropriate Mitigation Actions (NAMAs), which allow countries to describe the specific policies, programs, and international support needed to facilitate a low-carbon transformation in specific activities or sectors.

It is difficult, however, to align the CDM with the concept of NAMAs. A fundamental principle of the CDM is the measurement of additionality. If a NAMA creates an enabling environment for the diffusion of a new technology, then a project no longer requires financial support from the CDM. With a NAMA it is difficult to envision that countries would qualify for international support payments, meaning that the CDM would create a perverse incentive not to implement NAMAs.

### **Incentives to implement national mitigation policy parallel to the CDM**

To avoid such perverse incentives, an E+/E- rule has been defined for the CDM.<sup>31</sup> Projects are evaluated against policies that have historically been in place. This can allow governments to improve the support environment while retaining financial inflows from the CDM. The result is, however, equally challenging, as project developers can qualify for CDM projects even if the projects are already commercially viable under the current policy framework.

Aligning a project-based mechanism with NAMAs and other domestic policies to facilitate low-carbon development is challenging the CDM Executive Board. This has been exemplified in recent decisions.

### **CDM and renewables support schemes**

In its 51st session, the EB decided to reject ten Chinese wind farms because they could have been implemented without the CDM as a result of the feed-in tariff (He & Morse, 2010). The Chinese feed-in tariff had previously been decreased by the National Development and Reform Commission, and the EB feared that the CDM was replacing the feed-in support. However, the rejection based on this new tariff policy could be interpreted as a violation of the E+/E- rule. Even if the decision of the EB was correct in this case—in theory it would have prevented the approval of non-additional projects—it is not consistent with previous decisions, which deliberately ignored regulatory changes. This emphasizes the dilemma of the EB in deciding which projects to register. It also illustrates that credits are created from potentially non-additional projects, which are commercially feasible with available national support. The use of these credits increases global emissions.

### **Continuing support for carbon-intensive activities**

A further concern about the CDM is the significant support it offers to energy- and carbon-intensive activities, e.g. upgrades to improve efficiency of steel plants, ultra- or super-critical fossil-fuel power stations, and other industrial activities, which contributes to increased activity and growth in these sectors, rather than to a shift towards lower-carbon economic activities. For instance, in December 2009, the CDM Executive Board registered an Indian super-critical coal-fired power plant that was

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<sup>31</sup> The E+/E- rule stipulates that regulatory changes to the baseline at the national level should not be incorporated into baseline calculations if the regulation favours a less or a more emissions-intensive technology over the other (EB 22, Annex 3, paragraph 5). Regulations that give comparative advantage to more emission-intensive (E+) and less emission-intensive (E-) activities should be disregarded as of the end of 2001 and 1997, respectively.

expected to achieve 3.5 million tonnes of CO<sub>2</sub> emissions reductions.<sup>32</sup> Because CDM project qualification only stipulates that a project must have some level of support to be viable, this can easily result in situations where the CER price that is received by a project developer exceeds the incremental cost of emissions mitigation. The difference between the CER price and cost incurred are profits, many of them introduced into energy- and carbon-intensive activities.

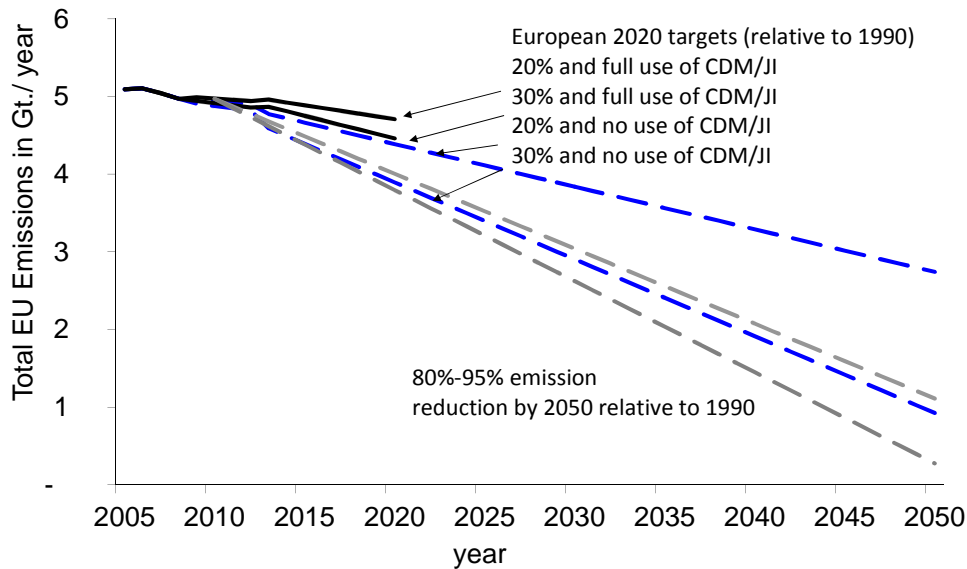
### The CDM as a first step towards a global carbon market

The CDM has often been supported in political discussions as a first step towards the development of a global carbon market, because it creates capacity, clarifies concepts, and initiates a certain level of data collection. If the CDM is continued and scaled up, however, it will create incentives for countries and stakeholders in those countries not to shift to a broader carbon trading mechanism. After all, countries and actors in countries that currently qualify for CDM credits are subsidized through the mechanism. Why would any country wish to move to a cap-and-trade system that imposes the cost of carbon on domestic actors and increases product prices for their consumers when the alternative is the continuation of a subsidy regime?

### CDM and EU ETS target stringency

In the EU ETS, the use of CERs reduces compliance costs in the short term but delivers fewer emissions reductions in the medium and long term, as illustrated in Graph 1.

Graph 1 Impacts of offset use on EU emissions trajectory and low-carbon opportunities (Source: CPI calculations)<sup>33</sup>



With full CDM use, Europe would reduce CO<sub>2</sub> emissions by 2020 by 7.5% relative to 2005, instead of 13.8% without any CDM use (Table 1). This is not compatible with the long-term emissions reduction objective of 80-95% necessary for achieving the EU target by 2050. The current market spread of 20-25% between CERs and EU ETS allowances, suggests that market participants assume a higher supply of CERs available relative to demand; i.e. the volume of projects that can be imported into the EU ETS. This implies that market participants expect the full capacity of allowed credits to be utilized

<sup>32</sup> CDM Project 2716: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1245932980.89/view>

<sup>33</sup> The factors used for the continuation of mitigation beyond 2020 were the linear reduction factors of the total EU cap from the period 2010-2020, resulting in a yearly reduction beyond 2020 of the cap by 55 million tonnes in the 20% and by 99 million tonnes 30% case.

by 2020. Delayed domestic abatement increases the costs in the future of mitigation and infrastructure investments necessary for a low-carbon transition.

Thus, the large-scale use of CDM credits – without a corresponding tightening of EU emissions reduction targets – weakens the policy framework that private-sector actors need to make strategic and investment choices in favour of low-carbon development.

### **3.3.5 Section Summary**

For the EU, the CDM lowers substantially the abatement efforts to be achieved through domestic efforts, and the cost of delayed abatement increases due to its presence. The rents accrued by EU ETS participants using the CDM are a result of generous allocation and the lower CER price. These rents reduce the cost-efficiency of mitigation and create incentives to maintain the status quo – e.g. not to pursue domestic mitigation policies in developing countries.

One fundamental principle of the CDM, to substitute some emission reductions in developed countries with emission reductions in developing countries, requires that all CDM projects are only viable because of the additional support provided through the mechanism. However, the existing reviews suggest that a large share of CDM projects is not additional, and would have happened anyway.

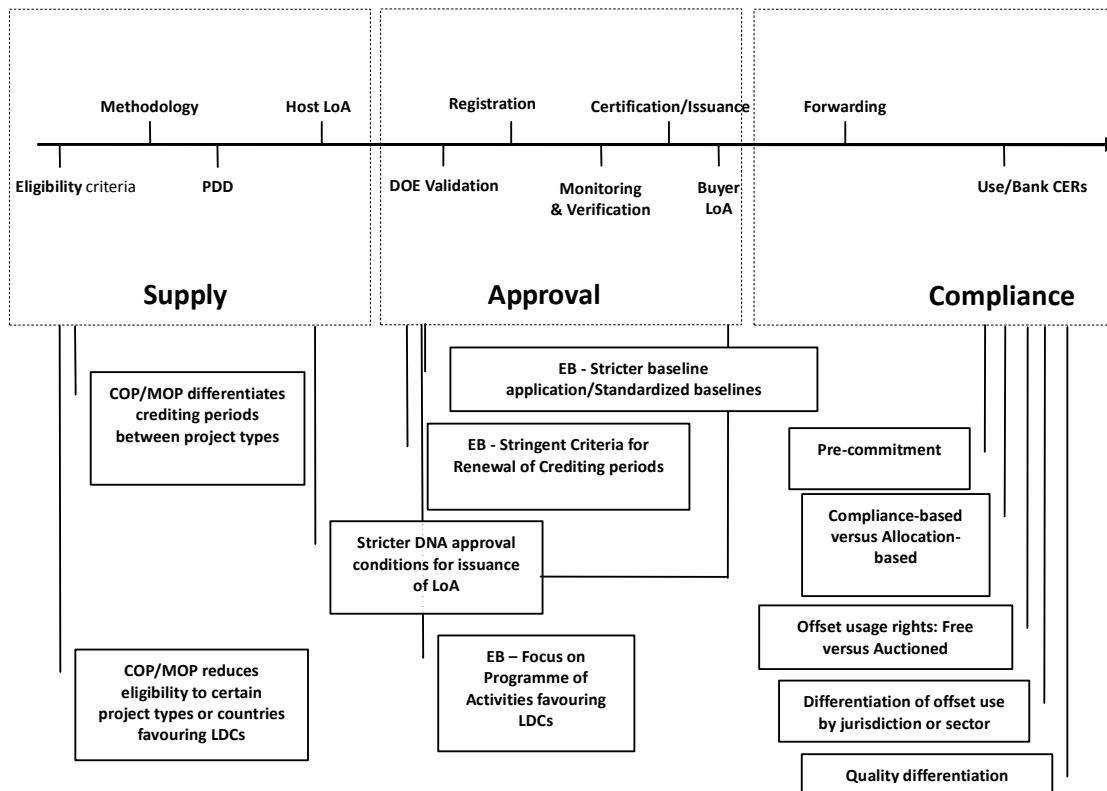
A discouraging result is that the CDM fails to demonstrate technological pathways and how it supports low-carbon development. These are important criteria for developing countries to establish national policies addressing mitigation that are aligned with their development goals.

## **4 Proposals to realign results with objectives**

New approaches to support developing countries' low-carbon development strategies are now in discussion. These approaches emphasize the need for domestic policy frameworks and build on initiatives by domestic stakeholders to achieve a low-carbon economy. They also involve direct co-operation with governments to enhance their ability to implement regulatory frameworks for low-carbon transitions. Such cooperation requires public finance support, which raises the question of how developed countries can contribute to the effort.

The following sections focus on options for transitioning from the CDM to other mechanisms of international climate co-operation. To structure the discussion, we first outline the CDM project cycle (Figure 1). It shows the various steps from supply to approval to compliance.

Figure 1 CDM Project Cycle



#### 4.1 CDM host/supply side opportunities<sup>34</sup>

In Figure 1, in the supply stage of a CDM project, two options have been identified for limiting supply and providing transparency. The first option is the strengthening of eligibility criteria for CDM project types so as to favour sustainable development and projects that have a large impact on the long-term low-carbon path. The second option is to review and differentiate the time in which support is granted (crediting periods) between project types.

##### 4.1.1 Limitation to projects that provide sustainable development /long-term benefits

The eligibility criteria for project types are set by the COP/MOP<sup>35</sup> and are supervised by the EB in their decisions on the registration of projects and approval of methodologies. Until now, the COP/MOP

<sup>34</sup> Other options discussed are sectoral trading and discounting of CERs. Sectoral crediting would apply a baseline to the whole sector. The system relies on defining the sector boundaries and awarding credits to sectors that stay below the baseline. Major challenges are the stringency (setting of the baseline on a national and international scale), the definition of the sector, and who should ultimately receive the sectoral credits. Discounting would apply a multiplication factor (below 1) to credits from certain project types (Schneider, 2009b) or regions (Castro & Michaelowa, 2009). This would ensure that at the aggregate level some real emissions reductions are generated, which are not offset through increases in the CDM buyer countries. Challenges include the determination of the discounting rate and which countries and projects would receive favourable rates. Furthermore, discounting, for example on the basis of sustainable benefits, could potentially hurt additional projects more than non-additional projects – since discounting decreases the CDM cash flow to projects (Hepburn, 2009:p. 16). Non-additional projects by definition carry on towards registration, while additional projects become economically unfeasible even with CDM revenue.

<sup>35</sup> “COP” stands for Conference of Parties, and “MOP” for Meeting of the Parties, respectively. They denote the highest positions within the UNFCCC framework.

has only disallowed the use of credits from nuclear and avoided deforestation activities. For the period post-2012, however, it could further limit the scope of the CDM and exclude additional project types. Since decisions at the COP/MOP level are made by consensus, the challenge is to find criteria that are supported by project host countries and buyers, and which constrain the creation of project credits. Implementing regional restrictions, e.g. restrictions to Least Developed Countries, as proposed by the European Commission, could also be used to limit the volume of project credits created. However, as of now, the EB can only influence regional distribution by designing CDM methodology to favor project types of interest to LDCs.

### **Impact on the EU and Developing countries**

Within the EU, the change in the eligibility of project types will have an impact on the EU ETS carbon price, if the supply of credits is substantially constrained.

Within CDM host countries, the focus on the eligibility of projects in line with a low-carbon transition could contribute to technological momentum. Projects that do not meet criteria will have to be addressed through national regulation. This can lead to an efficient use of funds for abatement, as rents are not lost in the process. All else being equal, however, these measures must be paid for by domestic tax income or government investment financed through debt. The change in eligibility also does not address the problem of non-additional projects or the reluctance of banks to incorporate CDM finance in their lending decisions due to uncertain future CER values. The main challenge of this approach, however, is political, because CDM host countries might disagree on which projects contribute to sustainable development and a long-term transition to a low-carbon economy.<sup>36</sup>

#### **4.1.2 Crediting period differentiation**

Currently, CDM project developers can decide whether they want to receive credits for seven years, with the option of two renewals of seven years each (i.e. a total of 21 years), or whether they want to receive project credits for ten years without renewal (3/CMP.1, Annex, paragraph 49).<sup>37</sup> This rule does not differentiate between projects, despite the difference in economic pay-back periods between project types (see UNEP Risoe, 2010). If the COP/MOP could differentiate pay-back periods across project types, they could limit the incentives for investment in some project types as well as the rents accrued to certain project types.

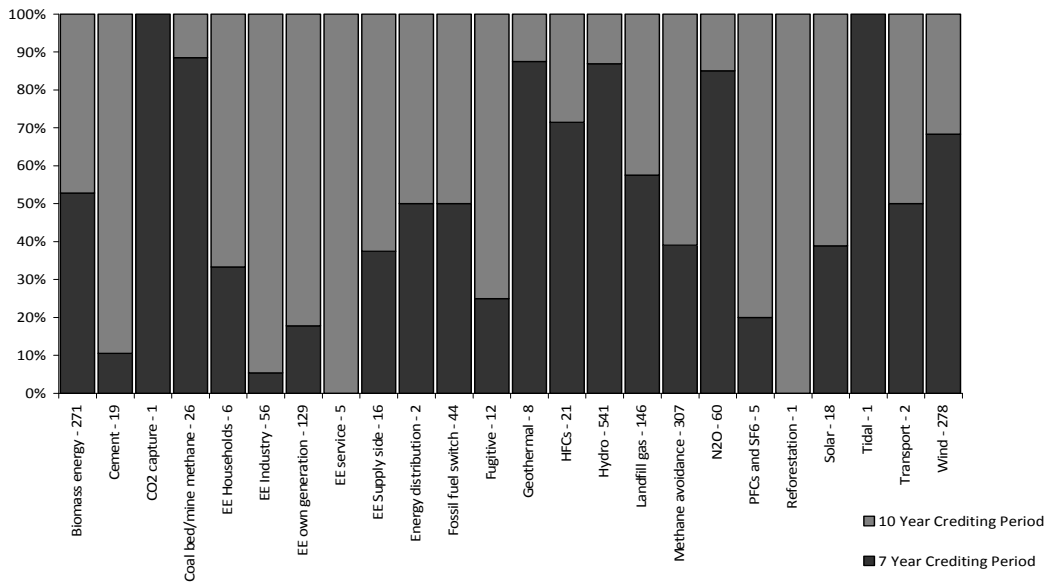
UNEP Risoe (2010) indicates that the largest number of projects chose the option of seven-year credits with two renewals (21 years total). It is highly unlikely that most projects need such a long pay-back time in terms of CERs to become commercially viable. Differentiating crediting times by project types could be an option, although it carries with it increased transaction costs and requires the collection of more information about the specific project types.

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<sup>36</sup> On earlier instances China and India opposed the exclusion of HFC-23 projects from the CDM (Egenhofer et al., 2011)

<sup>37</sup> The crediting period for Afforestation and Reforestation projects is either twenty years renewable twice, or a single thirty year period (5/CMP.1 Modalities and procedures for afforestation and reforestation project activities under the clean development mechanism, Annex, paragraph 23). The same applies to CDM Programme Activities in Afforestation and Reforestation projects (EB 32, Annex 38, paragraph 10).

Graph 2 Choice of crediting periods for registered projects (Source: UNEP Risoe, 2010)



### Crediting period differentiation - Impact on the EU and Developing countries

The EU ETS would be impacted by the change in credit supply from shorter crediting periods. Assuming no retroactive change in the crediting practice of already registered projects, expected CER supply up to 2012 is sufficient for EU ETS demand. EU CDM project developers would see a decrease in their rents after 2012, if DOEs and the EB were able to verify the information in the PDD on payback periods. Lower rents would decrease the subsidy to large conventional fuel and technology participants in the EU. This implicitly increases the incentive for these installations to invest in long-term abatement.

CDM host countries would profit from a better distribution of CER funds. Project types that might have received less attention by the CDM could be able to apply for the necessary support through differentiated crediting after 2012. Project developers, however, face the additional uncertainty as to whether the crediting period will be accepted by the DOE and the EB. This in turn leads to difficulties in finding finance partners. Non-additional projects are likely to benefit, as they do not need the CER finance.

### 4.2 Approval phase opportunities

In the approval phase, the Designated Operational Entity validates the Project Design Document and submits the host country Letter of Approval and a validation report to the EB for registration. If the EB does not respond within eight weeks of the submission, the project is registered. Subsequently, after monitoring actual emissions, the emissions reduction is certified and issued by the EB. After a Letter of Approval is issued by the buyer country's DNA, the credits can be forwarded to the buyer's (e.g. EU Member States) registry and subsequently traded, used for compliance or banked in the ETS and non-ETS sector. Figure 1 indicates three options for restricting supply of credits: 1) stringent renewal criteria for crediting periods, 2) a stringent, potentially standardised baseline application, and 3) conditional approval of projects through DNAs. It is unlikely that any of these changes would – by themselves – result in a significant change to the volume of project credits created. However, if these changes were to increase transaction costs significantly, they might reduce the profitability of projects and thus block some of the marginal projects.

For projects opting for a two times seven-year crediting period, the decision for the second approval is pursued based on the current methodology and new baseline. Up to the beginning of December 2010, 86 registered projects finished their first crediting period and could renew their crediting period. By the end of the 2012, 205 projects will be eligible for renewing their crediting period, adding a volume of 144 million CERs in their second crediting period. At the time of renewal, it might be possible to request projects to demonstrate that the sustainability criteria that justified the project's acceptance were actually fulfilled in the first crediting period. If the criteria were not fulfilled, the projects should not be renewed. The main criterion for the approval of any project is the demonstration of additionality. This raises questions as to (i) whether a project that already exists requires additional support to continue, (ii) whether a project which was implemented with limited certainty about post-2012 frameworks (and hence typically has no revenue assumptions post-2012), does require such revenues, and (iii) whether any such change would be interpreted as ex-post adjustment, which would damage the credibility of the international regulatory framework for future low-carbon investment.

As in the baseline case, host and buyer countries have an incentive to maximize profit and CER volume. Therefore, the criteria for issuing Letters of Approval, by both host and buyer countries, should be reviewed. To prevent a regulatory race to the bottom for approval criteria and strategic baseline choices, a buyer country could restrict issuing a Letter of Approval to projects that meet certain quality and sustainability criteria. However, due to fungibility of credits and EUAs, CERs would find their way into the compliance system if EU Member States could not harmonize their criteria, so the strategy of restricting Letters of Approval requires a significant co-ordination effort. The interpretation on the rules for the use of offsets from large hydroelectric power plants in the EU ETS Linking Directive is an example of how difficult harmonization is in this field. The different interpretations of the World Commission on Dams criteria, which are to be taken into account according to the EU Linking Directive, led to the most Letters of Approval being issued by the Netherlands; the country with the most transparent and easy-to-comply-with criteria. The ex-post harmonization effort required negotiation consensus and giving up certain sovereign decision options (Article 11b (6) of Directive 2004/101/EC).

### **Renewal of Crediting periods - Impact on the EU and Developing countries**

For the EU, the decision it makes about the renewal of crediting periods will have a similar effect to that of the decision about differentiated crediting periods. The difference is that with the former, EU ETS participants have an increased certainty about credit supply. If EU ETS participants expected and were dependent upon receiving CERs for a second commitment period, they would face increased compliance costs and would thus oppose such a rule. This scenario is unlikely, as most CDM projects have been conducted based on the expectation that they will be feasible with CDM support until 2012, since at the time of implementation, the future beyond Kyoto was uncertain. Reviewing the EU Member State practice of issuing Letters of Approval for CDM projects only has a credible effect on CER supply if it is harmonized and enforced at the EU level.

CDM host countries' Letters of Approval are dependent on the national definition of sustainable development. Thus, establishing additional international criteria for sustainable development, especially the verification of the achievement of sustainable development benefits claimed, could help to prevent a regulatory race to the bottom and could increase the share of long-term benefits achieved through projects (Olsen & Fenhann, 2008). The imposition of sustainable development criteria through the EU Letters of Approval might be viewed critically by some CDM host countries if vested interests are suspected. Thus, common criteria and verification methodologies should be developed by both parties together. This is subject to the high demand for negotiation resources and information needs, which the CDM must deliver. The high informational costs, combined with weak incentives for project developers to provide them, have been pointed out by Wara & Victor (2008). Furthermore, national or international support mechanisms must be found to address the project types

that are not approved through Letters of Approval or those that are additional and whose crediting period has not been renewed.

### 4.3 Demand side opportunities on the EU side

A number of options are open to the EU regulator to limit the use of the CDM:

- Enable the tradability of “the right to use CERs”
- Charge an institution with CER procurement
- Change the basis for allocating CER usage right to a share of verified emissions
- Limit the use of CERs subject to quality criteria

#### 4.3.1 Limit eligibility (quantitative and qualitative)

Currently, the main limitation to CDM use within the EU ETS is quantitative; some Member States have more stringent allocation limits than others. For example, a German installation receiving 100 grandfathered EUAs can use 22 CERs for compliance. An analogous installation in Slovakia would be allowed to use 7 CERs.

In addition to these quantitative restrictions, the EU regulator could apply qualitative restrictions. Since not all registered projects are sustainable and additional, the regulator could restrict use to high quality projects that were clearly identifiable, if the buyer parties agreed on stringent quality criteria. This is the same situation as deciding on criteria for Letters of Approval. Renewable energy and energy-efficiency projects could be given priority. Adding project quality criteria is likely to decrease the volume of credits eligible and increase the price of the eligible offsets. The main difficulty is in harmonizing the criteria across the EU. Because both the abatement and the sustainability value of a project would be priced in this way. Additional quality criteria could only be included under a review of the directive, which can only be implemented after December 2012.

The European Commission has already taken steps in this direction. It has carried out an impact assessment banning the use of CDM credits from industrial gas projects (HFCs and N<sub>2</sub>O<sub>s</sub>). The proposal to ban these credits has received a positive vote in the Climate Change Committee, consisting of all EU Member State representatives. The European Parliament has a three-month period to comment on the proposal after which the Commission will formally adopt it. The restriction will apply from May 2013 onwards.<sup>38</sup>

The quantitative and qualitative limit of CER use within the EU has an impact on both the EU and developing countries.

The EU regulation on quantitative limits benefits installations in countries with a generous CDM limit. The limit leads to a price spread between EUAs and CERs, with the arbitrage rent captured by ETS installations that have a generous CDM limit and due to generous free allocation of EUAs. The quantitative limit has been criticized by various economists, as it undermines the equalization of marginal abatement costs across regions and increases aggregate abatement costs instead (Böhringer, Löschel, Moslener, & Rutherford, 2009; Bollen, Gielen, & Timmer, 1999; Criqui, Mima, & Viguier, 1999).

Qualitative limits decrease the number of eligible projects overall. As long as there are other CDM buyers in addition to the EU, qualitative rules lead to a fragmentation of the market, with some credits being accepted by the EU and commanding a higher price while other projects are not accepted but

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<sup>38</sup> “Emissions trading: Commission welcomes vote to ban certain industrial gas credits:”  
<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/56>



eligible in other buyer countries. A fragmented market is by itself not a disadvantage. Given that the EU is currently the main buyer, other countries might learn from EU experience. Furthermore, the quality regulation, if well implemented, would increase the momentum for domestic EU abatement and the development of a competitive low-carbon economy well before other world regions.

Quantitative limits reduce the credit demand from CDM projects. Given the stringency of EU targets, current CDM limits, are generous and have not been used to their allowed threshold in the period 2008-2009. The implementation of quantitative limits is an implicit signal to developing countries that the EU is serious about climate change and that the additional costs from imposing the limit do not impose an intolerable burden on the EU economy. No limitation – while economically efficient – could foster the perception that industrialized nations are buying their way out, which is often cited by developing countries. Furthermore, it fosters the perception as engaging in abatement is harmful to economic development. CDM host countries profit most from a qualitative regulation if their own criteria are reflected in the definition of quality.

#### **4.3.2 Tradable CDM usage rights**

The CDM limit creates a rent equal to the price spread between EUAs and CERs. Assuming that demand to use offsets exceeds the limit set by the regulator (e.g. the complementarity condition), one could envisage a scheme that requires the presentation of an offset certificate for every CER that is to be imported into the EU ETS. If the certificates are allocated for free to existing installations, this approach is largely equivalent to the current scheme of installation-based limits for the use of CER credits. As the right to use offsets effectively transfers a monetary value to an installation that can use cheaper CER credits for compliance, this right could also be sold, e.g. in an auction. Auctioning corrects for potential arbitrage profits made by EU ETS operators that receive both allowances and offset certificates for free, and is the preferred option from an efficiency and competition point of view.

The initial allocation of offset certificates must counter potential market power effects, i.e. it would have to ensure that the rights are spread widely. Concerns about potential monopoly power could reduce actors' interest in investing in CDM projects, since the exercise of market power would result in an increased spread between the CDM and the EU ETS allowance price. Transparent monitoring would be essential to limit this effect.

#### **Tradable CER usage rights - Impact on the EU and Developing countries**

The additional cost incurred for CER usage rights brings the cost of CER use closer to the actual EUA price. If the CER usage rights are auctioned to ETS installations, Member State government revenues will increase accordingly. These funds can be used for additional cost-efficient mitigation domestically and internationally. Furthermore, for CDM host countries the CDM usage right potentially increases the demand for credits, and increases certainty in the market.

#### **4.3.3 Institutional EU procurement of credits**

Another option for achieving an equalization of prices between allowance prices and CDM credits is the "Institutional EU procurement of credits" (pre-commitment) option. Under this approach, the regulator issues additional allowances equal to the allowed offset limit. These allowances could be sold through an auction or distributed for free among existing installations. When the regulator issues the additional allowances, it signs an agreement to buy the same volume of offsets in the international market. Thus, no rents would accrue to private actors from the difference of CER and EU ETS prices.

## **Institutional Procurement - Impact on the EU and Developing countries**

By acting as a large buyer in the CDM market, the EU regulator could minimize transaction costs and impose certain quality purchasing standards on the CDM market. It could also offer the opportunity for the purchasing institution to sign long-term contracts to support early stage CDM projects and promote renewable energy and other sustainable development. This could serve as a credible signal to project developers in the CDM market, and would enhance certainty in the CDM market about what projects are accepted not only by the EB but also by the compliance market. It is not clear, however, whether one single organization is sufficiently responsive to national circumstances and needs across many countries.

### **4.3.4 Changing the basis of allocating CDM usage limits**

Under entity-based limitations, each emitting entity is entitled to use offsets for a pre-defined share of either compliance needs ("compliance option") or of allocated allowances ("allocation option"). Under the former option, the higher an entity's verified emissions, the more CERs it can use. Under the latter rule, the higher the free allocation, the more CERs an entity can use. The rules differ in their effects on distribution, incentives for domestic emissions reductions and incentives to engage in international activities. The compliance option could give rise to perverse incentives to increase emissions, while the allocation option might give rise to competitive distortions by enhancing the distortions caused by free allocation.

If the CDM limit is binding, the right to use CDM credits to cover domestic emissions becomes valuable. If governments allocate allowances for free, this is likely either a reflection of industrial policy perspectives or of domestic political economy, or an attempt to target emissions leakage. This might justify linking the benefit arising from using CDM credits to allocation of allowances, rather than granting the benefit to all installations.

### **Change of allocation basis - Impact on the EU**

The allocation of the right to use CDM credits in proportion to either current (compliance option) or recent (historical) CO<sub>2</sub> emissions, create a benefit from increasing CO<sub>2</sub> emissions. Another approach, in which the right to use offsets must be bought, leads to reduced distortions and reduced perverse incentives for domestic EU ETS installations.

## **4.4 Summary of options to limit CDM**

The options to limit the CDM include supply-side and compliance-side options. On the supply side, the Executive Board can introduce rules to favour long-term sustainable projects, such as renewables, through differentiated approval and renewal criteria of crediting period length, apply baselines more stringently, and, finally, enable harmonization of approval criteria between host countries to restrict a race to the bottom. On the compliance side, installation-based CDM limits could be tightened, tradable CDM usage rights could be introduced and auctioned, or a public institution could be created instead, which would acquire a pre-defined quantity of CDM credits, with a focus on agreed quality.

## **5 Concluding remarks**

In this paper, we have presented arguments that the CDM should be considered as a transitional, not a permanent, tool of international climate co-operation. It creates incentives to delay domestic climate policy in developing countries and limits ambition for low-carbon transformation in industrialized countries. This suggests a need for structured transition from the CDM to other schemes of international climate co-operation, including international financial mechanisms based on auction

revenues and other revenue streams. This paper has focused on the different options available to structure such a phase-out and has presented an individual evaluation of their economic and political merits.

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## Annex 1: The regulations for the CDM limit: CDM under the 20% target

The volume of CDM credits that can be used for the period 2008-2020 can be calculated by three approaches:

- The amended EU Emissions Trading Directive (2003/87/EC) defines limits for the use of CDM credits post-2012. Within the EU ETS, the unused CDM quotas from Phase II can be used. The overall CDM quota over 2008-2012 is equal to 1,436 million tonnes.
- The CDM limit as a percentage of allocation varies across NAPs and in Article 11a, the EU ETS directive increases this percentage limit to “not lower than” 11%. With this rule, the total CDM limit is equal to 1,534 million tonnes without the new scope and 1,574 with the new scope.
- Using the supplementarity criteria, that up to half of the reduction effort can be covered with offsets, we arrive at 1,424 million tonnes without the new scope and 1,471 million with the new scope.

In the following we will use the more restrictive supplementarity criterion.

Ex-ante it is not clear whether this potential demand will be realized, nor whether it can be satisfied with CDM credits. The types of credits that can be used post-2012 are contingent on a satisfactory climate change agreement and are divided into three categories of eligible credits:

- Credits from projects that started before the end of 2012, and the resulting credits up to the end of 2012;
- Credits from projects that started before the end of 2012, and which are issuing credits after 2013; and
- Credits from projects that started in 2013, and are being pursued in Least-Developed Countries.

For the first category (registered and issued credits before 2013), the competent authority can convert unused credits issued until March 31st, 2015, into allowances valid from 2013 onwards (Article 11a (2)). All other credits (under categories two and three) used post-2012 can only be generated from project types that were allowed in phase II. However, additional qualitative criteria might restrict the variety of project types eligible, subject to a comitology procedure.<sup>39</sup> New entrants, and new entrants from phase II and aviation (Article 11a (8)), which have not received an entitlement to use offsets or free allocation pre-2012, can use offsets “not below” 4.5% of their verified emissions in the period 2013-2020.

In addition, EU Member States can use CDM credits to cover emissions in the sectors that are not covered by EU ETS, towards their national target. In the absence of an international agreement on climate change, EU Member States are allowed to use CDM credits up to 3% of their 2005 non-ETS sector emissions annually for the period 2013-2020. In addition, 12 Member States can use an additional 1% of their 2005 non-ETS sector emissions from project-based credits in the same period.<sup>40</sup> The credits allowed through the additional 1% are non-tradable, non-bankable and can come only from projects in LDCs or Small Island States. In total, this amounts to an annual allowance of 97.8 million tonnes of CDM offsets, a total of 782 million tonnes in the period 2013-2020.<sup>41</sup> Of these, 78.2 million tonnes can exclusively be provided from LDCs. Potential CDM supply currently in the pipeline

<sup>39</sup> Preamble 29-31 of Revised EU ETS Directive 2009/29/EC.

<sup>40</sup> Council of the European Union (2009: paragraph 16)

<sup>41</sup> However, should a Member State have more stringent national targets, “the limitation imposed by this Decision on the use of greenhouse gas emissions reduction credits should not apply to the additional emissions reductions to attain the national objective.” Council of the European Union (2009: paragraph 17).

from LDCs is 112 million tonnes up to 2020, of which 5.1 million tonnes is already registered, and less than 20,000 million tonnes had been issued before 2010.

Thus, under a 20% target, total EU CDM demand is potentially 2,253 million tonnes with the new scope (1,471 million tonnes + 735 million + 47 million tonnes) and 2,206 million tonnes without, in the period 2008-2020.

## **Annex 2: What would the CDM limit be in the case of the 30% target?<sup>42</sup>**

The move to 30%, described in the following section, is based on key assumptions, which have not been confirmed by official European Commission decisions. The total reduction necessary in by 2020 is 1,669 million tonnes below EU 1990 emissions of 5,564 million tonnes.

Assuming the effort-sharing between the EU ETS and non-ETS sectors stays equal to their shares in the 20% target, then the 493 million tonnes additional CO<sub>2</sub> emissions reductions are split to 301 million tonnes and 192 million tonnes between the ETS and non-ETS sector, respectively. This would shift the linear reduction factor from 1.74% to 3.19% for the EU ETS reduction target. EU ETS allocation under the 30% target would be equal to 1,531 million tonnes in 2020 including new scope.

If we assume that the CDM limit remains half of the emissions reductions (i.e. complementarity equal to 50% relative to 2005 emissions levels), then the EU ETS CDM limit will be 2,207 million tonnes for the EU ETS sector for the period 2008-2020, not including the new scope.<sup>43</sup> Adding the CER allowance from the new scope would increase this number by 86 million tonnes, to 2,294 million tonnes.<sup>44</sup>

For the non-ETS sector, assuming the ratio above, the move to the 30% target would require additional emissions reductions of 212 million tonnes in 2020. This translates into a 17.1% reduction target, relative to 2005.<sup>45</sup> Additional 534 million tonnes (for a total of 1,269 million tonnes) of CDM credits would be allowed in the non-ETS. The total EU CDM limit sums up to 3,563 million tonnes under the complementarity criterion.

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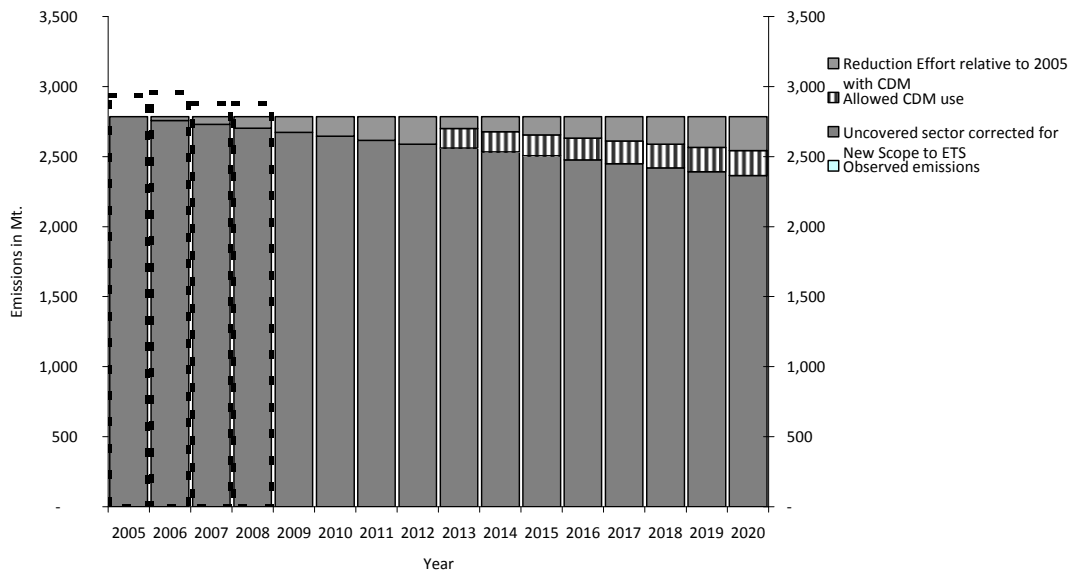
<sup>42</sup> In this paper, we do not account for the possibility that, under a higher target, Member States might get access to credits from LULUCF.

<sup>43</sup> Including the CDM limit for aviation would add 47 million tonnes.

<sup>44</sup> Difference caused by rounding.

<sup>45</sup> The European Commission proposal suggested that the additional emissions reductions due to a 30% target should be distributed among Member States according to their non-ETS emissions share in 2020 under a 20% reduction target. This rule was not included in Decision 406/2009/EC. Instead, the Decision reads in the preamble: "Upon the approval by the Community of an international agreement on climate change, the emissions limits for Member States should be adjusted to achieve the Community's greenhouse gas emissions reduction commitment set out in that agreement, taking into account the principle of solidarity between Member States and the need for sustainable economic growth across the Community. The amount of credits from greenhouse gas emissions reduction projects in third countries that each Member State can use should be increased by up to half of the additional reduction effort under this Decision".

Graph 3 Emissions trajectory non-ETS sector under a 30% target



Graph 4 Emissions trajectory ETS sector under a 30% target

