



23 April 2009

## The Kyoto Protocol's Clean Development Mechanism

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## List of acronyms

AFB	Adaptation Fund Board
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CER	Certified emission reduction
COP	Conference of the Parties
CPRS	Carbon Pollution Reduction Scheme
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EE	Energy Efficiency
ERU	Emission reduction unit
GHG	Greenhouse gas
GWP	Global Warming Potential
HFC	Hydrofluorocarbon
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
JI	Joint Implementation
LULUCF	Land use, land use change and forestry
PDD	Project Design Document
REDD	Reduced Emissions from Deforestation and Degradation
UNFCCC	United Nations Framework Convention on Climate Change

## Introduction

The Clean Development Mechanism (CDM) is an avenue for industrialised countries to undertake carbon abatement projects in developing countries. The mechanism is an element of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC). Carbon abatement credits occurring from these CDM projects can be used by developed countries to meet their Kyoto emission reduction targets.

Also, from 2010 under the proposed Commonwealth Carbon Pollution Reduction Scheme (CPRS), greenhouse gas (GHG) emissions trading will begin in Australia. Carbon polluting companies will be required to hold 'emissions permits' equal to the value of their emissions. The proposed CPRS is anticipated to participate in international trading of GHG emissions reductions credits, but trading only certain international units. Specifically, units generated under the Clean Development Mechanism (CDM) and its sister scheme, the Joint Implementation mechanism. This Background Note provides information on the CDM and its associated emissions credits.

Since the inception of the CDM, its projects have generated a great number of emission credits, and this is expected to increase. Through their inclusion in the CPRS, it is likely that such units will have some influence on Australia's emissions trading. The CDM is therefore a topic of some importance for considering the merits or otherwise of the proposed CPRS. Yet in itself the CDM is a topic of debate. In its fifth year, it appears to be hugely popular for a variety of developing countries, but it has also generated a multitude of criticisms.

## What is the Clean Development Mechanism?

The CDM is one of three 'flexible mechanisms' defined under the Kyoto Protocol to the UNFCCC.<sup>1</sup> It allows developed countries to undertake GHG emission reduction (or emission removal) projects in developing countries to counteract their own domestic emissions. Each CDM project generates Certified Emissions Reduction (CER) units, where one CER is equivalent to one tonne of carbon dioxide (CO<sub>2</sub>) or its equivalent for the other GHGs.<sup>2</sup> CER

1. The others are Joint Implementation (JI) projects (where developed countries undertake emission reduction projects in other developed countries) and international emissions trading.
2. Carbon dioxide equivalent is defined in terms of the global warming potential (GWP) of the five other GHGs noted in the Kyoto Protocol. The six GHGs are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs, a class of gases containing carbon, hydrogen and fluorine), perfluorocarbons (PFCs, a class of gases containing carbon and fluorine), and sulphur hexafluoride (SF<sub>6</sub>). A gas' GWP is defined as the relative ability of 1kg of that gas, compared with 1 kg of CO<sub>2</sub>, to warm the atmosphere over a 100-year time horizon. Thus each gas is assigned a multiplier, ranging from 1 for CO<sub>2</sub> to as high as 22,200 for SF<sub>6</sub>; See P Forster, V Ramaswamy, P Artaxo, T Berntsen, R Betts, DW Fahey, J Haywood, J Lean, DC Lowe, G Myhre, J Nganga, R Prinn, G Raga, M Schulz and R Van Dorland, 'Changes in Atmospheric Constituents and in Radiative Forcing' in S Solomon, D Qin, M Manning, Z Chen, M Marquis, KB Averyt, M Tignor and HL Miller, eds, *Climate Change 2007: The Physical*

units can be traded or sold, and finally used by industrialised countries to meet part of their emission reduction targets under the Kyoto Protocol.<sup>3</sup>

## The aims of the CDM

Under the Kyoto Protocol, a CDM project must provide real, measurable and long-term benefits relating to the mitigation of climate change. It must produce a reduction in emissions that would not occur in the absence of the particular project undertaken.<sup>4</sup> There are varying views over whether these particular outcomes are being achieved, and any program should be assessed against its declared aims in the first instance. The CDM's declared aims are:

- to accomplish the overarching goals of the UNFCCC – namely to prevent dangerous interference with the climate system
- to encourage sustainable development in developing nations, and
- to reduce the cost of complying with the provisions of the Kyoto Protocol for developed nations.<sup>5</sup>

## How it works

The project is designed by the entity proposing to implement it, known by the UNFCCC as the 'designated operational entity' (DOE). The design document is aptly known as a Project Design Document (PDD). The PDD must detail how the proposed project will reduce GHG emissions. To establish this, an operational entity must detail the emissions that would have occurred in the absence of the particular proposed project (that is, an emissions baseline). In the language of the UNFCCC, emissions reduction must be 'additional' to that which would have occurred had the particular project not gone ahead, or not been part of the CDM program. The PDD may propose a new methodology to establish this point, or use an already accepted method for this task. It uses the same method to propose how this reduction in emissions will be monitored and verified.

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*Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

3. United Nations Framework Convention on Climate Change, 'About CDM', UNFCCC website, viewed 25 February 2009, <http://cdm.unfccc.int/about/index.html>
4. Article 12.5 Kyoto Protocol to the UNFCCC, UNFCCC website, viewed 25 February 2009, [http://unfccc.int/essential\\_background/kyoto\\_protocol/items/1678.php](http://unfccc.int/essential_background/kyoto_protocol/items/1678.php)
5. Article 12.2, Kyoto Protocol to the UNFCCC; M Wara, 'Measuring the Clean Development Mechanism's Performance and Potential', *Working Paper #56 - Program on Energy and Sustainable Development Stanford University*, Stanford, California, June 2006, p. 11.

The PDD must be approved by a 'Designated National Authority' (DNA) in the country where the project is to take place. DNAs are usually developing country government departments dealing with environment or climate change matters. An independent body, often in the private sector, then validates the project against the CDM project requirements. If the proposed project passes the validation process, the CDM Executive Board (EB) then 'registers' the project. This amounts to the project being approved for CDM purposes as generating valid CER units.

Then the operation of the project is verified by a second independent group (again, often in the private sector). The operational entity is required to monitor reductions in human-induced emissions (known as anthropogenic emissions) and certify that the proposed reductions take place during the specified period. Only then are the CER units arising from that project issued to the operating entity.<sup>6</sup> Different, simplified procedures apply to small-scale projects and to afforestation and reforestation projects.<sup>7</sup>

### **Potential supply of CER units to the CPRS**

The Australian Government's final policy position is to allow an unlimited number of eligible international units to be accepted for CPRS compliance. It considers that accepting international emissions credits has the potential to:

- control domestic costs
- provide support for the international Kyoto Protocol architecture
- promote technology transfer, and
- facilitate Australia's involvement in international carbon markets.<sup>8</sup>

However, not all CER units will be acceptable for trade within the CPRS. The scheme proposes to accept CER units subject to certain restrictions. For example, CER units that have contingent obligations and high administrative costs will not be accepted. These are generally known as temporary CER units and arise from forestry activities. CER units issued during the Kyoto Protocol's first commitment period (2008-2012) will be accepted, but only after 2012–

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6. UNFCCC, 'CDM Project cycle', UNFCCC website, viewed 25 February 2009, <http://cdm.unfccc.int/Projects/pac/index.html>

7. UNFCCC, 'Approved small-scale CDM methodologies', UNFCCC website, viewed 30 March 2009, <http://cdm.unfccc.int/methodologies/ARmethodologies/index.html> and, 'Approved CDM afforestation and deforestation methodologies', UNFCCC website, viewed 30 March 2009, <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>

8. Department of Climate Change, *Carbon Pollution Reduction Scheme: Australia's Low Pollution Future – White Paper*, Canberra, 15 December 2008, pp. 11–19.

2013. CER units issued during the first commitment period for abatement that occurs from 2013 onwards will also be accepted.<sup>9</sup>

As a side note, the CPRS would also generally accept Emission Reduction Units (ERU), which are those generated by the Kyoto Protocol's Joint Implementation Mechanism (JI). Again, restrictions apply.<sup>10</sup>

According to the UNFCCC, to date about 252 million CER units have been issued globally. To the end of 2012, a further 1.5 billion credits are expected to be issued from already registered CDM projects and the average annual rate of issue is expected to be about 259 million per year from already registered CDM projects.<sup>11</sup> These figures increase as additional CDM projects are registered and commence operation.

## The CDM projects

### Countries

A first glance at the map of CDM host countries in Figure 1 tells most of the story. Although a total of 76 developing countries participate in the Kyoto Protocol scheme, the majority of CDM projects are hosted by China, India and Brazil.

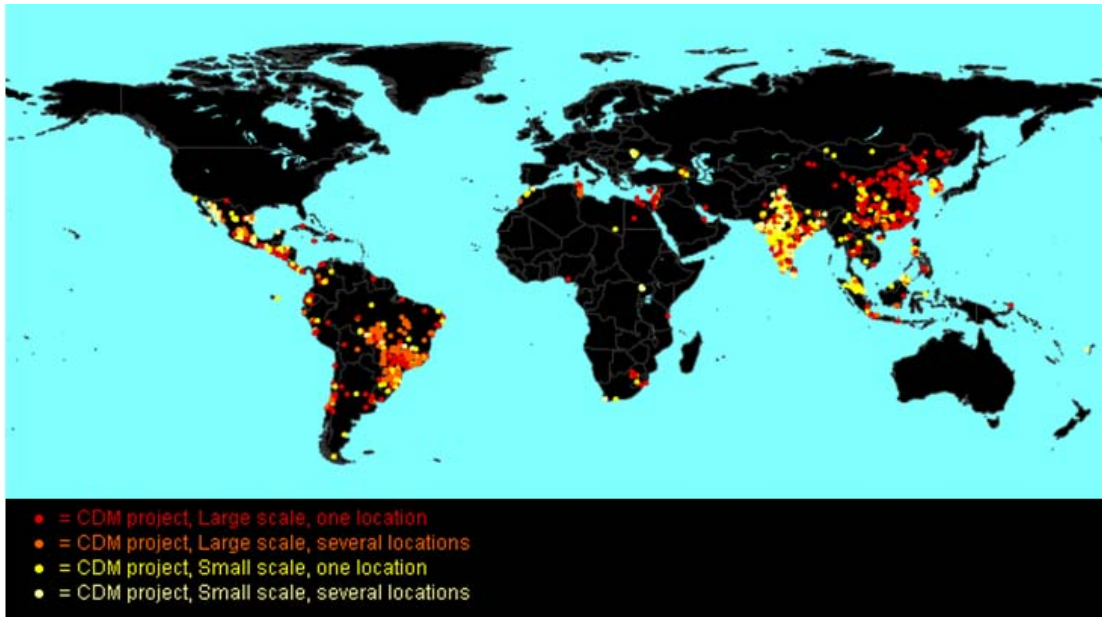
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9. Department of Climate Change, pp. 11–15.

10. Department of Climate Change, pp. 11–19.

11. United Nations Framework Convention on Climate Change, 'CDM Statistics Web Page', UNFCCC, viewed 11 February 2009, <http://cdm.unfccc.int/Statistics/index.html>

Figure 1: Map of CDM projects [Source: UNFCCC (February 2009)]



In fact, according to the latest data provided in Table 1, more than 70 per cent of all projects take place in these three countries.

Looking down the list, the top ten host countries are all situated within the Asia Pacific region or South America.

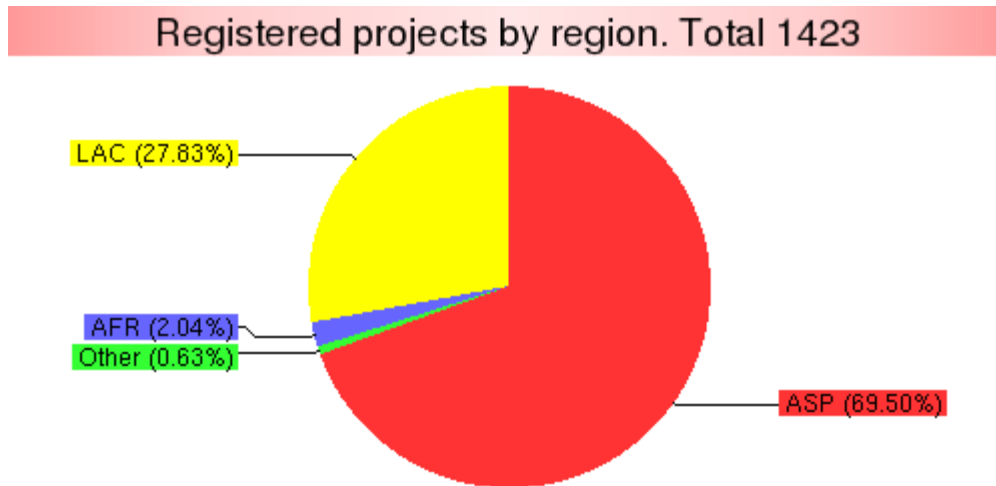
Table 1: Top 25 CDM host countries by number of projects [Source: www.cdmpipeline.org (February 2009)]

Host country for CDM projects by status	Number of projects			Total expected
	At validation	Request registration	Registered	
China	1057	208	395	1660
India	749	40	392	1181
Brazil	193	10	150	353
Mexico	85	5	110	200
Malaysia	105	5	37	147
Indonesia	79	1	22	102
Thailand	70	8	11	89
Philippines	53	7	20	80
Chile	34	5	28	67
South Korea	34	3	22	59
Vietnam	52	3	3	58
Colombia	22	2	13	37
Israel	16	5	13	34
Argentina	17	1	14	32
Peru	10	2	16	28
South Africa	12	1	14	27
Honduras	11	1	14	26
Ecuador	9	0	13	22
Guatemala	10	1	8	19
Sri Lanka	15	0	4	19
Panama	10	1	5	16
Pakistan	11	0	2	13
United Arab Emirates	13	0	0	13
Egypt	7	1	4	12
Morocco	5	1	4	10
<b>Global total (of all 76 countries)</b>	<b>2780</b>	<b>324</b>	<b>1370</b>	<b>4474</b>

Figure 2 shows that these two regions host more than 97 per cent of the CDM projects, with almost 70 per cent in the Asia-Pacific alone.



Figure 2: Registered CDM projects by region [Source: UNFCCC (February 2009)]

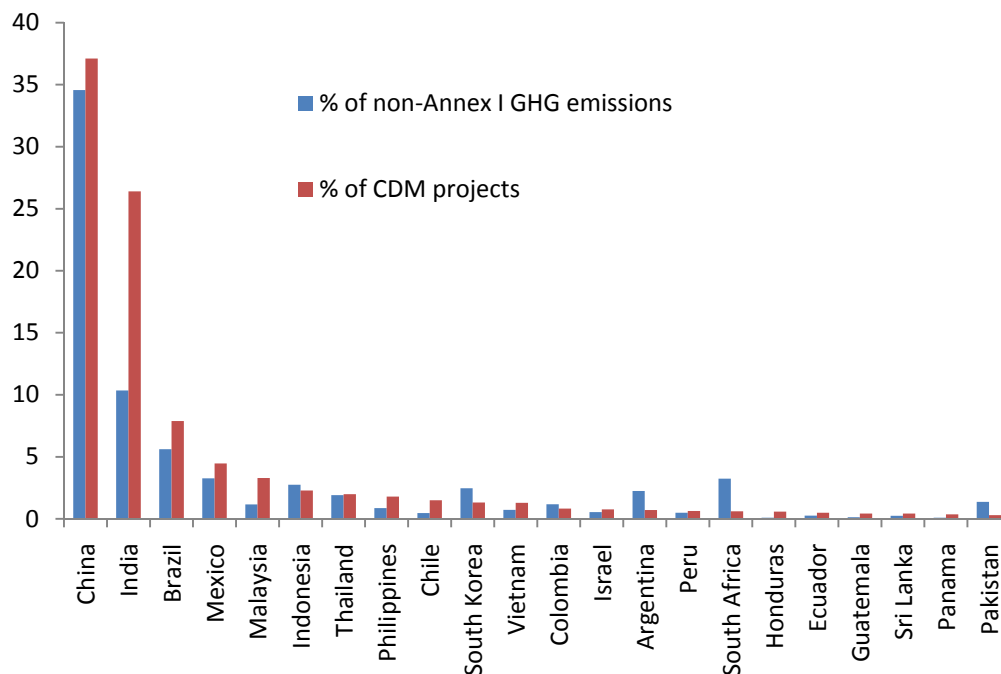


Note: Figure 2 LAC - Latin America, AFR - Africa and ASP - Asia-Pacific region.

In the Asia region, the leading host countries are China and India, and in South America, Brazil and Mexico lead the way. On the African continent, only South Africa and Egypt are counted amongst the global top 25, and South Africa is the clear leader with almost twice as many expected projects as Egypt. Similarly, the Middle-East lists only two important CDM host countries, with Israel counting almost three times more projects than its closest counterpart, the United Arab Emirates.

It follows that the more a country emits, the more opportunity there is for abatement projects. That China and India should top the charts for hosting CDM projects is fitting, given that these are the most highly populated countries globally, and the largest emitters of greenhouse gases in the developing world. From Figure 3, which shows the top CDM host countries and their respective emission levels, it seems that this correlation does not always hold true.

Figure 3: Top CDM host countries GHG emissions (excluding LULUCF) and project numbers relative to non-Annex I totals<sup>12</sup>



Examples that stand out are South Africa, South Korea, Argentina and Pakistan who all are responsible for a larger contribution of emissions than their relative number of CDM projects. Conversely, the participation of Chile, for example, in the CDM scheme overshadows the efforts of other developing countries with far higher emission levels.<sup>13</sup>

In addition, there are several countries that produce significant levels of GHG emissions, such as Iran and Saudi Arabia, but that are not yet CDM host countries.<sup>14</sup>

In absolute numbers, and in terms of the science of atmospheric greenhouse gases, it is unimportant where the actual emission reductions occur, and therefore which countries host CDM projects. However, it is significant in terms of economics and the cost-effectiveness of climate change mitigation. To minimise costs, GHG emission abatement should happen in the cheapest or most cost-efficient locations. However, the host country where the abatement

12. UNFCCC Secretariat, 'Sixth compilation and synthesis of initial national communications from Parties not included in Annex I to the Convention', and [www.cdmpipeline.org](http://www.cdmpipeline.org), viewed 25 February 2009 (calculations by author).

13. It should be noted that the emission levels used for this comparison exclude emissions from land-use, land-use change and forestry (LULUCF), as these would give a very different picture for some countries such as Malaysia and Indonesia.

14. J Ellis, *Overcoming barriers to clean development mechanism projects*, OECD, May 2007, p. 12.

does occur is likely to be the subject of useful technology transfer. More generally, to assist in ongoing negotiations for international agreements, participation by the biggest number of countries is a key factor. If a country is a potential home for CDM projects it will more inclined to meaningfully participate in these negotiations.

Research has shown that a number of factors combine to make a country more or less attractive for CDM projects. These factors can include:

- a strong institutional framework for CDM project approval
- access to investment capital
- the economic growth of the area
- the availability of information on undertaking CDM projects
- the opportunities that each country has for such projects
- the in-country costs of undertaking a particular project in a particular country, and
- the political, administrative and financial risks of undertaking a project in a particular country.

No one factor will dominate for all project location decisions, however, a favourable combination of factors may make some countries more attractive than others.<sup>15</sup> Several studies have been undertaken to rank counties in terms of overall attractiveness for CDM projects. The following table shows the results of two of these studies.

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15. M Schneider, A Holzer and VH Hoffmann, 'Understanding the CDM's contribution to technology transfer', *Energy Policy*, No. 36, 2008, p. 2934.

Table 2: CDM attractiveness<sup>16</sup>

Country	Oleschak and Springer <sup>17</sup>	Point Carbon <sup>18</sup>
India	1	2
China	2	1
Brazil	3	5
Mexico	4	4
Chile	5	3
Morocco	6	10
S. Africa	8	8
Argentina	11	12
Thailand	12	16
Korea	13	16
Malaysia	15	6
Vietnam	22	13
Peru	26	7
Egypt	35	15
Indonesia	57	11

These rankings are not static and may change from year to year, depending as much on developments in individual country policy, as to who undertakes the calculations.<sup>19</sup>

The above results are perhaps unsurprising, given the current actual distribution of CDM projects. However, they do underscore the point that the location of a CDM project is an investment decision influenced by a number of factors.

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16. M. Schneider, and others, p. 2934.

17. R. Oleschak, U. Springer, 'Measuring host country risk in CDM and JI projects: a composite indicator', *Climate Policy*, No. 7, 2007, pp. 470–487. The indicator contains variables from a broad range of sources measuring the institutional environment for the Kyoto mechanisms, the regulatory environment, and the economic environment.

18. Point Carbon, *CDM host country rating*, August 2007. Point Carbon is an organisation providing data, news and commentary on emissions trading and international carbon markets, amongst other subjects.

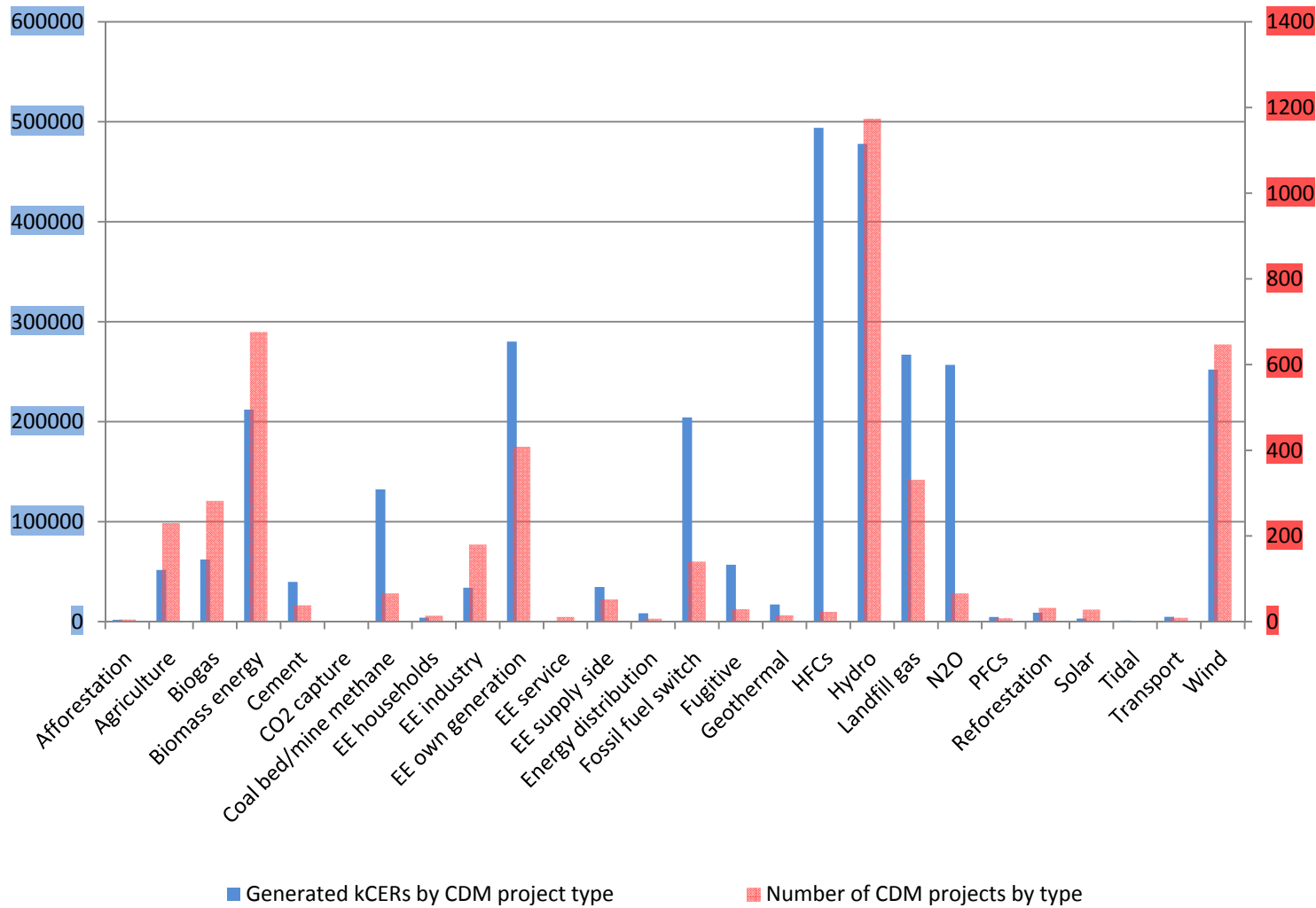
19. It is only fair to note that other authors have a very different CDM competitiveness ranking. See J Avis & C Blodgett (EcoSecurities), 'CDM: the Changing host country landscape' in K. Carnham (ed.) (International Emissions Trading Association), *Greenhouse Gas Market Report 2008*, Geneva, 2008, p. 74. The point here is that these CDM competitiveness or attractiveness ratings are not static from year to year and will not be so in the future.

## **Activities/technologies**

Hydropower is the most popular CDM project, closely followed by the production of biomass energy and wind power plants. Overall, renewables represent more than 60 per cent of expected CDM projects.

However, not all projects generate the same number of CER units. Each CER unit certifies an annual reduction of greenhouse gas emissions equivalent to one tonne of carbon dioxide. Figure 4 shows the amount of actual emissions from CDM project types, and the generated CER units. Although hydro is the most popular CDM project type, slightly more emission reductions are accomplished through HFC (a potent greenhouse gas and by-product of refrigerant gas production) emission reduction projects.

Figure 4: Numbers of CDM projects and generated '000' CER units. [Source: www.cdmpipeline.org February 2009]



Here the role of HFC emission reduction projects is striking. Just 23 HFC projects represent a bigger reduction in greenhouse gas emissions than any other of project types, including hydro, which outnumbers them more than 50-fold. It is clear that HFC destruction generates the largest number of CER units. What factors may explain this pattern?

To begin with, a CDM project must be commercially viable. In interviews, CDM project developers have revealed that the most commercially attractive projects are the ones that generate the greatest returns.<sup>20</sup> Returns can most easily be measured by calculating a project's internal rate of return (IRR).<sup>21</sup> Table 3 gives some calculated IRRs for various types of CDM projects.

Table 3: Impact of CDM on project profitability at US\$4/CER unit<sup>22</sup>

Project type	CDM impact on IRR %
Hydro, wind, geothermal	0.5 to 3.5
Crop/forest residues	3 to 7
Municipal solid waste	5 to 60
HFC destruction	plus 500

As can be seen, the destruction of HFC refrigerant gas has a high rate of return. That is to say that it is cheaper than other projects for the produced emission reduction. This explains the high number of CER units generated by this type of project.

Another important CDM project type is the reduction of nitrous oxide (N<sub>2</sub>O). Just 66 projects make this activity the fifth most important CDM project type in terms of generated CER units. It is expected to overtake landfill gas projects to join the top four abatement activities by 2012.<sup>23</sup>

Global concern has arisen over the predominance of HFC and N<sub>2</sub>O reduction projects, in the context of the CDM.

Although many gases cause global warming, CO<sub>2</sub> matters most because it is emitted in prodigious quantities and has a long atmospheric lifetime. The energy sector is generally the largest emitter of CO<sub>2</sub> in any country. Yet a detailed look at CDM projects producing and

20. M. Schneider, and others, p. 2933.

21. The IRR is the annualized effective compounded return rate which can be earned on the invested capital, i.e., the yield on the investment.

22. United Nations Environment Project, 'Capacity Development for Clean Development Mechanism (CD4CDM) and EcoSecurities BV', *Guidebook to financing CDM projects*, UNEP RISOE Centre, Roskilde, Denmark, 2007, p. 77, viewed 23 March 2009, <http://www.cd4cdm.org/Publications/FinanceCDMprojectsGuidebook.pdf>.

23. Enttrans, *State of play with the CDM*, November 2008, p. 7.

selling credits reveals that nearly two-thirds of emissions reductions involve neither CO<sub>2</sub> nor energy production.<sup>24</sup>

From Figure 4, the contributions of afforestation and reforestation CDM activities are almost negligible, both in terms of project numbers and emission reduction value. The first small-scale afforestation project has only just recently been registered by the CDM Executive Board.<sup>25</sup> Some critics of the CDM scheme have raised this as a weakness of the system.

## Project scales

According to the *Marrakech Accords* to the UNFCCC (plus subsequent amendments) which sets out the rules regarding meeting allocated Kyoto emission reduction targets, 'small-scale' CDM project activities are limited by the following criteria:

- (a) ... renewable energy[type] project activities shall have a maximum output capacity of 15 MW (or an appropriate equivalent);
- (b) ... project activities ... relating to improvements in energy efficiency which reduce energy consumption, on the supply and/or demand side, shall be limited to those with a maximum output of 60 GWh per year (or an appropriate equivalent);
- (c) ... other project activities, shall be limited to those that result in emission reductions of less than or equal to 60 kt CO<sub>2</sub> equivalent annually;<sup>26</sup>

Following from this, with some gross approximations, the orange bars in Figure 5 represent the small-scale CDM projects. This includes a slight majority of the projects.

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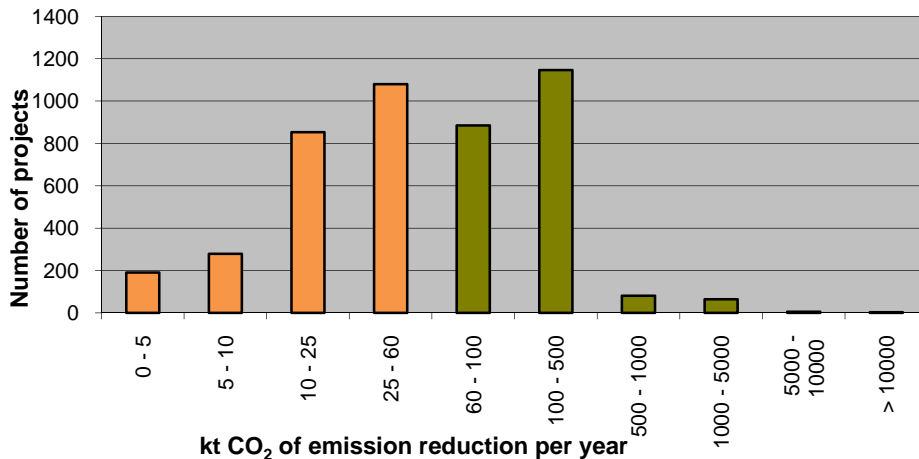
24. M. Wara, 'Is the global carbon market working?', *Nature*, vol 445/8 February 2007.

25. UNFCCC, 'CDM Project Design Document Form for Small-Scale Afforestation and Reforestation Project Activities, viewed 30 March 2009, <http://cdm.unfccc.int/UserManagement/FileStorage/DJISYMVG9RKHTCPU53X4BZA0NW8O2L>

26. UNFCCC Secretariat, Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its second session, held at Nairobi from 6 to 17 November 2006 Addendum, UNFCCC website, 2 March 2007, <http://unfccc.int/resource/docs/2006/cmp2/eng/10a01.pdf#page=3>



Figure 5: Number of CDM projects in different size intervals [source: www.cdmpipeline.org, February 2009]



The Marrakech Accords are important on the issue of project scale because, in the first place, they allow simplification of the administration. The distinction in project scale implies that some smaller projects might be allowed simplified cost-effective emissions accounting shortcuts. Secondly, it opens up the possibility of ‘bundling’ several similar small projects together, again resulting in simplified and less cost-intensive procedures. The importance given to small projects reflects the desire for simple, replicable, technologies that might promote sustainable development in developing countries.<sup>27</sup>

## Criticisms of the CDM

The effectiveness of the CDM has been questioned. The recent Australian Garnaut Climate Change Review has summarised some of these concerns as follows:

- the emissions reductions achieved by CDM projects have to be additional to those that would have occurred had the particular project not gone ahead. This involves calculating the baseline emissions that would have occurred without the project. However, this is at best an estimate only. It is impossible to either prove or disprove that the calculated amount of GHG emissions would have occurred without the particular project
- the basis of the CDM is a series of discrete projects. However, this has been argued to lead to high transaction costs and unreliable price signals for emissions reductions

27. Enttrans, State of play with the CDM, November 2008, p. 11.

- CDM projects generate emissions credits that offset emissions elsewhere. As such, they do not actually reduce emissions in developed countries purchasing these credits, and
- large scale sales of CER units may stand in the way of developing countries undertaking more comprehensive emissions reduction commitments. That is, developing countries may consider that increased participation in CDM projects will substitute for any commitment to reduce their own emissions<sup>28</sup>. This is an especially important point considering that over 90 per cent in the expected growth in GHG emissions may come from developing countries.<sup>29</sup>

Other points raised in criticism of the CDM are:

- CDM projects are concentrated in China and India, which together account for over 67 per cent of all projects. Other developing countries, particularly in Africa, are far from satisfied with this outcome
- the approval process is overly complex and time consuming. The body administering this process (the CDM Executive Board) does not have enough resources for the task it has to carry out
- the 'additionally' of many projects is questionable. That is, many of the projects would have gone ahead anyway in the absence of the CDM
- to date, most CDM projects have addressed the abatement of industrial gases only (mainly HFCs). More projects addressing the abatement of other GHGs are required
- to date, the CDM has not included large scale forestry and reforestation projects
- the CDM is not promoting enough technology transfer to the developing world<sup>30</sup>
- in some cases projects were created for the main purpose of generating CER units. Thus a CDM project may, in some instances have the perverse outcome of actually adding to the total stock of GHG in the atmosphere. This would occur where a project was undertaken only for the purposes of generating CER units and it otherwise emitted GHGs. This criticism has been levelled at some HFC reduction projects, and

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28. R Garnaut, *Garnaut Climate Change Review: Final Report*, Canberra, October 2008, p. 182.

29. R Garnaut, p. xxxvi

30. N Fujiwara, M Alessi, C Egenhofer and A Georgiev, European Parliament, Policy Department - Economic and Scientific Policy, UNFCCC COP 14 in Poznan, *Note*, IP/A/CLIM/NT/2008-19, PE 408.570, December 2008, p. 6.

- the slowness with which projects are approved and registered means that the supply of CER units will not keep up with the potential demand.<sup>31</sup> Of course, this leads to higher prices for these credits than might otherwise be the case.

These problems have led to calls for the CDM to be scrapped.<sup>32</sup>

## But before throwing the CDM baby out with the bathwater

### Responses to the critics

As convincing as these criticisms of the CDM may be, each has a valid retort:

- Baseline estimates: the Garnaut Climate Change Review's first issue is that it is impossible to determine whether a project would have gone ahead without the CDM. As such, an assessment is necessarily based on what might have happened in the absence of the scheme. However, the reverse argument is also true, as determining what may have happened without an existing policy is also very difficult. In any event this approach misses the point about GHG emissions reduction. If the problem is as urgent as the scientific data suggests then there is a strong policy need to ensure that GHG emissions are reduced or offset. This would not occur in the developing world without the CDM scheme.
- Cost-inefficiency of discrete projects: it may be the case that a large number of discrete CDM projects raises transactions costs and generates unreliable price signals. However, two further points must be kept in mind. A calculation of generated CER units on a project-by-project basis is possibly the best approach for ensuring that the emissions reductions or offsets actually occur. It enhances the reliability of the CER unit, which is reflected in the generally higher prices on the global secondary carbon markets than other GHG emissions credits arising from the voluntary action.<sup>33</sup> The second point is that the pricing of CER units on a secondary market is determined by the overall supply and demand for such credits, not the discrete project basis of the CDM.

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31. M Wara and D Victor, 'A realistic policy on international carbon offsets', *Program on Energy and Sustainable Development Working Paper #74*, Stanford University, Stanford, California, 2008, p. 11. This document has been the source for many of the above points. See also Friends of the Earth and International Rivers, 'The Failure of the Kyoto Protocol's Clean Development Mechanism, December 2008', viewed 2 March 2009,

[http://internationalrivers.org/files/CDM\\_factsheet\\_low-rez.pdf](http://internationalrivers.org/files/CDM_factsheet_low-rez.pdf); 'Trading in fake carbon credits: Problems with the Clean Development Mechanism (CDM)', Fact Sheet, 2008, International Rivers website, viewed 2 March 2009,

<http://www.internationalrivers.org/files/FOE%20IR%20CDM%20fact%20sheet%20FINAL3,%2010-08.pdf>

32. Friends of the Earth and International Rivers.

33. Boozé&Co, *Assessment of the International Carbon Market*, report prepared for the Department of Climate Change, October 2008.

- Displaced abatement: to observe that the CDM may excuse developed countries from taking their own action to reduce GHG emissions misses the point of the scheme. One of the aims of the CDM is to reduce such emissions where it costs least to do so. This is in the developing world. Further, it is not the case that the developed world is not taking action to reduce its own GHG emissions. Many developed countries, including Australia and the United States, have implemented or are implementing emissions trading schemes that will, when operational in normal economic conditions, reduce their GHG emissions.<sup>34</sup>
- Developing countries inaction: to suggest that a developing country's large-scale participation in the CDM will lead to its comparative inaction to reduce domestic GHG emissions has not been observed in practice. Together China and India will account for the majority of future increases in GHG emissions, and they host the overwhelming majority of CDM projects. Both China and India are implementing substantive additional policies to further reduce their own GHG emissions.<sup>35</sup>
- Uneven distribution: it is clear that the highest concentration of CDM projects is in Asia generally, and that this does little for the economic development of the rest of the developing world. However, from an environmental point of view it does not matter where the emissions reduction or offset takes place. Only that it does take place. From a financial point of view it is normal commercial practice to undertake the least-cost emissions reductions/offset activities first. As these opportunities are exhausted then CDM projects may spread to higher cost, or more risky, locations. A significant caveat to the above view is that CDM projects, often involving significant expenditure, will generally take place only in locations that have less political and economic risk. A key factor to ensure the spread of CDM projects to other locations may be for involved parties to lessen these risks.
- Minimal forestry projects: as discussed below, forestry and avoided deforestation may well be a part of the future of the CDM. Indeed, as noted below, the first small-scale forestry project has been approved by the CDM EB.
- Onerous bureaucracy: all parties involved in the CDM acknowledge that the approval is time-consuming. However, the thoroughness of the process is a guarantee of the quality of the CER units created from this process (see further discussion below).

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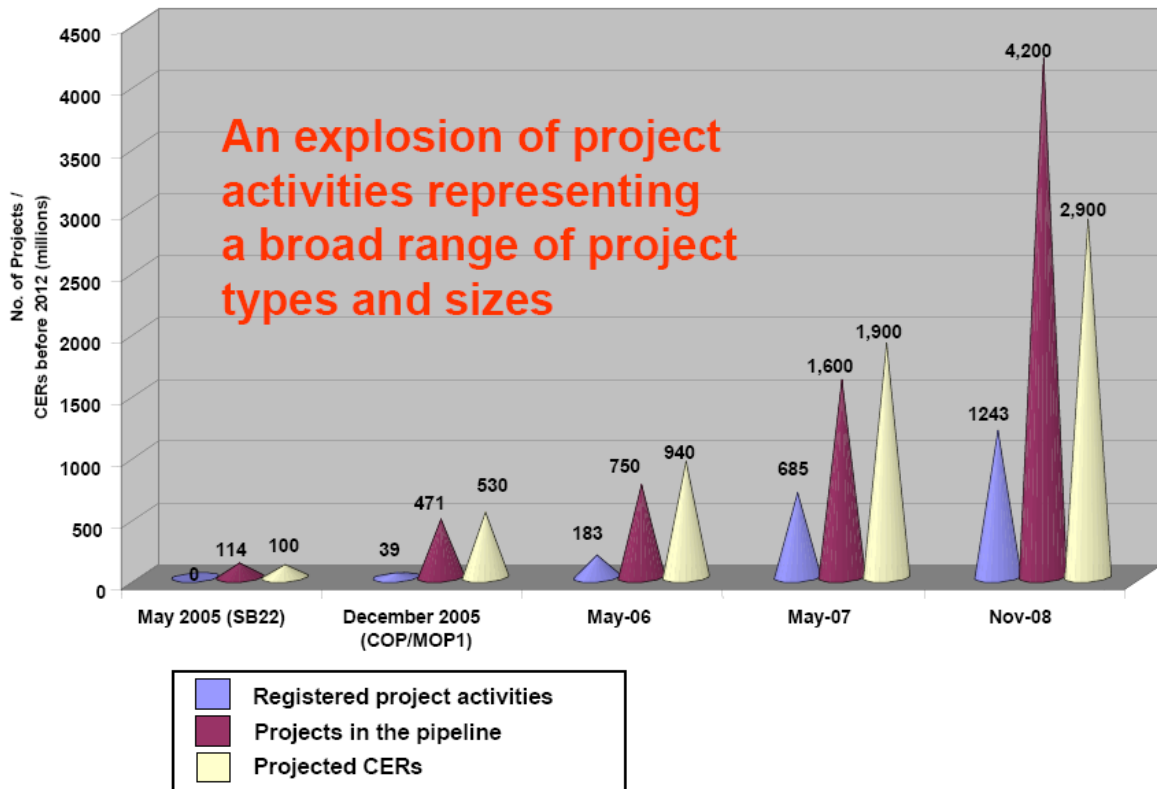
34. L Nielson, *Emissions – who is trading what*, Background Note, 15 August 2008, Parliamentary Library, Canberra, 2008, viewed 7 April 2009, <http://www.aph.gov.au/library/pubs/BN/2008-09/emissions.htm>

35. L Nielson, *Climate Change Policy: Brazil China, India and Russia*, Background Note, 25 February 2009, Parliamentary Library, Canberra, viewed 7 April 2009, <http://www.aph.gov.au/library/pubs/BN/2008-09/ClimateChange.htm>

### Administrative problems

To some extent the administrative problems of the CDM have been the result of sharp increases in the number of projects seeking approval and registration. Figure 6 shows the increasing working loads for the CDM Executive Board in recent years.

Figure 6: Numbers of CDM Projects seeking registration



Source: CDM Executive Board – Presentation at UNFCCC Poznań Conference December 2008

The main body overseeing the operation of the CDM—the Executive Board (EB)—has taken action to streamline the administration of this program to clarify the requirements for Designated Operational Entities (DOE) and other entities. For example, it has recently published a ‘Validation and Verification Manual’ to provide additional guidance to DOEs and others. Standard timelines for the completion of verification and assessment work have been determined. Other guidance documentation has been recently published.<sup>36</sup>

A particular complaint has been the potential corruption of the project assessment process. This occurs where DOEs and DNAs, for their own reasons, apply a less than rigorous process

36. UNFCCC, ‘Reference/Documentation’, CDM website, viewed 2 March 2009, <http://cdm.unfccc.int/Reference/index.html>

in the assessment of particular projects.<sup>37</sup> It is interesting to note that industry participants in the CDM assessment process regard it as an increasingly rigorous one, producing emissions credits that are valued highly in international carbon markets.<sup>38</sup> Further the EB has been reviewing the performance of various DOEs as well as particular CDM projects. This process has led to the recent suspension of a leading DOE from providing this service.<sup>39</sup> In short, the CDM EB recognises that there are administrative and verification problems and is working to address them.<sup>40</sup>

### Technology transfer

As noted above, the promotion of sustainable development is a goal of the CDM, not technology transfer to developing nations as such. However, encouraging the transfer of technology to developing nations is an aim of Australia's use of the CER units in the proposed CPRS. So, it is important to clarify whether the CDM has in fact promoted the transfer of emissions reductions technology to the developing world.

Studies have suggested that advanced technical means of emissions control and abatement have been transferred to developing countries, but that this transfer has been uneven and concentrated in narrow technological sectors.<sup>41</sup> If both the types of projects undertaken and the number of host countries expand, this particular problem may become less important.

### Future of the CDM

As noted above, Australia is proposing to accept CER units for compliance purposes in the proposed CPRS. The European Union's Emissions Trading Scheme also accepts limited amounts of CER units (and other Kyoto Protocol emissions reductions units) for compliance purposes.<sup>42</sup> There is some suggestion that the proposed emissions trading schemes in Canada

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37. Friends of the Earth and International Rivers; Wara and Victor.

38. R Dornau, 'Defending the Integrity of the CDM', in K Carnahan, ed, International Emissions Trading Association, *Greenhouse Gas Market 2008*, Geneva, 2008, pp. 77–82.

39. D Forston and J Leake, 'UN suspends carbon trading auditor', *Times Online*, 21 December 2008

40. CDM EB, Q&A Session, CMP 4 Poznan, viewed 2 March 2009, <http://copportal1.man.poznan.pl/Doc.ashx?Id=70&Mime=application/pdf&Presentation=True>.

41. A. Dechezlepretre, M. Glachant and Y. Meniere, 'The Clean Development Mechanism and the international diffusion of technologies: An empirical study', *Energy Policy*, no. 36, 2008, pp. 1273–1283; M. Schneider, and others.; H. C. de Coninck, F. Haake and N. H. van der Linden, 'Technology transfer in the Clean Development Mechanism', *Energy Research Centre of the Netherlands Paper ECN-E—07-09*, January 2007.

42. European Commission, DIRECTIVE 2004/101/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms, Official Journal of the European Union, L 338/18, 13.11.2004,

and the United States will also accept CER units for compliance purposes, if and when they are implemented.<sup>43</sup> As the Australian scheme and other proposed national emissions trading schemes develop, the current international trade in CER units (and other accepted Kyoto Protocol project-based emissions credits) may become the de-facto method of linking these various trading schemes.

This adds to the importance of reliability for CDM emission reduction, which the Executive Board is working to raise. Inevitably, this will also improve the stringency of procedures for the creation and verification of CER units. Even if the number of projects seeking registration declines, there seems to be no prospect of speeding up the registration and verification process. The advantage of this is that the quality of the emissions reductions or offsets represented by the CER units may increase.

Given the popularity and general success of the CDM scheme as a tool for mitigation, it was suggested at the UNFCCC conference in Bali in 2007 that the scheme be leveraged for adaptation purposes as well. It was suggested that a two per cent levy be taken from the CER unit revenues to support adaptation efforts in the developing world. This framework was agreed upon and finalised at the conference of the parties to the UNFCCC in Poznań in December 2008. The program is known as the Adaptation Fund. It is managed by the Adaptation Fund Board (AFB) consisting of 16 members representing the various groupings that have formed for the purposes of Kyoto negotiations. An important role of the AFB is deciding on appropriate adaptation projects and relevant funding.

The existence of the Adaptation Fund increases the significance of the CDM, now serving multiple purposes. In light of this, some of the criticisms of the CDM are being given further consideration. In particular, the exclusion of certain activities as eligible CDM projects, such as the sequestration of carbon in soils and carbon capture and storage (CCS) projects are now under review.<sup>44,45</sup>

At the Poznań discussions, Australia was a strong advocate for the inclusion of reduced emissions from deforestation and forest degradation (REDD) in the CDM. The concept of REDD is to provide a higher value to existing forestland than can be generated from

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viewed 23 March 2009, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:338:0018:0023:EN:PDF>

43. G Turner (New Carbon finance), 'The missing link: Linking emissions trading schemes', in Kim Carnahan, ed, International Emissions Trading Association, *Greenhouse Gas Market 2008*, Geneva, 2008, pp. 136–40.
44. UNFCCC, 'Implications of possible changes to the limit established for small scale afforestation and reforestation CDM projects SBSTA agenda item 9(b)', CDM website, viewed 23 March 2009, <http://cdm.unfccc.int/about/limitations/index.html>
45. UNFCCC, 'Carbon dioxide capture and storage in geological formations as clean development project activities', CDM website, viewed 23 March 2009, <http://cdm.unfccc.int/about/ccs/index.html>

agricultural land. At the Poznań meeting, Australia and Indonesia presented a joint submission describing the Indonesia-Australia Forest Carbon Partnership. This partnership is an example of developed and developing countries cooperating on REDD.<sup>46</sup> While the partnership is a demonstration that REDD is practicable on a one-off basis, issues of baselines, methodologies and verification need to be resolved before it might be included as part of a post-2012 agreement. To address these issues, Australia in partnership with the Clinton Climate Initiative, is developing a global carbon monitoring system as an extension of its National Carbon Accounting System. The system will provide free and open access to satellite, aircraft and field measurements within a toolkit for national forest monitoring. It will form the basis for verification of reductions in deforestation and forest degradation.

Since the Poznań meeting, Australia has proposed a separate 'market mechanism' for the trading of emissions credits generated by REDD. This mechanism may build on the current CDM scheme, or may be an extension of it.<sup>47</sup>

## Conclusion

By any measure, the CDM is a work in progress. Since its inception it has experienced an almost exponential growth in project numbers. In particular China, India and Brazil have recognised the benefits of the CDM program and now host more than 70 per cent of projects. The past few years have demonstrated that the CDM has the potential to be a major avenue for international cooperation in GHG emissions reductions. Although it has been the subject of a number of criticisms, the recent 'explosion' in project numbers suggests that it does have value. As criticisms are taken on board and improvements made, governments from both developed and developing countries should look onto the scheme even more favourably. Certainly, it will be a major point of discussion in Copenhagen when world leaders assemble to take the Kyoto agreement to the next stage, post-2012.

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46. P Wong (Minister for Climate Change and Water), *Building confidence towards an effective climate change agreement – An Australian Perspective*, address to the International Peace Institute, New York, 27 March 2009.

47. Australian Government, Reducing Emissions from deforestation and forest degradation in developing countries, Submission to the UNFCCC AWG-LAC, AWG-KP and SBSTA, New York, 27 March 2009.



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