

# Initial Evaluation of CDM type projects in Developing Countries

## Executive Summary

*March 2000*

By

Dr K.G. Begg  
Project Coordinator

Centre for Environmental Strategy,  
University of Surrey, UK

Dr S.D. Parkinson

Centre for Environmental Strategy,  
University of Surrey, UK

Dr Y. Mulugetta

Centre for Environmental Strategy,  
University of Surrey, UK

Dr R. Wilkinson

Intermediate Technology Consultants, UK

Dr A. Doig

Intermediate Technology Development Group, UK

Dr T Anderson

Formerly Intermediate Technology Consultants

Contact Point:

Dr K. Begg, Centre for Environmental Strategy,  
University of Surrey, Guildford, Surrey GU2 7XH,  
UK

Tel: +44 1483 876687

Fax +44 1483 876671

Email [k.begg@surrey.ac.uk](mailto:k.begg@surrey.ac.uk)

This document is an output from the project R7305 funded by the UK Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of the DFID.

## **Acknowledgements**

This project was funded by the UK Department for International Development (DFID) under their Knowledge and Research (KaR) program (theme E6: reducing the environmental impacts of energy use). We are very grateful for DFID's support and would particularly like to thank Dick Jones, David Woolnough, Peter Dearden, and Peter Davies at DFID for their assistance.

We would also like to thank the numerous individuals and organisations who made this study possible. For help in the data gathering, we are grateful to the country offices of the Intermediate Technology Development Group in Kenya, Nepal, Peru, Sri Lanka, and Zimbabwe. In particular thanks to Lahiru Perera, Sanjeevani Munasinghe and Lalith Gunaratne in Sri Lanka and Tinashe Nhete in Zimbabwe who provided helpful assistance during the field visits. We are also grateful to those representatives of government, business and NGOs who helped us with extra information, especially those who made time to meet us during our field visits in Sri Lanka and Zimbabwe. In particular, in Sri Lanka, we would like to thank Mr Amarasekera, Mr L.G. Lamasena and Mr. S.D. Abayawardana of the Integrated Development Association (IDEA); Dr J. Ratnasiri, of the Ministry of Forestry and Environment; Mr L. Fernando of Sarvodaya; Mr Kariyawasam of the Ceylon Electricity Board; Mr J. Nagendran of the DFCC Bank; and Mr S. Samarakoon and Mr B. Chandrasekara of CAPS. In Zimbabwe, we would like to thank Mrs. Muguti of the Department of Energy; Mrs Mukahanana of the Ministry of Mines, Environment and Tourism; Mr. Masola of Solar Industries Association of Zimbabwe; Mr Niziramasanga of the Southern Centre for Energy and Environment; Dr. Mandishona of the UNDP/GEF SHS Project and Mr. Midzi of the Zimbabwe Electricity Supply Agency.

## **Executive Summary**

This report is the final report of the project “Initial Evaluation of Clean Development Mechanism (CDM) type projects in Developing Countries” carried out for the UK Department for International Development (DFID) under its ‘Knowledge and Research’ programme. The study was designed to contribute to the current debate on methodological aspects of the CDM set up under the Kyoto Protocol to the UN Framework Convention on Climate Change (UNFCCC). The study could therefore form the basis for capacity building for the CDM in host countries. It can also inform DFID on how the CDM with its climate change priorities, could contribute to development and sustainability goals.

The focus of the study is the energy sector at the mainly household rural and urban level where direct benefits for poverty alleviation may be expected. The projects studied were Micro/Mini Hydro Plants (MHP), Biogas digesters, Improved Cook Stoves (ICS) and Solar Homes Systems (SHS). These were located in Sri Lanka, Nepal, Zimbabwe, Kenya and Peru. Unfortunately the Peru data were insufficient for analysis in this project.

Based on an in depth analysis of a restricted set of projects, this study shows that there is a great deal of potential for positive action using the CDM and suggests a possible methodological approach to baselines which is a practical system with low transaction costs for the small scale project types studied. It was found that projects which focus mainly on cooking (eg Biogas digesters and ICSs) are likely to yield much larger greenhouse gas emissions reductions than those which focus mainly on lighting (eg SHSs), since cooking makes up a greater proportion of household energy use.

Consideration of uncertainty in the baseline suggests that poverty focussed projects have the least counterfactual uncertainty as the range of alternative energy options is severely limited. This could work in favour of the poorest if the CDM is found to be easier to apply to such projects. Capacity building, technology transfer and poverty alleviation requirements are also identified and a comparison is made between project types on maximising climate change and sustainable development benefits.

### ***A. Outputs***

The outputs from the study include

- Calculated ranges of greenhouse gas (GHG) emission reductions for MHP, Biogas digesters, ICS, and SHS projects.
- Treatment of non equivalence of service by new method.
- Sustainability and development assessment of the projects taking into account issues such as technology transfer, poverty alleviation, capacity building, environmental effects, and country priority compatibility.
- Key features of technology transfer, poverty alleviation and capacity building.

- Comparison of project types over climate change and sustainability objectives.
- Suggestions for new project types which maximise combined benefits.
- Methodology proposal for baselines and calculating emission reductions from small scale projects.
- Proposal for additionality implementation for small scale projects in developing countries.
- Implementation proposal for the CDM from approval to monitoring and verification.
- Recommended roles for DFID.
- Recommendations for future work.

### ***B. Background to the CDM***

The concept of the CDM is relatively simple in that an industrialised country with GHG emission reduction targets (known as a *donor*<sup>1</sup>) may choose to carry out emission reduction projects where the cost is lower, such as in a developing country (known as a *host*). In this way, there is flexibility to reduce the costs of a programme of reductions from the donor country. The donor receives credits (called certified emission reductions or CERs) for the emission reductions achieved and the host country receives investment, which is theoretically supposed to be in line with a sustainable development path and with country priorities.

Though the concept is simple so far the practicalities, such as how these latter conditions are supposed to be implemented and how the emission reductions are to be calculated, have not yet been resolved. Agreement on the basic operation of the CDM is due at the 6<sup>th</sup> Conference of the Parties (COP-6) to the UN FCCC in November 2000. This report is intended to inform those negotiations.

### ***C. Projects and Data***

The projects examined are development projects which are in operation and which may be part of a large scale national development programme. They are listed in Table 1 and are described in the report in section 2 with further detail being given in Annex 1 to the report. The analysis was conducted against a country background which provided the context of the likely economic, environmental, and social developments in the country, and in the energy sector. These country contexts are summarised and listed in Annex 2 to the report.

---

<sup>1</sup> Throughout this report we use the term *donor* to mean the country or designated legal entity who will provide the investment funds for the CDM project, as specified in the Kyoto Protocol. This should not be confused with the development donor who provides aid.

Sector	Type	Project	Country	Organisation
Heating (mainly cooking)	Biogas digesters	National family biogas	Nepal	BSP SNP-Nepal
	Improved Cooking Stoves (ICS)	Anagi	Sri Lanka	IDEA
		Maendeleo	Kenya	Various
		KCJ	Kenya	KENGO
		National Institutions	Kenya	Bellerive
Electricity (mainly lighting)	Micro-Hydro-Power	Katepola	Sri Lanka	IT-Sri Lanka
		Umangedera	Sri Lanka	IT-Sri Lanka
		Barpak	Nepal	Local businessman
	Mini-Hydro-Power	Nyadi	Nepal	LEDCO
	Solar PV	National SHS	Kenya	Various
		National SHS	Zimbabwe	GEF
	Biogas	Kirulapona	Sri Lanka	IT-Sri Lanka

**Table 1 - List of Selected Projects**

#### ***D. Accounting for GHG Emissions Reduction and Costs***

The case study projects have been chosen from a range of successful development-orientated projects which also reduce GHG emissions. Since only one of the projects was actually implemented with the aim of reducing GHGs (the Zimbabwe SHS project), the others cannot, strictly speaking, be said to meet the criterion of *additionality* necessary to qualify as CDM projects. This criterion says that projects should lead to GHG emissions reduction ‘additional’ to that which would have happened in the absence of specific emissions reduction efforts. So, in order to undertake a meaningful analysis of the emissions reduction for the projects, we ask the question: what would have happened if the funding for each of the case study projects had not been available? Since most of the funding for these projects was through international aid agencies or charitable trusts, we argue that the situation is somewhat similar to the CDM where funding also comes from external donor organisations.

One final point: another aspect of additionality (specified in the UN FCCC) is that funding shall be additional to Official Development Assistance (ODA). Although several of our case study projects have been funded through ODA, we are not suggesting that this ODA should be reduced. In those cases, the assumption we make in order to estimate the emissions reduction is that the ODA is spent on another development project elsewhere in the host country.

In order to estimate the GHG emissions reduction and cost for each of the case study projects, the project scenario must be compared with a *baseline* scenario of the GHG emissions and costs in the absence of the project. Since, by definition, such a situation is impossible to measure, there is significant uncertainty associated with baseline construction which increases the further into the future it is projected. Indeed, it is this issue which is one of the most contentious in negotiations concerning the CDM. In this study, we take the perspective put forward by Begg et al (1999), that for the purposes of in depth analysis, a *range* of baselines should be estimated for each project, so that an indication of the uncertainty in the emissions reduction and cost can be seen.

Other major uncertainties in calculating emissions reduction are the crediting lifetime of the projects and uncertainties on input values for key parameters such as amount of fuel reduced. The details are discussed in sections 4 and 5 of the main report, with full details given in Annex 3. We summarise the main results here.

### **D.1 Equivalence of Service Problem**

One of the main problems encountered was that many of these projects do not usually have an equivalence of service between the project and the baseline. For example a lighting project delivers an energy service, especially if using compact fluorescent lamps, which can be a factor of 500 times better than a baseline consisting of kerosene lamps. Having no equivalence means that the normal method of expressing emission reductions in terms of unit activity, as in tonnes of CO<sub>2</sub> equivalent per MWh (tCO<sub>2</sub>/MWh), for a project type, can no longer be used.

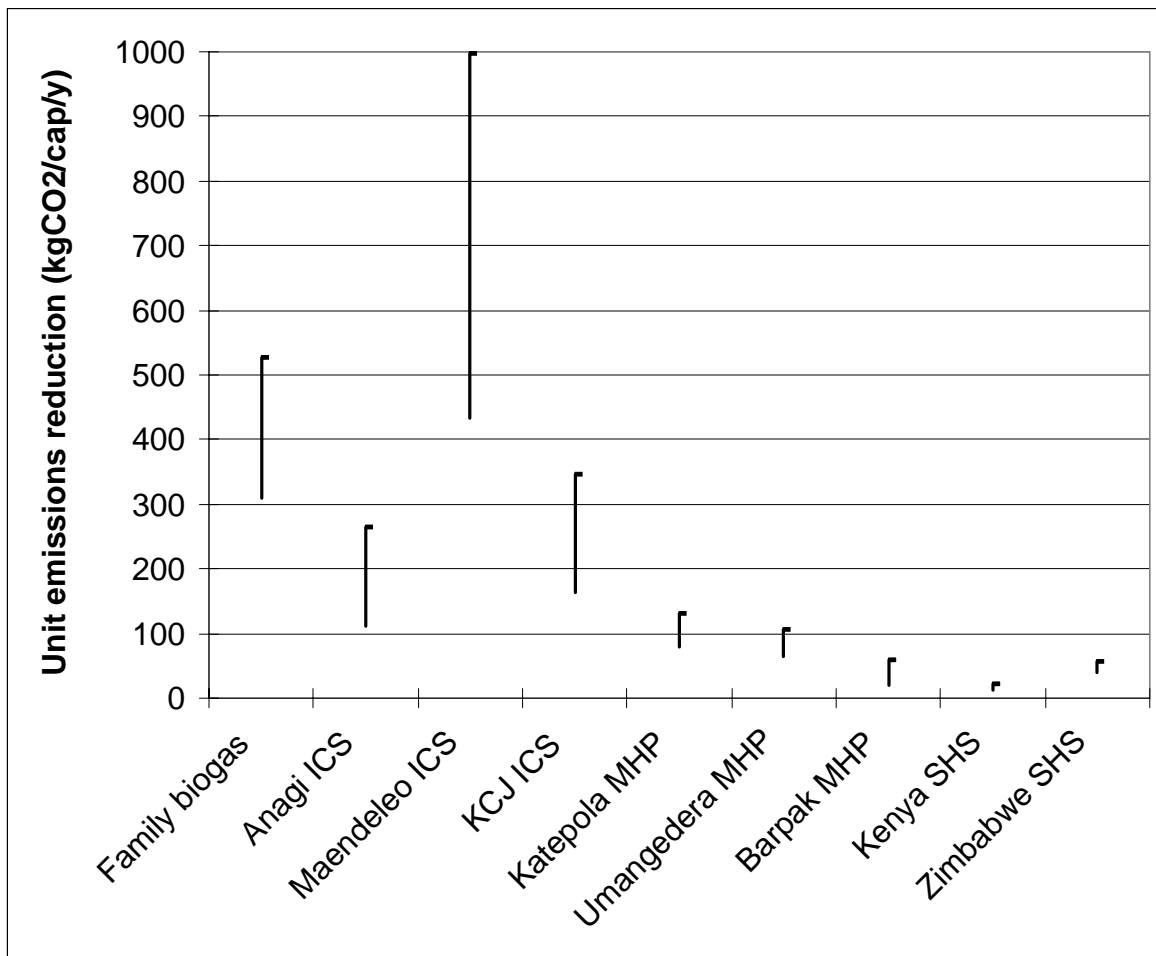
We have therefore devised an alternative unit that allows comparisons between small scale projects to be made. This unit is kgCO<sub>2</sub>/capita/y.

### **D.2 Comparison between Projects**

The results for unit emissions reduction (given in Figure 1 in kgCO<sub>2</sub>/capita/y) clearly show a contrast between project types. For project types which involve cooking, ie family biogas digesters and the improved cook stoves, the emissions reduction per capita are large (310-530 kgCO<sub>2</sub>/cap/y for biogas, and 100-1000 kgCO<sub>2</sub>/cap/y for ICSs). This is unsurprising since the majority of household energy consumption in the project areas is related to cooking, for which inefficient methods were used prior to the projects. By contrast, micro-hydro projects and solar home systems provide a low unit emissions reduction (19-130 kgCO<sub>2</sub>/cap/y for micro-hydro and 12-57 kgCO<sub>2</sub>/cap/y for SHSs). This is due to the fact that they mainly provide lighting, a comparatively small proportion of household energy use. The higher figures for micro-hydro are generally due to the fact that they also provide electricity for village-scale enterprises, eg rice milling.

The total emissions reduction for different project types obviously depends on the unit emissions reduction, already discussed, and the size of the programme. The ICS programmes, in particular, have been large: between one quarter and one million households, leading to emissions reductions of around 200 ktCO<sub>2</sub>/y in Sri Lanka and

around 1000 ktCO<sub>2</sub>/y in Kenya. These figures translate to approximately 3% and 15% of national CO<sub>2</sub> emissions in Sri Lanka and Kenya respectively.



**Figure 1 – Unit Emissions Reduction (in kgCO<sub>2</sub>/capita/y) for Nine of the Case Study Projects**

Thus, small scale projects of this type, when gathered into a programme, become equivalent to large projects. Sometimes known as ‘umbrella projects’, these could be administered in such a way that investors could receive CER credits from a collection of small projects. Hence, small scale projects become attractive to investors, and CDM funding could thus enable expansion of existing development project programmes or initiate new programmes.

Projects have also been compared in terms of unit incremental costs (US\$/tCO<sub>2</sub>). In calculating values for unit incremental costs we use a social costing method (with a discount rate of 4%) as discussed in Annex 3. In general, micro-hydro projects are found to be generally cost saving (-118 to -53 US\$/tCO<sub>2</sub>), whilst SHSs are very expensive (120 to 770 US\$/tCO<sub>2</sub>). In the case of ICSs the values show the projects to be cost saving(-190 to -42 US\$/tCO<sub>2</sub>), based on the assumption that all fuelwood is bought. Since in practice this is often not the case, the cost savings should be interpreted in terms of time saved

rather than money. For the biogas project, no data was available for the costs of the displaced fuelwood because, as in the ICS projects, it was often not traded. Hence, in this case there appears to be no saving in monetary costs (the results give a range of 7 to 18 US\$/tCO<sub>2</sub>) but, again, it is time that is saved.

- These results indicate that, in general, project types related to cooking, ie Improved Cooking Stoves and family biogas digesters, may be the most preferable projects of those considered in terms of both GHG emissions reduction and cost. Solar Home Systems appear to be the least preferred on the basis of emissions reduction and cost.

So far in the UN FCCC Activities Implemented Jointly pilot programme only 1 micro-hydro, 1 mini-hydro and 1 ICS (conversion from wood to kerosene stoves), and 3 SHSs have been implemented out of about 130 projects. This shows that the potential for large reductions from small scale biogas and ICS is being missed. The emphasis on high-technology does not necessarily maximise reductions and does not lead to direct poverty alleviation, a major development priority.

A surprising result is that the variation between projects of the same type is more significant than differences between countries. This is due to large technical differences between the projects. Nevertheless some country differences are important such as the capita per household in developing countries and we would retain the country as the first characteristic to be considered.

### **D.3 Implications of Emissions Reduction Analysis**

The results raise a number of important issues related to the methodology of setting baselines and calculating values for GHG emissions reduction for the small scale household and institutional project types studied. Naturally this is a preliminary assessment and more work is required to gather more precise data and to test the results on other projects of similar type. However the following description outlines the main points which are discussed more fully in Section 5 of the report.

#### **D.3.1 Uncertainty and Baselines**

The results show that there is high uncertainty in estimates of emissions reduction of between  $\pm 25\%$  and  $\pm 50\%$ , mainly due to baseline uncertainty. There seems to be little correlation between project type or country and the size of uncertainty. More important seems to be the level of poverty in the project area.

- High levels of poverty often means there are few alternatives to the pre-project situation, leading to lower uncertainty in the baseline.

A further interesting point is that, regardless of the technology of the proposed project and country of operation,

- (a) for lighting projects, the pre-project situation (and hence the initial baseline situation) is generally kerosene lamps; and

- (b) for cooking projects, the pre-project situation (and hence the initial baseline situation) is generally unsustainably-harvested fuelwood burnt in low-efficiency stoves/ open fires.

In order to manage the large uncertainty and prevent it being exploited to overestimate the CER credits due to a given project, we recommend the use of standardised baselines. Standardisation means that the baseline is simplified to reflect the major determining factors relating to the emission reductions. The process is thus faster and simpler but does not compromise the environmental integrity of the result. The process of baseline standardisation is outlined later as part of the recommendations for CDM implementation in section G, and in detail in the main report (section 6).

Since the uncertainty in the baseline increases the further into the future it is projected, it is important to combine standardised baselines with other measures to limit uncertainty. In this respect we recommend the use of short crediting lifetimes, or regular revisions of baseline in combination with the baseline.

Obviously, such conclusions need to be verified over a wider range of areas and projects and are relevant only to projects operating in low-income areas as higher incomes lead to use of a wider range of fuels.

### *E. Sustainability and Development Analysis*

How to implement the CDM aim that projects should contribute to a host country sustainable path has been explored in this study. One method is to use sustainability indicators of some form. It is unlikely that a general set of indicators will be used by the CDM Executive Board in the project approval criteria despite the need for strengthening host country negotiating positions on this issue. Instead, host countries may derive their own country-specific set of indicators for their approval procedures. Capacity building may be required in order to enable developing countries to do this.

To investigate what would be appropriate as indicators and to compare project types and their contributions to the different aspects of sustainability, the projects have been evaluated using a number of aspects of sustainability relevant to the CDM context. These are as follows:

- technology transfer
- poverty alleviation
- capacity building
- environmental effects
- country priorities

All of the aspects are themselves complex issues. The projects were therefore evaluated on each of these aspects using a set of criteria or components which in combination try to define the aspect. For example, technology transfer was evaluated according to the criteria of initiation, imported technology, local technology, energy needs met, cultural

needs met, affordability, training, quality control, participation of locals, subsidy, access to credit, stability of income

The details of the analysis are given in Annex 4, with a summary in section 5.2. Within project type evaluations were carried out usually comparing projects in different countries. The variations in projects are very dependent on how they have been implemented and only a few features are project dependent. From this analysis key features which could act as criteria or indicators have been identified for all the aspects.

### ***E.1 Key Features for Sustainability Aspects of Projects***

From the analysis, it was possible to identify key features for each aspect which were common to all project types studied, and which were important for project and CDM success.

#### **E.1.1. Technology Transfer**

- Quality control and training for small scale project programmes are crucial for their maintenance and reliability in delivering reductions over the long term and in ensuring commercial viability in the long term. Business and marketing skills as well as technology training are key factors to aid success.
- Access to affordable credit facilities for consumers is also important for the uptake of the technology
- All the projects generated a within-country industry base to supply some or all of the components of the technology and to supply services such as installation and maintenance or training and inspection which is important for sustainability.
- Import tax and other fiscal structures need to be geared towards encouraging commercialisation of projects.
- Consultation is a major feature in household biogas, ICS, and MHP, but not in SHS as these have been carried out either on a commercial basis subsidised by donor grants for large projects or have considered consultation much later in the process and proceeded to commercialise as quickly as possible.
- Subsidies have been important in many projects eg SHS, Biogas, ICS, MHP at the early stages and to promote uptake by the market or to attract investors.

Initiation models for the projects studied are also discussed and the varying partnerships over time. There was no single successful model. All the approaches seemed to work and were characterised by a very fluid interaction between development aid and commercial ventures.

### **E.1.2 Poverty Alleviation**

The analysis indicated that the following features were important in the success of projects designed for poverty alleviation.

- For direct effects, they should be small scale, affordable and accessible to the poor. This implies, particularly for projects requiring wiring, such as SHS and MHP that additional measures such as improved housing may need to be provided first before project benefits can follow. In other project types micro credit facilities and know how are needed.
- Access to energy is important in that in moving from a rural poor condition, increasing access to energy can provide the means for freeing time and empowering the people. Where possible the energy service being delivered should allow either a manual drudgery task to be replaced, or provide an improvement in efficiency which results in freed time. This allows an increase in earned income or other quality of life benefits.
- This also maximises local benefits from any energy project in terms of education and health.
- Institutional projects such as electricity for clinics and schools provide indirect benefits to the poor by improving the quality of services provided.

### **E.1.3 Capacity Building**

- In some countries, eg Kenya and Nepal, the government works actively with NGOs to develop viable market systems. Investors could fund expansion of programmes already under way or new programmes
- Education, training, public participation - sometimes purely through marketing but often through consultation and feedback - are all important capacity building aspects of projects which are also important for the success of the venture. There are likely to be the same household educational opportunities for both the development funded and private company initiatives. However the training of people is of a higher quality in development projects, as is public participation.
- Capacity building projects could take the form of these additional activities which make a project fully viable. These could include introducing quality control systems, management, marketing and technology training, micro-credit financing skills or funding as well as public participation expertise.
- Infrastructure gains for the country and local people result from individual, but more commonly, a programme of small scale projects through the supply chain for the technology and the installation of plant and the initiation of new activities. There are

more infrastructure benefits with the private enterprise project where the investment capital tends to be higher.

- The partnerships and networks with government and other organisations which help strengthen capacity at all levels seem to grow with time and depends on the size of the programme.
- There is insufficient data gathered and experience shared on the projects. Funding for regular exchanges at local and regional workshops which should include government departments is needed to contribute to a country database for best practice.
- Commercial projects do not empower the people to the extent that community owned projects do and if the CDM can be done within countries by developing country governments at the community ownership level then this would be a useful model to pursue.

#### **E.1.4 Environmental Effects**

- All the projects contribute to a reduction in GHG emissions. As discussed earlier, the scale of the reduction depends on the type of project with the reductions due to biogas digesters being similar to those due to Improved Cook Stoves. The reductions from Micro Hydro Power are much smaller with Solar Home Systems achieving the least reductions.
- All projects contribute to a reduction in indoor air pollution to a varying degree. Lighting projects contribute least (SHS and MHP) while those affecting cooking (Biogas and ICS) have the greatest effect with Biogas eliminating most of the problems.
- Where battery charging or dry cells were used, this use was reduced.

#### **E.1.5 Country Priorities**

All the projects studied contributed to host country priorities.

### ***F. Project Types to Maximise Climate Change and Sustainable Development Objectives***

#### **F.1 Comparison of Project Types**

In section 5.2 in the report, across project type comparisons were made using the limited set of project dependent features for the aspects of technology transfer, poverty alleviation and environmental effects. Capacity building and contribution to country priorities are not so project type dependent.

Having made these comparisons the project analyses were combined with the climate change and cost information for an overall assessment of project types for maximising climate and development objectives. This is summarised in the Table 2. A *Multi-Attribute Decision Analysis* approach was used to score the project types on the development criteria of technology transfer, poverty alleviation and environmental effects. The scores of the options allotted to the development criteria were relative preference scores made by the authors on a 0 to 100 relative scale where 100 is the preference for the most preferred of the options and 0 is the preference for the least preferred option of the option set. The scores are purely subjective as in any assessment of this type and follow decision analytic practice. They are not intended as literal values but as an indication of the relative preference of one project type over another given the assessments across all the projects. The criteria are assumed to have equal weight which means that the expected value (sum of the weights multiplied by the scores over all the criteria for that option) is reflected in the overall scores in this case. The most preferred option would theoretically be that with the highest expected value. In a full scale Multi-Attribute Decision Analysis exercise of course there is a great deal more exploration of the options using sensitivity analysis on the inputs.

Project type	GHG reduction kg/cap/y	Cost US\$/tCO <sub>2</sub>	Technology transfer	Poverty alleviation	Environment	Overall development preference score	Overall performance order of preference
SHS	10 to 60	120 to 770	0	0	0	0	4 not strong on reductions, cost or on development
ICS	160 to 1000	-190 to -40	100	90	70	260	1 best on development and reduction potential and no regrets
Biogas	310 to 530	10 to 20	90	80	100	270	2 Also high reductions, low cost and good development performance
MHP (micro)	20 to 130	-120 to -50	80	100 if high service	70	250	3 low climate reduction but no regrets on cost and very good development performance

**Table 2 - Comparison of Project Types**

Given the restricted set of project types examined here, and that in any particular situation the available resources and therefore available project types will vary from place to place, the table illustrates that some project types can maximise both GHG and development

benefits and this information can be used in developing a strategy for optimising on these areas within existing constraints.

For small scale projects in a development context, ICS and biogas projects have the potential in large programmes to deliver significant GHG reductions, at savings or low cost to the community and with many social, economic, and environmental benefits. MHP has many development advantages but with its current replacement of mainly lighting service, the climate change benefits are lower. Though SHSs do not deliver many development benefits compared to the other projects and only low GHG reductions at high cost they may be the only viable alternative under some circumstances.

## **F.2 New Project Combinations**

From the foregoing work, new project combinations, which would enhance the benefits from the project types studied, can be suggested.

- Combining sustainably managed forests with a fuelwood project such as an ICS project would lead to even higher reductions for minimal investment.
- ICS and MHP projects could be combined.
- Environmentally and socially friendly practices could be combined with projects eg recycling of batteries for SHS projects
- Solar (or even wind) pumps for irrigation could decrease the amount of forest clearance for agriculture as irrigation allows more than 1 or 2 crops a year.

## ***G. Proposal for Implementation of the CDM***

The main report presents a simplified implementation plan for CDM projects based on the findings of this study, taking into account previous work (Begg et al, 1999). This examines the following issues:

- project approval;
- accounting for emissions reduction (including baseline methodology);
- management of uncertainty (using a ‘package’ of measures);
- monitoring and verification;
- operationalisation of additionality; and
- institutional aspects.

It is by no means fully detailed but sets out the main steps required. It is particularly important to confront the problem of uncertainty in the emissions reduction estimation which as we have pointed out can be high, and mainly irreducible. For credible, certifiable, credits, a package of measures, for managing the uncertainty is needed. This would involve using standardised baselines where possible, monitored data where applicable and, we suggest, limited crediting lifetimes as the simplest and easiest way of doing this. Baseline revision is an alternative to limiting the crediting lifetime.

Monitoring for these projects means a survey pre-project and after the project to determine the change in fuel use. Verification, using further spot checks, during the crediting lifetime will be required. Monitoring as is currently discussed in the UNFCCC referring to the stack gas measurements of the US SO<sub>2</sub> programme are unnecessary when the baseline is highly uncertain and inappropriate in this context.

### **G.1 Host Country Approval**

Host countries are keen to maintain sovereignty over what criteria they apply for project approval. The analysis in Annex 4 and section 5.2 indicates that there are useful lessons to be learned and common features between the key sustainability areas studied. Ensuring that projects are designed with these features should ensure that CDM projects are implemented in a way which maintains the reductions over the long term and achieves the development goals required. These lessons could be used to set up criteria for approval of projects by host countries and could be used by donors to ensure success of applications.

### **G.2 Standardised Baselines**

The approach to baseline standardisation basically assigns a unit emission reduction to a CDM project fuel/technology type, in kgCO<sub>2</sub>/capita/y. For example, for an MHP plant supplying lighting, this would be derived from average fuel savings from displaced kerosene lamps (l/capita/y) multiplied by the emissions of GHGs (in kgCO<sub>2</sub>) per litre of kerosene. This unit emissions reduction would then be multiplied by the number of people supplied by the project to give the annual emissions reduction of the project.

In order to get standardised values for average fuel savings for a particular project type in a given country, surveys would be required.

The loss in accuracy compared to a more detailed specific project analysis is low compared to the overall uncertainty in the estimate. Environmental integrity of the result is not jeopardised but the process is simplified. It also removes the negotiation phase of baselines which currently occurs and through which gaming can occur as it is in the interests of both parties to 'talk up' the baseline.

The standardised approach can be summarised as a series of steps which are listed as follows and discussed more fully in section 6.

- Step 1: State host country. Decide whether project is rural/urban, household/ institutional
- Step 2: Decide which service the project replaces
- Step 3: Identify what is being replaced
- Step 4: Choose a standardised baseline from the Table provided (see section 6)
- Step 5: Calculate the reduction
- Step 6: Manage the uncertainty

### **G.3 Operationalisation of Additionality**

In the report the different definitions of additionality, including financial additionality and environmental additionality, are discussed. In order for a project to qualify as a CDM project it must provide emission reductions ‘additional to any that would occur in the absence of the certified project activity’ and funding must be additional to ODA funding.

The project must be additional at the start and throughout its crediting life. From the study it is clear that for small scale projects the current model for additionality based on positive incremental costs is inappropriate. It is suggested that alternative additionality criteria need to be developed for these projects and some possible suggestions could include the following:

- Commercial projects in very poor developing countries could be automatically additional as it is unlikely that any other action would have occurred.
- Commercialisation of ODA pilot projects to CDM projects could be automatically additional.

These types of approaches to additionality would be practical for these small-scale projects and would entail minimal transaction costs.

The implications of the operationalisation of additionality for ODA and the CDM need to be explored further.

### ***H. Roles for DFID***

The report concludes with a discussion of the possible roles for DFID in the CDM. Several suggestions for possible future directions are given. It goes without saying that development projects should maximise climate change benefits where possible. DFID could also undertake capacity building for host governments for implementation of the CDM at the small scale household level. It could also advise the UK Government Department of the Environment on a range of issues including host country capacity building, technology transfer and baselines as well as possible indicators for sustainability tracking and approval criteria for hosts.

However there is also an opportunity to fund development projects to the point where further investment could make the programme commercially viable and host countries could then offer the expansion of these pilot scale projects for investment under the CDM.

### ***I. Further Work***

Suggestions for future work are made in the report on both the accounting for emissions reductions and for the sustainable development aspects of the CDM.