EcoSecurities Ltd
Environmental Finance Solutions

The Delawarr House
45 Raleigh Park Road
Oxford OX2 9AZ, UK
Telephone (44) 1865 202 635
Fax (44) 1865 251 438
E-mail: uk@ecosecurities.com
Web site: www.ecosecurities.com

ECO SECURITIES

Final report

Department for International Development

Clean Development Mechanism (CDM): Simplified Modalities and Procedures for Small - Scale Projects

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NOTE

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Offices in Oxford; London;
Los Angeles; Sydney;
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Executive Summary

Overview

The Marrakech Accords establish the possibility of introducing fast-track modalities and procedures for small-scale projects, recognising that the sustainable development benefits of these projects can be high but that these projects may not have the economies of scale or levels of emissions reduction that larger projects enjoy. It may be the case, at least in the first compliance period (2008 - 2012), that the CDM market is limited, and that larger projects could 'crowd' out the smaller projects, due to the comparatively higher price of the emission reductions generated by small-scale projects.

The definitions of small-scale projects, set out in the Marrakech Accords, are as follows:

1. Renewable energy project activities with a maximum output capacity of up to 15 MW (or an appropriate equivalent);
2. Energy efficiency improvement project activities which reduce energy consumption on the supply and/or demand side, by up to the equivalent of 15 GWh per year;
3. Other project activities that reduce anthropogenic emissions by sources and that directly emit less than 15 kilotonnes of CO_2 equivalent per year.

Analysis of a sample of CDM-type projects showed that certain types of projects can be defined in more than one way, raising the possibility that some projects not eligible under one definition could be eligible under another definition, depending on which is less stringent. This is important because the ability of small-scale projects to compete in the CDM market, helped by the simplified rules and procedures, could be reduced if larger-scale projects benefit from simplified rules and procedures too.

The objective of this study is to critically review the small-scale project definitions and to identify and evaluate options for the simplification of rules and procedures for the trading of the CER value from small-scale projects.

Review of the definitions set out the Marrakech Accords

Definition 1 is the least stringent definition, because it is not linked to a project's output. There are two possible ways around this loophole. The first is to attach an output value to the definition, to equate it more closely with Definitions 2 and 3. The second is to attach an indicative list to Definition 1, which would help prevent any project with a renewable energy element to qualify as small-scale under Definition 1. It could be limited to the following project types:

a) Electricity generation and thermal energy generation projects from renewable energy sources, up to a maximum installed capacity of 15 MW;
b) Fuel switching electricity generation projects using renewable energy;

c) Household-level renewable energy projects that provide an electricity service where none was available before.

The interchangeability of projects types between Definitions 2 and 3 is not problematic because they are both based on a project's output.

There are two possible problems associated with the way Definition 3 is worded:

1. Both parts of the equation depend on the project size, and because project emissions are subtracted from the displaced baseline emissions, projects can be nearly 30 GWh or equivalent and still be eligible under Definition 3;

2. The 15 kilotonne parameter is attached to the clause of the sentence that refers to the project emissions. Taking this interpretation literally, any size renewable energy project would qualify because, by definition, project emissions are always zero.

Both of these problems could be resolved by attaching the 15 CO_2 kilotonne figure to the first clause, as well as the second, so that the wording of Definition 3 is now:

- Other project activities that reduce anthropogenic emissions by sources less than 15 kilotonnes of CO_2 equivalent per year, and that directly emit less than 15 kilotonnes of CO_2 equivalent per year

The disaggregation of a project into parts of a project is another way that large-scale projects could benefit from simplified rules and procedures. The Executive Board should stipulate that for projects involving electricity generation from methane, the emissions reduction estimates from methane combustion be estimated and that the project be submitted under Definition 3. For other technologies, we recommend that this issue of 'debundling' is noted as a possible loophole for large projects to benefit from simplified rules and procedures and that it is monitored to assess its significance as the CDM market develops. If simplified rules and procedures are focused on a subset of small-scale projects, as recommended in Section 4, this disaggregation issue need not be considered further.

Simplified rules and procedures for small-scale projects

Some streamlining options for small-scale projects focus on simplifying the assessment of a CDM project's carbon value. These measures could allow an influx of small-scale projects under the CDM that would ordinarily not be eligible as CDM projects, thus threatening the environmental integrity of the CDM. This could be a particular problem if larger-scale projects benefited from the simplified rules and procedures for small-scale projects. We recommend that this set of simplification measures is focused on a subset of projects with particular development benefits because these projects:

- offer the least threat of free riding (i.e. allowing non-eligible emissions reductions into the CDM);
- are likely to be the least competitive in the CDM market.

A *strategy* for simplified rules and procedures for development-focused projects could decrease transaction costs by over two thirds. For small-scale projects in general, a simplified approach to monitoring, and the possibilities for multi-project verification could lead to a reduction in costs of around 30 percent.

It is important to note that even with reduced transaction costs, small-scale projects in general may need support with the transaction costs that remain with regards to developing the carbon value of their projects, or some guarantee that the project is eligible for trading is required. Support for risk mitigation mechanisms for under-performance or non-performance of the project would further help these projects. Supporting local consultants in the accreditation process would help reduce transaction costs for all projects, large and small.

1. Overview

The Marrakech Accords establish the possibility of introducing fast-track modalities and procedures for small-scale projects, recognising that the sustainable development benefits of these projects can be high but that these projects may not be as competitive as larger-scale projects.

Market forecasts predict that the CDM market may reach billions of dollars by the compliance period: 2008 to 2012. However, with no specific measures aimed to encourage projects that are focused on 'sustainable development' as much as on least-cost mitigation, the CDM could largely benefit the larger developing countries[1] and could focus on a restricted typology of projects. Simplified modalities and procedures for small-scale projects are intended to reduce transaction costs and reduce investor uncertainty in CDM projects, thus boosting their competitiveness in the CDM market.

The definitions of small-scale projects, set out in the Marrakech Accords, are as follows:

1. Renewable energy project activities with a maximum output capacity of up to 15 MW (or an appropriate equivalent);
2. Energy efficiency improvement project activities which reduce energy consumption on the supply and/or demand side, by up to the equivalent of 15 GWh per year;
3. Other project activities that reduce anthropogenic emissions by sources and that directly emit less than 15 kilotonnes of CO_2 equivalent per year.

The three definitions refer to non-LUCF projects. This is obvious in the first two definitions. Definition 3 stipulates projects that reduce anthropogenic emissions 'by sources', referring to activities that emit, rather than sequester, greenhouse gas emissions.

While definitions for small-scale projects have been established, streamlined procedures still need to be defined to enable these projects' participation in the CDM. Simplified rules and procedures could include different levels of standardisation of emissions reduction data and a simplified CDM project cycle. One of the effects of these simplified procedures would be a reduction in transaction costs facilitating the participation of small-scale projects.

A possible trade-off to these measures could be that the environmental rigor of the CDM is reduced and that the risks related to CER delivery are enhanced. Streamlined rules may generate an influx of projects under the CDM or a stream of CERs that would ordinarily not be eligible under the CDM, thus threatening the environmental integrity of the CDM.

It is important to recognise that simplified procedures by themselves are not likely to be the single solution in enhancing the participation of small-scale projects in the CDM. Risk perception is one of the main

[1] Recent data highlights that South, East and South East Asia account for over 50 percent of foreign direct investment flows, Latin America and the Caribbean 35 percent, whilst Africa accounts for only 4 percent (Unctad 2001).

deterrents preventing investment in CDM projects, particularly for small-scale projects. Measures aimed at risk mitigation as well as the reduction of transaction costs need to be pursued in parallel.

The objectives of this study are to:

1. critically review the definitions for small-scale CDM project activities adopted in the COP decision -/CP.7 (Article 12) and their implications;

2. to identify and evaluate options for how the modalities and procedures for small-scale CDM project activities could be simplified to lower transaction costs associated with them whilst maintaining environmental integrity;

3. to assess the impact on (a) whether the promotion of investment in smaller scale projects could lead to higher developmental and poverty reduction impacts; (b) on the objective of promoting better equitable distribution of projects under the CDM; and (c) on the level and ease of 'free riding' under the CDM,

Section 2 of this study critically reviews definitions of small-scale projects established in the Marrakech Accords. Section 3 evaluates different options for simplification for modalities and procedures for small-scale projects. Section 4 considers various fast-track options, and recommends a possible strategy for the simplification of rules and procedures for small-scale projects.

1.1. Data analysis methodology

The analysis in this report was based on a number of different sources of data on planned and implemented projects in developing countries. The sources of data were:

1. UNFCCC AIJ programme;
2. World Bank Prototype Carbon Fund;
3. Dutch ERUPT purchasing programme;
4. EcoSecurities project database;
5. The US Joint Implementation Pilot Phase;
6. The Australian Greenhouse Office;
7. The Honduras UNFCCC Focal Point;
8. The World Energy Council;
9. The Global Environment Facility Small Grants Programme;
10. DFID projects database.

A total of 508 projects were evaluated. Table 1 sets out the distribution of projects by type and data source. The definitions are taken directly from source. Where project information was too limited to classify them into different project or technology types, we have classified them as 'unknown'.

Table 1 Data set used for analysis, divided by data source and project type.

	Data sources 1-10										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	
Renewable Energy											
Wind	6	2	1	0	0	0	0	7	1	1	
Hydro	9	5	1	1	0	0	78	28	11	6	
Solar	5	0	0	0	0	1	2	1	20	2	
Biomass	3	3	2	1	1	0	1	0	4	0	
Geothermal	0	0	0	1	0	0	6	3	0	0	
Unknown	31	1	0	1	1	1	0	3	22	0	
Total	**54**	**11**	**4**	**4**	**2**	**2**	**87**	**42**	**58**	**9**	**273**
Energy Efficiency											
Supply –side	43	3	1	1	2	2	41	23			
Demand side	11				1		2		6	2	
Unknown	3						5	2	1	1	
Total	**57**	**3**	**1**	**1**	**3**	**2**	**48**	**25**	**7**	**3**	**150**
Other											
Fuel switching	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**40**	**0**	**0**	**48**
Fugitive gas capture*	**8**	**2**	**0**	**4**	**0**	**3**	**0**	**1**	**0**	**0**	**18**
Unclassified	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**2**	**13**	**2**	**19**
TOTAL	**125**	**17**	**6**	**8**	**5**	**7**	**134**	**112**	**78**	**14**	**508**

*14 out of the 16 fugitive gas projects were waste-related, and out of these over half were landfill gas projects.

Emission reduction information was available for the majority of projects. A smaller number of projects size had information on installed capacity (MW). An even smaller subset had information on output (GWh). To enable comparison across the three project definitions, we interpolated data using assumptions on the capacity factors of different technologies[2] and we applied a country-specific carbon emissions factor (CEF), sourced from the International Energy Agency (IEA) to convert emission reductions to an 'equivalent' in MW and then GWh. This is not always appropriate. For example, methane mitigation projects generate large emission reductions, but will not necessarily translate into a large project in terms of electricity generation. Where possible these considerations have been taken into account when analysing the results.

Distribution curve analysis was used to analyse the frequency of different project sizes by programme, region and technology.

[2] The average capacity factors used were as follows: Wind: 30%; Biomass: 30%; Hydro: 50%; Gas: 70%; geothermal: 90%.

2. Critical review of the definitions for small-scale CDM project activities

2.1. Methodology

The first part of this report focuses on whether the three definitions of small-scale, as set out in the Marrakech Accords, are straightforward to interpret and whether there is any ambiguity in the interpretation of the definitions that could impact on the environmental integrity of the CDM. The principle issue is whether larger-scale projects could benefit from the simplified rules and procedures for small-scale projects. The concern is that this negates the effect of simplified rules and procedures on the relative competitiveness of small-scale projects with respect to larger-scale projects, and that the negative impact on the environmental integrity of the CDM could be high because some of the measures aimed at simplification, discussed in Section 3, have the potential to allow non-eligible emission reductions into the CDM.[3]

2.2. What are the Marrakech small-scale project definitions?

Box 1 sets out the three definitions of the Marrakech Agreement.

Box 1 . Marrakech definitions for small-scale CDM projects

Definition 1

?? Renewable energy project activities with a maximum output capacity of up to 15 MW (or an appropriate equivalent)

Definition 2

?? Energy efficiency improvement project activities which reduce energy consumption on the supply and/or demand side, by up to the equivalent of 15 GWh per year

Definition 3

?? Other project activities that reduce anthropogenic emissions by sources and that directly emit less than 15 kilotonnes of CO_2 equivalent per year

Definition 1 relates to projects that use renewable resources as their primary energy source. Such renewable resources include solar, wind, water, certain forms of biomass, geothermal electricity, wave power and tidal power.

Definition 2 relates to projects that use technologies to improve energy consumption. Energy efficiency projects can be categorised into two distinct areas. The first are demand-side projects: these projects yield the same output or service as their alternative, consuming less energy (for example, compact fluorescent lighting). The second are supply-side projects: these projects generate the same electricity

[3] Non-eligibility can arise in two different ways: from a project being accepted into the CDM even though it is not environmentally additional or from the overestimation of emission reductions.

using smaller quantities of fuels, or, put another way, generate more electricity from the same amount of fuel (for example, cogeneration, which uses waste heat to generate electricity).

The third category can refer to non-electricity projects such as fugitive gas capture and fuel switching. Fugitive gas capture projects relate to the capture and combustion of methane emissions from landfills, natural gas production fields, natural gas pipelines, active and abandoned coal mines and the anaerobic digestion of waste. Fuel switching could relate to any projects "*where fuel combusted in an existing system is replaced by fuel with a lower carbon content. This project category limits itself to application in boilers, turbines or engines used to produce heat, electricity or both simultaneously (CHP). The above indicates that the activity level can be altered by the project, but the nature of the output of the system is NOT changed by the project"* (ERUPT, 2000). Such fuel switch projects could include a switch from fossil fuel to fossil fuel or from fossil fuel to a renewable energy source.

The following section goes on to critically review these definitions and their implications for the environmental integrity of the CDM.

2.3. What are the potential problems in the way the definitions are currently defined?

The principle issue is whether larger-scale projects could benefit from the simplified rules and procedures for small-scale projects. The concern is that this negates the effect of simplification on the relative competitiveness of small-scale projects with respect to larger-scale projects and that the negative impact on the environmental integrity of the CDM is high because some of the measures aimed at simplification, discussed in Section 3, have the potential to allow non-eligible emission reductions into the CDM.

We divide this section into two themes:

1. Larger-scale projects qualifying under the small-scale simplification thresholds by using the least stringent definition of small-scale;
2. Larger-scale projects being disaggregated into parts of a project and submitted under more than one definition.

2.3.1. The stringency of the definitions

Analysis of the projects in the database showed that certain type of projects might be defined in more than one project category, raising the possibility that some projects not eligible under one definition could be eligible under another definition. Boxes 2 to 4 highlight examples of projects included in the UNFCCC database that can be classified into different definitions. Table 2 provides an overview of the type of CDM projects that would fit under more than one definition.

Table 2 Inter-linkages between small-scale project definitions.

Project type	Definition 1	Definition 2	Definition 3
Definition 1			
Household level renewable energy	?	?	?
Fuel switching to renewable energy for electricity generation	?		?
Transport (use of biofuels)	?		?
Energy efficiency at household level	?	?	?
Definition 2			
Energy efficiency at industrial level	?	?	?
Energy efficiency at household level	?	?	?
Definition 3			
Fuel switching to renewable energy for electricity generation	?		?
Fuel switching to renewable energy + upgrading of technology	?	?	?
Transport (use of biofuels)	?		?

Ticks denote whether a project type could fall under the given definition.

The three definitions may be more or less stringent comparatively, depending on the circumstances of the project. Table 3 shows the different maximum project sizes in terms of MW, GWh and $ktCO_2$ for each definition, based on performance characteristics of a typical small-scale electricity CDM project: a load factor of 60 percent and a CO_2 emission reduction factor of 0.75 tCO_2/MWh. In this example, Definition 1 allows the largest projects: a 15 MW project will generate 78.8GWh (five times more than the project capped at 15 GWh following Definition 2) and will abate 59.1 $ktCO_2$ (four times more than the 15 $ktCO_2$ cap set by Definition 3). That means that an energy efficiency project of 60 GWh with a renewable component could still benefit from simplified procedures if it defined itself as a small renewable project (max 78.8 GWh) rather than as an energy efficiency project (15 GWh).

Table 3 Maximum project sizes for the different definitions: MW; GWh/year, and $ktCO_2$/year (load factor = 60% and CEF = 0.75tCO_2/MWh)

	MW	GWh/year	ktCO2/year
Definition 1 (renewable energy)	**15.0**	78.8	59.1
Definition 2(energy efficiency)	2.9	**15.0**	11.3
Definition 3 (other projects)	3.8	20.0	**15.0**

We carried out a sensitivity analysis on the size thresholds for the three definitions to assess whether the potential for varying interpretations in defining projects would impact on whether projects would be eligible as small-scale under one or more definitions. Since many of the CDM-type projects to date could be classified under Definition 1, we took projects in this category and analysed whether they could also be eligible under Definition 2 (in terms of GW hours generated) and Definition 3 (in terms of kilotonnes of CO_2).

Of the 268 renewable energy projects analysed, 182 of these projects fall within the first small-scale definition. When these projects are translated to GWh and kilotonnes of CO_2 equivalent, the number of eligible projects decreases. Of the 182 renewable energy projects analysed, 131 would be eligible under Definition 2 (in terms of GW hours generated) and 155 would be eligible under Definition 3 (in terms of kilotonnes of CO_2), based on the efficiency factors and operating factors we assumed for the analysis.

What this shows is that Definition 1 is the least stringent definition. When projects that fall under Definition 1 are linked to output (GWh) or tonnes of CO_2 mitigated (which is also linked to output), fewer projects remain eligible as small-scale. Table 4 highlights this point with a few examples of real-life projects that have installed capacities of under 15 MW (Definition 1) but that would not qualify if submitted under Definitions 1 or 2.

Table 4 Projects that are eligible under Definition 1, analysed under the other definitions.

Country	Technology	Size (MW)	Size (GWh) (where it exceeds small-scale)	Size (Ktonnes CO2) (where it exceeds small-scale)
China	Wind	7	18	
Estonia	Boiler conversion	7	30	
Honduras	Hydro	6.4	28	22
Honduras	Biomass	15	39	53
Uganda	Hydro	3.3		16

Source: UNFCCC AIJ database

Indicative lists of project types that are eligible under Definition 1 would limit this loophole. The indicative list for Definition 1 could be limited to the following project types:

d) Electricity generation and thermal energy generation projects from renewable energy sources, up to a maximum installed capacity of 15 MW;
e) Fuel switching electricity generation projects using renewable energy;
f) Household level renewable energy projects that provide a new electricity service.

For other renewable energy projects, for example, biofuel projects, which could be captured under the clause "or an appropriate equivalent" in Definition 1, the assessment of whether a project is small-scale necessarily requires the project impact to be converted to kilotonnes of CO_2 equivalent mitigated, and then translated to a MW equivalent. We argue that this is an unnecessarily long route to assess a project's eligibility under the small-scale definitions. This, coupled with the fact that Definition 1 is the least stringent definition, leads us to recommend that Definition 1 should be restricted to electricity generation projects.

The interchangeability of projects types between Definitions 2 and 3 is not problematic because they are both based on a project's output. Output (GWh) is multiplied by a carbon emission factor to arrive at the parameter required by the threshold set out in Definition 3 (kilotonnes of CO_2 equivalent). The higher the carbon emission factor (the dirtier the technologies being replaced) the larger the project becomes under Definition 3. If we take a renewable energy project that displaces the dirtiest existing technology (coal-fired conventional steam) by producing 15 GWh of electricity, and we multiply it by its carbon emission factor for this technology (956 tonnes of CO_2/GWh), it results in a CO_2 kilotonne figure of 14,340.[4] Defined both ways, the project is at or near the limit set out for small-scale projects.

The most likely scenario where a project is eligible under Definition 3 but not under Definition 2 (in other words, where the number of kilotonnes of CO_2 equivalent mitigated is larger than the number of GWh produced) is in the case where a cleaner fossil fuel replaces a dirtier fossil fuel.[5] This is because the calculation method for Definition 3 is:

Emissions displaced (+) + project emissions (0 or -) = Total kilotonnes CO_2 equivalent.

There are two possible problems associated with the way Definition 3 is worded:

1. Both parts of the equation depend on the project size, and because project emissions are subtracted from the displaced baseline emissions, the eligible project size can be much larger than 15 GWh or equivalent;
2. The 15 kilotonne parameter is attached to the clause of the sentence that refers to the project emissions. Taking this interpretation literally, any size renewable energy project would qualify because, by definition, project emissions are always zero.

The project could be nearly 30 GWh in size in order for the threshold in terms of kilotonnes of CO_2 equivalent is reached. The following example illustrates this: a combined cycle gas plant generating 30 GWh and replacing conventional steam coal-fired technology, produces the following net project emissions reductions:

(30 GWh * 920 t CO_2/GWh) - (30GWh * 405 t CO_2/GWh) = 15.45 kilotonnes of CO_2.

Both of these loopholes could be plugged by attaching the 15 CO_2 kilotonne figure to the first clause, as well as the second, so that the wording of Definition 3 is now:

?? Other project activities that reduce anthropogenic emissions by sources less than 15 kilotonnes of CO_2 equivalent per year, and that directly emit less than 15 kilotonnes of CO_2 equivalent per year

A related criticism of Definition 1 is that it discriminates against technologies that have inherently lower capacity factors. The plant capacity factor is the ratio of annual produced energy to nameplate installed capacity and it is affected by factors such as resource availability and operational and maintenance

[4] This uses carbon emission factors from the World Bank OEKO model, which in turn assumes efficiency factors and operational factors.

[5] Our data analysis bears this out: projects eligible under Definition 3 but not under Definition 2 are mostly boiler replacement projects that typically switch from coal to gas.

requirements of the technology. Consequently, technologies with low capacity factors such as wind and hydro technologies would be penalised, while technologies that typically operate with higher plant capacities, such as geothermal technology, would benefit from this definitional approach.

For example, a geothermal plant has a typical plant capacity factor of 90 percent. For a 15 MW plant, this translates as 118,260 MWh per annum. If we then look to a 15 MW wind plant, with a plant capacity of just 20 percent, this yields only 26,280 MWh per annum. For this wind plant to match the electricity output of a 15 MW geothermal plant, it would need to have a nameplate capacity of 67.5 MW. This would exceed the threshold set out in Definition 1. The way around this would be to attach an output parameter to Definition 1. This would negate the need for an indicative list for Definition 1, since all three Definitions would be measuring output-related parameters.

BOX 2 EXAMPLES OF PROJECTS FALLING UNDER MORE THAN ONE DEFINITION: RENEWABLE ENERGY

HYBRID ENERGY PROJECT, EASTERN INDONESIA

Classified: Renewable energy
Alternative classifications: Energy efficiency; fuel switching

The objective of this project is to design, install, monitor and evaluate the performance of solar/diesel hybrid power systems that are to provide electricity to 14 villages in eastern Indonesia. The systems will be used to provide affordable electricity for lighting and basic entertainment.

Rural Indonesian villages presently rely extensively on kerosene for lighting and the hybrid power supply systems will displace kerosene use for this purpose. The reduction in emissions will arise from an increase in the overall energy efficiency with which lighting services are provided; and a reliance on solar energy to meet 50 percent of the electricity requirements.

BALVI BOILER CONVERSION, LATVIA

Classified: Renewable energy
Alternative classifications: Energy efficiency; fuel switching
Notes: There are two different emissions reduction streams which could be classified under different definitions.

The project involves the replacement of a coal-fired boiler to a boiler using woodchips. The project also involves supply-side energy efficiency measures such the modernisation of the existing heat distribution system and demand-side energy efficiency measures such as installing additional insulation.

Source: www.unfccc.int.

BOX 3 EXAMPLES OF PROJECTS FALLING UNDER MORE THAN ONE DEFINITION: ENERGY EFFICIENCY

HEAT SUPPLY MODERNISATION, POLAND

Classified: Energy efficiency
Alternative classification: Fuel switching

The project involves the modernisation of the heat supply system in the town of Byczyna located in the Southwestern part of the Poland. This involves the replacement of 16 coal fired boilers by 15 modern gas-fired boilers. One coal-fired boiler will be eliminated and not replaced. The project also involves the construction of a gas distribution system and the optimisation of the heat distribution network.

PLANTAR S.A - USE OF CHARCOAL FOR PIG IRON PRODUCTION, BRAZIL

Classified: Energy efficiency
Alternative classification: Fuel-switching

The project involves the maintenance of charcoal-based production of pig-iron. The baseline is the use of coal. The project also involves the adaptation of its existing 2000 carbonisation kilns to incorporate a better design that avoids emissions of methane.

SWISS ENERGY EFFICIENCY PROJECT, SLOVAK REPUBLIC

Classified: Energy efficiency
Alternative classification: Fuel-switching
Notes: There are two different emissions reduction streams, which could each be classified differently.

The project involves energy efficiency improvements in the privately owned wood processing plant Bucina a.s. Project components include the installation of a natural gas-fuelled turbine in the wood drying process for the co-generation of electricity and heat and the upgrading and extension of a energy control system for heat, lighting and wood processing technology to decrease the overall heat and electricity demand

Source: www.unfccc.int

BOX 4 EXAMPLES OF PROJECTS FALLING UNDER MORE THAN ONE DEFINITION: OTHER (FUEL-SWITCHING AND FUGITIVE GAS CAPTURE.

FUEL SWITCHING AND COGENERATION IN THE DOROG EROMU KFT POWER PLANT

Classified: Fuel Switching
Alternative classification: Energy efficiency

The project involves the installation of a 5 MWe gas turbine (cogeneration), increasing the overall efficiency of the plant. The project uses existing boilers as heat exchangers with post combustion of the turbine exhaust gases by natural gas burners. The project uses process gas from a nearby pharmaceutical factory to supplement natural gas.

SOLAR LIGHT FOR THE CHURCHES OF AFRICA

Classified: Fuel Switching
Alternative classification: Renewable energy

The project will provide electric light and radio to areas of rural Uganda where electric grid extension is unlikely. The goal is to electrify 5,000 churches, schools, health clinics, community centres and homes over the next two years. Each unit will be provided a solar lighting kit powered by a 60-watt roof-mounted solar module, with a battery for night time use. The project is replacing kerosene lanterns.

Source: www.unfccc.int

A last point refers to the emission reduction profiles of some technologies. For example, landfill gas capture projects typically have methane generation curves that follow a bell curve shape, so that more methane is generated in the middle years of a project compared to the start and end years of the project. We do not see this as being problematic since the average per year figure could be taken as the indicative size of the project.

2.3.2. Disaggregating projects into parts of one project

The disaggregation of a project into parts of a projects can be done for projects with one emissions reduction stream, (for example, breaking down a wind farm, comprising a number of wind turbines, into a series of smaller wind farms); or for projects with more than one emissions reduction stream - these are typically methane capture and electricity generation projects (for example, a landfill gas electricity generation project can be broken down into two parts: methane capture and combustion represents one emissions reduction stream, and displacement of fossil fuel-sourced grid electricity represents the second.) Methane gas capture and electricity generation projects are not expected to be problematic in this respect, since we would not expect them to enter within the definition of small-scale[6]. It is possible that developers may seek inclusion of these projects into the simplified rules and procedures by only disclosing the rated capacity (MW) or output (GWh) of the electricity generation part of the project, and

[6] It is not expected that landfill gas electricity generation projects would qualify as small-scale projects, as they could only mitigate a maximum of 650 tonnes of methane per year, which relates to a plants size of less than 0.5 MW. This is not likely to be cost-effective to develop projects of this size in the first place.

omiting to disclose the size of emissions reductions from methane combustion. The Executive Board should stipulate that for projects involving electricity generation from methane, the emissions reduction estimates from methane combustion be estimated and that the project be submitted under Definition 3.

De-bundling of projects other than methane gas capture is more problematic. The wind farm that is broken down into more than one project can be given different project names or there could be different 'ownership' of the project. Another issue is that a project may initiate within the small-scale project size and then grow over time into a scale that falls outside the small-scale boundary. Wind energy projects often follow this dynamic in regions where system operators and utilities are unsure of the characteristic of the resource at the outset of a development.

A counter-argument is that there is a greater incentive for project developers to aggregate projects rather than disaggregate them. This is because favourable financing terms can usually be found for larger-scale projects. Projects requiring a $20 million or larger credit facility will be able to choose from a far greater number of financiers than a project requiring a $5 million facility. The project can therefore choose the best financing terms. Secondly, the relative transaction costs (due diligence) of project financing decreases as the amount of capital required increases. Financiers pass these costs onto the debtor. Thirdly, the economies of scale of large projects can potentially increase the rate of return on the project, thus the payback period is shortened.

Imposing rules to stop disaggregation of projects risks making participation rules unwieldy and over-bureaucratic. We recommend that this issue of 'debundling' is noted as a possible loophole for large projects to benefit from simplified rules and procedures and that it is monitored to assess its significance as the CDM market develops. There are two broad monitoring strategies:

- Project -specific;
- Market-specific.

Table 5 sets out possible monitoring points.

Table 5 Possible monitoring points to assess the rate of project 'debundling'.

Monitoring strategy	Monitoring point
Project-specific	Geographical location. Where are the CDM projects applying to simplified rules and procedures located? Are there clusters of projects appearing in the same location?
Market-specific	Rate of penetration of the technology in question in the CDM (taking the reference point as, for example, the average penetration rate of 1998 - 2002). Is there a greater MW installed capacity being installed under the CDM post-2002 (or for a range of years -- for example -- 2002 - 2007) as there was before 2002?

In section 4 we recommend that small-scale fast-track rules and procedures focus on a particular subset of technologies and user groups, because the potential level of negative environmental impacts will be negligible, and it is for these projects that the sustainable development benefits are likely to be highest. These projects are also likely to be the least competitive in the CDM market. If simplified rules and procedures are indeed focused on a subset of small-scale projects, this disaggregation issue need not be considered further.

3. Identification of fast-track options

3.1. Overview

There are two main constraints to small-scale projects participating in the CDM:

1. Supply-side related issues that impact on the development of small-scale CDM projects;
2. Demand-side related issues that impact on the level of demand for emissions reductions generated from small-scale projects, particularly those projects that are development-oriented.

Simplified rules and procedures can go some way to reducing the barriers to the supply of small-scale projects. Other support measures, such as project development grants and risk guarantee mechanisms are required to encourage the supply of small-scale projects and reduce the level of risk attached to emissions reductions generated by small-scale CDM projects, particularly those that development-focused.

Section 3.2 and 3.3 go on to describe the issues involved in each of these constraints respectively. Section 3.4 evaluates different fast-track options and other support mechanisms.

3.2. Why do we need fast-track options for small-scale projects?

The net financial gains derived from the sale of Certified Emission Reductions (CERs) from CDM projects can be expressed as follows:

Net CER Value = Project CER value - Transaction Costs

There are three issues associated with this:

- Low project CER value: The carbon reduction benefits of small-scale projects can be lower than for larger-scale projects, because, for example, the baseline consumption of fossil fuel energy is low, due to affordability and availability constraints. This makes net CER value smaller;
- High transaction costs: Without simplification of modalities and procedures, the level of transaction costs is generally independent of project size. In addition, the small and medium sized enterprises, which, in many cases, would be involved in developing community-focused and development-oriented projects, are less able to meet these transaction costs. They may lack the capacity to implement the complex CDM procedures and lack the resources to hire external consultants for this purpose. Many of these transaction costs may require hard currency payments to international advisors which may be difficult to access for some small-scale projects. The level of resources required to prepare a small-scale project under the CDM, together with the relatively small carbon benefits, makes net financial returns from CER sales smaller;

- Most transaction costs are required to be paid up-front, while the project CER value is payable over a number of years. If the CER production per annum is small, then this issue can jeopardise the viability of developing the project at all under the CDM.

It should be noted that the price of CERs is instrumental in altering the balance of the formula set out above. The higher the carbon price, the less significant are the transaction costs. The PCF predicts that the price of CERs could be around US$8 by the 2010, an increase of over 100 percent on today's value (PCF, 2001). There is, in addition, an emerging demand for CDM projects with strong social impacts, and a willingness to pay more for the CERs generated by these projects. A key example is Triodos Bank in the Netherlands that has recorded carbon prices for certain small projects of over €10 per tonne of CO_2.

3.2.1. Impact of transaction costs on the implementation of small-scale projects

In the absence of simplification, pre-operational transaction costs are independent of the size of project. Transaction costs can, however, depend on the complexity of a project. For example, the construction and validation of a project design document for a programme of micro-scale projects is likely to be more complicated than a single grid-connected wind farm. This disadvantages small-scale projects because transaction costs are higher, and this is independent of the potential CER value.

Table 6 highlights typical costs at each stage of the project cycle, based on a previous study conducted by EcoSecurities (EcoSecurities, 2000). It should be noted that these costs reflect the use of external advisors and consultants. The use of local and internal resources would reduce costs considerably. However, in many cases this capacity is absent in many developing countries. Total known pre-operational direct costs that must be supported before any carbon transaction can take place are therefore a minimum of £42,000 per project.

An additional category of costs is associated with delays and uncertainty of outcomes of the CDM project cycle, such as stakeholder consultation and approval of the project by the host country. We have not attempted to put a cost on these elements, but these 'hidden' costs could be significant in deterring investments.

Table 6 Minimum transaction costs associated with the CDM project cycle**.**

	CDM project cycle stages where costs are incurred	Estimate of cost (£)
Pre-operational phase design	Baseline study	12,000 – 15,000
	Monitoring plan	5,000 – 10,000
	Environmental assessment	Time & uncertainty
	Stakeholder consultation	Time & uncertainty
	Approval	Time & uncertainty
	Validation	10,000 – 20,000
	Legal and contractual arrangements	15,000 – 25,000
Operational phase	Sale of CERS	5% -15% of CER value.
	Adaptation levy	2% of the CER value annually
	Risk mitigation	1% - 3% of CER value annually.
	Verification	5,000 per audit

Investors will typically not support transaction costs that are more than seven percent of the CER revenue of the project. (EcoSecurities, 2000). For a minimum level of transaction costs of £42,000, this is equivalent to a total CER value of £600,000. Discounted by six percent over ten years using a price of US$3 per tonne of CO_2 this is equivalent to some 26,000 tonnes of CO_2 emissions reductions per annum[7]. To put this into context, 100 solar home systems displace around seven tonnes of CO_2 per annum.

Table 7 sets out the carbon profiles and impacts of transaction costs on projects, based on projects that EcoSecurities has worked on. We have assumed two levels of transaction costs as lower and upper boundaries of transaction costs. We have taken the figure of £42,000 as a lower bound estimate. The World Bank Prototype Carbon Fund estimates that transaction costs are in the range of US$200,000 and US$400,000 (PCF, 2000). We will take the upper bound as the mid-point in this range ($300,000 or £210,666).

Table 7 Impact of transaction costs on CO_2 and CH_4 mitigation projects of different sizes

	5 MW CO2 mitigation		**2 MW CH4 mitigation**		**20 MW CO2 mitigation**	
Emission Reductions (tCO_2)	69,020		520,000		500,000	
Present Value (discounted @ 6%)	£195,340		£1,471,698		£1,415,094	
(Price $3 tCO_2)						
% of Net present value from 10 years of CER value	10.3%	108%	2.9%	14.3%	3%	14.9%

[7] Using a discount rate of 15 percent this is equivalent to some 24,000 tonnes.

The 5 MW project would struggle to meet the costs related to the CDM.[8] Even for the 20 MW project it would not be worth meeting the transaction costs of developing the project under the CDM, if we take the upper bound transaction cost estimate.

Simplifying the rules and procedures for small-scale projects can go some way to increasing the supply of small-scale projects in the CDM, but it is not the whole story. One problem frequently encountered by CDM project developers is the up-front nature of the costs, particularly in the face of still considerable uncertainty in finding a buyer for the carbon value. Reducing transaction costs could be necessary but not sufficient in encouraging small-scale projects. Any discussion of fast-track options to reduce costs of developing small-scale projects should bear in mind that assistance with payment of these pre-operational costs is likely to be required for small-scale projects to be supplied under the CDM. This is likely to remain the case at least while the carbon market develops, capacity is built in host government and trading experience is gathered.

3.3. Reducing buyer risk

The level of buyer risk is an important factor in securing emission reduction value for small-scale projects. It is important at this point to note that small-scale projects are not necessarily equivalent to development-focused projects. Appendix 1 highlights that the main difference between CDM-type projects that are implemented by the private sector and the CDM-type projects that are implemented by official development assistance is the technologies implemented, rather than the size or the regional location of the project. Those technologies that supply energy services to the rural poor are aimed at users with limited affordability and are typically technologies that can be implemented at household level, thereby making monitoring of project performance more costly. In some cases, these technologies are at demonstration stage in the country in question. In many cases, the company developing the project in question will have no credit-rating, thereby reducing the project's credibility. The risk of under-performance or non-performance of the technology is therefore greatest for development-focused projects. Risk is one the largest contractual obstacles in the negotiations for CER transactions. Risk guarantee mechanisms would address this disadvantage that small-scale projects address.

The following section discusses fast-track options, some of which reduce transaction costs, and some of which impact on the levels of carbon value from emissions reduction projects. It also briefly considers financial support mechanisms to encourage small-scale projects.

3.4. Scoping of fast-track options

Fast-track procedures can be divided into two types:

1. Simplified procedures;

[8] Comparing this to the 2 MW CH_4 mitigation project shows that the impact of transaction costs on project feasibility depends more on whether the project mitigates CH_4 or CO_2, rather that being dependent on the size of the project. This is because of the global warming potential of CH_4 as compared to CO_2, frequently making this greenhouse gas mitigation option highly cost effective.

2. Standardisation of information/reporting requirements.

Both these approaches are likely to result in lowered transaction costs, which would facilitate the development of small-scale projects.

Table 8 outlines the stages of the CDM project cycle, together with information on where transaction costs could be reduced.

Table 8 Fast-track options at each stage of the project cycle

Stage of the Project Cycle	**Details**	**Responsibility**	Category of option ☞ - simplified procedure ☞ - standardisation of information/ reporting
1. Development of project design document	✍✍ Baseline report ✍✍ Monitoring protocol ✍✍ Environmental assessment ✍✍ Stakeholder consultation	Project developer	☞☞
2. Approval	Includes: ✍✍ Approval of additionality of the project; ✍✍ Approval of sustainable development benefits	Host country government	☞☞
3. VALIDATION: 30 days of public consultation		Operational Entity	☞
4. REGISTRATION: max 8 weeks. Review of baseline methodology possible: max 4 months.		CDM Executive Board	☞
5. Project monitoring & reporting		Project developer	☞
6. VERIFICATION		Operational Entity	☞
7. CERTIFICATION: 15 days after date of receipt. Review possible: max 30 days.		CDM Executive Board	☞
8. CER sales	✍✍ CER disbursement method	Project developer	☞

The fast-track options are listed in Table 9 and discussed below.

Table 9 Summary of possible fast-track options

Stage project cycle	Possible fast-track options for small-scale projects
1.	**Development of the project design document (PDD)** ✍ Use host country requirements for environmental assessment ✍ Standardise information used for baseline analysis and PDD ✍ Standardise approach to monitoring protocols ✍ No need to evaluate leakage
2.	**The approval process** ✍ Establish default positive lists ✍ Establish 'default' list of sustainable development evaluation criteria
3	**The validation process** ✍ Streamlined validation ✍ Facilitate accreditation of local consultants
4	**The registration process** ✍ Fast-track registration
6, 7.	**Verification and certification activities** ✍ Merge verification and monitoring activities ✍ Fast-track verification and certification ✍ Facilitate accreditation of local consultants ✍ Multi-project verification;
8.	**CER sales** ✍ Longer crediting periods (i.e., no re-evaluation of baselines at 7 years). ✍ Exemption from the adaptation levy ✍ Standardised legal contracts

3.4.1. Simplification 1: Development of project design document

The project design document is required for registration of the project with the CDM Executive Board, in order to allow the carbon value from the project to be transacted. The project design document should contain the following information, as set out in the Marrakech Accords:

- a description of the project;
- baseline and emissions reduction analysis;
- environmental impacts of the project;
- information on sources of public funding from the involved Annex 1 parties;
- stakeholders comments on the project;
- a monitoring plan.

Possibilities for simplifying the project design document are as follows:

a) The project in question would have its environmental and social impacts assessed following host country requirements. In this way, smaller projects may not be required to organise, for example, public consultation exercises.
b) Simplifying the data used for the emissions reduction analysis. Standardising baselines is a key fast-track option to reduce transaction costs and making the CER value of a project more attractive. The choice of technology used in the baseline case for development-focused projects is relatively easy to identify, as the range of alternative energy options is severely limited (Begg *et al*, 2000). 'Equivalence of service' between different project services should be taken into account when setting standardised CEFs, for example, compact fluorescent lamps can be 500 times better than kerosene (Begg et al, 2000). Standardised baselines should be based on future projections of the baseline, to capture rising emissions arising from future scenarios for electrification or greater consumption of other energy sources. Standardised information eliminates the problem of project developers having to deal with incomplete or uncertain country information on the baseline scenario and carbon emissions factors and can therefore increase the credibility of CER generation from small-scale projects to buyers;
c) Simplifying the approach to monitoring protocols. A monitoring protocol monitors project performance, and, as such, is specific to the technology being applied. Monitoring of emissions reduction data requires selecting relevant parameters of concern, determining the method of collecting and processing the information and specifying a format for reporting the results. The approach to monitoring protocols can be standardised, depending on the technology and its use.
d) No requirement to determine leakage. Leakage is the unexpected emissions taking place as a consequence of a project, but outside its immediate or expected boundaries. The size of leakage is can be difficult to determine because it can difficult to identify the cause and effect. In the case of small projects, the actual effect is low, even if the relative effect is high.

3.4.2. Simplification 2: The approval process

One way of cutting the number of steps involved in the approval process is to make approval criteria transparent. Increasing the incentive to spend resources on developing the project design document. Two possible ways of increasing transparency are as follows:

e) establishing a default list of sustainable development checklists or a default screening tool for environmental and social impacts. Article 10 of the Kyoto Protocol states that host country government is responsible for deciding whether greenhouse gas mitigation projects conform to sustainable development objectives. The vast majority of developing countries still do not have operational sustainable development assessment criteria for projects under the CDM, creating uncertainties among developers about whether or not the project meets host country expectations. In order to sharpen the impact on development-focused projects, these sustainable development checklists could specifically address poverty reduction objectives for fast track projects.
f) establishing a list of technologies that automatically qualify as being environmentally additional. For example, it can be argued that many off-grid renewable technologies are always environmentally additional because there are so many barriers to their development. Whilst this does not reduce

transaction costs, it may *increase the willingness to spend resources* on developing the project design document.

3.4.3. Simplification 3: The validation process

Validation is the process by which an independent third party reviews and endorses the project design document.

g) Simplified validation procedures of projects could only take place if it is known with relative certainty that the project is additional (for example, the technology being proposed is part of a pre-approved list) and the emissions reduction analysis is accurate to acceptable levels (for example, the project uses pre-approved standardised baseline data). The reduction in costs comes about because the validation can simply be a quick desk review of the study, instead of an involved verification of the project design document taken place in-country.

3.4.4. Simplification 4: The registration process

h) Registration with the CDM Executive Board can take up to eight weeks, or longer if reviews of the project are required. Small-scale projects that have been approved by the host country government and are validated could be given fast-track approval by the CDM registration board.

3.4.5. Simplification 5: Verification and certification activities

i) As currently stated, the CDM project cycle requires that verification and certification activities are carried out by different Operational Entities. This can be a significant cost. These activities could be merged for small-scale projects, and the process of verification streamlined by developing standard reporting forms and reducing the need for in depth assessments during the verification audits.
j) Multi-project verification could significantly reduce costs. This would require a bundling mechanism whereby projects are verified at the same time and the costs divided among the number of projects being verified.

3.4.6. Simplification 7: CER sales

k) No re-evaluation of baselines every seven years. The crediting period for CDM projects matters, particularly for technologies that have longer project lifetimes and high up-front costs, such as renewable energy technologies. Short crediting periods make options with short pay-back periods, such as energy efficiency measures, more attractive (PCF, 2000). Financiers of projects are only likely to take account of the crediting value for the seven-year period, and will ignore the possibilities offered by the options for renewal (this can be done twice, so that the total crediting period could be 21 years).
l) The CDM adaptation levy is two percent of the project proceeds. While this 'tax' is relatively small, it is yet another cost barrier to implementation of small-scale projects. We argue that exemption should be extended to projects that focus on the 'least developed communities' reflecting the fact that the least developed countries are currently exempt.

m) Standardised legal contracts. Contracts are required to set out the key risks in CER delivery and to manage these risks. Risks to CER delivery could include equipment failure, labour disputes, acts of God and terrorism. Parties that could take on the liability are the equipment suppliers, project operators, financiers or the buyer. A contract would establish all possible risks and establish where liability for these risks lies. We will assume that some legal work is required to review these standardised legal contracts and modify them to specific circumstances.

In addition to the fast-track options identified, it is important to consider financial incentives in order to encourage the development of small-scale projects. We list four possible financial support mechanisms:

- Project development grants to develop the project design document for small-scale projects;
- Funds to facilitate the accreditation of local consultants to carry out validation and verification activities;
- Risk mitigation mechanisms such as performance delivery guarantees and insurance against non-performance;
- Cash advancements, given on the basis of expected CER value stream in the future.[9]

3.5. Impacts on the level of transaction costs, environmental integrity and distributional equity of the CDM.

Table 10 evaluates the fast-track proposals outlined in Section 3.4. Environmental integrity has been assessed according to whether the options listed are likely to impact negatively on the greenhouse gas emissions additionality of the project and on the estimation of emissions reductions. Distributional equity has been assessed according to whether the options listed are likely to impact positively on the geographical distribution of projects and on the socio-economic focus of projects within countries.

The following criteria were applied in order to evaluate the fast-track options on transaction costs, environmental integrity and distributional equity:

- Fast-track options that impact on time and uncertainty of the approval outcomes do not have as much impact on the level of transaction costs as options that remove direct transaction costs;
- Fast-track options that impact on the level of CERs generated such as automatic additionality, standardised baseline values, streamlined validation and fast-track registration *may* affect the environmental integrity of the credits generated, depending on the user group considered.

[9] A common problem in the implementation of some small-scale technologies, such as solar home systems, is the start-up costs of the project, which, in many cases, coincides with a lack of affordability on the part of the users of the technology. This could, in major part, be resolved if project developers could benefit from the financial resources expected from the sales of CERs up-front. The use of CERs before they are generated is not acceptable from an environmental point of view. In order to resolve this impasse, financial mechanisms could be put in place to anticipate the capital required for investment in the project infrastructure or activities. Such “cash flow advancements” would also require risk mitigation instruments and guarantees beyond the reach of most small-scale projects. Financial mechanisms to address these points could be promoted as a parallel initiative to the simplification of rules and procedures for small-scale projects.

- Options that significantly reduce (by, say, more than 75 percent of costs) or remove up-front CDM-related transaction costs, and/or boost the level of CERS generated by the project will impact on the distributional equity of the CDM.

Table 10 Evaluation of the impact of options for simplified modalities and procedures for small-scale projects on transaction costs, environmental integrity and distributional equity.

Fast track option	**Reduction in transaction costs**		**Reduction in environmental integrity**	**Distributional equity**
	Pre-operational	Operational		
a) Follow host country environmental and social assessment requirements	+			
b) Simplifying the data used in the baseline analysis 1. Small-scale projects 2. Development focused projects	 ++ ++		 ++ -	
c) Standardised approach to monitoring protocols	++			
d) No requirement to determine leakage	+		+ in some cases	
e) e) Default sustainable development checklists	+			
f) Pre-approved technology list 3. Small-scale projects 4. Development focused projects			 ++ -	
g) Simplified validation 5. Small-scale projects 6. Development-focused projects	 ++ ++		 ++ None, if combined with (b) and (g)	
h) Fast-track registration 7. Small-scale projects 8. Development-focused projects	 + +		 ++ None, if combined with (b), (g) and (h)	
i) Merge validation and verification activities		++		
j) Multi-project verification		++		
k) No re-evaluation of baselines every 7 years (extend the crediting time period).		++	++	
l) Adaptation levy exemption	+	+		
m) Standardised legal contracts	++			
Financial support mechanisms				

n) Facilitate accreditation of local consultants for validation and verification		++		++
o) Project development grants	++			++
p) Risk mitigation mechanisms		++		++
q) Cash advancements	++			++

\+ Some impact; ++ Medium impact

The key messages from the evaluation is that:

- In many cases, there can be a trade-off between the environmental integrity of the CDM and the simplification of rules and procedures. However, simplified rules and procedures for development-focused projects carry the least environmental impact, *if* carried out as a strategy rather than as independent steps.
- Distributional equity may, in some cases, be affected by individual measures to reduce transaction costs or to reduce the project risk, for example, measures that eliminate the net cost of development the carbon value from projects or take the risk out of the purchase of the CERs. Distributional equity is also likely to be impacted positively (ie towards least-developed communities) if a number of fast-track actions are carried out together, thereby reducing transaction costs significantly.

It is important to put concerns of potential 'free-riding' from simplified modalities and procedures into context. Research by the OECD highlights that the maximum level of free-riding that could be expected from small-scale projects is three percent of the required emissions reduction from Annex 1 Parties (this includes the US reduction). (OECD (b), 2001). This is counter-balanced by the significant environmental benefits that could be captured from the development of small-scale projects.

4. Recommendations for simplified rules and procedures

There are three key principles on which we have formed our proposal for simplified rules and procedures for small-scale projects:

1. The level of transaction costs involved in developing a project under the CDM and the requirement to pay these up-front can deter investment in projects.
2. Small-scale projects generally require assistance to boost their competitiveness relative to larger-scale projects.
3. Development-focused projects have, by definition, the highest developmental benefits.
4. The risk of free-riding under the CDM is lowest for development-focused projects because they have the greatest technological and economic barriers to development and the least certainty in the baseline emission estimates.

In our recommendations for simplified rules and procedures, we have only considered those fast-track options that have a significant impact on transaction costs (++). These fast-track options, (for example, standardisation of baselines parameters) could lead to some free riding (i.e. allowing non-eligible emissions reductions into the CDM). The level of free riding is, however, limited for some types of small-scale projects, where the range of alternative energy options is severely limited (Begg *et al*, 2000) and where there are many technological and financial barriers to development, so that they are likely to environmentally additional and the relative certainty in the baseline scenario leads to relatively certain CER values. These projects tend to be located in rural areas where the range of energy options is limited to unsustainable consumption of biomass and kerosene. These projects are typically implemented at a disaggregated level at household or village level, and the technologies typically implemented are solar, mini-hydro and improved cooking stoves.[10] These projects are likely to be the least competitive in the CDM market.

For a significant reduction in transaction costs, we recommend a *strategy* for simplified rules and procedures, rather than a piecemeal approach to simplification. Table 11 sets the fast-track options we have shortlisted, based on assumptions 1 to 4 above.

[10] This is based on some CDM project scoping, with particular reference to development objectives, carried out in four developing countries, DFID, 2002.

Table 11 Recommended fast-track options

Stage of the CDM project cycle	Fast-track measure	Small-scale projects	Development-focused project
Reduce transaction costs			
Development of the project design document	Standardised baseline parameters		?
	Standardised approach to monitoring	?	?
	Pre-approved eligibility of technology		?
Validation and verification	Simplified validation		?
	One operational entity for validation and verification	?	?
	Fast-track registration		?
	Multi-project verification	?	?
CER sales	Longer crediting period (no re-evaluation of baselines)		?
	Standardised legal contracts	?	?
Financial support mechanisms			
	Project development grants	?	?
	Risk mitigation mechanisms	?	?

Table 12 shows how these fast-track options could impact on transaction costs.

Table 12 Impact of recommended fast-track options on transaction costs

	CDM project cycle stages where costs are incurred	Estimate of cost (£) /impact
Pre-operational	Simplified project design document: 1. Emission reduction analysis 2. Monitoring plan	 1,000 2,500
	Simplified validation	3,500
	Legal work	5,000
Operational phase	One operational entity for validation and verification	3000
	Or Multi-project verification (if a bundling mechanisms exists)	Depends on the number of projects, but for a large pool, the costs could be insignificant
	Longer crediting periods (i.e. no re-evaluation of baselines)	Depends on the project, but could be significant
	Sale of CERS	5% -10% of CER value.
	Risk mitigation	1% - 3% of CER value annually.

Total known transaction costs could decrease to a minimum of £15,000, a decrease of over two thirds of the lower bound estimate of transaction costs - more if there is a bundling mechanism to enable multi-project verification. For other small-scale projects, a simplified approach to monitoring, legal contracts and the possibilities for multi-project verification could lead to a reduction in the lower bound estimate of transaction costs of around 30 percent.

It is important to note that even with reduced transaction costs, small-scale projects *in general* may need support with the transaction costs that remain with regards to developing the carbon value of their projects, or some guarantee that the project is eligible for trading is required. Support for risk mitigation mechanisms for under-performance or non-performance of the project would further help these projects. Supporting local consultants in the accreditation process would help reduce transaction costs for all projects, large and small.

References

DFID (Department for International Development), 2000, Initial Evaluation of CDM type projects in developing countries, produced by Begg, et al.

FCO, (Foreign and Commonwealth Office), 2000, Financing and financing mechanisms for joint implementation (JI) projects in the electricity sector, produced by EcoSecurities Ltd.

DFID (Department for International Development), 2002, Moving towards Emissions Neutral Development, draft report produced by EcoSecurities et al.

OECD, 2001, Fast-tracking small CDM projects: implications for the electricity sector.

Oko Institute, 1998, Environmental Manual for Power Development (EM model), funded by the World Bank.

World Bank Prototype Carbon Fund, 2000, Learning from the implementation of the Prototype Carbon Fund, Occasional Papers Series, Number 1.

UNCTAD, Estimated FDI flows in 2001 and the impact of the events in the United States, 2001

Appendix 1 The current pattern in investment in small-scale projects

Overall, a significant proportion of the projects analysed fall below the small-scale criteria thresholds. Of the 268 renewable energy projects analysed, 187 of these projects fall within the first small-scale definition under their original categorisation (Fig 1).

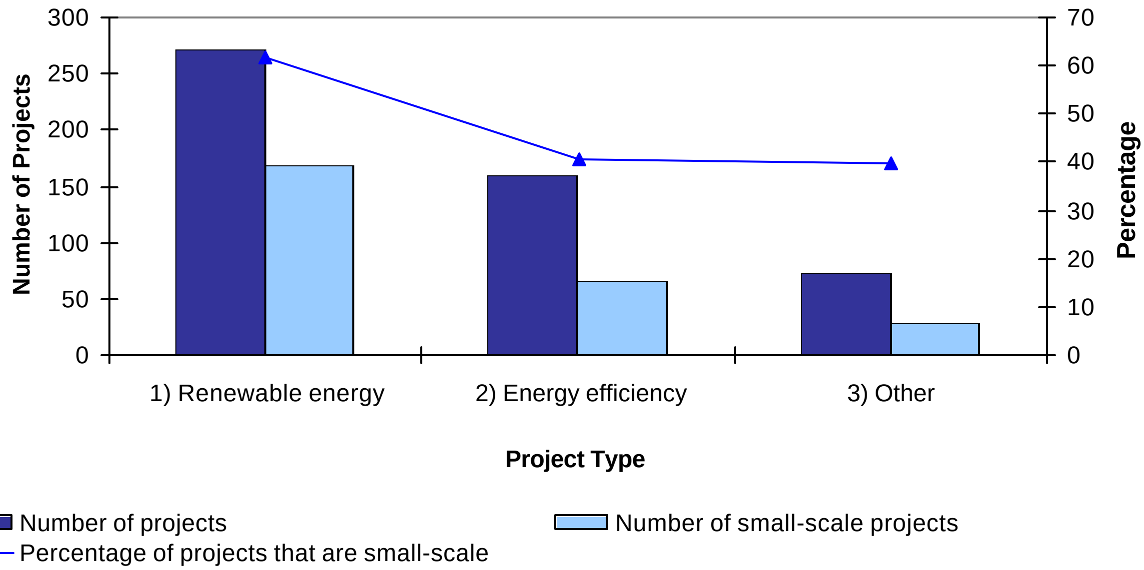


Figure 1 Percentage of projects that fall under the definitions of small-scale, by definition.

If we look at specific sizes of projects, most small-scale projects fall well within the thresholds set by the definitions. Most small-scale projects are 5 MW.GWh or kilotonnes of CO_2, (Fig 2).

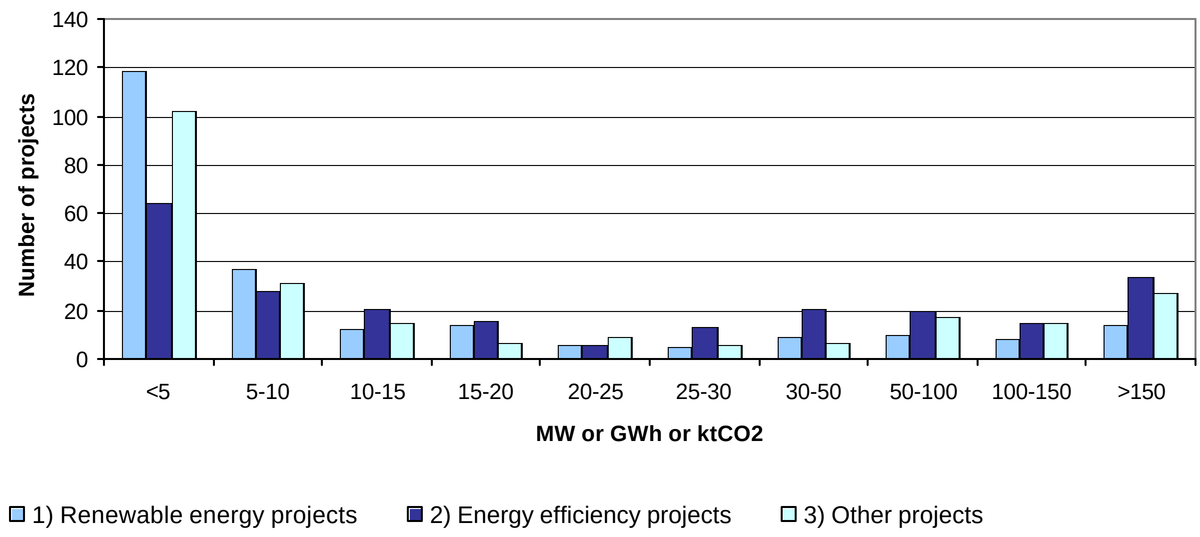
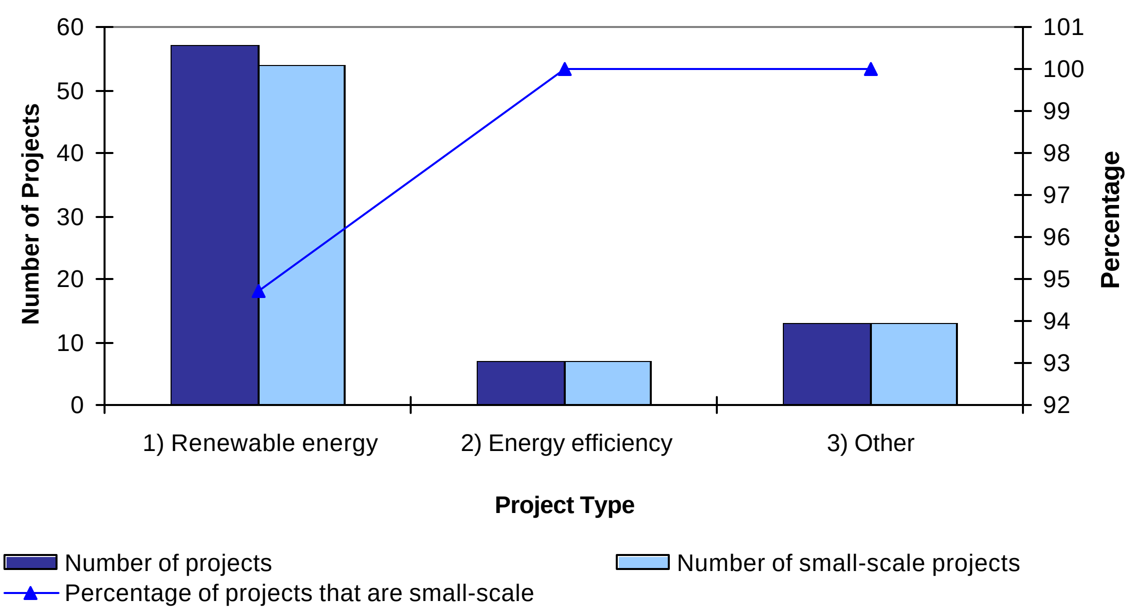


Figure 2 Distribution of projects by size and type (MW, GWh or $ktCO_2$).

The distribution of projects according to their programmes was analysed. Figures 3 to 5 highlight the difference in focus between our data sources, by analysing the percentage of small-scale -projects implemented under three different programmes:

a) GEF Small Grants Programme;
b) UNFCCC AIJ Programme;
c) World Energy Council.



Fig

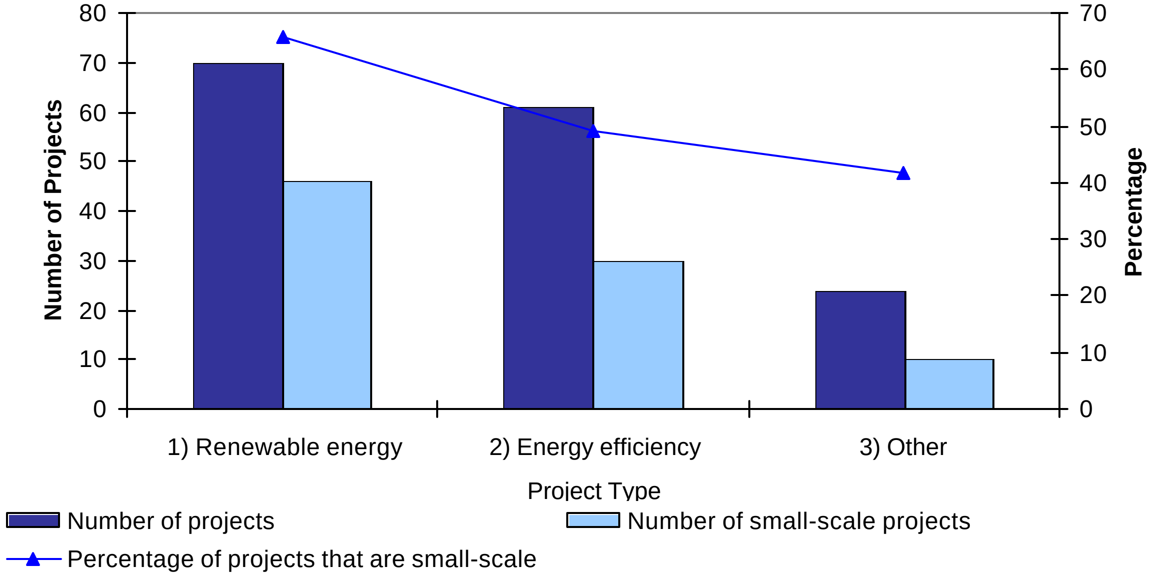


Figure 6 Distribution of Projects across UNFCCC AIJ Programme

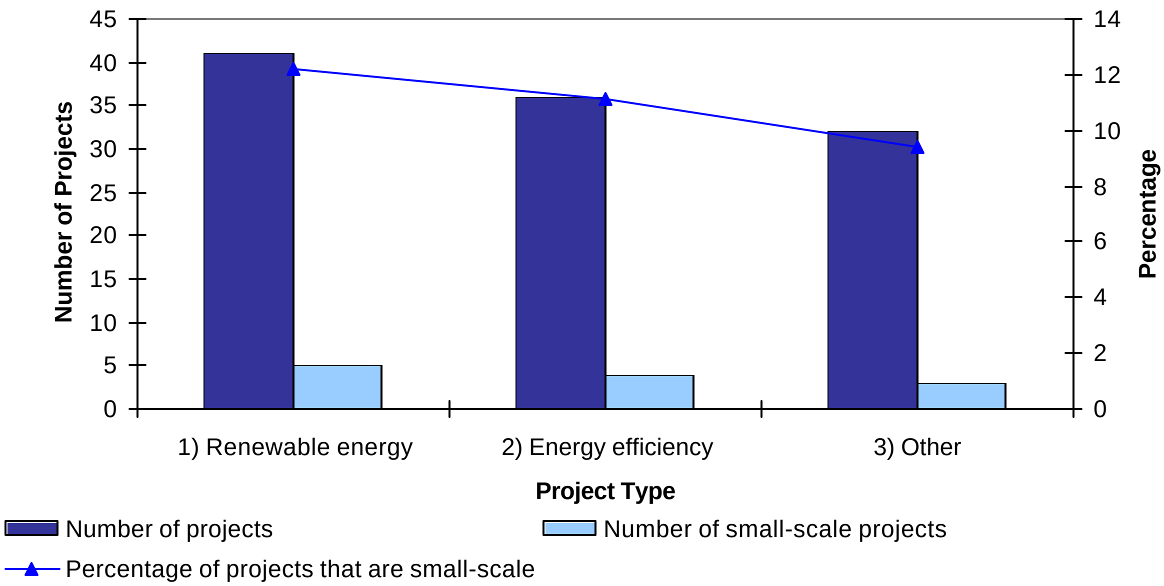


Figure 7 Distribution of Projects across World Energy Council Project Portfolio

As expected, the GEF Small Grants Programme is comprised almost exclusively of projects that would qualify as small-scale. The UNFCCC AIJ programme, on the other hand, represents a more balanced portfolio with between 40 to 70 percent of all projects classified as small-scale. The World Energy Council represents the opposite end of the spectrum with large projects making up the bulk of its portfolio. Less than 12 percent of projects in the World Energy Council portfolio would qualify as small-scale under the current definitions.

Interestingly, the source of funding (private sector-focused vs public sector-focused) has a more determinant effect on the technologies deployed than on *where* the technologies are deployed. Table A1 summarises the percentage of small projects from the total number of projects occurring in different regions. The average number of small-scale projects, taking out the Asian region, seems to lie around 63 percent of total projects. South East Asia has a higher average, and this is because the GEF has high percentage of its projects in South East Asia. If we look at the World Energy Council which tends to focus on private sector funds, around 20 percent of their projects are located in Africa, with another 20 percent in Asia, 30 percent in Central and Eastern Europe and another around 30 percent in Latin America also.

Table A1 Distribution of small-scale projects by region

Region	Total number of projects	Number of small-scale projects	Percentage of small-scale projects out of total number of projects
Africa	62	39	63
Asia	45	29	64
SE Asia	54	46	85
Latin America	227	139	62
CEE	118	81	69
Middle East	2	0	0
TOTAL	**508**	**334**	**-**

Looking at the technologies that have been implemented under the different programmes, see Table 1 in the main report, there is also a clear split between programmes that are more private sector-focused and those that lie more in the domain of public sector. Within the category of renewable energy projects, the Honduras CDM office has recorded projects that are nearly all hydroelectricity and the World Energy Council projects also focus on hydroelectricity as well as wind energy. The GEF small grants programme, by contrast, focuses on solar technologies. If we look at projects falling within the energy efficiency category under the World Energy Council, the AIJ pilot programme, the Australian Greenhouse Office and the Honduras CDM office, these agencies focus on supply-side energy efficiency measures. The GEF small-scale projects programme and DFID focus on demand-side energy efficiency projects.