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How Many CERs by 2013?

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Abstract

This paper exploits the data related to CDM projects currently being implemented around the world and attempts to estimate the future amount of certified emissions reductions (CERs) generated by 2013, i.e. before the end of the third phase of the EU ETS, which is the main demand source for CERs until now.

We first consider historical development of CDM projects, which reveals bottlenecks in the process due to delays and risks. We establish a model taking into account three delays and two risks: a delay at the stage of validation (285 days on average), a delay at the stage of registration (111 days on average), and a delay at verification (180 days). Delays make certified emissions reductions to be issued later than expected, but do not affect the total quantity of CERs generated by projects. This later effect is taken into account by two correcting factors: a validation success factor - all projects at validation will not be registered (97.9% of the expected emissions reductions on average) - and an issuance success factor, which represents the risk of under/over performance (96.7% of expected credits are actually delivered on average). Those delays and risks are calculated based on historical data for each host country and project type, and used each month to estimate future CER flows of projects that are not yet issuing credits.

Based on the evolution of our monthly estimate during the past year, we anticipate that 1.6 billion CERs will be generated before the end of April 2013 when the second compliance period of the EU ETS ends.

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The Mission Climat is a research center on climate change economics www.caissedesdepots.fr/missionclimat. It is part of CDC Climat, the department of Caisse des Dépôts in charge of carbon finance activities.

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1. Introduction

The central feature of the Kyoto Protocol is its requirement that countries limit or reduce their greenhouse gas emissions. By setting such targets, emission reductions took on economic value. To help countries meet their emission targets, and to encourage the private sector and developing countries contribute to emission reduction efforts, negotiators of the Protocol included three market-based mechanisms: emissions trading between Annex B countries, the Clean Development Mechanism (CDM) and Joint Implementation (JI).

Among those three mechanisms, the CDM has proved to be the most successful until now. The CDM allows projects reducing emissions in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO_2. These CERs can be traded and sold, and used by industrialized countries to meet part of their emission reduction targets under the Kyoto Protocol. The aim is to stimulate sustainable development, technology transfers and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction limitation targets. It is the first global environmental investment and credit scheme providing a standardized emission offset instrument. Since the first project was submitted in late 2003, more than 5,000 projects have entered the pipeline, i.e. are being developed; out of those projects, more than 1,600 have been registered and may lead to a total emission reduction of more than 3 billion tons of CO_2 equivalent in the first commitment period of the Kyoto Protocol.

Empirical evidence show that *ex-ante* expectations do not always happen: the process that leads a project's concept to become effectively implemented and to reduce emissions is quite uncertain. There are delays and risks all along the road, from the project conception and validation to the actual issuance of CERs. Most of the demand for CERs comes from the European Union Emission Trading Scheme (EU ETS), and additional demand could show up as other cap-and-trade systems (in the United States, Australia, New Zealand etc.) develop. It is thus necessary to quantify or estimate the "real" supply of CERs – i.e. taking into account risks and delays. This paper describes the CDM conception and implementation process, and its historical development, in the second section. The third section analyses empirical evidence, explains which are the delays and risks accounted for and details the methodology used to estimate the "real" CER supply. The fourth section presents a static estimate of CER output by 2013, using the information available as of August 2009, based on the results of our model, and a dynamic estimate of CER output, obtained by extrapolating static results over the last year into 2013; and the fifth section briefly discusses those results.

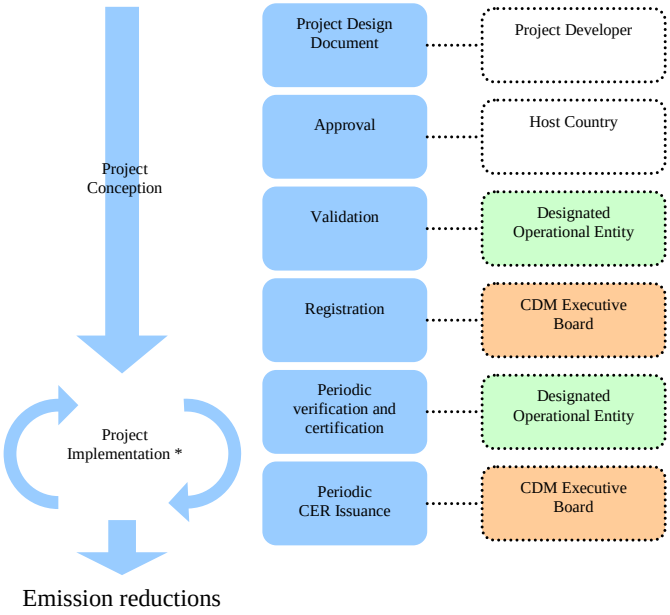
2. The Clean Development Mechanism Process

2.1. From project design to Certified Emission Reductions

There are two major phases in a CDM project's process: (i) the conception phase, during which the project's concept is technically approved and officially recognized as compatible with CDM rules, and (ii) the project implementation phase, during which emissions reductions occur, are verified and CERs are issued. Four different actors play a part at one time or another in the process.

- The project developer is responsible for the project design. He compiles a Project Design Document (PDD), under an official UN format, and submits it to the public for comments.
- The Designated National Authority of the project's host country must approve the project.
- The Designated Operational Entity (an auditor, chosen by the project developer among the auditors accredited by the CDM Executive Board) is responsible for the *ex-ante* validation of the project, and for the *ex-post* verification of the emission reductions, once the project is implemented. In principle, validation and verification of emission reductions for a given project have to be carried out by different Designated Operational Entities.
- The UN's CDM Executive Board registers – or rejects - projects as official CDM projects and issues the emissions credits once the projects are implemented and emission reductions verified by a Designated Operational Entity.
- Projects are registered either for a 10-year or a 7-year crediting period, at the choice of the project participants. In the latter case, the crediting period may be renewed up to two times, thus yielding a total crediting period of up to 21 years.

Figure 1– The CDM process: steps and associated actors



** : 10 years non-renewable, or 7 years renewable up to three times ; 20 years renewable up to three times for forestry projects*

Source: UNFCCC.

2.2. CER demand: Europe and the rest of the world

A Certified Emission Reduction is currently the most widely recognized carbon asset around the world. The demand for CERs is threefold:

- The international Kyoto market: the demand coming from Annex B countries that ratified the Protocol, and that are willing to compensate a deficit of Assigned Amount Units (AAUs)[1] by the purchase of CERs. Depending on how countries will arbitrate between AAUs, CERs, and Emission Reduction Units (ERUs) coming from Joint Implementation projects, the demand for CERs could go from near zero to 1,500 Mt. That being said, there is a potential surplus of AAUs on the market, and a lot of uncertainty remains on whether there will be a real demand for CERs if AAUs remain cheaper. Some countries have already announced their will to or not to purchase CERs. Among those willing to purchase CERs, a number of countries have already set up government procurement programs[2].
- Regional emissions trading schemes: the demand coming from "regional" trading schemes that have allowed for the import of Kyoto credits. The major demand by

[1] AAUs are the CO_2 assets that are given to Annex I countries under the Kyoto Protocol.

[2] See for example : Cochran & Leguet, 2007, *Carbon Investment Funds – The Influx of Private Capital* available here http://www.caissedesdepots.fr/missionclimat

far is coming from the European Union Emission Trading Scheme, in which a total import of roughly 1,400 Mt is allowed until 2012. Other demand from other emerging cap and trade systems might become significant within a few years, mainly from the United States.

- Voluntary demand: the demand coming from different types of private actors. For example, a private company with no constraint but willing to compensate emissions can buy CERs on the market (or directly finance a project). This so-called voluntary demand is *a priori* negligible.

Table 1 – Cumulated demand estimate for CER until 2012

	CER Demand estimate, 2008- 2012 (Mt)		CER Demand estimate, 2008- 2020 (Mt)	
	Low estimate	High estimate	Low estimate	High estimate
International carbon market (Kyoto)				
EU27 - domestic	100	1000	900	2100
Japan	200	400	200	1600
Canada	0	0	0	360
New Zealand	0	10	0	50
Australia	0	100	0	500
Other carbon markets				
EU27 - EU ETS	1100	1400	1500	2700
Japan Voluntary ETS	0	5	0	20
United States ETS	0	0	0	500
Voluntary demand	0	10	0	30
Total	**1400**	**2925**	**2600**	**7860**

Note: figures given here are broad estimates; except for the EU ETS since the Climate-Energy Package fixes maximum potential credits imports up to 2020 (end of phase 3). Difference between the low and high estimates in the EU ETS mainly depends on whether a future international agreement is ratified.

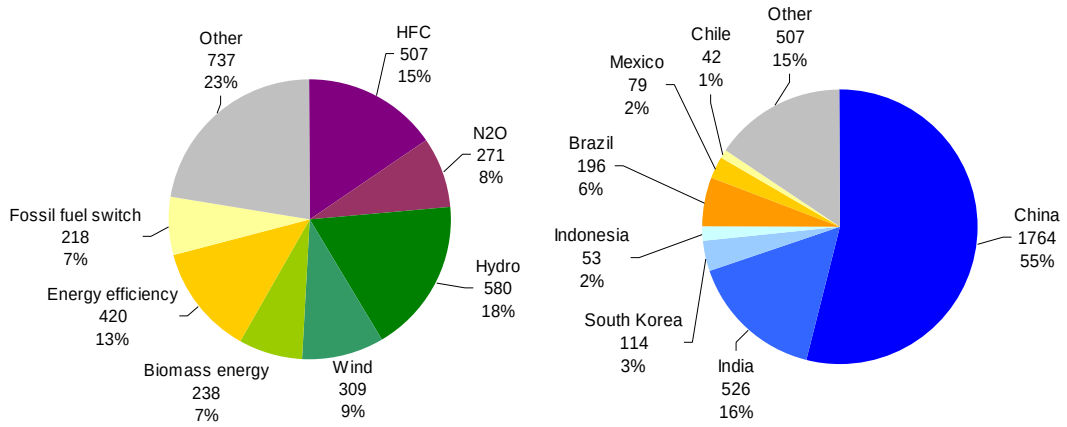
Source: Mission Climat of Caisse des Dépôts, 2009.

There is a lot of uncertainty on the level of actual demand. One thing is for sure: Europe will be the first buyer of CERs at least until 2012, with a large chunk of the demand coming from the EU ETS, and the remainder coming from European Member States for complying with their Kyoto commitment. Demand could total around 2.0 GtCO2 until 2012, and reach more than 7.0 GtCO2 between now and 2020. Eyes are turning towards Japan, Australia and the United States, which could soon become the main source of demand for offsets. The outcome of the Copenhagen conference in December 2009, which may extend demand for flexible mechanisms beyond 2012, is crucial. The international framework will also influence the rules of the future regional Emission Trading Schemes.

2.3. The historical development of CDM projects

As of August 2009, there are 5,215 projects in the UNEP Risoe's CDM Pipeline[3]. Those projects should, according to the data available in their PDD, deliver roughly 3.2 billion tons of CO_2 by the end of 2012. Figure 2 shows the breakdown of those potential CERs by host country and project type.

Figure 2 – Potential CER supply by host country and project type, until 2012

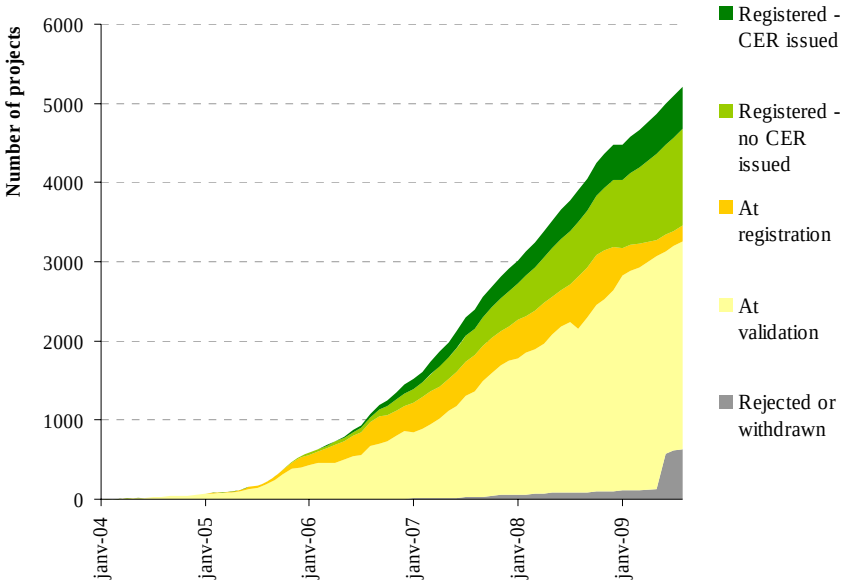


Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

1,750 of those projects have been registered by the CDM Executive Board, and 535 of those – just above one out of ten - are registered and already issuing CERs. Very few projects have been rejected by the CDM Executive Board or withdrawn by the project participants. The vast majority of projects in the pipeline are waiting for validation or registration. This is mainly due to the exponential development the CDM has seen since 2004.

[3] The list of all projects, their characteristics and their stage in the CDM process can be found in the UNEP RISOE's CDM Pipeline (www.cdmpipeline.org). All projects are included in the pipeline as soon as their PDD is communicated to the public on the UNFCCC website. Our study is primarily based on this dataset.

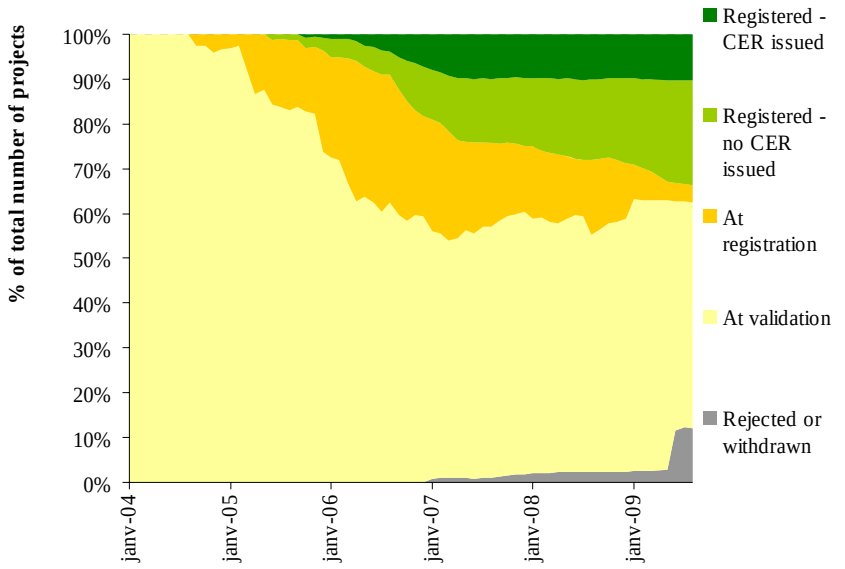
Figure 3 – Historical development: number of projects at each step



Source: deducted from UNEP Risoe CDM Pipeline (August 2009).

The first projects were launched in early 2004. It took around two years before the first certified emission reduction was issued in late 2005. From that moment on and with the development of the EU ETS, many more projects entered the pipeline each month and successfully went through the validation stage. This created a batch of projects waiting for registration by the CDM Executive Board. From mid-2007, even if projects continue to enter the pipeline at the same pace, the proportion of projects at each step remains more or less constant over time.

Figure 4 – Historical development: number of projects at each step (% of total)



Source: deducted from UNEP Risoe CDM Pipeline (August 2009).

2.4. Expected emission reductions

The cumulated credits expected until end 2012 is the sum of credits that will potentially be generated by all projects currently in the pipeline. In January 2007, there were only 1,500 projects in the pipeline and we could expect around 1.5 billion CERs before 2012. As of August 2009, the potential is close to 3.3 billion CERs expected before 2012.

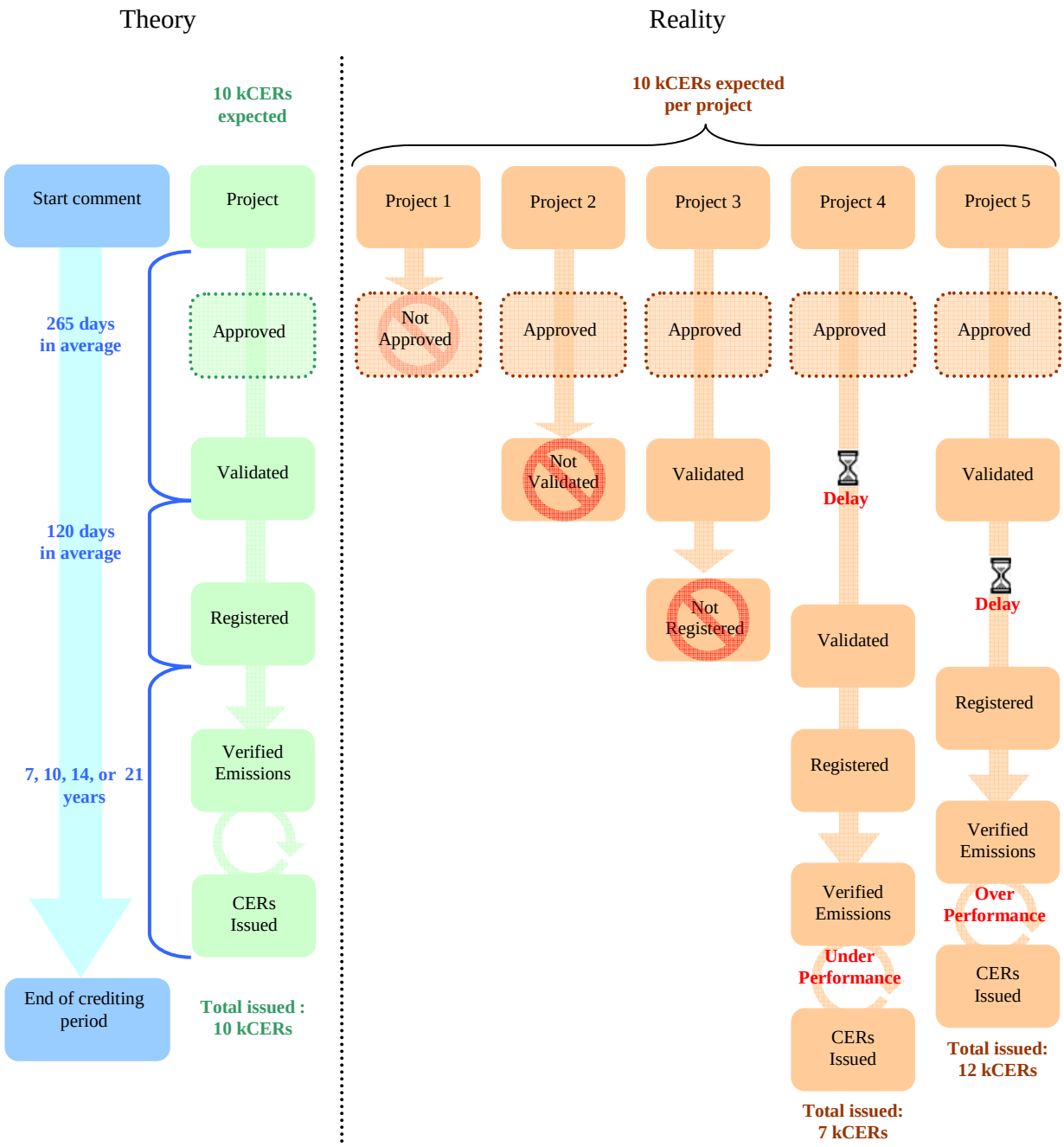
But the supply of CERs may not turn out to be as expected *ex ante*. To estimate the actual quantity of CERs that will be delivered, we created a model that forecasts corrected emissions reductions from CDM projects. The next section explains the methodology we used.

3.How to Forecast the Credit Supply: Methodology

3.1. Risks and delays along the pipeline

In the case of CDM, uncertainty comes from delays and risks that hinder the process: a project can be rejected at the approval, validation or registration stage, or can pass through but be delayed at those same stages. Ultimately, CDM projects bear a risk of under- or over-performance, i.e. projects may generate less or more credits than expected, or rather than stated in the Project Design Document.

Figure 5 – CDM process: a comparison of theory and reality



- All projects are implemented
- 100% of expected emission reductions are delivered
- CERs are issued on time

- Not all projects are implemented
- Not exactly 100% of expected emission reductions are delivered
- CERs are issued with delays

Source: Mission Climat of Caisse des Dépôts.

3.2. Our model

3.2.1. Reference case: gross expected emission reductions

In the reference case, all projects are supposed to generate 100% of expected credits, that is to say what is stipulated in the Project Design Document, between the project start (as guessed *ex ante*) to the end of the crediting period. The reference scenario thus represents the theoretical maximum emission reductions that can be expected by projects currently in the pipeline, if everything happens as stipulated in the PDD.

3.2.2. Estimate: corrected emission reductions

Statistical data is drawn from the CDM Pipeline of August 2009, on a project-by-project basis, which is then aggregated by host country and project type. Four factors are influencing the temporal output of CER associated to each project. Those are divided into two types:

- Delays model the timing uncertainty at the validation and registration stage. They are expressed in days.
- Correcting factors model the output uncertainty of projects. They are expressed as a percentage.

Table 2 – Methodology for estimating emissions reductions of a given project, depending on its status

	Correction applied			
Project's status in the pipeline	**Delay at validation**	**Validation success**	**Delay at registration**	**Issuance success**
Registered – CERs issued	**Own**	**Own**	**Own**	**Own**
Registered – no CERs issued	**Own**	**Own**	**Own**	**Estimated**
Validated, not registered	**Own**	**Own**	**Estimated**	**Estimated**
At validation	**Estimated**	**Estimated**	**Estimated**	**Estimated**

Own: No correction is made. The own value of the considered delay/factor for the project is used.

Estimated: The historical delays/factors are applied to the expected emission reductions of a given project, on the basis of its host country and type. If there are not enough similar projects (in the same country or type) to provide reliable statistics, the global average is applied.

Source: Mission Climat of Caisse des Dépôts.

3.3. Delay and risk at validation

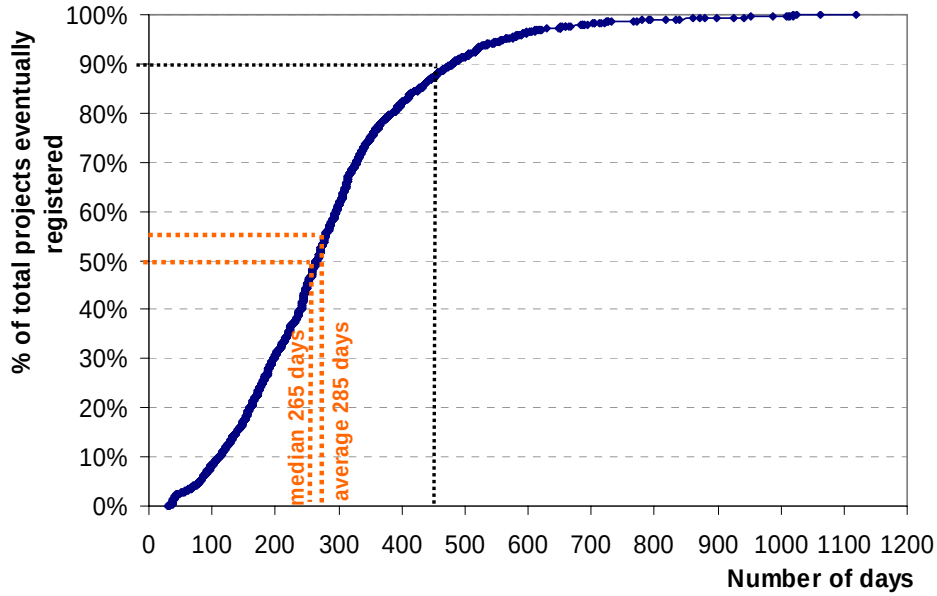
Projects that enter the pipeline will not all be eventually registered and issuing credits. This is taken into account by three means:

- Eliminating projects that have been at the validation stage for too long;
- Simulating additional delays for all projects that are at the validation stage;
- Cutting down the future potential output of projects at validation to reflect the probability for the project of not being validated, for a given project type and host country.

3.3.1. Delay at validation

Our model takes this correcting factor into account by considering that there is a maximum amount of time after which a project at validation is automatically rejected. Figure 6 shows that almost 90% of projects that were successfully registered spent less than 450 days at the validation stage. The average and the median are around 270 days. Over the last year, the average delay has increased from 245 days in August 2008 to 285 days in August 2009 (see Annex C).

Figure 6 – Time spent at validation by projects eventually registered



Note: The time spent at validation is the difference (in days) between the "start comment" and the "registration request" that happens right after validation.

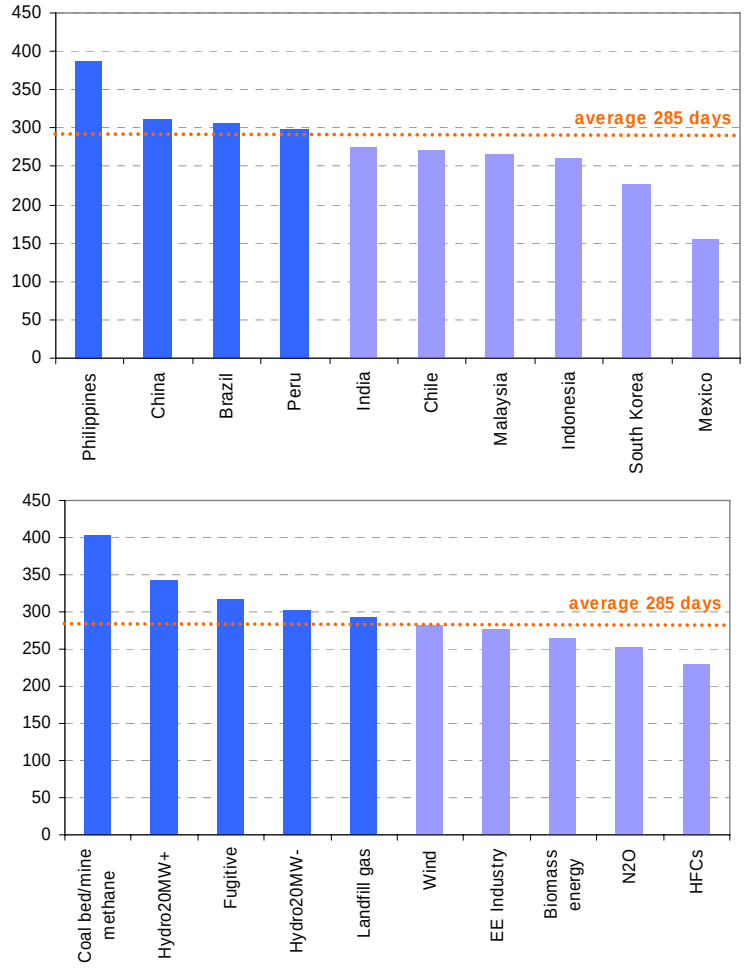
Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

Even if some projects stayed longer and were eventually registered (sometimes after more than 1,000 days), those cases are exceptional and go back to the beginning of the implementation of the CDM. Given the CDM learning curve, which means that the approval process has now sped up, and the fact that projects

developers that would wait for too long to see their project registered – or rejected - are few, we believe it is realistic to account for a maximum of 450 days spent at validation, and thus do not take into account potential emission reductions generated by those projects that have been at the validation stage for longer than 450 days.

Most projects (70 %) actually go through validation in less than a year. The general average time spent is 285 days. When enough data is available for a given host country and project type, the average delay for that country and type (with a 50/50 weight) is applied to CERs that would be generated by the projects at validation. In other cases, the overall average is applied.

Figure 7 – Examples of time spent at validation, by country and type



Note: EE = Energy efficiency

Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

3.3.2. The risk of not getting through validation

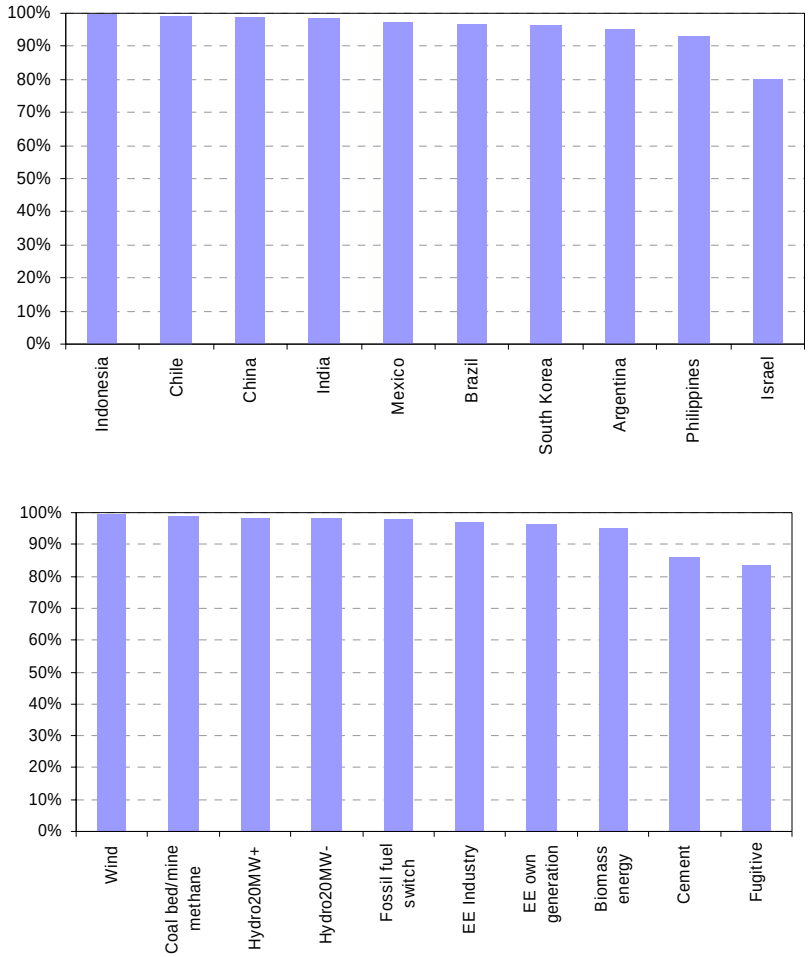
This risk is modeled by a correction factor called “Validation success”, applied to all projects at validation and affecting their future CER generation performance.

On average 97.9 % the potential credits of projects at validation successfully go through registration.

Validation success =
Expected emission reductions from all projects except those withdrawn or rejected / Expected gross emission reductions from all projects.

When enough data is available for a given host country and project type, the average success rate for that country and type (with a 50/50 weight) is applied to CERs that would be generated by the projects at validation. In other cases, the overall average is applied.

Figure 8 – Examples of validation success, by country and type

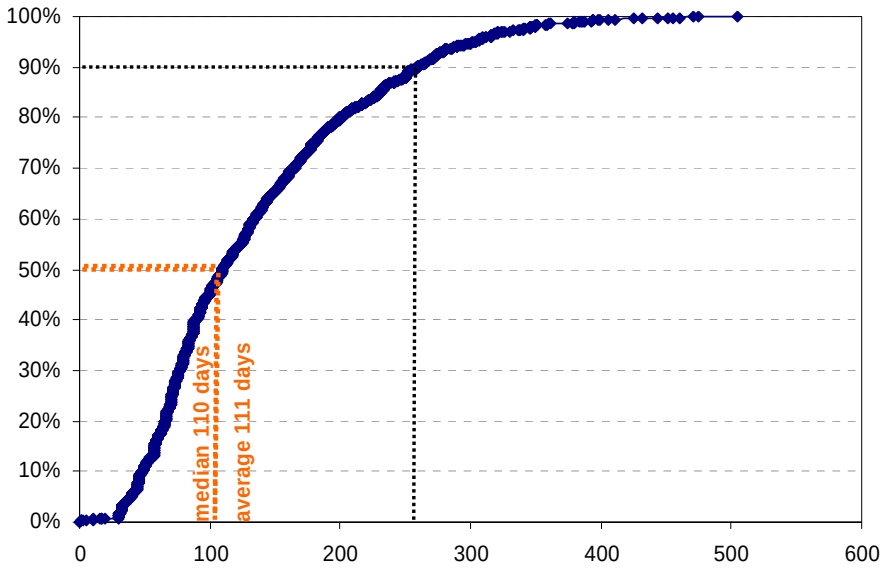


Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

3.4. Delays at registration

Most projects go through that stage fairly quickly, usually around 100 days. 99% of projects were registered a year after registration was requested (see Figure 9).

Figure 9 - Average time spent at registration by registered projects

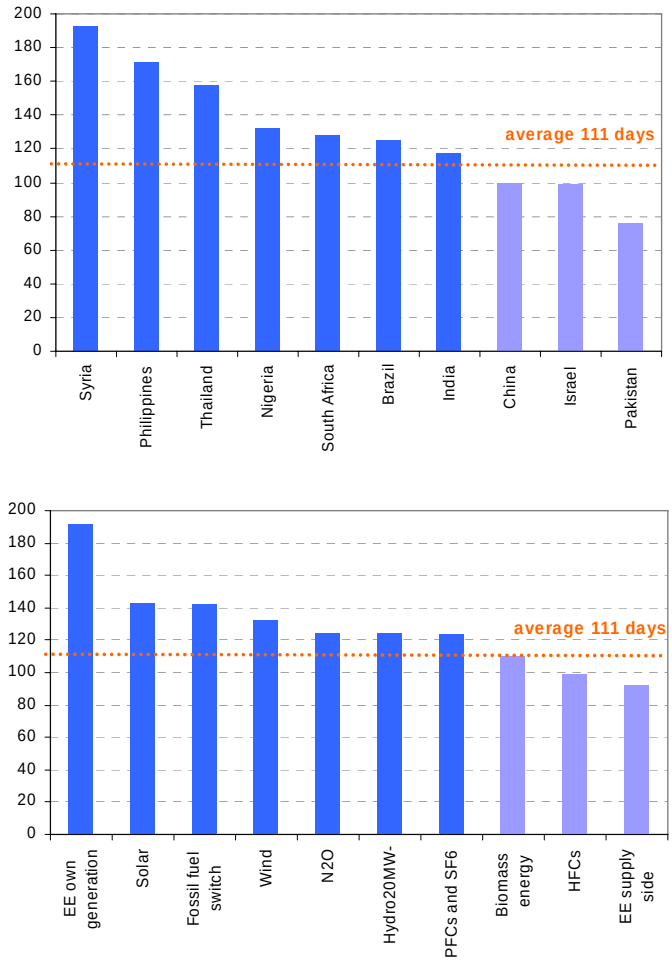


Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

When enough data is available for a given host country and project type, the average delay at registration for that country and type (with a 50/50 weight) is applied to CERs that would be generated by the projects having requested registration. In other cases, the overall average is applied.

Over the last year, the average delay has increased from 99 days in August 2008 to 111 days in August 2009, see Annex C.

Figure 10 – Examples of time spent at registration, by country and type



Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

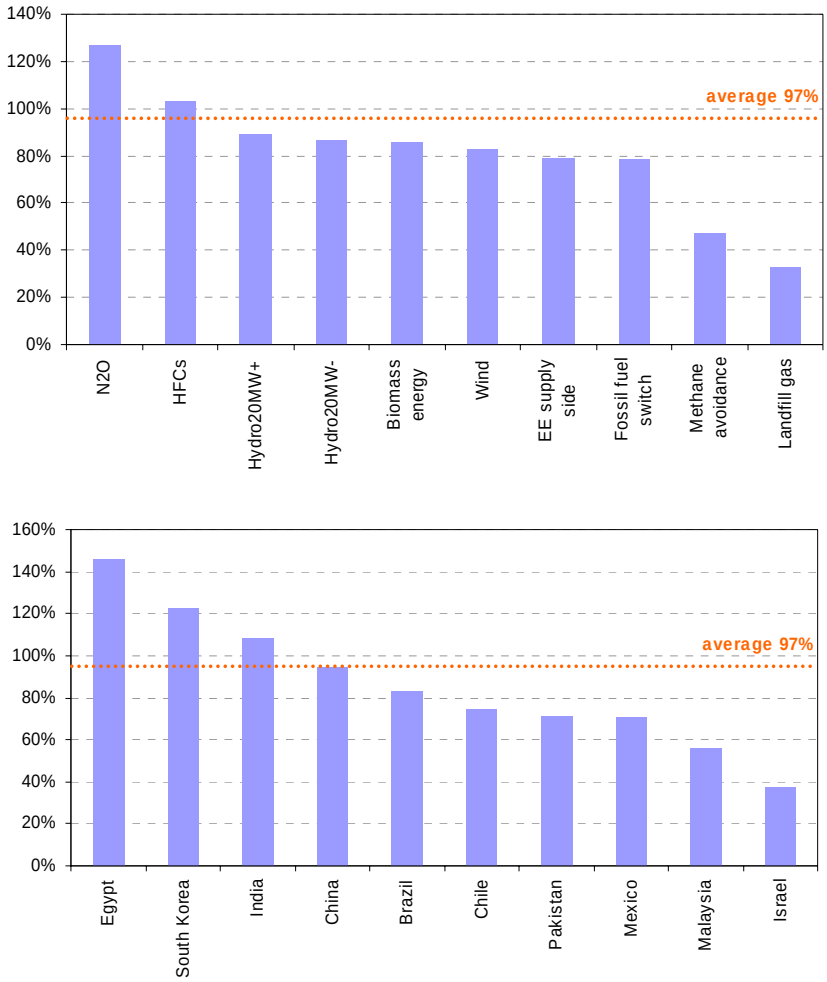
3.5. The risk of performance

Once a project is registered and implemented, the project developer and the Designated Operational Entity regularly monitor, verify, and report emissions reductions. Ultimately an amount of CER corresponding to the verified emission reduction is issued to the project developer. This amount may be different from the expectations in the Project Design Document. For example, good meteorological conditions on the site of a wind turbine can improve emission reductions. On the contrary, technical problems may hinder the recuperation of mine gas and reduce emissions reduction. Also, poor monitoring might jeopardize the issuance of CERs, even if emission reductions have actually taken place. This can lead to a large difference between expected and actual emission reductions, in a negative – or sometimes positive - way. Our model accounts for this by associating to each project an issuance correction factor, which depends on the project's type and host country.

Issuance success =

CERs actually issued over their crediting period by projects registered up to now / Ex-ante potential CERs from those projects over the same period

Figure 11 – Example of issuance success, by country and type



Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

3.6. The "usual" delay at certification

When the verifier arrives on site to certify emissions reductions, he cannot verify emissions reduction that happened until this very day. Monitoring and verification takes time. Based on conversations with Designated Operational Entities and project participants, we estimate that there is a delay at this stage of 180 days on average. This means in the case of the 2013 estimate, that emissions reductions issued before the end of April will correspond to emission reductions that happened at the latest in October 2012.

3.7. What about new projects?

When estimating the amount of credits that are going to be generated by CDM projects before a certain date, it is necessary to simulate the future arrival of projects in the pipeline between now and the aimed date. Our model simulates a constant arrival of new projects in the pipeline, by repeating each year the arrival of the previous year's new projects in the pipeline, by host country and project type. Those simulated new projects then go through the pipeline as any other project, and their credit output is corrected by the same delays and factors.

3.8. Integrating new information

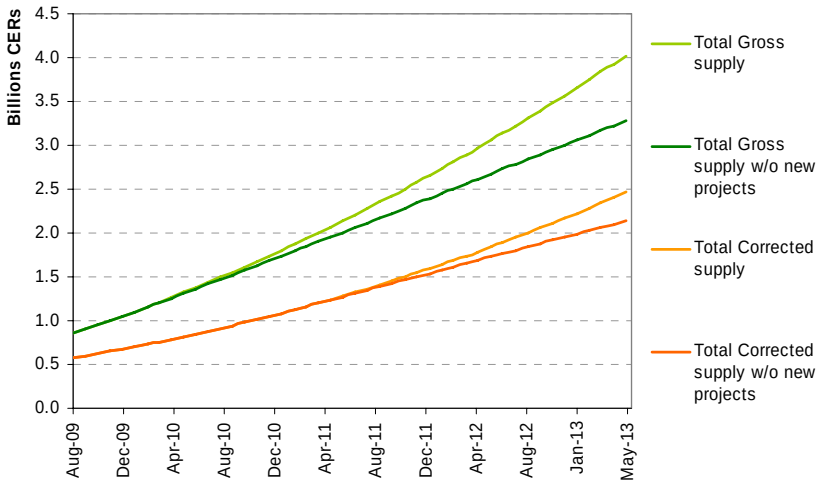
Each month, the model integrates new data that is available in the current CDM Pipeline. The risk factors and delays are updated, taking into account new data on the projects (i.e. projects that have been registered or rejected, credits that have been effectively issued, etc.). This enables us to produce each month a static estimate of the CER supply by 2013.

4.Results: 1.6 Gt by April 2013

4.1. A static estimate as of August 2009: between 2.1 and 2.5 Gt before April 2013

As of August 2009, more than 315 million CERs have actually been issued. According to our model, the last emission reduction corresponding to those credits was realized at the end of 2009; other projects reduced emissions over the same period but have not asked for issuance for the time being, corresponding to around 200 Mt. Our estimate of the output of CERs by 2013, taking into account the historical information available in the CDM pipeline as of August 2009 amounts to 2.1 Gt. While potential supply is expected to grow and reach 3.3 Gt in April 2013 (4.0 Gt if new projects continue to arrive at the same pace), our model forecasts a supply of 2.1 Gt, plus 325 Mt if hypothetical new projects are taken into account.

Figure 12 – Supply of CER credits before April 2013 (gross and corrected) – Static estimate as of August 2009



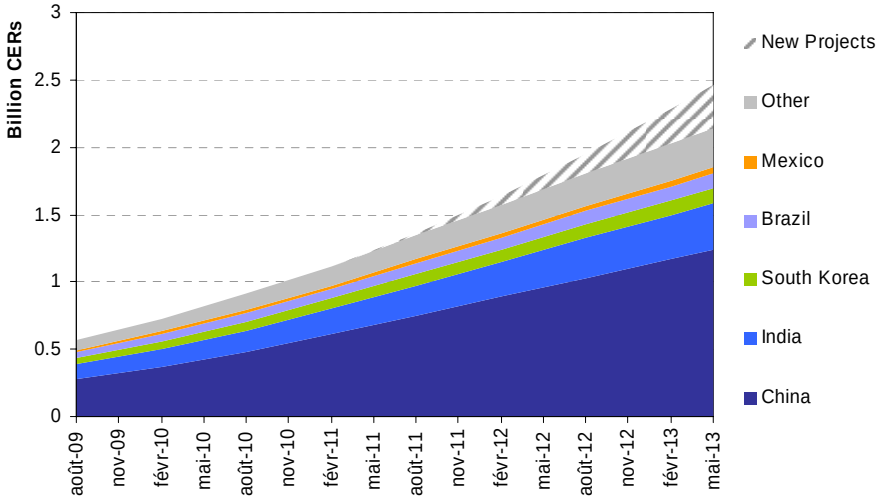
Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

This represents a 35% cut in the potential supply. But most of the cut is not due to project rejection or withdrawal, nor to under-performance; delays are primarily responsible. Most of the credits that will possibly not be generated before 2013 may be issued afterwards.

4.2. Our model's detailed output

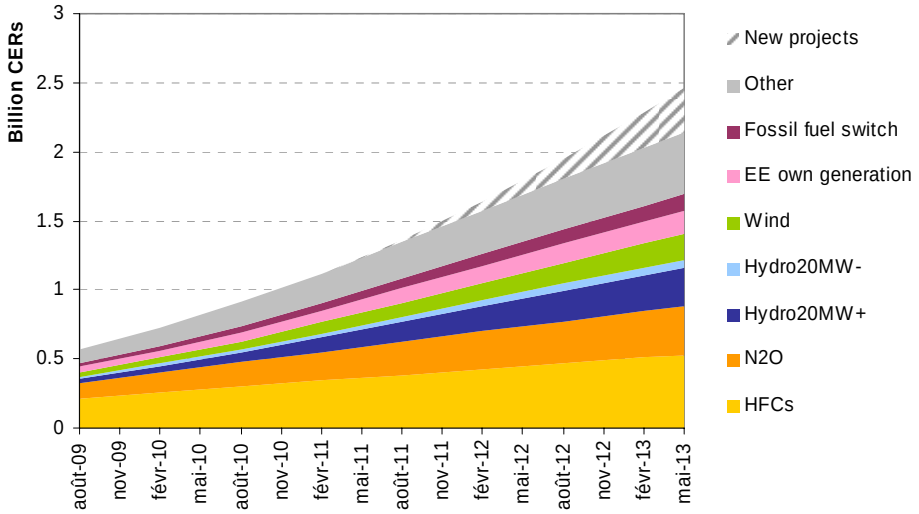
The model output is at the project level. This allows aggregation at any interesting level, e.g. by host country or project type as shown on the two figures below.

Figure 13– Estimated CER supply before April 2013, by host country – Static estimate as of August 2009



Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

Figure 14 – Estimated CER supply before April 2013, by type – Estimate as of August 2009

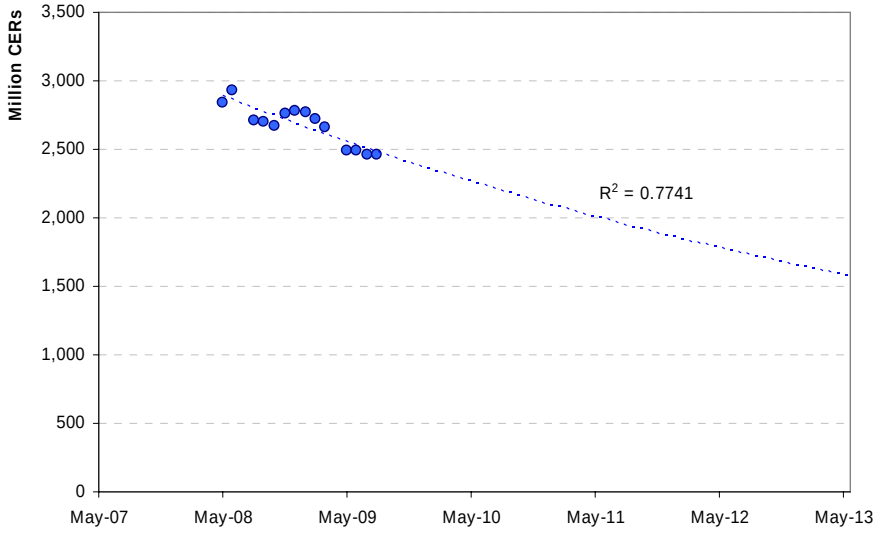


Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

4.3. Improving our Estimate in a Dynamic Perspective: 1.6 Gt before April 2013

Running our model each month on the current CDM Pipeline enables us to plot a series of static estimates, using each month the date that is available then. The series of estimates that is obtained can then be extrapolated into April 2013. The assumption here is that our static estimate becomes every month ore accurate, since new information is integrated each month into the estimate. The static estimate is thus interesting *per se*, but it only represents the output of a theoretical model based on historical data. The dynamic estimate, on the contrary, represents the trend that is followed by our static estimate. As such, it does represent our best estimate for CER supply by April 2013.

Figure 15 – Estimated CER supply before April 2013 – Static monthly estimates and extrapolation into April 2013.



Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline(May 2008 to August 2009).

Our best estimate as of August 2009 is thus that 1.6 Gt of CERs would be generated before April 2013, taking into account existing projects in the pipeline as of August 2009, as well as future projects that will be added to the pipeline before April 2013.

5.Concluding remarks

Our estimate is based on a statistical analysis of the past development of CDM. Most of the change in future estimates would thus come from events whose effects cannot yet statistically be measured in the pipeline. The potential biggest impacts would come from:

- A change in the delays or performance of projects that have not issued many credits at the moment. In this respect, the increase in delays at validation and registration – observed over the past year - might have a substantial impact if they're sustained until 2013.
- The renewal of projects' crediting periods: so far, only 7 out of the 973 projects that have been registered with a 7-year crediting period have had their crediting period renewed.
- Simulated new projects. Due to delays, those have a significant impact on the CER output around two years after their entry in the pipeline.
- The effects of the economic and financial crisis.

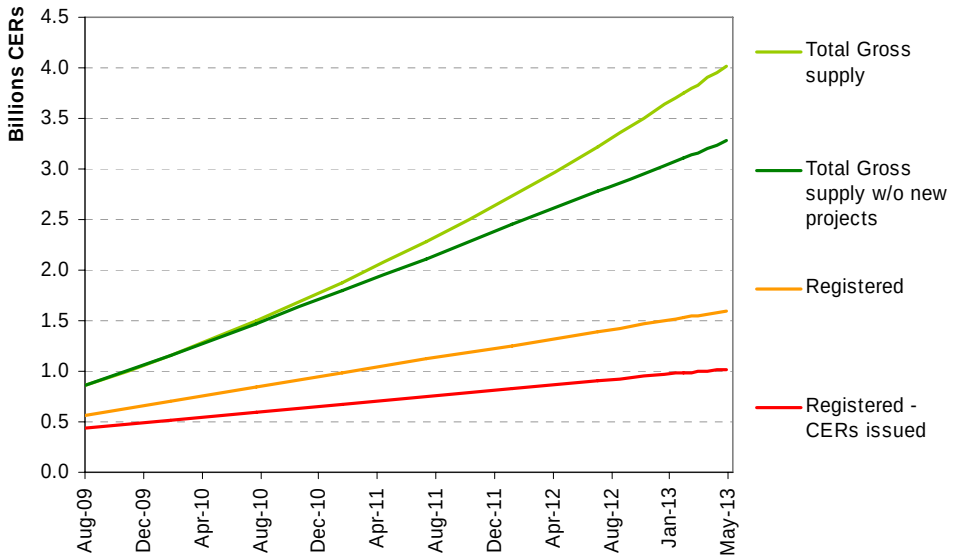
Figure 16 – Sensitivity analysis of the estimated supply

	Impact on total supply until April 2013
Delays	-20< <-35 Mt/month of additional delay
Performance +/- 15%	+/- 320 Mt
Projects renewal	+20 Mt
Simulated new projects to come	+0.5 Mt

Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

Figure 17 shows several analyses of the impact of the crisis on the static estimate of the CER supply. For scenario 1 ("hard crisis"), only projects that are registered today would generate credits; in other words, project developers would drop all projects for which carbon finance is not 100% secured. For scenario 2 ("very hard crisis"), only projects that are registered and are already issuing credits today would continue to generate credits; in other words, all projects that are not yet fully operating would be dropped. This results in a supply between 1.0 and 1.5 Gt, i.e. a monthly supply of around 10 to 20 Mt. For those two scenarios, the static estimate would roughly be equal to the dynamic estimate. As a matter of fact, the uncertainty on the output of CERs stems from the different risk factors and delays that a given project faces when going through the successive steps of the pipeline: our "hard crisis" and "very hard crisis" scenarios *de facto* reduce the uncertainty on those risks and delays.

Figure 17 – Crisis scenarios: impact on supply estimate



Source: Mission Climat of Caisse des Dépôts, from UNEP Risoe CDM Pipeline (August 2009).

Our estimate for assessing pre-2012 CER supply tends to show that the supply would be in any case more than 1.0 Gt by 2013, and will most likely be of the order

of magnitude of 1.5 Gt. It would thus be sufficient to cover the potential demand from ETS compliance buyers in 2012, and could contribute substantially to quench the thirst for CERs of Annex I countries.

Annex A: Delays and rates by host country

	Average Validation delay	Average Registration delay	Number of registered projects	Number of registered projects which issued CERs	Validation + registration success	Issuance success
Albania			0	0	100.0%	
Argentina	256	98	15	8	94.9%	19.5%
Armenia	254	103	4	0	100.0%	
Azerbaijan			0	0	100.0%	
Bangladesh	144	63	2	0	100.0%	
Bhutan	308	45	1	1	100.0%	70.5%
Bolivia	326	74	3	1	93.1%	106.0%
Brazil	307	125	160	91	96.9%	82.6%
Cambodia	272	148	4	0	100.0%	
Cameroon			0	0	100.0%	
Cape Verde			0	0	100.0%	
Chile	271	129	34	15	99.2%	74.7%
China	311	100	599	125	98.9%	94.5%
Colombia	273	124	15	5	100.0%	53.2%
Congo DR			0	0	100.0%	
Costa Rica	160	124	6	1	100.0%	55.4%
Cuba	257	134	2	1	100.0%	64.9%
Cyprus	261	109	5	0	100.0%	
Dominican Republic	181	101	1	0	100.0%	
Ecuador	257	133	13	9	100.0%	71.2%
Egypt	199	127	4	1	100.0%	145.9%
El Salvador	364	134	5	1	100.0%	62.2%
Equatorial Guinea			0	0	0.0%	
Ethiopia			0	0	100.0%	
Fiji	90	44	1	1	100.0%	51.5%
Georgia	59	90	1	0	100.0%	
Guatemala	403	102	10	4	89.3%	98.7%
Guyana	415	156	1	0	100.0%	
Honduras	331	83	15	8	86.9%	74.0%
India	275	117	448	198	98.2%	108.7%
Indonesia	259	115	27	6	99.7%	41.1%
Iran			0	0	100.0%	
Israel	207	99	16	4	80.1%	37.1%
Ivory Coast	238	252	1	0	100.0%	
Jamaica	236	67	1	1	100.0%	81.9%
Jordan	152	183	1	0	100.0%	
Kenya	343	315	1	0	100.0%	
Kyrgyzstan			0	0	100.0%	
Lao PDR	286	52	1	0	100.0%	
Liberia			0	0	100.0%	
Macedonia			0	0	30.4%	
Madagascar			0	0	100.0%	
Malaysia	265	114	58	5	93.6%	55.9%
Mali			0	0	100.0%	

	Average Validation delay	Average Registration delay	Number of registered projects	Number of registered projects which issued CERs	Validation + registration success	Issuance success
Malta			0	0	100.0%	
Mauritius			0	0	100.0%	
Mexico	155	94	117	20	97.3%	70.5%
Moldova	209	83	4	0	100.0%	
Mongolia	134	56	3	0	100.0%	
Morocco	129	165	5	1	100.0%	91.7%
Mozambique			0	0	100.0%	
Nepal	63	35	2	0	100.0%	
Nicaragua	252	103	4	2	100.0%	32.0%
Nigeria	625	133	2	0	100.0%	
Pakistan	405	75	3	1	100.0%	71.3%
Panama	204	88	6	0	98.8%	
Papua New Guinea	399	58	1	1	100.0%	58.5%
Paraguay			0	0	100.0%	
Peru	299	128	18	4	96.7%	80.5%
Philippines	387	171	39	2	93.1%	47.9%
Qatar	93	182	1	0	100.0%	
Rwanda			0	0	100.0%	
Senegal			0	0	100.0%	
Singapore	275	124	1	0	100.0%	
South Africa	252	128	15	4	100.0%	118.2%
South Korea	226	115	28	7	96.3%	122.5%
Sri Lanka	168	98	5	3	82.5%	65.3%
Swaziland			0	0	100.0%	
Syria	97	193	1	0	100.0%	
Tajikistan			0	0	100.0%	
Tanzania	353	127	1	0	100.0%	
Thailand	544	158	18	2	99.6%	55.8%
Tunisia	127	92	2	0	100.0%	
Uganda	385	85	1	0	100.0%	
United Arab Emirates	318	88	2	0	100.0%	
Uruguay	483	122	3	1	100.0%	80.3%
Uzbekistan	339	159	6	0	100.0%	
Vietnam	174	116	7	1	99.9%	162.2%
Zambia			0	0	100.0%	

Annex B: Delays and rates by project type

Type	Average Validation delay	Average Registration delay	Number of registered projects	Number of registered projects which issued CERs	Validation + registration success	Issuance success
Afforestation	245	95	1	0	100.0%	
Agriculture			0	0	100.0%	
Biomass energy	265	111	259	113	95.1%	85.5%
Cement	218	125	18	7	86.0%	58.6%
CO2 capture	214	149	1	1	100.0%	111.4%
Coal bed/mine methane	403	172	22	4	98.8%	35.6%
EE Households	313	143	4	0	100.0%	
EE Industry	275	104	54	24	97.3%	82.0%
EE own generation	274	191	121	32	96.1%	93.1%
EE Service	192	110	5	1	90.8%	60.9%
EE supply side	304	93	13	6	98.5%	79.0%
Energy distribution	120	74	2	0	99.3%	
Fossil fuel switch	304	143	42	20	98.0%	78.8%
Fugitive	317	138	10	2	83.6%	162.0%
Geothermal	375	91	7	3	100.0%	30.0%
HFCs	229	99	19	17	100.0%	103.5%
Hydro20MW-	301	125	270	68	98.2%	87.1%
Hydro20MW+	343	-32	183	35	98.5%	89.2%
Landfill gas	293	132	130	38	100.0%	33.2%
Methane avoidance	254	120	260	51	99.1%	47.5%
N2O	252	125	55	13	100.0%	127.2%
PFCs and SF6	323	124	5	0	100.0%	
Reforestation	425	94	5	0	100.0%	
Solar	221	144	11	1	100.0%	17.8%
Tidal	194	81	1	0	100.0%	
Transport	165	52	2	2	100.0%	26.6%
Wind	281	132	250	97	99.4%	82.6%

Annex C: Evolution of our estimated CER supply over time

	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07
Total Gross CER w/o NewProjects (MCER)												
Total Gross CER NewProjects only (MCER)												
Total Gross CER (MCER)												
Total Corrected CER w/o NewProjects (MCER)												
Total Corrected CER NewProjects only (MCER)												
Total Corrected CER (MCER)												
Average delay between start comment and registration request (days)												
Average delay between registration request and registration (days)												
Performance success												
Validation and registration success												
Number of projects (total)		1,586	1,743	1,801	1,885	2,041	2,285		2,424	2,593	2,701	2,838
Number of projects (registered)		492	547	590	645	685	738		763	803	827	859
Number of projects (registered&CERissued)		123	138	158	175	191	213		232	247	259	270
Volume of CER issued (cumulated, MCER)		29	36	40	45	51	63		76	83	86	94
CER available 2008-2012, source UNEP Risoe (MCER)		2,771	3,111	3,050	3,017	2,909	3,045		2,167	2,125	2,021	2,106

	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08
Total Gross CER w/o NewProjects (MCER)					2,732	2,809		2,888	2,924	2,986	3,048	3,085
Total Gross CER NewProjects only (MCER)					1,684	1,636		1,387	1,348	1,303	1,287	1,215
Total Gross CER (MCER)					4,416	4,445		4,275	4,272	4,289	4,335	4,300
Total Corrected CER w/o NewProjects (MCER)					1,914	2,014		1,980	1,988	2,013	2,111	2,175
Total Corrected CER NewProjects only (MCER)					921	915		734	711	661	653	607
Total Corrected CER (MCER)					2,835	2,929		2,714	2,699	2,674	2,764	2,782
Average delay between start comment and registration request (days)					237	241		244	245	247	250	250
Average delay between registration request and registration (days)					93	95		99	100	101	102	109
Performance success					95.6%	96.3%		94.2%	94.7%	95.2%	94.5%	96.4%
Validation and registration success					98.5%	98.6%		98.6%	98.6%	98.4%	98.3%	98.3%
Number of projects (total)	2,944	3,035	3,150	3,265	3,403	3,580		3,788	3,909	4,064	4,257	4,359
Number of projects (registered)	895	909	948	978	1,033	1,080		1,133	1,152	1,170	1,190	1,243
Number of projects (registered&CERissued)	281	288	306	319	335	355		385	391	403	412	428
Volume of CER issued (cumulated, MCER)	103	114	127	133	139	152		174	183	195	204	225
CER available 2008-2012, source UNEP Risoe (MCER)	2,114	2,137	1,835	1,776	1,510	1,568		1,509	1,478	1,496	1,537	1,568

	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09
Total Gross CER w/o NewProjects (MCER)	3,101	3,144	3,143		3,188	3,224	3,244	3,280
Total Gross CER NewProjects only (MCER)	1,122	1,089	1,041		912	814	775	739
Total Gross CER (MCER)	4,223	4,232	4,185		4,100	4,038	4,019	4,019
Total Corrected CER w/o NewProjects (MCER)	2,218	2,211	2,182		2,110	2,118	2,117	2,138
Total Corrected CER NewProjects only (MCER)	554	505	476		379	376	347	326
Total Corrected CER (MCER)	2,772	2,716	2,658		2,489	2,494	2,464	2,463
Average delay between start comment and registration request (days)	255	260	265		275	280	282	285
Average delay between registration request and registration (days)	112	116	120		130	108	110	111
Performance success	97.1%	97.1%	97.7%		97.0%	97.0%	96.9%	96.7%
Validation and registration success	98.3%	98.3%	98.2%		97.9%	97.9%	97.9%	97.9%
Number of projects (total)	4,475	4,586	4,660		4,869	4,995	5,089	5,215
Number of projects (registered)	1,300	1,370	1,424		1,596	1,652	1,699	1,750
Number of projects (registered&CERissued)	441	465	473		500	511	525	535
Volume of CER issued (cumulated, MCER)	240	251	262		282	288	308	317
CER available 2008-2012, source UNEP Risoe (MCER)	1,518	1,431	1,398		1,343	1,312	1,321	1,278