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ent Biomass Stoves for Institutions and SMEs in Kenya

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UNITED NATIONS DEVELOPMENT PROGRAMME

**MID-TERM EVALUATION REPORT ON THE
Market Transformation for Highly Efficient Biomass
Stoves for Institutions and Medium-Scale Enterprises
in Kenya**

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Kenya

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The Government of Kenya/UNDP GEF ~~%~~*Market Transformation for Highly Efficient Biomass Stoves for Institutions and Medium-Scale Enterprises in Kenya* project was undertaken during the period October 21-31, 2008, with report writing extending through to November 10, 2008. The Draft Final Report was submitted to the Project Management Unit on November 17, 2008.

This Final Report has incorporated additional data and information provided by Project Management Unit as well as the written responses and suggestions for modification to the Draft Final Report made by the Project Management Unit and various Stakeholders.

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A young Plantation of Eucalyptus established by Alimus Academy, Nairobi



7-year Eucalyptus Plantation at Kathanthatu School, Uruku, Mt Kenya Region



Highly Efficient Biomass Stove Set Up in a Private School (Bridgewater Girls Secondary School at Nakuru)

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| | |
|---|-----------|
| Knowledge Management..... | ii |
| List of Tables..... | v |
| List of Abbreviations..... | vi |
| 1. Executive Summary..... | 1 |
| 2. Introduction..... | 5 |
| 2.1 Purpose of Evaluation..... | 5 |
| 2.2 Background..... | 6 |
| 2.3 Implementation Strategy..... | 6 |
| 2.4 Project Strategy..... | 7 |
| 2.5 Project Funding and Work Plan..... | 7 |
| 2.6 Set Targets..... | 8 |
| 3. Evaluation Methodology..... | 9 |
| 3.1 Other Monitoring and Evaluation Activities Integral to the Project..... | 10 |
| 4. Evaluation Findings..... | 10 |
| 4.1 General Observations..... | 10 |
| 4.2 Global Objective..... | 12 |
| 4.3 Outcome 1: Supportive Policies and Legal Framework..... | 13 |
| 4.4 Outcome 2: Supply Chains for Products and Financing..... | 14 |
| 4.4.1 Outcome 2.1..... | 14 |
| 4.4.2 Outcome 2.2..... | 14 |
| 4.4.3 Outcome 2.3..... | 15 |
| 4.5 Outcome 3: Sensitized Policymakers, Financial Sector, Suppliers, End Users..... | 17 |
| 4.6 Outcome 4: Strengthen Administrative and Infrastructure Support for PMU..... | 18 |
| 4.7 Outcome 5: Learning, Evaluation and Adaptive Management..... | 18 |
| 4.8 Budget Performance..... | 19 |
| 5. Evaluation Based on the Terms of Reference..... | 20 |
| 5.1 Project's Environmental Objectives..... | 20 |
| 5.2 Project Activities, Roles and Responsibilities..... | 22 |
| 5.2.1 Renewable Energy Technology Assistance Programme (RETAP)..... | 22 |
| 5.2.2 Rural Technologies Enterprises Limited (RTE)..... | 22 |
| 5.2.3 Tree Biotechnology Programme Trust (TBPT)..... | 23 |
| 5.2.4 Failures in School Woodlot Establishment..... | 24 |
| 5.2.5 Tree Seedling Transportation..... | 24 |
| 5.2.6 The Participating Institutions..... | 25 |
| 5.2.7 Competition for Woodlot Products..... | 25 |
| 5.2.8 Urban Schools and Woodlot Establishment..... | 25 |
| 5.2.9 Woodlots and Biodiversity..... | 26 |
| 5.2.10 Forest Action Network and Options for Woodlot Establishment..... | 26 |
| 5.3 Balance Between Technical Product and Mainstreaming Process..... | 27 |
| 5.4 Level of Public Investment..... | 28 |
| 5.5 Efforts of UNDP in Support of Implementing Agencies and National Institutions..... | 28 |
| 5.6 Extent to which Project is Reaching Intended Beneficiaries..... | 30 |
| 5.7 Sustainability of Outcomes/Benefits after Expiration of GEF Project..... | 30 |
| 5.7.1 RETAP Green Capital..... | 31 |
| 5.7.2 Kenya Improved Stove Association (KEISA)..... | 31 |
| 5.7.3 Kenya Tree Propagators and Tree Growers Associations and Networks of School Clubs and Teachers | 32 |
| 5.7.4 Kenya Forest Service..... | 34 |
| 5.8 Logical Framework Approach and Performance Indicators..... | 34 |
| 5.9 Main Lessons from the Project..... | 35 |
| 5.9.1 Global | 35 |
| 5.9.2 Lessons Specific to GEF Biomass MTR Project..... | 35 |



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| | |
|--|-----------|
| | 36 |
| | 36 |
| | 36 |
| 6.3 RETAP Green Capital..... | 37 |
| 6.4 Woodlot Establishment..... | 37 |
| 6.5 Tree Seedling Transportation..... | 37 |
| 6.6 Database..... | 37 |
| 6.7 RTE Improved Stove..... | 38 |
| 6.8 Sustainability..... | 38 |
| 6.9 Post-Election Violence..... | 38 |
| APPENDICES | |
| APPENDIX I: Terms of Reference..... | 39 |
| APPENDIX II: Approved Work Plan- Time Table for Mid-Term Review Consultants... | 44 |
| APPENDIX III: Table 6: Project Performance Matrix..... | 45 |
| APPENDIX IIIB: Table 6B: Performance Tracking, 2008: Budget Performance..... | 49 |
| APPENDIX IV: Tables of Results from Study on GHG Emission Reductions Achieved In Schools after Changing from Traditional to Improved RTE Stoves..... | 51 |
| APPENDIX V: List of Persons Consulted by Evaluation Team..... | 53 |
| APPENDIX VI: Central, Mt. Kenya and Rift Valley Regions Visited by Evaluation Team..... | 54 |
| APPENDIX VII: List of Participants at the Presentation of Preliminary Findings by Consultants on Friday 31st 2008 at the Safari Club, Nairobi..... | 55 |
| APPENDIX VIII: Literature..... | 56 |



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| | |
|--|----|
| Table 1: Budget, 2006 -2010..... | 7 |
| Table 2: Project Work Plan and Budget Up to Mid-Term, 2006 2008..... | 8 |
| Table 3: Correlation between Credit Allocation and Sale of Stoves by Province..... | 16 |
| Table 4: Training of End Users in Schools in 2008..... | 17 |
| Table 5: Budget Performance by Outcome..... | 20 |
| Table 6: Project Performance Matrix..... | 45 |
| Table 6B: Performance Tracking, 2008: Budget Performance | 49 |

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ectors

| | |
|----------|---|
| CDF | Constituencies Development Fund |
| CDM | Clean Development Mechanism |
| CFA | Community Forest Association |
| CER | Certified Emission Reduction |
| EMCA | Environmental Management and Coordination Act No. 8 of 1999 |
| ESD | Energy for Sustainable Development, Kenya |
| FAN | Forest Action Network |
| GEF | Global Environment Fund |
| GEF-SGP | GEF Small Grants Project |
| GHG | Greenhouse Gases |
| ICT | Information and Communication Technology |
| KCJ | Kenya Ceramic Jiko |
| KEBS | Kenya Bureau of Standards |
| KEFRI | Kenya Forest Research Institute |
| KEISA | Kenya Improved Stove Association |
| KFS | Kenya Forest Service |
| KNFJKA | Kenya National Federal of Jua Kali Associations |
| M&E | Monitoring and Evaluation |
| MFI | Micro-Finance Institution |
| MoE | Ministry of Energy |
| MTR | Market Transformation |
| NGO | Non-Governmental Organization |
| PANERECC | Parliamentary Network on Renewable Energy & Climate Change |
| PMU | Project Management Committee |
| PIR | Project Implementation Review |
| PSC | Project Steering Committee |
| R&D | Research and Development |
| RETAP | Renewable Energy Technology Assistance Programme |
| RTE | Rural Technology Enterprises Limited |
| SGP | Small Grants Programme |
| SME | Small and Medium Enterprises |
| TBPT | Tree Biotechnology Programme Trust |
| TOR | Terms of Reference |
| UNDP CO | United Nations Development Programme Country Office |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VAT | Value Added Tax |

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1. This GEF-funded market transformation for highly efficient biomass stoves project is aimed at removing market barriers to the adoption of sustainable biomass energy practices and technologies by institutions (schools and hospitals) and small businesses (restaurants, hotels) in the rural and urban areas of Kenya. The project is building on the successful initiatives of local Non-governmental Organizations (NGOs) and private sector players and scales up successful existing business models using well-proven commercial technologies by removing barriers, which are currently limiting the growth of this market. The project builds on and scales up a successfully implemented GEF Small Grants Programme (SGP) in which a revolving fund credit scheme to disseminate energy-saving stoves to institutions in Kenya on a commercial basis was established. Past initiatives by the government, NGOs and the private sector have demonstrated that improved institutional stoves reduce greenhouse gas emissions. The wood-burning stoves require 70% less wood for the same cooking task; and reduce emissions of products of incomplete combustion which have higher global warming potentials than CO₂.
2. United Nations Development Programme Country Office (UNDP CO) is the Implementing Agency for the GEF project, which is being executed nationally by the Ministry of Energy (MoE) through Renewable Energy Technology Assistance Programme (RETAP). But, various stakeholders are also involved in the project, including, Rural Technologies Enterprise (RTE) responsible for the fabrication, sale and installation of the improved highly efficient wood burning stoves, and Tree Biotechnology Programme Trust (TBPT) responsible for raising and distributing seedlings of cloned fast growing hybrids of eucalyptus species for the establishment of woodlots to provide wood fuel to institutions.
3. A Project Management Unit (PMU) established within the RETAP is responsible for overall project co-ordination and implementation. Expert and policy guidance is provided by the Project Steering Committee (PSC) made up of members from civil society, research, private sector, and government, UNDP-GEF and other relevant stakeholders. This group, under the joint chairmanship of the UNDP CO and the MoE also gives advice to the Project Manager, thus supporting the decision-making process.
4. The purpose of the Mid-Term Review is to review progress towards the project's objectives and outputs, identify strengths and weaknesses in implementation, assess the likelihood of the project achieving its objectives and delivering its intended outputs, and provide recommendations on modifications to increase the likelihood of success (if necessary)

Project Relevance

5. The project is relevant to Kenya given the fact it is classed among the countries of the world that are forest poor. Therefore, this project is relevant to Kenya's policy to promote energy conservation measures at the household, institution and industry levels. Kenya is home to Africa's most successful fuel-efficient stove programme in the form of the Kenya Ceramic Jiko (KCJ) initiative started in the mid-1980s. Nearly 1.5 million domestic fuel-efficient stoves have been sold in Kenya since its inception. Approximately 10-15% of education institutions have switched from the traditional, inefficient open-fire cooking systems to fuel-efficient institutional biomass stoves within the last two decades. In the 2004 White Paper on Energy Policy Kenya set the goal of increasing the rate of adoption of efficient charcoal stove from 47% currently to 80% in urban areas by 2010 and to 100% by 2020. This would translate to a reduction in demand for fuelwood for charcoal production by 3.36 million tonnes. It also aimed at increasing the rate of penetration of efficient fuelwood stoves from 4% currently to 30% by 2020 in both rural and urban areas. This would reduce the overall demand for fuelwood by 15.4 million tonnes
6. This GEF project has the potential to reduce greenhouse gas (GHG) emissions and to curtail deforestation significantly. It also promises to improve household health by reducing CO and PM₁₀ emissions from improved wood burning stoves.

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in delivery. The fabrication, distribution and installation of the highly popular improved wood stove have been stalled by problems with the revolving credit loan scheme. Funding of the credit is from the loan repayments for stoves made by schools per school term. Money accruing from the 16% VAT deductions from the term repayments is used to purchase and distribute eucalyptus tree seedlings to schools. The VAT remittances only come in trickles. The efficiency of the revolving credit scheme has been substantially reduced by the low repayment rate of loans by institutions, the diminished ability of public institutions to meet their loan repayment schedules since the introduction of free education policy, and the post-election violence which grounded many institutions in some parts of the country. Propagation and distribution of the fast growing cloned tree seedlings has been done efficiently but there have been lapses in the much needed follow up and monitoring of what happens to the seedlings at the institutions end. The institutions woodlot establishment is the weakest link in the entire project. RTE has been able to produce the improved wood stove on demand. But, at its present production level and mode of operation, it will not be able to meet the greatly increased demand for the wood stove that its success has generated. Its production rate and level is greatly constrained by the non-availability of raw materials particularly stainless steel

8. In spite of these lapses, the project is on course. There is much progress in the policy formulation sector; while consultants are working on vital issues of the microfinance institution, RETAP Green Capital, and improved wood stove cost reduction. It is not unusual for projects to experience occasional disturbances and unforeseen circumstances which may call for adjustments in the project implementation. What is important is that the PMU has been able to respond decisively whenever such needs arose. Ability to respond and adapt to changing circumstances has been a strength of the project implementation process.
9. The studies being carried out by University MSc graduate students are increasingly documenting the superiority of the RTE improved wood stoves over all other competitors. Knowledge is increasing on the wide range of stoves used in Kenyan schools and their wood fuel consumption rates, and on the GHG emission reduction potentials of the RTE improved stoves relative to others. There are verifiable data and information on the fuel and monetary savings and environmental benefits associated with the switch by an average school or enterprise from the use of traditional to the RTE improved stove. These vital data and information should be used to further promote and popularize the RTE improved wood stove not only among the general populace but among policy makers, entrepreneurs and potential donors or contributors to the business in future.

Project Effectiveness and Impact

10. The project has been effective in achieving desired outcomes and making an impact in the following areas:
 - Development of significant footprints in the form of institutions and SMEs with improved wood stoves and accompanying woodlots, and in the form of tree seedling nurseries run by private entrepreneurs
 - Effective publicity of the benefits of the improved highly efficient wood stove and the consequent overwhelming demand for it and the supportive credit loan scheme among institutions, SMEs and private individuals and households
 - Decentralization of the activities of TBPT from Karura to 8 other stations in different parts of the country
 - Replication and extension of the business model to all 8 provinces of Kenya
 - Pursuit of policy dialogue aimed at raising awareness of biomass fuel issues in government circles and mobilizing relevant government departments and officials to formulate appropriate integrated wood fuel strategy and action plan for Kenya.

and capacity building for the long term sustainability of project
of links with indigenous associations, and formation of new
and users and private entrepreneurs

- Strengthening the infrastructure for MFI operations and advancing the strategic planning process that would culminate in the incorporation of a standalone MFI called RETAP Green Capital
- Increased awareness by end users and implementation of the end user training programme in spite of the disruption caused by the post-election violence in the country
- Establishment and strengthening of PMU

11. The project has been less effective regarding:

- GHG emission reduction
- Rate of tree planting by institutions
- 20% cost reduction for wood stove
- Sustaining the revolving credit scheme fund
- Baseline surveys and data collection

Sustainability and Replicability

12. The PMU has pursued many viable options for ensuring the sustainability of the project outcomes and benefits and the replicability of the business model in other regions. The following structures have high prospects for succeeding

- RETAP Green Capital
- Kenya Improved Stove Association (KEISA)
- Kenya Tree Propagators Association
- Kenya Tree Growers Association

13. But, it is important to create and prepare focal points to which these structures can relate after the expiration of the GEF project. Possible focal points include MoE, RETAP, RTE and TBPT. Also, the establishment of woodlots to provide for the wood fuel needs of institutions and other users needs to be targeted specially to ensure sustainability.

Lessons

14. The global lessons are that

- A short term externally funded project has a good chance of succeeding where the project creates tangible and significant footprints and has a direct impact on the livelihood of the people at the grassroots level.
- Government departments can work together in harmony where their respective mandates are clearly defined and recognized by all parties and where there is a well defined and recognized common interest.
- Biomass or greenenergy is a new area in the world of business. There are still many grey areas and much effort is needed in mobilising finance institutions to invest safely in the sector.

15. Lessons specific to this GEF project include:

- Openness has been the watchword in the implementation of this project at all levels. But, there is still room for improvement. Stakeholders and partners, even members of the PSC, have access to information and ideas that could facilitate aspects of the project.

plots of the project was inadvertently neglected. Too much trust was placed on institutions to establish and manage woodlots. The *laissez faire* approach to woodlot establishment has not worked.

- The judicious use of consultants to handle specialised aspects of the project has been quite beneficial especially in relation to the development of the policy documents, liaison with parliamentarians, and development of the RETAP Green Card.
- Information dissemination and networking are critical in the implementation process of a project such as this.
- Efforts to transfer knowledge and technology have yielded good results in the area of tree biotechnology transfer to private entrepreneurs in nursery operations. The prospects are high too that similar success would be achieved in respect of improved institutional and household wood stove fabrication. The approach adopted of creating relevant institutions, organizing informal sector operators into professional guilds or associations and building up their capacities, has worked very well thus far.

Main Recommendations

16. The major recommendations deriving from this mid-term evaluation exercise are as follows:

- The global objective and the targets on levels of emission reduction and deforestation avoided should be retained. But, more realistic time lines for meeting the targets should be set for the second half of the project's life.
- Given the importance attaching to these GHG emission reduction and deforestation avoidance, experts should be brought in during the second phase of the project to carry out surveys and make the calculations necessary to showcase the achievements of the project on these issues.
- RETAP should establish a computerized database and Geographic Information System (GIS) that would integrate the data being generated by various units involved in this GEF project.
- Provide more funds in support of the revolving credit loan scheme and facilitate the access to the £100 000 pounds sterling offered to RETAP by ASHDEN TRUST on condition that the deficit in the seedlings training budget indicated in the overall budget presented to them is removed.
- The PSC should engage with PANERECC, CDF office, the Ministry of Education and Local Authorities to work out a loan guarantee scheme for schools to be able to purchase the improved wood stoves.
- A unit, desk, focal point should be created within the PMU to specifically target the promotion of woodlot establishment and management by the institutions themselves or by other agencies and strategies. It should also be designated a separate Sub-Outcome under Outcome 2. The cost implications require looking for donors to fund woodlot establishment.
- The tree seedling distribution system should be more closely managed and monitored. RETAP/TBPT should be provided with 2-4 heavy duty articulated vehicles for transportation of tree seedlings. Institutions supplied with seedlings should be followed up to ensure that the seedlings are not diverted to private estates or left to die off in the schools' store houses.
- RTE should upgrade its stove fabrication operation from an informal sector activity to a full scale mechanized factory operation. RTE needs to move towards mass production of the wood stoves in order to reduce unit costs.
- The target to reduce the cost of the improved wood stove by 20% cannot be met and should be reviewed downwards, if not totally discarded.
- RETAP Green Capital is critical to the sustainability of project outcomes and the replicability of its business model. Therefore, the move to upgrade it into a micro-finance institution

concluded before the expiration of this GEF project. Although, grow and survive on its own, the growth process should be s to build up its capital base to a threshold level.

- The structures which have been established have the potential to ensure the sustainability of the outcomes and benefits of this GEF Project. Therefore, the process of registering them, establishing their secretariats and building up their capacities should be given priority in the second phase.
- There is urgent need for RETAP to work out and sign memoranda of understanding with all the groups especially the Kenya National Federation of Jua Kali Associations to avoid complications in the future.
- At the public level, the Ministry of Energy would be the most appropriate institution to situate this project for mainstreaming purposes.
- The effects of the post-election violence are still relevant in the plans for the implementation of the GEF project in the second half of its life span. In the Rift Valley, for one, the situation has not normalised sufficiently for project activities to flow smoothly.

2. Introduction

17. The UNDP Country Office initiated this mid-term evaluation in compliance with provisions of the project document. In the Workplan and Budget 2008 for the project the mid-term evaluation was slated for the third quarter of the year.
18. The evaluation is being undertaken in order to assess and document the experience to date with the formulation, objectives, implementation, achievements and potential for success and sustainability of the MTR-Biomass Project and suggest improvements that can be made to the project.

2.1 Purpose of Evaluation

19. The overall objective of the Mid-Term Review was to
 - review progress towards the project's objectives and outputs,
 - identify strengths and weaknesses in implementation,
 - assess the likelihood of the project achieving its objectives and delivering its intended outputs, and
 - provide recommendations on modifications to increase the likelihood of success (if necessary)
20. More specifically, the Mid-Term Evaluation was expected to undertake the following tasks:
 - Assess progress towards attaining the project's environmental objectives and outcomes. The effectiveness of these actions given the available funding will be considered.
 - Clarify the project objectives and activities both in light of the evolving thinking on global and local thinking and action, and how these relate to the UNFCCC priority work programme. Validate the developing project approach to incorporating those priorities.
 - Review the clarity of roles and responsibilities of the various agencies and institutions and the level of coordination between relevant players. In particular, the capacity and performance of the project secretariat will be reviewed.
 - Review the balance between 'technical product' and 'mainstreaming process' in the project; and given the nature of that balance, assess the optimum institutional placing of the project with regard to mainstreaming products. Optimal here includes both cost effectiveness and technical effectiveness.

involvement in the project and comment as to whether public participation is necessary to the goals of the project.

UNDP in support of the implementing agencies and national

institutions.

- Review and evaluate the extent to which project impacts have reached the intended beneficiaries.
- Assess the likelihood of continuation of project outcomes/benefits after completion of GEF funding; and describe the key factors that will require attention in order to improve prospects for sustainability of project outcomes.
- Assess the level to which the Logical Framework Approach (LFA) and performance indicators as developed at the inception phase have been used as project management tools; and review the implementation of the projects monitoring and evaluation plans. Assess the strength of the log-frame process as a whole.
- Make recommendations as to how to improve project performance in terms of effectiveness and efficiency in achieving impact on both capacity and the targeted Institutions.
- Describe the main lessons that have emerged in terms of: efforts to secure sustainability; knowledge transfer; and the role of M&E in project implementation. In describing all lessons learned, an explicit distinction needs to be made between those lessons applicable only to this project, and lessons that may be of value more broadly.

2.2 Background

21. The MTR-Biomass project is aimed at removing market barriers to the adoption of sustainable biomass energy practices and technologies by institutions (schools and hospitals) and small businesses (restaurants, hotels) in the rural and urban areas of Kenya.
22. The project aims to achieve this by (i) promoting highly efficient improved wood-burning stoves, and (ii) establishment of woodlots owned and managed by the institutions and the private sector.
23. The project is building on the successful initiatives of local Non-governmental Organizations (NGOs) and private sector players and scales up successful existing business models using well-proven commercial technologies by removing barriers, which are currently limiting the growth of this market. The project builds on and scales up a successfully implemented GEF Small Grants Programme (SGP) in which a revolving fund credit scheme to disseminate energy-saving stoves to institutions in Kenya on a commercial basis was established.
24. Past initiatives by the government, NGOs and the private sector have demonstrated that improved institutional stoves reduce greenhouse gas emissions. The wood-burning stoves require 70% less wood for the same cooking task; and reduce emissions of products of incomplete combustion which have higher global warming potentials than CO₂.
25. Expected project outcomes include:
 - Development and strengthening of supportive policies and the legal framework for sustainable biomass energy businesses;
 - Strengthening and expanding supply chains for both products and financing; and
 - Improved awareness by policy makers, financial sector, suppliers and end-users of benefits and market opportunities for improved stoves.
26. The key project indicator is the reduction of CO₂ equivalent emissions by an accumulated total of between 400,000 and 960,000 tonnes by 2020.

2.3 Implementation Strategy

27. The UNDP CO is the implementing agency for the GEF MTR-Biomass project. But, the Kenya Ministry of Energy (MoE) is executing the project nationally through its Renewable Energy Technology Assistance Programme (RETAP). But, RETAP is working with several other stakeholders and with specialized agencies, notably, Rural Technology Enterprises (RTE). The overall day-to-day implementation and coordination of the project is the responsibility of the Project Management Unit (PMU) created within RETAP and overseen by a Project Steering Committee (PSC) co-chaired by

of members from civil society, research institutions, the private and other relevant stakeholders. The PMU is managed by a National Technical Officer.

2.4 Project Strategy

28. The implementation of the project is to be guided and its progress measured through a number of indicative expected outputs with objectively verifiable indicators:

- Policy dialogue facilitated for increased coordination between government sectors
- Coordination and strengthening of parliamentary support for biomass energy legislation
- Delivery infrastructure for seedling supply established with appropriate revenue and financing structures (mini-nursery pilots for seedling sales)
- Increased liquidity in institutional, SME and formal household stove markets
- Reduced product and service costs-bulk purchasing, mass component production, tooling, design
- Business models improved and replicated
- Exploitation of applications to drive market growth and create volume
- Information on costs and benefits of technologies well known, supporting market decisions by end users (SMEs, institutions), households, supply chain, financing chain, policy makers
- Users trained in biomass energy saving techniques and forest management
- Project Management Structure in place
- Learning, Evaluation and Adaptive Management increased

2.5 Project Funding and Work Plan

29. Project funding and work plan were carefully spelt out in detail. This MTR-Biomass project is to be wholly funded by GEF and implemented by RETAP as shown in Table 1 below

Table 1: Total Project Work Plan and Budget, 2006 - 2010

| Project Outcome | Responsible Party | Source of Funds | Total Budget (USD) |
|---|-------------------|-----------------|--------------------|
| OUTCOME 1: Supportive policies and legal framework for sustainable biomass energy businesses developed and strengthened. | RETAP | GEF | 31 100 |
| OUTCOME 2: Supply chains for both products and financing are strengthened and expanded. | RETAP | GEF | 508 400 |
| OUTCOME 3: Sensitized policymakers, financial sector, suppliers and end-users. | RETAP | GEF | 76 500 |
| OUTCOME 4: Strengthen administrative and infrastructural support to the project Management Unit | RETAP | GEF | 334 000 |
| OUTCOME 5: Learning, Evaluation and Adaptive Management Increased | RETAP | GEF | 25 000 |
| TOTAL PROJECT BUDGET | RETAP | GEF | 975 000 |

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...ng implemented within 3 main components focusing on *policy* *nt skills* (Outcome 2); and *awareness* (Outcome 3)

2.6 Set Targets

31. End-Term Targets

- 100 000 tonnes of CO₂ avoided by 2010, representing a switch of about 3000 institutions and small businesses to efficient stoves.
- 15 million tree seedlings planted within the project in managed fuelwood plantations with an indicative minimum of 75% long-term tree survival rates

Table 2: Project Work Plan and Budget up to Mid-term, 2006 – 2008

| Outcome | Responsible party | Source of funds | Budget, 2006-2008 (USD) |
|--|-------------------|-----------------|-------------------------|
| OUTCOME 1: Supportive policies and legal framework for sustainable biomass energy businesses developed and strengthened | RETAP | GEF | 27300 |
| OUTCOME 2: Supply chains for both products and financing are strengthened and expand. | RETAP | GEF | 505400 |
| OUTCOME 3: Sensitized policymakers, financial sector, suppliers and end-users. | RETAP | GEF | 66000 |
| OUTCOME 4: Strengthen administrative and infrastructural support to the project Management Unit | RETAP | GEF | 269750 |
| OUTCOME 5: Learning, Evaluation and Adaptive Management Increased | RETAP | GEF | 16000 |
| TOTAL OUTCOME BUDGET | RETAP | GEF | 884450 |

32. Mid-Term Targets

- 50 000 tonnes of CO₂ avoided by 2008
- 7.5 million tree seedlings planted within the project in managed fuelwood plantations

33. In addition, there are specific targets for each activity associated with each of the major expected outcomes

34. Country Ownership Targets

Kenya embraced the biomass technology by ratifying the United Nations Framework Convention on Climate Change (UNFCCC) on 30 August 1994. The practice in Kenya over the years has also been encouraging: ratifying the UNFCCC in 1994, hosting the first UN conference on New and Renewable Sources of Energy in Nairobi in 1981. Kenya is also home to Africa's most successful fuel-efficient stove programme in the form of the Kenya Ceramic Jiko (KCJ) initiative started in the mid-1980s. Nearly 1.5 million domestic fuel-efficient stoves have been sold in Kenya since its inception. Approximately 10-15% of education institutions have switched from the traditional, inefficient open-fire cooking systems to fuel-efficient institutional biomass stoves within the last two decades.

35. The Government of Kenya, through a White Paper on Energy Policy (2004) also set her own targets which are relevant to the goals of this MTR-Biomass project:

- increasing the rate of adoption of efficient charcoal stove from 47% currently to 80% in urban areas by 2010 and to 100% by 2020. This would translate to a reduction in demand for fuelwood for charcoal production by 3.36 million tonnes;

of efficient fuelwood stoves from 4% currently to 30% by 2020 would reduce the overall demand for fuelwood by 15.4 million

tonnes;

- rehabilitate and strengthen the 10 Agroforestry centres country wide and increase them to 20 in order to act as demonstration centres on issues of efficiency and conservation. These Agroforestry centres have big potential as centres of excellence in disseminating information on biomass demand and supply management. Agroforestry centres should lead the implementation of strategies recommended on biomass enhancement and conservation.
- promote energy conservation measures at household level, institution and industry level, namely, drying of wood before burning, soaking of long-cooking grains, adoption of fireless cookers, and putting off fires after use etc.

3. Evaluation Methodology

36. The Evaluation Team comprised one International Consultant and one National Consultant. Both have expertise and research, professional and consultancy experience in natural resources management, bio-energy and related environmental, socio-economic, technical and policy issues particularly in the context of developing countries.
37. This mid-term evaluation exercise has focused as much as possible on an outcomes based evaluation approach (Logical Framework Analysis). However, as input to the next phase of the project, the evaluation has also dealt with activity-based issues where necessary. Many issues are examined and discussed with particular reference to the specific tasks itemised in the TOR for this exercise
38. The Evaluation Team had access to some relevant documents on the project prior to commencement of fieldwork to gather relevant data and information:
 - UNDP Project Document: UNDP Medium-Size Project (MSP): Market Transformation for Highly Efficient Biomass Stoves for Institutions and Medium-Scale Enterprises in Kenya (UNDP/Government of Kenya).
 - Summary Operational Plan 2007
 - GEF Biomass Energy Project: Market Transformation for sustainable Biomass Energy: Workplan and Budget 2008
39. The documents facilitated the development of the data collection framework and strategy. Findings from these documents were combined with the objectives and tasks specified in the TOR in designing the work plan and data gathering strategy for this evaluation exercise
40. The fieldwork stage of the exercise lasted for a period of 11 working days and consisted of
 - Extensive review of relevant project documents
 - Discussions with key UNDP and PMU staff at the beginning and end of the fieldwork and during joint visits to various sites and stakeholder offices
 - Site visits to woodlots, participating institutions, out stations in Nairobi, and the Central, Mt. Kenya and Rift Valley regions
 - Discussions and interviews with relevant stakeholders in institutions and the private sector
 - Discussions with government officials in relevant ministries and departments

ings to a stakeholders meeting at the end of the Mission. The
es from the UNDP CO, MoE, RTE, RETAP and a consultancy
ortunity for the stakeholders to make comments and seek

clarification on many issues.

3.1 Other Monitoring and Evaluation Activities Integral to the Project

42. The MTR-biomass transformation project has many monitoring and evaluation processes integral to it. These have been used by RETAP/RTE, PMU and UNDP. The evaluation team has availed itself of the reports on these internal monitoring activities in making its evaluation. The internal project monitoring activities and reports include:

- Tripartite Review Meetings (UNDP, Ministry of Energy, GEF, RETAP and Regional Technical Adviser, and other Stakeholders)
- Project Monitoring and Evaluation Reports
- Quarterly Project Progress Reports
- Annual Report 2007
- Accounting Policies, Systems and Procedures,
- Policies and Procedures Manual
- Project Steering Committee Meetings
- Meetings of Sub-Components of the Project (Tree Component, RETAP/Rural Subcommittee, and other consultative groups)
- Project Management Committee Meetings
- Partners Quarterly Meetings
- Proceedings of Workshops, Retreats, Roundtable, Clubs and Networks

4.0 Evaluation Findings

4.1 General Observations

43. This project has succeeded beyond most traditional short term externally funded projects in that it has developed significant footprints. These foot prints are in the form of institutions and SMEs with improved wood stoves and accompanying woodlots. The improved wood stoves, the tree nurseries, and the woodlots springing up all over the country have the potential to last and become part of the cultural landscape. They are also of great promotional value to the project in civil society, government circles and potential donors/ investors
44. This GEF Biomass Energy Market Transformation for Sustainable Biomass Energy Project is a large and complex undertaking that has multiplier effects on and many linkages with other sectors of the economy. Consequently, the demands on the project have increased over time as its popularity has grown and as new challenges have emerged in the implementation process.
45. It is not unusual for projects to experience occasional disturbances and unforeseen circumstances which may call for adjustments in the project implementation. What is important is that the PMU has been able to respond decisively whenever such needs arose. Ability to respond and adapt to changing circumstances has been a major feature and strength of the project implementation process. Even where there has not been an immediate solution, the willingness to acknowledge the existence of a problem or an issue requiring special attention has been a distinct feature of the project implementation process. There has been no attempt to ignore or downplay emerging issues and challenges.

respond promptly and appropriately to emerging challenges, including for example

- the unanticipated increase in demand for the stoves from schools and other institutions
- the aftermath of the post-election violence that occurred early in 2008
- the implementation of the public policy on free secondary education in the country which has seriously reduced the ability of the schools to repay loans
- rampant market immorality

47. The factors responsible for the obvious smooth running of the project are worth highlighting in a complex project of this nature with so many stakeholders and operational areas. The success of the earlier NGO-led small grants project appears to have fired the imagination and interest of all stakeholders. The project implementation process has been facilitated by the close cooperation of all stakeholders with the Project Management Unit. There is clear evidence of a good working relationship between the PMU and stakeholders; there is openness in the administration of the project and issues are candidly discussed at the meetings of the PMU and PSC. RETAP, the project management unit, acknowledged the assistance it has received from different stakeholders:

- UNDP greatly facilitated the takeoff of the project by making funds readily available and through the privileges it provided for the importation of components
- The generosity of donors in making funds available for the credit scheme and its progressive upgrading to a micro-finance institution
- The collaboration with the Tree Biotechnology Programme Trust which developed the fast growing cloned type of eucalyptus tree seedlings for distribution to participating institutions
- The open, candid discussion of issues and challenges facing the project at the Project Steering Committee meetings as well as the support and inputs from the Regional Technical Adviser based in Pretoria
- The successful coming together of relevant government agencies to collaborate in formulating the necessary policies, guidelines and regulations on biomass energy which are crucial to the long term sustainability and mainstreaming of the project
- The internal monitoring and evaluation system in place within the project and the active cooperation of project staff and the field officers in different parts of the country.

48. The project has been actively pursued along five major lines of activity

- Fabrication, installation and training of users of improved energy efficient stoves, primarily through the activities of Rural Technology Enterprises (RTE)
- Production and distribution of high quality tree seedlings in support of the tree planting programmes of participating institutions with the collaboration of Tree Biotechnology Programme Trust (TBPT)
- Implementation, management and popularization of the revolving credit loan scheme, the purview of RETAP
- Pursuit of the policy dialogue process aimed at raising awareness of biomass fuel issues in government circles and mobilizing relevant government departments and officials to formulate appropriate integrated wood fuel strategy and action plan for Kenya. The Ministry of Energy has largely coordinated these activities.
- Establishment of structures and capacity building for the long term sustainability of project outcomes through development of links with indigenous associations, and formation of networks of end users and entrepreneurs

GHG emission is also being pursued on the side. The belief the project are achieved the benefits in terms of reduction in

50. But, studies are being carried out to establish baseline data and models for determining emission reduction rates. Other studies are focused on tree survival rates and indoor air quality. It is perhaps too early for the expected positive impacts on GHG emission reduction to be determined with a reasonable degree of certainty.

4.2 Global Objective:

The key project indicator is the reduction of CO₂ equivalent emissions by an accumulated total of between 400,000 and 960,000 tonnes by 2020.

51. In pursuance of this overall target, the project set mid-term targets of 50 000 tonnes reduction in CO₂ emissions and 7.5 million seedlings planted in managed tree plantations by 2008. As at June 2008, only 296,030 seedlings had been delivered and planted in schools up from 138 120 planted by 156 schools in 2007, a 114% increase. But the total number of seedlings delivered and planted from 2007 to June 2008 is only about 3.9% of the set target of 7.5 million.
52. The number of tree seedlings planted does not accurately reflect the number of seedlings sent out by TBPT. TBPT has delivered about 342,000 seedlings but the number of trees on the ground is not this although no actual counting or reckoning has been done. Indeed, with the exception of one or two none of the schools visited could give an accurate number of seedlings they had planted nor the size of their woodlots. In one district it was found that only 68% of the trees delivered actually made it to the field; some schools left the seedlings unattended for a long time until most died off before they could be transplanted. There is some evidence too that tree seedlings are disappearing from schools to private plots and residential compounds although the numbers have not been documented. Thus, the impact of the planted trees on GHG emission reduction is likely to be lower than expected at this stage in the project's life. However, it is important to note that the performance of the seedlings that have been planted has been good: the schools visited during the evaluation exercise reported survival rates of between 80 and 95 per cent. The Project target of achieving 75% tree survival rate has a good chance of being met.
53. In addition to the problem just highlighted the disruption caused by the post-election violence in the country, and widespread drought in many parts of the country also appeared to have greatly constrained the tree planting programme. The fact that the seedling production and distribution activities are centralized in one location, Karura Forest Station, could also have been a contributory factor especially in terms of delivery to schools in distant locations and in terms of monitoring what the schools did with the supplies sent to them. Fortunately, the TBPT is already working toward decentralizing the operations to regional centres.
54. The slow pace of the tree planting programme was noted at the Steering Committee meeting of November 29, 2008. This tree planting programme by the schools must be seen as perhaps one of the major weak links in the entire project. Therefore, it needs to be specially targeted for action during the remaining life span of the project.
55. Surveys carried out showed that by June 2008, 998t CO₂ equivalents had been achieved due to the adoption of the improved energy efficient wood-burning stoves. This level of CO₂ reduction is only about 2% of the 50 000 tonne target level of reduction by 2008.
56. However, it was noted that the calculation of GHG emissions reduction was based on the 123 institutions that had been fully entrenched in the revolving fund scheme and not on the 244 institutions where the improved stove had been installed. It is more proper to do the calculation on the basis of the number of schools (244) that have had the improved stove installed. Based on data from the more recent study by Ngeywo (2008), the Evaluation Team recalculated the CO₂ equivalents emission reduction achieved in the two years of the project's life span to be approximately 3,400t CO₂ equivalents. Based on the more recent data from Ngeywo (2008), our calculation used a higher mean enrolment figure of 536 compared to 427 used by RETAP. Still the emission reduction level achieved is only 6.8% of the mid-term target of 50 000 tonnes.

ambitious for the first half of the project. The targets did not take into account the focal points, the schools, nor could the political disruption be factored into the setting of the targets. The virtual grounding of the revolving loan scheme has stalled progress in getting the improved stove into more schools.

58. Also, the tree planting programme by the schools must be seen as perhaps one of the major weak links in the entire project. With the present level of performance of schools in woodlot establishment and management the target of 7.5 million seedlings planted by 2008 could not have been met even in the absence of the other limiting factors mentioned earlier.
59. Furthermore, it is doubtful that TBPT could have raised the 7.5 million seedlings required for planting in two years. The evaluation team got information that TBPT had been able to raise only 14 million seedlings in 8 years of operation. This is not to diminish the achievements of TBPT but to highlight the unrealistic expectation about the tree planting programme at this mid-term stage. It also highlights the wisdom in trying to raise private entrepreneurs to participate in tree seedling propagation in order to ensure future sustainability.

4.3 Outcome 1:

Supportive policies and legal framework for sustainable biomass energy businesses developed and strengthened.

60. The target for this outcome is to have an integrated wood fuel policy, action plan and rules and regulations gazetted by the Government of Kenya. Progress towards achieving this outcome is quite encouraging especially given the active cooperation and participation of the relevant government departments and officials. The engagement of the services of a consultant to collate inputs from the various dialogue sessions, meetings and workshop and produce a draft integrated wood fuel strategy and action was a step in the right direction.
61. The project succeeded in engaging the Ministry of Energy at a very high level and has brought together an array of people from civil society, government and the private sector to work together on developing the documents on biomass strategy. Thus far, five government departments, agriculture, energy, environment, forestry and industry, have been involved in the deliberations. The establishment of this institutional framework is a major achievement as it promises to ensure the development of a policy document with wide acceptance in government circles.
62. The fact that the Ministries of Environment and Energy are working respectively on a *National Environment Policy* and a *National Energy Policy* is a measure of the success that has been achieved in raising awareness on biomass energy and environment issues at the executive arm of government at the national level.
63. The policy and biomass strategy documents being developed can be accommodated within the existing Energy Act. The policy and biomass strategy documents being developed can be accommodated within the existing Energy Act. So, there is no need for the documents to go through the long legislative process. But, the draft Biomass Strategy needs to be augmented to integrate the wood fuel, biofuel and biogas components.
64. The Project has had less of a direct contact and influence on the legislative arm of government. The decision to support the existing Parliamentary Network on Renewable Energy and Climate Change (PANERECC) is perhaps the best option at this stage. The link between the ministries and PANERECC is a major achievement as both the executive and legislative arms of government are working together. The parliamentarians are enthusiastic and willing to learn because they are looking for projects to do for their constituencies. The significance of this lies in the fact that the Constituencies Development Fund controlled by parliament is a potential source of help to schools intending to install the improved wood stove in the different localities. Also, MoE has funds in its huge energy development budget; with proper cooperation between it and the parliamentarians proper allocations can be made to the renewable energy sector in general and biomass energy in particular.

forums and the publication of policy briefs have certainly yielded
that the GEF Biomass Energy Project is making its presence felt

4.4 Outcome 2:

Supply chains for both products and financing are strengthened and expanded.

66. The project has surpassed in part its target of realising minimum orders of 100 improved stoves from at least four market sectors. Thus far, 463 stoves ordered have been supplied to 244 institutions, under the revolving credit scheme. But, the 244 institutions represent only approximately 1% of the estimated 24,500 schools in Kenya made up of 4500 secondary schools and 20,000 primary schools. But, the 244 institutions represent only approximately 1% of the estimated 24,500 schools in Kenya made up of 4500 secondary schools and 20,000 primary schools. The PMU is planning to break into its second major market sector by focusing on involving the catering SMEs in the revolving credit scheme beginning in 2009.

4.4.1 Outcome 2.1

67. **Strengthening the supply chain for stoves is a major target of this project.** Thus far the expected outcomes of attracting commercial loans to stove suppliers, and reducing costs by 20% have not been realised. But, RETAP has made some progress in strengthening the infrastructure for MFI operations by expanding the MFI office to include basic banking infrastructure like front-desk and security facilities. There is also an on-going Strategic Planning process for the MFI product that would hopefully lead to the incorporation of a standalone MFI to be known as RETAP GREEN CAPITAL. The recent enactment of the Microfinance Act, 2008 would allow the MFI to function as planned.

68. RETAP has been confronted with what it calls *rampant market immorality*. As is very common in many countries, sharp businessmen are copying the RTE stoves but using inferior quality materials and technologies. Therefore, they are able to undercut RTE in the market place. As to be expected, these inferior type stoves are not performing at the same level of efficiency as the RTE model. But, its impact on the project could be minimised as long as only users of the standard RTE stoves are considered for the credit grant. Notwithstanding, there is need to address this problem if the positive impact of the adoption of the improved wood burning stove on GHG emission reduction is to be fully realised.

69. The link with the Kenya National Federation of Jua Kali Associations and the formation of the Kenya Improved Stove Association (KEISA) is a major success story on the part of the Project and GTZ-PSDA. The prospects are high for the regulation of the stove supply system in the near future. Once the registration of KEISA is effected and its constitution is in operation, this association will be able to curb to some extent the activities of rogue adulterators in the stove business. At the moment, there appears to be no set of standards to regulate the manufacture and sale of the wood efficient stoves. A manufacturers' association working together with professional engineering bodies and the Kenya Bureau of Standards would be in the best position to develop appropriate standards for the manufacture and marketing of the stoves. Hence, the collaboration between the Jua Kali, the Kenya Bureau of Standards and other stakeholders in the 4K initiative is a significant development towards regulating the stoves market.

70. However, the competition from the low-cost sub-standard stoves is sufficient justification for pursuing the goal of reducing stove cost by 20%. A consultant is currently working on the assignment. Issues to consider might include how to overcome the problem of raw material supply especially stainless steel which is by far the most important and costly ingredient in the making of the stoves; and the possibility of mass production by more established private sector manufacturing concerns with the benefit of lower production cost per unit. Furthermore, efforts by PMU to get private sector operators to invest in the school stoves are worth pursuing.

4.4.2 Outcome 2.2

71. **Strengthening and expanding the seedlings supply chain is another target of action.** Efforts are being made to improve the supply side by decentralizing the operations of the Karura Forest Station

wide. Also, much has been accomplished by way of training operators and tree growers

72. But, in spite of these efforts, and as noted above, the rate of tree planting has been extremely low and the problem may not be exclusively related to the vagaries of the weather, pest damage and political instability. Other more serious factors include:
- a) Lack of or limited land available to schools to establish their own woodlots
 - b) Prohibitive cost of land especially in areas of intense land use pressure
 - c) Lack of information by schools about the opportunities available to them to meet their woodlot development needs
 - d) Lack of expertise to appraise the wood fuel needs of each school and the size of land required to grow trees
 - e) The dependence on the marketing/loans officers to provide extension services to schools in woodlot management.
73. Thus, while efforts are being made to improve the supply side by decentralizing the operations of the Karura Forest Station, more attention should be paid to capacity building at the schools level and to finding solutions to the obstacles militating against the schools establishment and maintenance of woodlot. School heads and teachers with responsibility for the management of the woodlots need to be targeted specifically to enhance woodlot management and productivity. Interviews with head teachers in some schools especially in the Mt. Kenya and Rift Valley regions indicate that cost of purchasing land is perhaps the biggest obstacle to the establishment of woodlots. The Mt. Kenya region is densely settled and land use intensity on the uplands is very high. There is really not much free land available for sale and, even where land owners are willing to sell, land costs as much as KSh 1 million per acre. In the Rift Valley where land is more freely available, the cost is still prohibitive, being about KSh500 000 per acre. These high land costs are a disincentive especially to the public schools to the establishment of woodlots. The head teachers are not very hopeful that local communities can come to their aid in helping them acquire land for their woodlots. This is because the lands on which the public schools are sited were donated in the first place by the communities.
74. Efforts aimed at enhancing the capacity of private entrepreneurs in nursery management and to organize and train the tree propagators (Tree Propagators Association) are steps in the right direction. TBPT also has promoted the formation and registration of the Kenya Forest Growers Association for the networking of the thousands of tree growers throughout the country. These private nursery and woodlot operators at the local level may be able to meet the needs of those schools and SMEs that, for one reason or another, are unable to meet their wood fuel needs. They are likely to operate in a more professional and competitive manner than the institutions and so be more efficient and effective at raising tree seedlings and wood fuel as the case may be.
75. It is doubtful also that, as indicated in the Workplan and Budget 2008, the marketing/loans officers are the best equipped to coordinate and provide extension support for the managers of the woodlots. Given the apparent loss of an undetermined proportion of the tree seedlings distributed by TBPT, it might be prudent to bring in more qualified forestry personnel to provide monitoring and extension services to the woodlot managers. These might be more dedicated to the cause of woodlot development than the marketing/loans officers who are more concerned about promoting the improved stoves and the credit scheme.

4.4.3 Outcome 2.3

76. **Strengthening and expanding the finance system is the third primary target under this outcome.** As at the end of June 2008, 463 RTE stoves had been produced and installed in 244 institutions throughout Kenya.
77. The revolving fund has grown from KSh14,018,000 to approximately KSh21,000,000 (growth of approximately KSh7,000,000). Credit allocations for the purchase of stoves commenced with KSh5.8 million in the first quarter of 2007 had grown to KSh22.1 million by June 2008. A correlation of credit allocations and actual sales of stoves by province is shown in Table 3.

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Allocation and Sale of Stoves by Province

| Province | % Credit Allocation to Schools | % Total Sales of Stoves |
|---------------|--------------------------------|-------------------------|
| Rift Valley | 43 | 34 |
| Eastern | 22 | 16 |
| Central | 15 | 18 |
| Western | 8 | 5 |
| Nairobi | 6 | 15 |
| Nyanza | 3 | 5 |
| Coast | 3 | 6 |
| North Eastern | 0 | 1 |

78. For the two top credit recipients of Rift Valley and Eastern Provinces, the proportion of total sales does not match the percentage allocation of funds. By contrast all but one of the lower level recipients of credit facilities did better than expected in the proportion of stoves purchased. The post-election violence might explain the pattern observed for the Rift Valley region. Even as at the time of the visit of the evaluation team, most schools in the region had not returned to normal school operations. Many schools lack the required number of students and little is being collected as school fees. Therefore, the schools are unable to meet their repayment commitments on the stoves they had purchased. This is certainly not good for the revolving loan scheme whose efficacy depends on the ability to collect loan repayments. The marketing/loans officers do not feel safe enough to visit and collect loan repayments in institutions in certain parts of the Rift Valley. Furthermore, they are receiving requests for the improved stoves from institutions in certain locations which are not yet safe to enter.
79. The RETAP representative in Nakuru made an important observation that because of the post-election violence in the region coupled with problems in the global credit system, local banks were no longer granting loans. Apparently, the inflation rate has risen much higher than the bank lending rate and the banks want to avoid accumulating huge debts which was what caused the credit crunch in the United State of America and led to the worldwide slump in the stock markets. The point of all this is to emphasise the vital role that the credit scheme is playing and will continue to play in the spread of the improved wood stoves throughout Kenya.
80. The main source of fund for sustaining the credit scheme is the erratic loan repayment by schools per school term. The concession granted by government to make use of VAT remittances from the sales of the improved stoves sustains the purchase and distribution of tree seedlings. So, efforts must be geared towards identifying and securing additional sources of funding. As at the time of this mid-term evaluation exercise the supply of the improved stoves to institutions and SMEs had virtually grinded to a halt. RETAP and RTE were literally in hiding from the deluge of requests for the stoves and the credit loan scheme. The credit scheme has been very crucial in motivating schools to adopt the improved wood stove. It is at the heart of this project. But, the ability of schools to repay loans regularly has diminished in the last several months as a fallout from the post-election violence and the free education policy. Thus, the credit loan scheme is no longer *evolving* as it should because of liquidity problems. Understandably, RETAP also has refrained from imposing the 1% penalty for default being concerned not to compound the circumstances of the institutions particularly following the post-election debacle.
81. The undertaking by the Ministry of Energy (MoE) to consider a proposal from the PMU for possible funding in support of risk management interventions following the post-election challenges in some regions and the government policy on free secondary education is a welcome short term measure if it yields expected results. But, intervention by the Ministry of Energy would have a more lasting impact

money available in support of RETAP's MFI in order to sustain the credit scheme for the long term. The piecemeal intervention by the MoE in the form of a grant on violence represents is not a viable solution to the funding challenges facing the stove supply chain or the establishment of a micro-finance institution.

82. RETAP has been active in looking for alternative sources of funds to sustain the credit scheme. It has already secured a commitment of about £100, 000 pounds sterling from the ASHDEN TRUST in Britain. But, the donors would not release the money until RETAP can make up the balance required especially to clear up the deficit in the seedlings training budget indicated in the overall budget presented to ASHDEN TRUST. This is one area where the assistance of MoE might be sought to make a substantial allocation to the credit scheme fund from its huge energy development programme budget. According to PMU, the budget deficit that needs to be cleared to unlock the ASHDEN fund is KhS 10 million.
83. RTE has been overwhelmed by the high demand for stoves. Everywhere the evaluation team visited, the popularity of the RTE stoves is loudly and proudly touted by the participating institutions. Among the promoters of the RTE stoves was a school that had patronised some other provider in the past and has now seen the difference. This unanticipated rise in demand is partly responsible for the market immorality discussed earlier. But, more importantly, it calls for a rethink on the modus operandi for granting credit facilities. A possible option is to delay allocation of credit facilities to schools for stoves until after the establishment of woodlots. This strategy might even boost the establishment of woodlots and the tree planting programme discussed above.
84. Finally, under this outcome, one of the mid-term targets was to replicate the business model in at least two other regions. It is highly commendable that, as of June 2008, the business model had been replicated in all 8 regions. This is a significant achievement and milestone in the life of the project.

4.5 Outcome 3:

Sensitized policymakers, financial sector, suppliers and end-users.

85. The project has surpassed in part its target of realising minimum orders of 100 improved stoves from at least four market sectors. Thus far, 463 stoves ordered have been supplied to 244 institutions, under the revolving credit scheme. The PMU is planning to break into a second market sector by focusing on involving the catering SMEs in the revolving credit scheme beginning in 2009.
86. There is no reference to the project outcomes in any government policy papers yet, but references have been made to them in recent speeches by at least one official in the Ministry of Energy. Also, key policy and decision makers in relevant ministries of education, energy and environment have been sensitized on the goals of the project.
87. A baseline study was conducted among school kitchen staff to establish a reference base for determining levels of awareness of the improved energy efficient wood-burning stove in the future.
88. RTE also engaged in vigorous training programme for end users of the stoves as shown in Table 4 below

Table 4: Training of End-Users in Schools in 2008

| Quarter | Number Trained | Description |
|---------|----------------|--|
| 1 | 44 | 37 cooks, 7 head teachers |
| 2 | 63 | 33 cooks, 12 head teachers, 15 teachers, 3 matrons, 1 Board of Directors chair |
| 3 | 231 | 175 cooks, 33 head teachers, 11 teachers, 2 bursars, 5 Secretaries, 5 cateresses |

Structural support to the Project Management Unit

89. All the set targets have been accomplished including all staff recruitment at PMU, expansion and refurbishment of the secretariat, purchase of vehicles, linkages with basic partnerships (TBPT, RTE, MoE), and purchase and operationalization of all ICT facilities.

4.7 Outcome 5:

Learning, Evaluation and Adaptive Management Increased

90. The Project has had a vibrant monitoring and evaluation component. These activities are very necessary first because they help in establishing base line conditions for subsequent monitoring and evaluation exercises. Secondly, they are vital to development of models and parameters for measuring the environmental outcomes of the project including GHG emission reduction rates, biomass growth and carbon sequestration rates of trees, and air quality, among others.
91. Significant accomplishments include
- Determination of the tCO₂ equivalent reduction achieved since the adoption of the stoves
 - Establishment of wood fuel consumption patterns and rates and the factors influencing such patterns throughout the country
 - Determination of the per capita GHG emission reduction and the avoided deforestation following the conversion from traditional to improved stoves by any given school
 - Measurement and determination of tree survival rates
 - Modelling biomass growth and carbon sequestration potential for the eucalyptus tree, the preferred species for woodlots
 - The use of CO and PM₁₀ methods to determine improvements in indoor air quality due to adoption of improved stoves
92. But, the opportunity presented to use the participating institutions to build up a countrywide database on energy consumption is yet to be seriously acted on. The effort by RETAP to use the marketing/loans officers to collect vital data on baseline conditions and subsequent wood consumption levels at each institution did not work out. RETAP tried to motivate the marketing/loans officers for this vital assignment by giving each one of them a free digital camera and a stipend. In spite of its failure with data gathering through the marketing/loans officers, RETAP should not give up on this data collection exercise. It has a chance now to establish a database on wood fuel consumption in institutions which could help in future exercises on wood fuel needs assessment for the nation as a whole and for sections thereof. Therefore, RETAP needs to design a proforma for all participating institutions to keep records of their wood fuel purchases and consumption as well as the tree planting and woodlot management operations. Basic information on the climate, terrain, soils, vegetation of the locality should be indicated also. Some institutions do have weather stations which could provide valuable statistics on weather conditions.
93. There is a problem with weights and measures in the various participating institutions which RETAP should be able to resolve by providing or stipulating appropriate measuring devices and units. During the visits by the evaluation team, schools gave information on their wood fuel purchases and consumption using various crude measures, such as, lorry loads, canter loads, and donkey carts.
94. RETAP has been more successful, however, in getting qualified candidates to carry out research studies into some key areas that have implications for achieving the global objective of the project to reduce GHG emissions. Its own efforts at developing factors to determine CO₂-equivalent reduction levels having been truncated by GEF, RETAP sponsored research by university postgraduate students are beginning to yield results.

and PM₁₀ were measured in sample school kitchens with and without improved stoves. This study was conducted by a project intern, Emmanuel C. Mwangi, a Chemistry student at the University of Nairobi, soon to be awarded a MSc (Environmental Chemistry) by the University. This data will aid the PMU in preparing awareness raising/training materials as well as improved stove marketing brochures. The PMU cover part of the costs of the intern's travel and subsistence for 30 days.

96. In his MSc. Dissertation titled *Investigating the Impact of Improved Cookstoves in Kenyan Schools on PM₁₀, CO, CO₂, CH₄, and N₂O Levels*, Ngeywo (2008) compared emissions of suspended <10µm diameter (PM₁₀) and CO from traditional stoves and improved institutional stoves in 22 primary and secondary boarding schools in Kenya. His analysis showed that the improved RTE stoves significantly reduced the 24-hour mean daily concentrations of PM₁₀ by 68% and of CO by 75%. Improved institutional stoves required 44% less wood fuel to complete the same cooking task as the traditional stoves. The fuel wood correction factor and the greenhouse gases emitted were also determined. The main findings of the study are tabulated and presented in Appendix IV.
97. The study by Ngeywo (2008) shows that the prospects are good for achieving the global objective of this project to reduce GHG emissions and avoid deforestation (see Table 4.13 in Appendix IV). To avoid deforestation, however, requires greater effort in the establishment of eucalyptus tree plantations to provide the wood fuel needs of the nation (see Table 5.5 in Appendix IV). For instance Ngeywo projected that by 2011 if all schools in Kenya were to adopt the improved stoves, they would consume over 3.36 million hectares of eucalyptus plantations per year to meet their wood fuel needs. This further emphasises the importance of promoting woodlot establishment.
98. GEF-SGP (2001-2004) post-project challenges were identified through an audit commissioned by the PMU in May 2007. The current GEF Biomass Energy Project is scaling up activities under the GEF-SGP that was implemented in 20 Mt Kenya schools between 2001 and 2004. The findings of this audit are critical in designing a sustainability strategy for the MSP. The PMU engaged an intern, Alex Njuguna Waithera, to carry out the audit as a project for his MSc (Environmental Management) degree at the University of Auckland, New Zealand. He is under joint supervision of the National Technical Officer (NTO) and a professor at the University of Auckland.
99. Models for estimating biomass and carbon stocks of eucalyptus woodlots in Eastern and Central Kenya have been developed using data collected from woodlots established in the 20 schools in Mt Kenya area participating in the GEF-SGP. These models will be used in the annual quantification of climate change benefits accruing from woodlots established in schools in the Mt Kenya area: Came up with a biomass growth model. An intern on the project, Robert Mugabe, will be awarded his MPhil (Forest Econ & Management) of Moi University, having achieved this under joint supervision of the NTO and Dr DO Ogweno of the Dept of Forestry, Moi University.

4.8 Budget Performance

100. All outcomes executed thus far have yielded positive budget performances as shown in Table 5. This suggests that many activities still remain to be done or accomplished. This is particularly true of Outcomes 3 and 5 where the proportion of the budget allocation utilized is below 25%. Many activities under these outcomes are billed for the future. With reference to Outcome 2, the disruption caused by the post-election violence as well as the near demobilization of the revolving loan scheme did not appear to have greatly hindered project activities given the high budget performance (about 83%).

| | Outcome | | | |
|---|-------------------|------------|------------|---------------|
| | Expenditure (KSh) | | | |
| | Budgeted | Actual | Variance | % Performance |
| 1 | 720,000 | 391,430 | +328,570 | 54.4 |
| 2 | 34,408,800 | 28,441,605 | +5,967,195 | 82.7 |
| 3 | 1,807,500 | 280,500 | +1,527,000 | 15.5 |
| 4 | 10,656,000 | 8,242,091 | +2,413,909 | 77.3 |
| 5 | 72,000 | 15,000 | +57,000 | 20.8 |

101. However, these positive budget performances have hidden deficits as seen in the performance tracking 2008 tabulated in Table 6B in Appendix III B. These hidden deficits are in the form of:

- a) Activities not envisaged or carried out without budget provision accounted for KSh385,265.00 (or about 3.7% of total expenditure so far)
- b) Activities which overshot their budgets, some by very wide margins

These deficits create problems for the future because those activities which are yet to be undertaken may face shortage of funds in the future. RETAP must find ways of making up those deficits. Already, approximately 84% of the budgeted sum of over KSh12 million has been spent and there is still a lot to do. Workshops, meetings and training sessions are the activities most guilty of cost overruns. Perhaps, the budget for these activities should be more carefully considered in the future. It may be necessary to make trainees responsible for some of the expenses of the training sessions.

102. It is important to note, however, that some activities were undertaken that did not seem to have incurred any expenditure. These are mainly activities related to fund raising and development of concept papers. It may well be that these activities are being done in-house by PMU personnel and the costs are subsumed in the office running expenses.

103. The performance tracking indicates that much has been achieved on Outcomes 1 and 2 while accomplishments on Outcomes 3-5 have been modest.

5.0 Evaluations Based on the Terms of Reference

104. In the following discussion, we shall address the specific tasks itemised in the TOR for this study and further highlight key issues that would provide the basis for the recommendations emanating out of this mid-term review exercise

5.1 Project's Environmental Objectives

105. Part of the overall objective of the mid-term evaluation is to review progress towards the project's objectives and outputs. More specifically, the evaluation is to assess progress towards attaining the project's environmental objectives and outcomes.

106. This project has made the institutions and SMEs its focal points and this has probably made it easier to introduce this innovation to the country. The project is having the desired impact on the local people and households who now aspire to have the improved wood stoves.

institutions and SMEs has led to a slight mismatch with the GHG emissions and avoiding deforestation. The institutions and SMEs are not the primary users of wood fuel. In fact not all of them were wood fuel users in the traditional mould prior to adoption of the improved wood stove. Rather many, particularly in the urban locations, are users of electricity, diesel, paraffin and liquefied gas. Current calculations of deforestation avoided by the use of the improved stove must be tenuous in a way since a proportion of the institutions were not in any way burning wood or causing any deforestation in the first place.

108. At this early stage in the life of the project, it is doubtful that it has made that much of a positive impact by way of slowing down the rate of deforestation. The institutions' woodlots are still too young to provide their wood fuel needs. Most users of the improved stove still obtain their wood fuel from traditional sources of supply. They are patronising informal sector wood fuel suppliers who, in turn, are busy buying up trees from land owners and farmers and felling them to meet the demand for wood fuel. The project would begin to have the expected positive impact on deforestation only when the planted trees are mature enough to be harvested and most institutions no longer patronise the informal sector wood fuel suppliers.
109. For purposes of meeting its environmental objectives, and for other reasons, the project will have to make wood lot development by institutions and other parties a focal point of attention in the remaining time available in its life span. The woodlots would increase the forest cover and relieve the pressure of wood fuel exploitation on the natural forests and farmlands. The wood lots developed in association with this project also have the potential for use in generating funds through carbon credit trading in the voluntary markets. Then would the project truly have the desired impact of mitigating deforestation.
110. The real users of wood fuel and so the people making the most impact on the forest estate as at now are those at the grassroots level. It would seem therefore that this project would not have achieved its laudable goal until the innovation has been diffused to people and households at the grassroots level. The present project targeted at institutions and SMEs is serving as a demonstration pilot project to establish the infrastructure, the policy instruments, and the business model for the real task ahead of getting the improved stove to the people who are really making the most impact on the major concerns of the on-going project. It can be seen also as an awareness and promotional campaign to demonstrate to the people at the grassroots level what they stand to gain by adopting this improved wood-burning stove.
111. Indeed, the original conception of the introduction of the improved wood-burning stoves was to target people and households at the grassroots level and to introduce technologies that are based on the use of readily available local low-cost raw materials and that are simple enough to be implemented by the local people themselves. It was meant to address the problem of deforestation while at the same time being conscious of the need for poverty alleviation at the grassroots level. In some other countries in Africa (e.g. Botswana, Nigeria), the efficient wood-burning clay stove was introduced and these are easily moulded by the traditional women potters. But, because the clay stove cannot withstand some of the more rigorous traditional food preparation processes, the local people on their own had converted to the use of metals to construct their own wood fuel efficient stoves.
112. It would be worthwhile for this GEF project to commission a study to examine the conditions and modalities for extending to households and communities the present business model targeted at institutions and SMEs. The roles of the structures being established, such as, KEISA, Tree Propagators Association and Tree Growers Association, in this future process of diffusing the improved wood burning stove to the grassroots would be worth exploring in such a study.
113. By contrast, the project is meeting its environmental objectives in respect of the improved stoves. From all the interviews held with users in the schools and businesses, the advantages of the improved stove are not in doubt. Those commonly mentioned advantages include
- a) Greatly reduced cost of energy in the operations of the institutions and businesses.

experienced a 50% reduction in its overall energy bill in the first year after installing the improved stove

- c) A school reduced its wood fuel costs bill from KSh80 000 to KSh20 000 per year
 - d) The kitchen staff are less stressed than before; they value most the fact that there is little or no smoke to bother them as they prepare meals
 - e) School head teachers claim they no longer have to micro-manage the kitchen staff and activities and so have more time to devote to their normal duties.
 - f) One school head affirmed that the woodlot planted on the school compound has ameliorated the microclimate around the school.
 - g) The woodlots also have aesthetic value
 - h) The stove requires less labour for the same tasks undertaken under the old system based on fossil fuels and/or charcoal pots.
 - i) Food prepared on the improved stove cooks faster and more thoroughly and is tastier than in the old system
 - j) Head teachers now spend less on transportation as the wood fuel is supplied perhaps once a term unlike in the past when schools had to go almost on a weekly or even daily basis in search of gas, charcoal or even wood fuel,
114. The overall effect of these benefits is less consumption of wood fuel, which translates to less deforestation, and less carbon emissions.

5.2 Project Activities, Roles and Responsibilities

5.2.1 Renewable Energy Technology Assistance Programme (RETAP)

115. RETAP is playing its role as the project management unit. It has been very successful in coordinating the activities of its partners, especially, RTE, TBPT and the Consultants. It is also in touch with the new associations being formed and its major informal sector partner, the Kenya National Federation of Jua Kali Associations. It has kept in touch with schools and the general public through the field days staged in different locations to publicise the improved wood stove, the fast growing tree seedlings and the credit loan scheme.
116. RETAP has succeeded very well in implementing the revolving credit loan scheme and is well on the way to upgrading it into a viable microfinance institution (MFI). But, the credit scheme has been overwhelmed by the unanticipated increase in demand both from the focal institutions and SMEs and the local people and households. There is an urgent need to increase the funds available for the credit scheme if the project is to be able to meet the demand that it has generated by its huge success. Failure to satisfy the demand will only give room for the so-called 'market immorality' to fester and grow. Adulteration of the RTE improved stove is common and there are schools that have fallen victim of such adulterated stoves.

5.2.2 Rural Technology Enterprises (RTE)

117. RTE has succeeded in fabricating, marketing and installing the improved stoves. RTE also has done a good job training the institutions on the use and care of the stoves. However, virtually all the schools that have adopted the improved stove complained about the high cost of the stoves. While some schools have been able to cope with the two-year repayment period, others are apprehensive especially in view of the government policy on free education which has reduced subvention to schools and in view of the inability of poor parents to meet up with their contributions. Since the introduction of the free education system, subventions to schools have been irregular and always short of the needs of the schools.
118. The RTE improved wood stove is superior to any other in the market. Institutions, SMEs and individuals who have enjoyed its benefits would not exchange it for any other. Its superiority lies

used in its fabrication and also in certain structural features. The high quality materials comprise stainless steel, vermiculite, and the cost of the RTE stove is due primarily to these high quality materials used in its fabrication and indications are that both RETAP and RTE are not willing to compromise on this. Adulterators are using lower quality materials and under-selling the RTE products. But, a number of customers have paid dearly for their wrong choices,

119. Still, it is important to seek ways of reducing the unit costs of the RTE products. But, this is one problem that does not appear to have a ready solution. The decision to make a 20% reduction of the cost of the stoves a target for the project was based on the assumption that materials would be purchased in bulk. Unfortunately, since that decision was taken the price of steel has risen sharply: whereas at the beginning of this project steel was sold at KSh3000 per sheet, the cost has more than doubled to KSh6700 per sheet. According to RTE, the material cost of a single stove is of the order of KSh30,000. This is a steep cost in the face of very limited funds. The project had set a target of 3500 stoves to be produced while the amount of money available so far to fabricate them is only US\$200,000 which is KSh14 million. This amount would only purchase materials for roughly 466 stoves at the rate of KSh30,000 per unit. Yet, now, much of this money is held up in the schools many of which do not make regular repayments.
120. Furthermore, the current production capacity of RTE may not be enough to meet the likely escalation in demand if there is a change in the fortunes of the credit scheme. A combination of high costs and inadequate supply might still drive many cash strapped institutions to patronize stoves of lower quality, which would be most undesirable. Presently, RTE makes the improved stoves at a workplace in Rongai outside Nairobi. The production system, though mechanized somewhat, is still very much in the mould of the labour-intensive informal sector (Jua Kali) system. With its normal workforce of 23-25, the RTE yard can only produce 60 of its stoves in a month or 720 in a year. But, the number can be increased to 200 per month and 2400 per year with more adequate supply of materials and an augmented workforce of 35. Erratic electric power supply and shortage of stainless steel are major constraints on the production process.
121. There is need for RTE to invest more in upgrading its production system and workplace by doing the following:
 - a) Build a proper factory for the manufacture of the wood stoves ensuring proper lay out of the manufacturing process and a clean work environment
 - b) It is important to take into account the new labour laws in the country which lay emphasis on occupational safety issues and insurance schemes for workers
 - c) Install more machinery and equipment to fully automate the key processes in the fabrication of the wood stoves and other products to increase output and ensure greater standardization of products
 - d) Mass produce the products in order to reduce production costs per unit
 - e) RTE might consider installing its own generator to augment electricity supply from municipal sources.
 - f) Contract out the supply of some of the key raw materials

5.2.3 Tree Biotechnology Programme Trust (TBPT)

122. RETAP has organised seminars and workshops for managers of woodlots. The training sessions, which invariably are run by the Tree Biotechnology Programme Trust (TBPT), have two components, theory and hands-on practical sessions. In the hands-on practical sessions participants go through the entire of process of cutting and planting tree shoots until rooting stage. The results of their efforts are communicated back to the participants long after the training sessions have ended so that they know how many of their cuttings made it to rooting stage. Participants at these training workshops confirmed that the training sessions were most beneficial to them. Also, gradually, there is developing a system of networking among the schools using the stoves. This networking is still rudimentary and is based on the personal initiatives of individual participants at the training workshops. Information

disseminated to others by participants of the training workshops. It is necessary to formalise this growing network of institutions using the RTE approach through the formation of associations of focal school clubs and of teachers/woodlot

managers.

123. Establishment of woodlots owned and managed by the institutions and the private sector is the second pivot on which this project stands. As noted above, RETAP and TBPT have done a lot to facilitate the process through:
- Free supply of seedlings of fast-growing eucalyptus trees, a hybrid of *Eucalyptus grandis* and *Eucalyptus camaldulensis*
 - Training of teachers/managers of the school wood lots
 - Sensitization and training of private entrepreneurs in both tree nursery and tree growing operations

5.2.4 Failures in School Woodlot Establishment

124. But, mistakes have been made along the way. The problems that institutions might face in finding/acquiring land for the woodlots did not appear to have been anticipated or treated with the seriousness it deserved. Indeed, unlike in the earlier NGO-led small grants project in the Mt. Kenya region, planting of a woodlot with at least 500 seedlings was not made a pre-condition for schools to be eligible for the credit scheme on the improved stoves. While this pre-condition is not being recommended at this time, the point helps to draw attention to the probably unintended and inadvertent neglect of this component of the project. Undue reliance on the marketing/loans officers to provide extension services to schools in the establishment and management of woodlots is the bane of the school woodlot establishment program. Not a single institution visited had done any appraisal to determine its wood fuel needs and make projections into the future so that it can determine what size of woodlot it would need to establish in order to sustain the use of the wood stove. It was clear from the head teachers interviewed that RTE sales representatives did not adequately explain to the institutions the implications of the adoption of the stoves for the establishment and management of woodlots.
125. TBPT that raises the seedlings should play a more proactive role in the management of the woodlots. It is better placed to help schools plan for the establishment of their woodlots and ensure higher survival rates. A group of qualified personnel should be recruited and placed under the supervision of TBPT who would serve as forestry extension officers and provide much needed support to schools and other entrepreneurs in woodlot planning, management and monitoring. The scope of the training provided by TBPT and of its involvement with the school woodlot management needs to be expanded such that institutions can be helped to determine how much land they would need to plant to trees and the planting schedule in relation to the projected harvest cycle based on wood consumption rates.
126. Also getting the schools to follow simple guidelines on the storage of their wood fuel has proved difficult. Most schools visited kept their wood fuel in the open. Also, many still use wood fuel that is not completely dry and so generate more smoke and tannin than necessary. Some schools still do not cut or split the wood into appropriate sizes for feeding into the wood burning stoves. An assortment of materials (planks, poles, twigs) is used as wood fuel by some schools pointing to the difficulty of getting adequate wood fuel supplies.

5.2.5 Tree Seedling Transportation

127. The visits by the evaluation team to different institutions in the central, Mt. Kenya and Rift Valley regions also highlighted the challenge of distributing seedlings to the institutions. Some schools are in isolated locations with poor access roads. Some of the roads are almost impassable during the rains. Only special types of trucks with the required traction can move relatively easily on these roads. The use of SUV vehicles fitted with a trailer is not the ideal mode of transportation in such difficult environments. The project should endeavour to purchase larger vehicles capable of travelling such difficult terrains and carrying greater numbers of seedlings than what the trailer carries at the moment. The transportation of tree seedlings and improved stoves appears to have been an

the PMU for long judging from the project monitoring records. The solution for the future by utilizing some of its client nursery in provincial locations. The creation of regional centres of TBPT operations is also a way of bridging the distance between seedling suppliers and the institutions.

5.2.6 The Participating Institutions

128. But, after all that we have noted above about the performance of the institutions, the point must be made, however, that participating institutions in the improved wood stove project represent a very mixed bag. In the first place, there is a clear demarcation between the schools and SMEs. The SMEs operate at a higher scale and are more businesslike in their approach to the development of woodlots. The catering SME visited is backed by thousands of hectares of woodlots which had been established fortuitously long before the adoption of the improved stove. Even, now, that wood is not yet being obtained from the eucalyptus plantations, the catering SME is ensuring regular supply of wood by stockpiling wood fuel from the informal sector suppliers and timber dealers. Secondly, there is a clear difference between the public and privately-owned schools, particularly in and around the major urban locations. The privately-owned schools are more motivated in embracing the improved stove and are more purposeful and decisive in developing their own woodlots. In most cases they have sought for land outside the school environs to establish woodlots that would meet their future needs. The public schools are generally more handicapped by shortage of funds, irregular release of government subventions and inability of parents to pay the school fees of their children promptly.
129. But, there are differences also between the public schools. Public schools, particularly in the Mt. Kenya region, are performing much better than those in the Nairobi region. The Mt. Kenya region was the focus of the small grants NGO-led project a little less than a decade ago. So, the project has had a longer period of gestation and impact. There are committed and enterprising school heads and teachers actively pursuing the development of woodlots and disseminating information about the improved wood stoves. In one of the schools, at Ukuru, the trees planted in 2001 are now mature and have grown very big. Four of the trees which had to be felled recently to make way for some physical development were cut in pieces to provide wood fuel. The wood harvest was a full 7-ton lorry load! This is very encouraging as it is now possible for the school to determine the wood fuel yield of its plantation and relate this to its wood consumption level and rate.

5.2.7 Competition for Woodlot Products

130. However, with the success story of woodlots in some regions has emerged a very critical issue. There is competition for the products of the woodlots from uses other than wood fuel. The eucalyptus trees make good electric poles, fencing poles and props for use in construction activities. The schools are under pressure to sell the mature trees; indeed in the Mt. Kenya region there are unscrupulous middle men trying to buy cheap from the schools and re-sell to the electric companies. But, the schools are wise to their antics and would rather deal directly with the end users. But, the issue that this has thrown up is demonstrated in one of the schools where the head teacher confessed they would sell some of the trees in order to meet certain needs. If public schools in particular remain forever strapped of funds, they would be forced to sell the products of their woodlots rather than use them for the purpose for which the woodlots were established. Schools with large enough woodlots might be able to balance the sale of trees and their use for wood fuel, but it is quite possible that dire economic circumstances might force some to go all out for the sale of the trees. It is also possible that some head teachers might opt to sell even where there is no pressing financial reason to do so.
131. Schools that sell their woodlot harvest would continue to patronise informal sector suppliers of wood fuel. These informal sector wood fuel suppliers would only exacerbate the problem of deforestation and so defeat the goal of this laudable improved stove project. This project needs to give closer attention to the establishment and management of the school woodlots particularly in public institutions. It is most important that the schools be given greater technical and financial support in order that the goals of this project might be fully realised and sustained.

5.2.8 Urban Schools and Woodlot Establishment

132. Public schools under the recently introduced free education system depend totally on the goodwill and cooperation of the parents to keep the improved wood stoves installed running. The head

ents/Teachers Associations and the school boards to garner varied with the drive and initiative of each head teacher. A is going about implementation of the project in an *ad hoc* manner tackling every issue that arises with each passing day. Being in a metropolis, the school has to deal with the planning and development control regulations in place. For example, no tree can be felled without the permission of the city council; also the head teacher had to consult the city council before beginning to plant the tree seedlings on the school compound. The total area of the school is 4.68 acres; there is not much space left outside the built-up areas and the sports ground, to establish a viable woodlot. Yet, the school does not see itself establishing a woodlot elsewhere outside the school compound. Public schools such as this represent a weak link in the entire project and would require the special consideration of the PMU and PSC.

5.2.9 Woodlots and Biodiversity

133. Finally, it is worth mentioning that, in at least one location, the establishment of woodlots is already having the desired impact on biodiversity. At Juja, the evaluation team saw monkeys and squirrels roaming around in the woodlots.

5.2.10 Forest Action Network (FAN) and Options for Woodlot Establishment

134. Discussions with Forest Action Network, a partner in the GEF project and a member of the PSC, showed that the major problem of schools in acquiring land for woodlots is lack of information. Consequently, FAN has given an undertaking to link up RETAP/TBPT with the work it is doing with local authorities and schools - part of which is to create woodlots. FAN deals with farmers and forest adjacent communities. There are many options open to institutions everywhere:

- a) FAN leases land from farmers to plant trees. There is no payment for the land; rather a proportion of the trees planted belong to the farmer. Schools can do the same.
- b) Schools or communities can join hands to lease land from Kenya Forest Service for tree planting. KFS still has forests with space for tree planting. For instance, it has up to 5000 ha in the Mt. Kenya, North Rift Valley and Mau regions.
- c) Local Authorities also have land that schools can lease at low rates. Some authorities might even be willing to give out some land.
- d) Schools without land or woodlots can patronize FAN woodlots
- e) There are woodlot owners willing to transfer their woodlots to schools on sale (not the land but the wood only).
- f) A study in western Kenya showed that there are microfinance institutions willing to support school woodlot development but they are afraid of the irregular loan repayment by schools.
- g) FAN is trying to persuade the micro-finance institutions to tailor the repayments to the peculiarities of the school calendar where most fees are collected during the first term
- h) Local governments and Roads Department now allow tree planting on road reserves along some highways. The road reserves are p to 90m wide in some places.
- i) There are community foresters associations that local schools without land or woodlots can patronize. Community Forest Associations (CFA) are grassroots institutions provided for in the Forest Act, 2005. They can engage in the management of both State and Local Authority forests upon request and consideration in the management of forests following formal application to the Director of Kenya Forest Service.

135. Given the above information, RETAP may not insist that every school must have its own woodlot. But, RETAP must work with the schools to identify possible options available in each school district. RETAP should encourage communities and local authorities to develop woodlots for the joint benefit of all schools in a community. Extension officers operating under the guidance of TBPT would be of great advantage in implementing this phase in the project's woodlot establishment and management

to note also that some of the options listed above have legal
action at the executive level of Government.

5.3 Balance Between Technical Product and Mainstreaming Process

136. In spite of the great strides that have been made by the different units, the GEF Biomass Transformation Project still has much of the features of a pilot project. But the project is growing in impact and geographical spread. All the participating institutions and the one catering SME visited cannot see themselves going back on the use of the improved wood stove. To that extent, the project is well on the way to being entrenched in the fabric of society. But, there are certain missing links which need to be tackled before the ~~mainstreaming~~ process can be said to be effective:

- The MFI tagged RETAP Green Capital is critical to the long term sustainability of the whole project. Therefore its planned up scaling and establishment as the sole MFI for all renewable and biomass energy in Kenya would be a significant milestone in the mainstreaming process. Currently, the funding limitations to which it is subjected and the limited support from local financial sources and institutions detract from the mainstreaming process
- Involvement of the public sector as represented by the various government departments is still too narrow and limited to tilt the balance in favour of mainstreaming. Thus far, the public sector has been active primarily in the formulation of enabling policies and regulations. This in itself is important to the mainstreaming process. But, the various government departments can play more pro-active roles in different areas especially to enhance the ability of public schools to take full advantage of the innovation. As indicated earlier, the MoE can and should contribute to raising the capital base of the current credit scheme as well as the MFI. The ministries of environment and agriculture (forestry) might be able to enhance the ability of public schools to establish and manage woodlots. The Ministry of Industry might be able to contribute to efforts aimed at reducing the costs of the improved wood stoves and related products so that they would become more affordable to institutions and SMEs.
- The public schools altogether still constitute a major weak link in the mainstreaming process. Almost everyone appreciates the immense value of the improved stoves but not all can afford the high cost of the high quality RTE stoves. Helping the public schools in this vital area is a major challenge facing the mainstreaming process. The Ministry of Education can help the schools by coming up with a bold policy decision to the effect that all schools shall be energy efficient within a certain time period. This might make it easier for donors, CDF and others to help schools to be able to subscribe to RETAP Green Capital and the improved stove. The Ministry of Education could also motivate schools to pursue energy efficiency more seriously by including it in the performance management contracts of head teachers. Such policy pronouncements might redress some of the adverse consequences of the free education policy
- Woodlots for fuel wood that would greatly reduce the pressure on the remaining natural forest areas are a key component of the project. Many factors that constrain the schools from developing and managing woodlots on a sustainable basis have been highlighted and need to be tackled.
- Finally, the policy documents and the biomass energy regulations and guidelines being formulated must be approved and gazetted by government before the mainstreaming process can be said to have been markedly accomplished.
- The innovation of improved wood stove and the business model that is its main support have generated much interest at the grassroots level. The overall goal of this project of reducing GHG emissions and avoiding deforestation cannot be fully achieved without considering the interests of the grassroots population. This excluded sector of the population is potential bedrock of the market irregularities currently plaguing the RTE improved stove project. It is also responsible for much of the indiscriminate and uncontrolled exploitation causing so much deforestation

credit scheme should continue as a private sector business venture. It should not be downgraded to a public sector venture. Facilitate the evolution of RETAP Green Capital as planned and get banking and financial institutions to become stakeholders in it. The Ministry of Energy that has the responsibility for developing the energy strategy for the country is in the best position to act as catalyst for the proper establishment and institutionalization of this business model and its associated MFI.

138. With the level of rapport and cooperation that the Ministry of Energy has achieved in bringing together other ministries and government agencies to formulate strategies on biomass energy, it can safely be concluded that its mandate in the energy sector is firmly established. Therefore, it is the department best placed and equipped to replicate the business model developed for this GEF project and sustain the outcomes and benefits far into the future.

5.4 Level of Public Involvement

139. The milestones that have been attained in regard to activities under *Outcome 1: Supportive policies and legal framework for sustainable biomass energy businesses developed and strengthened* are a measure of public sector involvement in this GEF project. The ability of MoE to work in partnership with relevant other departments and develop draft policy documents and legal instruments for consideration by the legislature and executive branch is a major accomplishment. MoE also has actively co-chaired the PSC participating fully in its meetings and in the decision making process. However, the ultimate test of the efficacy of this public involvement is yet to come when it can successfully have the policy and strategy documents approved and gazetted by the Government of Kenya.
140. The challenge for both MoE and the legislature is to ensure that biomass energy does not get lost in the legislative process by an undue focus and attention to more conventional energy sources such as petroleum, thermal and hydro electric power. The ministries of environment and agriculture (forestry) would be required to provide the required balance in official focus on the different forms of energy: concern for biodiversity degradation should be strong enough to ensure a just balance of attention to the biomass energy sector in public affairs.
141. Public involvement in the project needs to be scaled upward in view of the points made earlier in regard to the credit scheme, the MFI, the cost of the RTE stoves and the challenges facing the public schools in particular in the establishment and management of woodlots. The Ministry of Energy, a major stakeholder and co-chair of the PSC, has a huge budget on energy development for the country as a whole. It should be able to augment in the short run funds for the revolving credit scheme and in the long run the capital base of the fledgling microfinance institution which has the potential to make an impact in all areas of renewable energy development in Kenya in the foreseeable future. The Ministry of Energy, itself says it recognizes the critical importance of removing financial barriers to the adoption of biomass energy and particularly the improved wood burning stove. It also proposes to promote microfinance institutions to operate more effectively in the sector. The Energy Act even allows the MoE to aid private sector initiatives, giving financial incentives for any investment made to install additional capital investments to improve energy efficiency.
142. The least that the MoE in collaboration with the other major stakeholder and partner, UNDP CO could do for a start is to ensure that RETAP is able to receive the L100 000 pounds sterling offered to it by the ASHDEN TRUST on condition that it clears the deficit in the credit scheme account.

5.5 Efforts of UNDP in Support of Implementing Agencies and National Institutions

143. The UNDP oversees the project as a whole and acts as a kind of catalyst for ensuring that all the disparate stakeholders work together harmoniously for the benefit of the project implementation process. Its specific role is that of assurance to ensure that the project is running smoothly and on

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deals with teething problems and, wherever necessary, makes
mentation process.

144. The UNDP CO looks at the quarterly and other progress or survey reports and holds extensive consultations with all the relevant stakeholders and project implementing units. There is a monitoring and evaluation (M&E) office that monitors UNDP schedules and manages programme finances. In line with UNDP policy, there is country focal point . an officer . for M&E. Project monitoring and evaluation is no longer done on an ad hoc basis. There is now a document on UNDP Guidelines for Evaluators as well as a checklist for evaluators. At the end of the year, there is always a Project Appraisal and Implementation Report (PAIR) which is circulated to relevant stakeholders including the Regional Technical Adviser in Pretoria for assessment, comments and recommendations. The Annual report focuses on risks to the project and how they are being handled. The objective is basically to re-evaluate the project objectives for comprehensiveness, adequacy and proper targeting of the real issues.
145. The UNDP CO also helps with policy briefs and formulation of strategies, for example, on biofuel, and manages and promotes the public involvement sector of the project implementation process. Also, it oversees and assesses the PMU for efficiency and effectiveness. It carries out an audit of its activities
146. With specific reference to the GEF project on removing market barriers to the highly efficient biomass stoves, UNDP developed rapport and a working relationship with MoE, especially people at the level of directors. The Government, as represented by officials from the ministries, was suspicious of NGO component and had the project documents thoroughly scrutinized before becoming part of the project. Now, through the mediatory role of UNDP, Government now feels it is part of the project. The Government team has a whole component (Outcome 1) to work on with the inclusion of a policy component in the project. In spite of some problems related to the turnover of officers in MoE, the relationship with Government has yielded results. The project was invited to the National Energy Conference and there is now a Desk for Biomass Fuel in the ministry. This GEF project is gradually influencing government policy.
147. UNDP continues to support and facilitate country initiatives on energy utilization and efficiency issues from the point of view of both conventional electrical appliances and biomass fuel. Many lessons on natural resource management and climate change are being carried to UNDP's country planning project with emphasis on establishing standards for clean energy development.
148. It is the opinion of the PMU that UNDP has discharged its obligations to the project creditably. Still, in line with UNDP's practice of focusing on risks to the smooth running of the project, it is expedient that UNDP now target the following areas for special study or consideration in order to proffer appropriate solutions:
- the modalities for extending the project to cover other categories of potential adopters of the improved wood stove, with particular reference to households and people at the grassroots level who pose the greatest threat to the sustenance of the forests and biodiversity
 - the peculiar challenges faced by public schools in general, schools in urban locations and schools in areas of intense land use pressure in owning and managing woodlots
 - mobilizing the relevant government departments and the Kenya Bureau of Standards to regulate the manufacture and sale of improved wood burning stoves by developing the much needed trade standards
 - moving forward the ongoing involvement of government departments from the concentration on policy and regulatory issues to the consideration of more economic and financial matters particularly the all important issue of building up the capital base of the MFI
 - greater involvement of the private sector, particular financial institutions and industry, in the MFI.
149. The UNDP CO which oversees the project and co-chairs the PSC has access to and controls many donor funds on biomass energy, charcoal fuel, climate change, and biodiversity conservation,

at the funding for the credit scheme. Stakeholders and major themselves more to holding the forte for RETAP Green Capital or the duration of GEF project.

5.6 Extent to which Project is Reaching Intended Beneficiaries

150. The first two years of the project appear to have focused primarily on schools. For historical reasons, there is still an acute regional imbalance in the distribution of the improved stoves. Mt. Kenya and Rift Valley areas, which were the focus of the earlier NGO-led project, have more beneficiaries than other parts of the country. But, even in these areas, there is a huge level of demand that has not been satisfied. We have highlighted before the upsurge in the demand for the stoves among schools.
151. There has not been the same level of attention devoted to the other intended beneficiaries, that is, hospitals and SMEs. But, there is already a plan to pursue the SME targets beginning in 2009. This would be a most desirable development because indications are that these other targets might put less pressure on the credit schemes than the schools. The catering SME visited paid for the stoves in three instalments; this is very good for a revolving loan scheme.
152. The opinion of the catering SME is that the improved wood stove is technically easy to use and manage. However, any smaller enterprise aspiring to own and operate the stoves would need financial support because they would need from KSh 400 000 to KSh 1 million to set up. But, once set up, the catering SME reckons that investment costs on the improved stoves can be recouped in one year of good business.
153. Regular and uninterrupted supply of wood fuel is vital to the running of SMEs. Therefore, the establishment of woodlots would be important ultimately to the operations of the businesses. But it is quite possible for an SME to source for its wood fuels from commercially run tree plantations and still make a profit. It is quite conceivable that such SMEs would provide markets for businesses that decide to specialise in growing wood fuel for commercial purposes.
154. Hospitals are a different matter: many of them could face the same challenges as the schools. Again one might expect a dichotomy between private and public health institutions with the former have an advantage over the latter.
155. As emphasised by the catering SME visited, much more than the schools, SMEs would need to do appraisals before they establish their woodlots and they would need to manage the woodlots more professionally in order to ensure regular wood supply and to make profit.

5.7 Sustainability and Replicability of Outcomes/Benefits after Expiration of GEF Project

156. Many components and stakeholders are critical to its sustainability after the expiration of the GEF project. RETAP is establishing structures that, hopefully, would sustain the system in the long term. These include
- RETAP Green Capital microfinance institution
 - Kenya Improved Stove Association (KEISA)
 - Kenya Tree Growers Association
 - Tree Propagators Association
 - Network of School Clubs
 - Teachers/Woodlot Managers Network

... of a private sector microfinance institution that would continue to operate the credit scheme and business model in place after the expiration of the GEF project. RETAP itself will disengage from the project and continue to operate as an NGO. The MFI is not yet on firm grounds because of its uncertain capital base. It needs a substantial infusion of funds to be able to adequately support this initiative in the future. Efforts aimed at raising funds from international donor organizations are steps in the right direction but it is clear from the example of ASHDEN TRUST referred to above, that funds will also have to be sourced locally to provide the necessary matching grants to the funds from donor organizations.

158. The Ministry of Energy, a key partner and stakeholder in the GEF project also recognises the critical importance of removing financial barriers to the adoption of the biomass energy and particularly the improved wood burning stove. It proposes to promote microfinance institutions by mobilising SMEs into investing in them and by formulating the required regulatory framework for the microfinance institutions. This GEF project should pursue vigorously the possibility of getting the MoE to contribute to building up the capital base for the take off of RETAP Green Capital. The Energy Act allows the MoE to aid even private sector initiative, giving financial incentives for any investment made to install additional capital investments to improve energy efficiency. MoE further plans to organize stakeholders meetings for financial institutions in order to sensitize them to the opportunities available in the renewable energy sector and encourage them to come up with proposals for meaningful investments in the sector.

159. MoE itself recommends the scaling up of the GEF project for the future through linkage with the Kenya energy sector and environment programme and its various subsectors. It intends to bring together financing for renewable energy resources including biomass, wind, solar and biogas. It believes in working together with microfinance institutions to enhance credit schemes to cover all of the energy subsectors. Sponsors can be brought in to support the structures already in place and government can motivate these structures by creating competition between different associations and organizations.

160. The consultant working on the RETAP Green Capital has many novel ideas about how to build up its capital base. It is not advisable to reveal these ideas at this point in time. But, there is agreement on:

- a) the need for RETAP Green Capital to break out of the narrow confines of dealing with improved wood stove and wood fuel and diversify into other areas of renewable energy.
- b) RETAP Green Capital needs to develop project proposals in different areas of renewable energy which can attract investors, donor funds and free capital from sponsors willing to stake their resources in the energy sector.
- c) The project needs to explore the potential for making money through carbon credits based on the improved stoves and institutions woodlots

161. Opinion is divided as to whether the project can actually make money through carbon credits based on the improved stoves and the institutional woodlots. The woodlots are so small and widely scattered throughout the country that some kind of bundling of all the woodlots would be necessary to have any hope of selling in the voluntary market. Even so there are doubts as to whether the woodlots taken together would meet the threshold value required to qualify for carbon credits. These potential limitations notwithstanding, the issue should still be pursued in the future.

5.7.2 Kenya Improved Stove Association (KEISA)

162. The RTE improved stove can never hope to drive out the informal sectors producers of stoves. The Jua Kali producers are closer and more accessible to the people at the grassroots and they will continue to undersell the RTE stoves. For the sustainability of the improved wood stove, the GEF project has rightly decided to intervene proactively in the organization and operations of the Jua Kali stove manufacturing. They need to be organized and trained to progressively upgrade the quality of their production system and products. This is the long term solution to the problem of market immorality faced by the RTE improved wood burning stove.

The Jua Kali association to establish the Kenya Improved Stove of having it registered has reached an advanced stage. RETAP, KEISA and for training and technology transfer of some sort. The Jua Kali officials are enthusiastic about this partnership and working relationship with the GEF project. They have identified the following issues and problems areas as likely focal points of attention by the GEF project:

- availability of raw materials, especially the mild steel sheet, to be able to mass produce the improved stove and reduce costs. Currently suppliers of steel sheets only deal with bulk purchases; they are not friendly with Jua Kali operators
- access to appropriate finances in support of Jua Kali operators
- access to new technologies for their production processes e.g. dyes, rollers etc

164. KEISA and the Jua Kali have certain expectations as this partnership is being worked out:

- A rollout programme with RETAP to mobilize all stove makers in Kenya, sensitize them to industrial designs. Indeed over time, such knowledge may lead Jua kali producers to get together in joint ventures
- Establishment of a Secretariat and the Secretariat must have a programme with time lines
- The KEISA registration process needs to be accomplished expeditiously in order to sustain the momentum that has been generated among members of Jua Kali
- Sensitization workshops are very necessary as well as media publicity of the improved stove that emphasises its potential to bring the good life to Kenyans at the grassroots level.

165. The 4K initiative is very important to the sustainability of the improved stove scheme. Fortunately, the Jua Kali members are enthusiastic about it and are active promoters of the initiative. Indeed, the Jua Kali is so proud of the 4K initiative that it is being promoted in other countries including notably India. The MoE also sees the critical need to develop standards on stove production and trade practices. It believes that there should be standards for household as well as institutional stoves and a code of conduct or trade code for the stove business. The associations that have been formed should be supported to develop guidelines and regulations that would be enforceable by government.

166. Expectations are high among the partners of RETAP in the creation of these structures. Therefore, there is an urgent need for RETAP to sign an MOU with each of the partners so that no one is in doubt about what is expected of each other. It is also important to brief officials of these partner associations so that they know exactly where things stand at each stage. For example, it is very necessary now that the officials of the Jua Kali be properly briefed about the stages and processes involved in each activity connected with the collaboration with the GEF Project. This is because, already, there is a feeling among them that RETAP has been slow in getting the registration of KISA through. The officials are concerned about sustaining the momentum generated among their members.

167. Reduction of the cost of production of the RTE improved stove is one major issue to which no one seems to have a ready solution. Nobody knows how the planned 20% reduction in the cost of the stove would be achieved. RTE and RETAP would not compromise on quality by using lower quality materials than the stainless steel currently used in making the stoves. RETAP even plans to win over the Jua Kali producers to use better materials and to do away with certain materials such as clay linings for stoves. The Jua Kali believe that mass production would reduce the unit cost of the improved stove but raw material availability is a serious constraint. This highlights the importance of the recommendation made earlier that RTE needs to upgrade its factory and the wood stove production line.

5.7.3 Kenya Tree Propagators and Kenya Tree Growers Associations and Network of Schools

168. The MoE emphasised the need to manage the demand side of the improved stove project and stimulate commercial production of trees in the neighbourhoods to which the schools would have access. RETAP has already taken steps to establish a number of structures including the Tree

tree growers Association, Network of focal school clubs, and a total of 12 000 tree growers and nursery operators in its areas. The formation and registration of the associations was informed by the need to build networks for information sharing and other benefits. Members are being encouraged to use modern communication technologies (SMS, internet, email etc.) in linking up with one another. These associations are more amorphous and fluid in membership than the Jua Kali and would be more difficult to manage and empowered to play their roles in the sustenance of the improved stove. But they do have a role to play in the management of the demand side and the sustainability of the woodlots.

169. There is the possibility of developing partnerships at the community level to promote woodlot establishment and management. Village communities, women's associations, wood fuel traders and timber trade associations are possible partners. MoE already has plans to promote establishment of commercial and community woodlots and to sensitize the public to grow trees as a commercial venture. Such initiatives would be critical in providing public schools access to wood fuel where they do not have the land or resources to establish their own woodlots. For instance, TBPT trained entrepreneur nursery and tree growers can be linked with the schools in different localities for the supply of wood fuel where such schools cannot own and operate their own woodlots.
170. TBPT admits that site matching of species and pest damage are still problem areas in the establishment and management of woodlots in certain areas. It plans to be more pro-active in site-species matching before distributing seedlings to institutions. It has linked up with Kenya Forest Research Institute (KEFRI) to tackle the pest problem and a pesticide that is effective in dealing with the termites has actually been found. TBPT is also concerned that each institution should have a designated woodlot manager with the right academic background, preferably in cognate fields of agriculture, biology and geography. TBPT places much hope on the promotion of focal school clubs for example on environment, agriculture and the like to promote the establishment and sustenance of the woodlots.
171. TBPT outreach and extension efforts have been modest because of the demands of its primary activity to raise fast growing cloned tree seedlings. The outreaches and extensions services are its main areas of spending now as the tree cloning operations broke even in 2004 and have been self-sustaining since then. TBPT cannot keep up with the number of schools adopting the improved stoves because the budget for running the training sessions is rather high. Hence, it has only been able to train only 60 woodlot managers. Some schools have been rather disappointing in their handling of the seedlings supplied to them thereby losing many of them. There were ridiculous cases where head teachers wanted to be their own woodlot managers! As mentioned earlier, although, TBPT has distributed over 2 million seedlings nationwide, it is not sure that the number of trees out there matches the number of seedlings sent out. TBPT gives some training to buyers on what to expect after planting the seedlings and makes occasional visits to schools to assess things. It participates in joint M&E operations on tree survival and submits reports to RETAP. As has been suggested earlier, TBPT now needs to go a step further to help schools plan for their woodlots in terms of modelling their wood fuel needs and recommending the appropriate size of woodlot for each school. Already, it has been able to determine the amount of energy generated by burning the hybrid species, *Eucalyptus grandis-camaldulensis*, to be about 40 000 kcal.
172. TBPT noted that RETAP has changed from the strategy adopted during the earlier NGO-led project implemented in the Mt. Kenya region. Then, each school was required to plant 500 trees first before being eligible for the improved wood stove. Thereafter, the school was required to plant at least 500 trees per year for the next few years after installation of the stove. But, now, there is no such obligation to establish woodlots either before or after installation of the wood stove. This strategy may no longer work because it is likely to discourage many potential adopters from acquiring the RTE improved stoves and, instead, drive them to patronise the quacks.
173. More worrisome to TBPT is the fact that repayment of the revolving loans by schools has been problematic and RETAP is not able to keep up with payment for the tree seedlings. Thus, TBPT has been forced to extend credit to RETAP contrary to policy. TBPT on its part recognises its duty to make the tree seedlings available to farmers and people at the grassroots level at minimum cost. This

years running. RETAP must find a way of meeting its financial in the project. Prompt payment for the seedlings by RETAP TBPT to run more training courses.

5.7.4 Kenya Forest Service (KFS)

174. The Kenya Forest Service (KFS) is a potential source of help to tree growers and nursery operators. The Forest Act has provision for a *Forest Management Conservation Fund* which could provide communities and private sector operators assistance in developing the forest estate. But, KFS is yet to work out the operational modalities for implementing this provision in the Act. Unfortunately, KFS does not see itself establishing more woodlots to meet the potential needs of schools for wood fuel. KFS says it already has devoted 120 000 ha to the production of wood to serve the country's need for timber. About 10% out of this 120 000 ha is already allocated to satisfying the needs for wood fuel, poles etc. Kenya, classed among the forest-poor countries of the world, has only about 2 million hectares of forest cover found mostly in the so-called water towers, the highlands (Mt. Kenya, Aberdare mountains, Mau, Cherangan, and Mt. Elgon). KFS cannot see how more land can be given over to woodlots to service the institutional wood stoves. But, as noted earlier, FAN has identified areas where vacant lands exist in the forest regions under the control of KFS.
175. KFS is currently in dialogue with the *Clinton Foundation* which is interested in climate change mitigation and carbon assessment systems. This foundation has interest in the development of community woodlots and similar initiatives with potential positive impacts on climate change. RETAP might consider linking up with KFS and explore ways of raising funds for the school woodlot management programme.

5.8 Logical Framework Approach and Performance Indicators

176. The strength of the logical framework approach adopted in the implementation of this project lies in the clear identification and definition of roles assigned to specific stakeholders and partners. There is a focal point and associated players for each major outcome: MoE is the focal point for the policy issues contained in Outcome 1 while other government agencies and RETAP are associates; RETAP is the focal point for Outcomes 2 and 3 but relies heavily on RTE and TBPT for activities in key sub-sectors; RETAP is perhaps solely responsible for Outcome 4 while Outcome 5 has largely been devolved to consultancy and specialised M&E units. The biomass market transformation project is complex, with many activity areas and stakeholders. Without the judicious use of consultants and partners (e.g. RTE, TBPT) in special areas the job could not have been so easily accomplished.
177. The outcomes approach that has set out targets to be attained puts no one in doubt about the expectations from each individual stakeholder/partner or groups involved in the project. There are the occasional lapses in the fine details of the framework, for example, the confusion in the roles of RTE and RETAP/TBPT with regard to the establishment and management of woodlots. The project has laboured to turn the marketing/loans officers into woodlot managers and M&E agents without much success. The marketing/loans officers cannot market the wood stoves, run after school heads to repay their loans and at the same time be effective woodlot monitors and extension workers. Monitors and managers of woodlots are better placed under professional forest management experts such as can be provided by TBPT and KFS or in relevant academic units in universities and research institutes. Personnel with academic background in agriculture, biology, ecology, forestry or pedology would make the best woodlot development extension officers
178. RETAP has succeeded to a large extent in working out a smooth synergy between itself and its technical partners, RTE and TBPT respectively on stove and seedlings production. The distribution system both for stoves and seedlings appears rather more fluid as it is tackled on an *ad hoc* basis. Distribution and installation of wood stoves is by RTE/RETAP personnel while both RETAP and TBPT take part in the seedling distribution as exigencies of each day allow. As recommended above, RETAP needs to have heavy duty articulated trucks to be able to cope with the distribution of the tree

179. M&E operations are being pursued almost as an aside to the main project. The use of MSc candidates to research into certain aspects of the work of the GEF project has certainly been beneficial but perhaps more would be achieved by employing well-established experts to carry out some of the determinations. The imposition of the GEF factors for determining emission reduction levels appears to have truncated activities in the M&E sector. Without going against the directives of GEF, this biomass transformation project could still explore the possibility of developing other indices for purposes of comparison with the GEF-based measures.

5.9 Main Lessons from the Project

5.9.1 Global

180. A short term externally funded project has a good chance of succeeding where the project creates tangible and significant footprints and has a direct impact on the livelihood of the people at the grassroots level. This biomass market transformation project has succeeded beyond all expectation because it has been useful to institutions and SMEs that operate close to the grassroots. The unanticipated rise in the demand for the improved wood stoves is evidence of the huge impact that it has made in the different localities.
181. Government departments can work together in harmony where their respective mandates are clearly defined and recognized by all parties and there is a well defined and recognized common interest. This GEF has succeeded in engaging government ministries and departments at a very high level which in itself speaks very well of the calibre of the individual officers concerned. The other ministries appeared to have recognized and respected the mandate of MoE over all energy related matters and this facilitated their cooperation with it in developing the policy and strategy documents on biomass energy. They all have a common interest in biomass fuel conservation and efficient utilization.
182. Biomass or greenenergy is a new area in the world of business. There are still many grey areas and much effort is needed to mobilise finance institutions to invest safely in the sector. The people that are most directly targeted by development agencies are the least capable of meeting the stringent investment requirements of the financial sector. Micro-finance institutions need to be encouraged and stimulated somehow to venture into the green energy sector.

5.9.2 Lessons Specific to GEF Biomass Market Transformation Project

183. Openness has been the watchword in the implementation of this project at all levels. But, there is still room for improvement. Stakeholders and partners, even members of the PSC, have access to information and ideas that could facilitate aspects of the project. Examples include the Forest Action Network which has information that could bring solution to the problem of woodlot establishment by the schools; MoE which is in a position to help project find ways of benefiting from certain provisions of the Energy Act. The same can be said of KFS and PANERECC.
184. It is clear that one of the key pivots of the project was inadvertently neglected. Too much trust was placed on the schools to establish and manage woodlots. The *laissez faire* approach to the establishment of woodlots has not worked. There has not been adequate monitoring of the tree seedlings freely distributed to institutions. The capacity of the schools to establish and manage woodlots was not given serious consideration. The development of woodlots was a side show to the promotion and sale of the improved wood stoves. The big lesson from the experience of the last two years is that woodlot establishment to meet the wood fuel needs of participating institutions now and in the future must be made a separate focal point of action in the project.
185. The judicious use of consultants to handle specialised aspects of the project has been quite beneficial especially in relation to the development of the policy documents, liaison with parliamentarians, and development of the RETAP Green Card. The evaluation team had no access to the consultant working on the improved wood stove reduction. Still, the examples mentioned would

stantants has been a good project implementation strategy. More consultants in the M&E sector.

186. Information dissemination and networking are critical in the implementation process of a project such as this. Apart from the promotional activities of RETAP, the improved wood stove innovation has spread primarily through contacts information sharing between school teachers and head teachers. Failure to appreciate or foresee the informal networking between schools partly led to the PMU being caught unawares by the huge surge in the demand for the improved wood stove and the credit scheme. Now, information about the stove and credit has spread to individual households and people at the grassroots levels. This is partly responsible for the emergence of adulterators of the improved wood stove and the rampant market immorality identified by RETAP as a big challenge.
187. Efforts to transfer knowledge and technology have yielded good results in the area of tree biotechnology transfer to private entrepreneurs in nursery operations. The prospects are high too that similar success would be achieved in respect of improved institutional and household wood stove fabrication. The approach adopted of creating relevant institutions, organizing informal sector operators into professional guilds or associations and building up their capacities, has worked very well thus far. There is urgent need for RETAP to agree and sign memoranda of understanding with all the groups to avoid complications in the future. RETAP has established a model that should be replicable in other countries and regions. But, the point must be made that the informal sector operators, particularly the Federation of Jua Kali Associations, seem to be better organized in Kenya than in other Third World countries and is probably easier to involve in a project such as this. Such a favourable environment may not exist in other countries and regions.

6.0 Recommendations

188. In this section, we shall present a synopsis of the numerous recommendations and suggestions that have arisen in the foregoing discussions. These recommendations are targeted at ensuring the sustainability of the outcomes and benefits of this GEF project and the sustainability of the business model not only in different parts of Kenya but also in order countries within the East Africa region and beyond.

6.1 Global Objective

189. The global objective and the targets on levels of emission reduction and deforestation avoided should be retained. Scaling down the targets would reflect adversely on the project with sponsors and potential donors. Scaling down the target would limit also the potential of the project to use the improved wood stove and the woodlots to make money in the voluntary carbon credit market. But, the time lines for meeting some of the targets may need to be revised internally for the second half of the project's life.
190. Given the importance attaching to these GHG emission reduction and deforestation avoidance, experts should be brought in during the second phase of the project to carry out surveys and make the calculations necessary to showcase the achievements of the project on these issues. This approach of course would be more expensive than using MSc students but the results would be more timely, have greater spatial coverage and carry greater weight.

6.2 Credit Loan Scheme

191. The co-chairs of the PSC and major stakeholders in the project should endeavour to put more funds in support of the credit loan scheme which has virtually grinded to a halt. The credit scheme is critical to the spread of the improved stoves to more schools. The least that the UNDP CO and the Ministry of Energy could do is to facilitate the actualization of the £100 000 pounds sterling offered to RETAP by ASHDEN TRUST on condition that the existing deficit in the credit scheme be removed.
192. The PSC should engage with PANERECC, CDF office, the Ministry of Education and Local Authorities to work out a loan guarantee scheme or even a subsidy scheme for schools to be able to purchase the improved wood stoves. PSC should also engage with the Ministry of Education to come

ancement on energy efficiency in schools in order to provide loan guarantee scheme for schools.

193. The SMEs should be vigorously targeted for the sale of the improved stoves as they are more likely to be able to repay the credit loans. Experience has shown that SMEs and some private institutions repay their loans over a much shorter period than the public institutions. Focusing on the schools almost exclusively has led to the grounding of the revolving credit scheme and the sale of the improved stoves.

6.3 RETAP Green Capital

194. RETAP Green Capital is critical to the sustainability of project outcomes and the replicability of its business model. Therefore, the move to upgrade it into a micro-finance institution should be actively pursued and concluded before the expiration of this GEF project. Although, RETAP Green Capital can grow and survive on its own, the growth process should be facilitated for the sake of the sustainability of project outcomes and benefits. Given the huge demand for the improved wood stoves that this project has generated within its short life span, the co-chairs of the PSC and major stakeholders, UNDP CO and MoE, should seriously consider facilitating the firming up of the capital base for RETAP Green Capital until it matures and can stand on its own. The Consultant developing the concept has good plans but these plans will take time to mature and have the desired positive impact on the MFIs capital base. The plans call for the diversification of the RETAP Green Capital portfolio to include the variety of biomass energy types.

6.4 Woodlot Establishment

195. A unit, desk or focal point should be created within the PMU to specifically target the promotion of woodlot establishment and management by the institutions themselves or by other agencies and strategies as indicated in the body of this Report. Woodlot establishment should be a separate sub-section under Outcome 2. These developments would have cost implications; therefore, it would be necessary to look for separate sources of funding for woodlot establishment. Information is available about the options available for meeting the future wood fuel needs of institutions. PMU does not need to insist on individual ownership of woodlots by schools but it should promote joint efforts at the community, local authority, and school district levels and among schools. Partnerships must be sought at the local level with community-based organizations, women's groups, farmers' groups and the local authorities to develop woodlots for the use of local institutions.
196. A cadre of forestry extension workers should be created under the supervision of TBPT to provide much needed extension and monitoring services to the institutional woodlots. These extension workers should be college graduates with qualifications in agriculture, biology, chemistry, ecology, environmental science, forestry, geography, or any cognate field of science.

6.5 Tree Seedling Transportation

197. The tree seedling distribution system should be more closely managed and monitored. RETAP/TBPT should be provided with 2-4 heavy duty articulated vehicles for transportation of tree seedlings. Institutions supplied with seedlings should be followed up to ensure that the seedlings are not diverted to private estates or left to die off in the schools' store houses. Given the potential of the woodlots to be used for making money in the voluntary carbon credits market, RETAP should take a greater interest in their establishment and management.

6.6 Database

198. RETAP should establish a computerized database and a Geographic Information System that would integrate the data being generated by various units involved in this GEF project. In many cases, the data being generated are original baseline data that have the potential to contribute to future planning and development initiatives in the energy sector not only at the national (Kenya) but also at the regional (East Africa) level. The institutions and SMEs participating in this GEF project should be required to keep records of their wood fuel purchases and consumption, as well as, on their woodlots. A proforma should be designed for the institutions to make their recordings.

improved wood stove demand during the life of the project. But, it is doubtful that it will be able to meet future demands without raising its production level substantially. It has to upgrade its stove fabrication operation from an informal sector activity to a full scale mechanized factory operation. RTE needs to move towards mass production of the wood stoves in order to reduce unit costs. It is doubtful also that RTE can forever remain the sole fabricators of the improved wood stove; the possibility of bringing in others to join the improved wood stove manufacturing industry should be explored in order to ensure the sustainability of the outcomes of the project in the future.

200. The target to reduce the cost of the improved wood stove by 20% cannot be met and should be reviewed downwards, if not totally discarded. Although, the consultant working on this issue has not submitted his report, it is all too obvious that the cost of stainless has risen sharply in the world market and, as long as demands in China and other developed countries continue to mount, there is little hope that the price will come down. Short of using materials of lower quality, the prospect for reducing the cost of the improved wood stove is very dim.

6.8 Sustainability

201. The following structures which have been established have the potential to ensure the sustainability of the outcomes and benefits of this GEF Project: Kenya Improved Stove Association, Tree Propagators Association, Tree Growers Association, Network of Focal School Clubs, and Network of Teachers/Managers of Woodlots. But, they would need contact points once the GEF project expires. The potential contact points are RETAP Green Capital for the credit scheme; RTE for the improved wood stove; and TBPT for tree seedlings and woodlot management. RETAP Green Capital is the only one of these potential contacts that appears to be fully sensitized or geared towards its potential responsibilities. It is not certain the extent to which RTE and TBPT are prepared or disposed to shoulder their responsibilities as contact points in the future. PSC/PMU should begin a process of engagement with these units in order to define their likely future responsibilities and what it would take to equip and strengthen them to perform to expectation. Although, RETAP will continue as an NGO, its role as PMU will cease once the GEF project expires. Therefore, for the sake of continuity, all structures established and the participating institutions and SMEs must have focal points to which they can relate in order to obtain services which the GEF project currently provides.
202. At the public level, the Ministry of Energy would be the most appropriate institution to situate this project for mainstreaming purposes. Its mandate on energy matters in general and the policy and strategy documents that have been successfully developed under its leadership in the course of this GEF project make MoE the ideal institution to oversee and sustain the project outcomes for the benefit of the country as a whole. The institutional arrangements that produced the policy and strategy documents under Outcome 1 should be maintained by MoE, as well as, the working relationship with the parliamentarians through PANERECC. The draft Biomass Strategy should be augmented to integrate the wood fuel, biofuel and biogas components.

6.9 Post-Election Violence

203. The effects of the post-election violence are still relevant in the plans for the implementation of the GEF project in the second half of its life span. In the Rift Valley, for one, the situation has not normalised sufficiently for project activities to flow smoothly. The marketing/loans officers still do not feel safe enough to go into certain areas. Consequently, marketing/loans officers may need to be moved round so that officers who are acceptable to the local people in terms of ethnicity are sent to certain parts of the Rift Valley. This might facilitate the collection of loans from institutions and the sale and installation of more improved wood stoves. But, information gathered suggest that the people in certain localities will only accept those who speak the local dialect/language. It is clear also that as long as the IDP camps (particularly in Nakuru) remain as volatile as they are, the prospects of restoring normalcy in the operations of the project are not very bright.



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Biomass Stoves for Institutions and SMEs in Kenya

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REFERENCE



UNITED NATIONS DEVELOPMENT PROGRAMME

TERMS OF REFERENCE FOR THE MID TERM EVALUATION OF THE

**Market Transformation for Highly Efficient Biomass Stoves for
Institutions and Medium-Scale Enterprises in Kenya**

2008

MID TERM EVALUATION OF THE

Market Transformation for Highly Efficient Biomass Stoves for Institutions and Medium-Scale Enterprises in Kenya

Context

Past initiatives by the government, NGOs and the private sector have demonstrated that improved institutional stoves reduce greenhouse gas emissions through (a) improved efficiency, meaning that 70% less wood is required for the same cooking task (b) reduced emissions of products of incomplete combustion which have higher global warming potentials than CO₂. The initiatives have also demonstrated that, when the stoves are introduced together with a sustainably managed woodlot, the cycle becomes closed and therefore 100% renewable. Furthermore, these initiatives have shown the potential of the market and piloted successful business models using well-proven commercial technologies. However, policy, technological, financial, management skills, awareness and other interrelated market barriers combine to restrict the self-sustaining growth of this market.

Background

This project seeks to remove market barriers to the adoption of sustainable biomass energy practices and technologies by institutions (schools and hospitals) and small businesses (restaurants, hotels) in rural and urban areas of Kenya by: (i) promoting highly efficient improved stoves, and (ii) establishment of woodlots owned and managed by the institutions and private sector. The project builds on the successful initiatives of local Non-governmental Organisations (NGOs) and private sector players and scales up successful existing business models using well-proven commercial technologies by removing barriers, which are currently limiting the growth of this market. *The project builds on and scales up a successfully implemented GEF Small Grants Programme (SGP) in which a revolving fund credit scheme to disseminate energy-saving stoves to institutions in Kenya on a commercial basis was established.*

Implementation Arrangements:

UNDP is the Implementing Agency for the GEF project, which is being executed nationally by the Ministry of Energy through Renewable Energy Technology Assistance Programme (RETAP). Various stakeholders are also involved in the project. Outcome 1 requires the involvement of government and business stakeholders, while outcome 2 focuses more on work in partnership with the business sector. Outcome 3 involves civil society, communities and the business sector. RETAP is working with specialized implementation partners including Rural Technology Enterprises (RTE), who are being contracted to coordinate the overall production, supply, installation and servicing of stoves. It also trains stove users and coordinate tree planting activities and extension services on behalf of RETAP as well as coordinate the establishment of commercial nurseries.

A Project Management Unit (PMU) was established within the RETAP which is responsible for overall project coordination and implementation. Expert and policy guidance is provided by the Project Steering Committee (PSC) made up of members from civil society, research, private sector, and government, UNDP-GEF and other relevant stakeholders. This group, under the joint chairmanship of the UNDP CO and the Ministry of Energy also give advice to the Project Manager, thus supporting the decision-making process. The PSC meets at least once a year. However, ultimate responsibility for day-to-day project implementation lies with the PMU, which equally carries out the responsibility for delivery of project outputs.

is to review progress towards the projects objectives and outputs, identify strengths and weaknesses in implementation, assess the likelihood of the project achieving its objectives and delivering its intended outputs, and provide recommendations on modifications to increase the likelihood of success (if necessary.). A particular emphasis of the Evaluation will be on providing recommendations for modifications required to ensure that project activities are aligned with these commitments. More specifically, the Mid-Term Evaluation will undertake the following tasks:

- Assess progress towards attaining the project's environmental objectives and outcomes. The effectiveness of these actions given the available funding will be considered.
- Clarify the project objectives and activities both in light of the evolving thinking on global and local thinking and action, and how these relate to the UNFCCC priority work programme. Validate the developing project approach to incorporating those priorities.
- Review the clarity of roles and responsibilities of the various agencies and institutions and the level of coordination between relevant players. In particular, the capacity and performance of the project secretariat will be reviewed.
- Review the balance between 'technical product' and 'mainstreaming process' in the project; and given the nature of that balance, assess the optimum institutional placing of the project with regard to mainstreaming products. Optimal here includes both cost effectiveness and technical effectiveness.
- Assess the level of public involvement in the project and comment as to whether public involvement has been appropriate to the goals of the project.
- Describe and assess efforts of UNDP in support of the implementing agencies and national institutions.
- Review and evaluate the extent to which project impacts have reached the intended beneficiaries.
- Assess the likelihood of continuation of project outcomes/benefits after completion of GEF funding; and describe the key factors that will require attention in order to improve prospects for sustainability of project outcomes.

network Approach (LFA) and performance indicators as developed at
project management tools; and review the implementation of the projects

monitoring and evaluation plans. Assess the strength of the log-frame process as a whole.

- Make recommendations as to how to improve project performance in terms of effectiveness and efficiency in achieving impact on both capacity and the targeted Institutions.
- Describe the main lessons that have emerged in terms of: efforts to secure sustainability; knowledge transfer; and the role of M&E in project implementation. In describing all lessons learned, an explicit distinction needs to be made between those lessons applicable only to this project, and lessons that may be of value more broadly.

METHODOLOGY OR EVALUATION APPROACH:

The evaluation will be based on findings and factual statements identified from review of relevant documents including the project document, quarterly operational reports (QORs), Annual Project Reports (APR), minutes of both the Technical and Steering Committees meetings, Project Implementation Reports (PIR), in addition to the technical reports produced by the project and the different promotional materials. A list of the above reports will be shared with the consultants before the beginning of the evaluation. The mission will also undertake field visits and interview the stakeholders including the target beneficiaries, government officials (both at the national and regional levels), private sector and NGOs. Participation of stakeholders in the evaluation should be maintained at all the times, reflecting opinions, expectations and vision about the contribution of the project towards the achievement of its objectives.

7. REQUIREMENTS OF THE EVALUATION TEAM:

Two consultants are proposed to conduct the evaluation exercise: an international and a national consultant.

The International Consultant, who will also serve as the team leader, shall be Land Resources/Climate Change (energy) specialist having a post graduate qualifications and around 15 years of relevant experience preferably with renewable energy technologies (RETs) development and Natural Resources Management. In addition, the consultant should have substantive knowledge and experience in the technical, socio-economic and environmental issues and their applications, preferably in the developing countries. Extensive experience in project formulation, execution, and evaluation is required. Previous involvement and understanding of UNDP/ GEF's procedures is very important. The consultant should have strong writing skills coupled with relevant experience in results-based monitoring and evaluation techniques.

The National Consultant shall be a natural resources management expert, ecologist, or energy specialist having an advanced university degree preferably in relevant technical and field experiences of around 10 years. The consultant should be well acquainted with Kenya's contemporary environment management issues and challenges. Previous involvement or knowledge of the institutional and organizational setup of the energy sector will be an advantage & some experience in project formulation, execution, & evaluation is an asset. The consultant should be fluent in English and possess strong technical writing skills.

8. IMPLEMENTATION ARRANGEMENTS:

. The two consultants should work together as a team towards producing the evaluation report. The national consultant will be responsible for providing any necessary background information, attending meetings when

ts of the report. Nevertheless, the international consultant will be deliverables.

The consultants will be contracted by UNDP Country Office in consultation with GEF/RCU (Pretoria). The Project Management Unit shall arrange for the consultant all necessary site visits and meetings according to the TOR. UNDP Country Office in coordination with the PMU shall arrange logistics for the mission including hotel reservation and transportation during the mission. The mission will maintain close liaison with UNDP Resident Representative, The Ministry of Energy, as well as the PMU.

9. TIME FRAME:

The duration of the field mission for the international consultant is 7 working days and the total task is 12 days while the total task for the national consultant will be 10 days. The consultant(s) will be allowed two weeks from receiving feedback to respond to the comments by the project partners and submit a final report. The whole exercise shall be carried out over a period of four weeks.

Deliverables:

Three copies of a draft final report should be submitted for review to UNDP country office, Ministry of Energy, UNDP-GEF Regional Coordinator and PMU in a week's time after the end of the field mission. The findings of the mission will be presented and discussed in a general review meeting attended by the project partners. Four copies of the final report and one electronic copy are required.

The Report shall follow the format as follows:

1. Executive Summary
2. Introduction
 - a. Purpose of the Evaluation
 - b. Background
 - c. Evaluation Methodology
3. Evaluation Findings
 - a. Project Relevance
 - b. Efficiency
 - c. Effectiveness
 - d. Impact of the Project
 - e. Sustainability
4. Lessons Learnt
 - a. Operational
 - b. Developmental Lessons
5. Conclusions
6. Recommendations
7. Annexes
 - a. Terms of Reference
 - b. Project Performance Matrices
 - c. Itinerary for the Evaluation Team
 - d. List of Persons Consulted
 - e. Literature and Recommendation

By the end of the exercise, the Consultants shall submit five hard copies and an electronic copy on CD-ROM Microsoft Word of the Report to Project Monitoring Unit.

Consultants for the GEF Biomass Energy Project

| DATE | 8.30-10.30 am | 11-12.30 am | 3.30-5pm | 4-5pm | 4-5pm |
|---------------------------|---|--|--|---|-----------|
| 21-Oct | PMU | PMU | UNDP, Block Q, Gigiri <i>Gakabu/Nyandiga</i> | | Nairobi |
| 22-Oct | PMU Document review | PMU Document review | PMU Document review | PMU Document review | Nairobi |
| 23-Oct | Kileleshwa/St Mary's School <i>Principal</i> | Alimus L.F. Academy <i>Principal (0722288493)</i> | Buffet Park Restaurant <i>Proprietor</i> | St Catherine Girls Machakos <i>Principal (0722829047)</i> | Nairobi |
| 24-Oct | Travel to Meru with stop-overs | Juja Preparatory School | Kanthanthatu Girls Sec School <i>Principal 5</i> | Uruku Girls Sec School <i>Principal 6</i> Stay night in Nyeri | Nairobi |
| Saturday 25 th | Travel back to Nairobi | Hill View Academy <i>Principal 7</i> | Bridgewater Girls Sec School <i>Principal</i> | Blessed Kids Academy <i>Principal</i> | Nyeri |
| Sunday 26 th | | | | | |
| 27-Oct | Ministry of Energy <i>Eng. I. Kiva/F. Odongo</i> | KEISA <i>Mr. Gitabi Muikamba</i> | ECM Centre <i>Paul Kirai</i> | | Nairobi |
| 28-Oct | Kenya Forest Service <i>Mrs. M. Kalenda</i> | Tree Biotechnology PT <i>Mr. Benson Kanyi</i> | | | Nairobi |
| 29-Oct | | ESDA <i>S. Mutimba</i> | Forest Action Network <i>Dr Dominic Walubengo</i> | Ashington. Ngigi <i>Independent Consultants</i> | Nairobi |
| 30-Oct | Rural Technology Enterprises <i>David Kaman</i> | Olekasasi Tree Nursery <i>Mr. Fred Pertet</i> | | | Nairobi |
| 31-Oct | | Presentation of report <i>Nairobi Safari Club</i> | | | Nairobi |
| | | Days | Title | Name | Signature |

Nairobi
Nyeri

11
1

Lead Consultant
National Project Manager

Prof Areola
Mr. Charles Gitundu

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Performance Matrix

| Project Strategy Goals | Indicator | Mid-Term Targets | Mid-Term Accomplishments | Weaknesses, Risks and Challenges |
|--|--|---|--|---|
| <p>Global Objective</p> <p>GHG emissions sustainably reduced through a transformation of the institutional and SME wood-stove market, and related household sectors</p> | <p>CO₂ equivalent emissions are reduced</p> <p>Stove sales</p> <p>Tree seedlings planted within the project</p> | <p>50 000 tonnes of CO₂ avoided by 2008, from the selling of 2500 improved stoves in 2 years.</p> <p>7.5 million tree seedlings planted within the project</p> | <p>998 tonnes CO₂ emission reduction by June 2008.</p> <p>296 030 tree seedlings delivered for planting.</p> <p>463 improved stoves sold to 244 institutions</p> | <p>Woodlots too young and few to make much impact on emission reduction and rate of deforestation</p> <p>Insufficient follow-up and monitoring of tree seedlings supplied to institutions</p> <p>Institutions lack land or capacity to establish and maintain woodlots</p> <p>Targets are over-ambitious given the limitations of institutions and other unforeseen circumstances</p> |
| <p>OUTCOME 1:</p> <p>Supportive policies and legal framework for sustainable biomass energy businesses developed and strengthened.</p> | <p>Integrated Biomass Energy Policy</p> | <p>Integrated Biomass Energy Policy draft bringing together forestry, energy, environment, and industry sectors under discussion</p> | <p>Draft of Integrated Wood Fuel Strategy ready.</p> <p>Convened policy dialogue sessions bringing together government departments, public sector institutions, private sector, and civil society</p> <p>Participation in appropriate policy discussion forums</p> <p>Publication of two (2) policy briefs</p> <p>Engagement with parliamentary group PANERECC</p> | <p>Implementation process on course and much has been accomplished</p> <p>Awaiting approval process and gazetting</p> <p>Need to augment the strategy to integrate the wood fuel, biofuel and biogas components</p> <p>There is hope that the strategy documents would be adopted since they do not have to go through legislative process again. They can be accommodated in the existing Energy Act</p> |
| <p>OUTCOME 2:</p> <p>Supply chains for both products and financing are</p> | <p>Improved supply chain efficiency, cost reductions</p> | <p>Improved supply efficiency allows for a reduction in stove cost and</p> | <p>296,030 tree seedlings delivered and planted in schools</p> | <p>Pace of tree planting is too slow because of problems at the</p> |

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| | | | | |
|--|---|--|--|---|
| | <p>business model</p> <p>Private sector nurseries established</p> | <p>delivery of 20%; and used to cover cost of seedlings</p> <p>At least 8 private sector small nurseries established or under development to run on commercial basis</p> | <p>as at June 2008. Purchased from the VAT amount waived by Kenya Government on stoves.</p> <p>2 entrepreneurs from Western Province were supported to attend 3-week training at TBPT</p> <p>KSh200,000 is set aside to loan to them after submission and approval of their business plans</p> <p>Established a national Tree Propagators Association in collaboration with TBPT at a Workshop at the Cooperative College, Karen. Initial membership is 30 entrepreneurs across the country.</p> <p>Brought together 30 stove makers to form the Kenya Improved Stove Association with the collaboration of the Kenya National Federation of Jua Kali Associations (KEISA)</p> <p>As at June 2008, 463 stoves had been procured and installed in 244 institutions countrywide. 121 of the institutions are fully entrenched in the</p> | <p>institutions end.</p> <p>Drought, pests and post-election violence contributed to the slow pace of tree planting</p> <p>Marketing/loans officers inadequate and unqualified to provide extension services on woodlot establishment.</p> <p>Need to follow up on tree seedlings supplied to institutions</p> <p>Stove cost reduction made impossible by escalating cost of stainless sheet. But, the issue is still being studied by a consultant.</p> <p>RETAP/RTE overwhelmed by huge increase in demand for the improved stoves.</p> <p>VAT proving inadequate to fund the credit loan scheme. Rate of repayment by schools has been slow as their capacity to pay has diminished since introduction of free education.</p> <p>Revolving credit scheme has virtually grinded to a halt. RETAP/RTE are having to push back orders or requests for the improved stoves</p> <p>There is urgent need to boost the capital base of the credit scheme at least in the short run.</p> |
|--|---|--|--|---|

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|--|--|--|--|---|
| | | | <p>revolving fund scheme.</p> <p>PMU is upgrading the infrastructure for the MFI operations and a consultant is working on the incorporation of a standalone MFI called RETAP Green Capital</p> | <p>£100 000 from ASHDEN TRUST cannot be actualised for lack of internal counterpart funding.</p> <p>Stove market is bedevilled by rampant market immorality</p> |
| <p>OUTCOME 3: Sensitized policymakers, financial sector, suppliers and end-users.</p> | <p>Levels of awareness</p> <p>Levels of capacity</p> | <p>Survey shows capacities of users built: implementation of the end user training programme</p> | <p>338 end users were trained made up of cooks, Head teachers, school matrons, bursars, secretaries, cateresses and Board of Directors member</p> <p>The two trainers earlier attended a trainers training course.</p> <p>Baseline survey commenced in some schools for use in future project monitoring</p> | <p>Training schedule was disrupted in the first and second quarters by the post-election violence</p> <p>Project has focused more on institutions than on SMEs. The focus will change to SMEs at the beginning of 2009.</p> <p>Formation of Network of Teachers/Managers of School woodlot and the Network of focal school clubs is a welcome development to ensure sustainability of project outcomes.</p> <p>High cost of participation. Registration and Per diems for staff cost between KSh 150000 to 500000 depending on the location.</p> <p>Logistical challenges particularly when two provincial events occur at same time.</p> |
| <p>OUTCOME 4: Strengthen administrative and infrastructural support to the</p> | <p>Existence and operation</p> | <p>Recruitment of all project staff, procurement, infrastructure in place and</p> | <p>All set targets met: 5 staff hired</p> <p>Secretariat</p> | <p>Commendable achievements and done within budget.</p> |

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| | | | | |
|---|---|--|---|---|
| | | functional | <p>refurbished and expanded</p> <p>2 vehicles and trailer purchased</p> <p>Linkages with basic partnerships (TBPT, RTE, MoE) are up and running</p> <p>ICT facilities all purchased and working</p> | |
| OUTCOME 5: Learning, Evaluation and Adaptive Management Increased | Observations, Project Progress Reports, Impact Assessment reports, End of Project Reports | Effective and efficient Adaptive Management and Monitoring and Evaluation of all project activities in place | <p>Recent surveys on:</p> <ul style="list-style-type: none"> • 998 tCO₂-equivalents reduced by adoption of stoves by June 2008 • Wood fuel consumption rates and patterns and factors influencing • Per capita GHG emission reduction • Models for estimating biomass growth • Indoor air quality • Mid-Term Evaluation exercise, October-November, 2008 | <p>PMU is making up for gaps in its data and information on many key environmental indicators pertinent to the global objective of this project.</p> <p>Use of MSc Candidates to research into some pertinent issues has yielded valuable results.</p> <p>While, this approach is a cheap way of obtaining requisite data, more can be achieved by using established experts to carry out the require surveys and generate the necessary factors and indices.</p> |

APPENDIX IIIB: PERFORMANCE TRACKING, 2008: BUDGET PERFORMANCE (next page)

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UP TO SEPTEMBER

| Outcome | Output | ACTIVITY | COMPLETION DATE | | | BUDGET |
|---|--------|---|-----------------|--------|----------------------|-------------------|
| | | | Expected | Actual | Remarks | Budgeted |
| 1. Sustained Policy Dialogue | | | | | | |
| 1 | 1.1 | Public sector workshop | 30-Mar | 26-Mar | Done | 69 000.00 |
| | 1.1 | Public-Private sector workshop | 30-Jun | 30-Jun | Done | 69 000.00 |
| | 1.1 | Production of final policy & regulations draft | 30-Sep | 15-Sep | Done | 78 000.00 |
| | 1.2 | Produce policy brief targeting parliamentarians | 30-Mar | 25-Mar | Done | 40 000.00 |
| | 1.2 | Consultative workshops with PANERECC | 30-Jun | - | Awaiting new team | 140 000.00 |
| | 1.1 | Stakeholder' workshop on policy | 30-Nov | - | Planning in progress | 140 000.00 |
| Sub-Total | | | | | | 536 000.00 |
| 2. Capacity Strengthening of Field Teams | | | | | | |
| 2 | 2.2 | Training of trainers on best-practice stove use | 30-Mar | 6-Feb | Done | 0 |
| | 2.1, | Engage and train Tree Procurement Assistant | 30 Feb | 1-Mar | Done | 4 650.00 |
| | 2.2 | Induction of marketing officers on expanded activity | 30-Mar | 24-Aug | Done | 32 550.00 |
| | 2.2 | Develop comprehensive TORs for marketing officers | 30 Feb | 1-Feb | Done | 0 |
| | 2.2 | Develop data collection tools for marketing officers | 30 Feb | 23-Feb | Done | 0 |
| Sub-Total | | | | | | 37 200.00 |
| 3. Strengthening Woodlot & Data Management | | | | | | |
| 2 | 2.1 | Training for woodlot managers (4 sessions) | 4 sessions | 21-Sep | Done | 580 000.00 |
| | 2.1 | Consultation meeting nursery entrepreneurs | 30-Mar | - | Pending | 25 000.00 |
| | 2.1 | Selecting commercial nursery entrepreneurs | 30-Mar | 20-Feb | Done | 18 000.00 |
| | 2.1 | Training of 5 selected tree entrepreneurs (1 session) | 30-Jun | 2-Mar | Done | 182 500.00 |
| Sub-Total | | | | | | 805 500.00 |
| 4. Engendering Project Ownership in Schools | | | | | | |
| 2 | 2.1, | Develop concept paper on clubs & network | 30-Mar | 7-Jul | Done | 0 |
| | 2.2 | Convene planning roundtable on clubs/networks | 30-Mar | 25-Jul | Done | 22 400.00 |
| | 2.1, | Workshop on clubs for patrons from participating schls. | 30-Mar | 22-Sep | Done | 175 000.00 |
| | 2.2 | Capacity building of Network secretariat | 30-Jun | 17-Nov | Done | 100 000.00 |
| | 2.1, | Committee meeting on annual award programme dev. | 30-Jun | - | Planned | 22 400.00 |
| Sub-Total | | | | | | 319 800.00 |
| 5. Mitigating Risks in Improved Stoves Market | | | | | | |
| 2 | 2.2 | Intensify fundraising to boost GEF revolving fund kitty | Continuous | | On-going | 0 |
| | 2.2 | Develop concept paper on Stove Producers Assoc. | 30-Mar | 9-May | Done | 0 |
| | 2.2 | Mobilization of provincial reps of stove producers | 30-Mar | 15-May | Done | 20 000.00 |
| | 2.2 | Workshop to launch national stove producers assoc. | 30-Jun | 30-Jun | Done | 320 000.00 |
| | 2.2 | Capacity building of secretariat for growth | 30-Sep | 3-Aug | Done | 100 000.00 |
| | 2.2 | Initiate quality standards process with KNFJKA/KEBS | 30-Dec | - | Planned | 0 |
| Sub-Total | | | | | | 440 000.00 |
| 6. Increased Outreach | | | | | | |
| 3 | 3.1 | Participation in annual KSSHA exhibition | 30-Jun | 26-Jun | Done | 500 000.00 |

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| | | | | | |
|------------------|---|--------|-----------|----------------|---------------------|
| | | 30-May | April-May | Done | 240 000.00 |
| | | 30 Feb | Cancelled | | 240 000.00 |
| 3.2 | Produce newsletters and policy briefs | 30-Dec | | In Preparation | 150 000.00 |
| 3.2 | Produce calendars, folders etc for outreach | 30-Mar | 18-Jan | Done | 180 000.00 |
| 3.2 | Workshop for banking sector | 30-Sep | - | Postponed | 69 000.00 |
| 2.3 | Regional workshop with GTZ-ProBEC | 30-Sep | - | Postponed | 200 000.00 |
| Sub-Total | | | | | 1 579 000.00 |

7. Strengthening the Microfinance Function

| | | | | | | |
|------------------|------|--------------------------------------|------------|--------|---------------------|-------------------|
| 2 | 2.1, | Strategic plan development 2008-2011 | 30-Mar | 10-Sep | Ongoing | 100 000.00 |
| | 2.2 | | 30-Mar | - | Ongoing | 50 000.00 |
| | 2.1, | | 30-Mar | - | Awaiting MFI launch | 25 000.00 |
| | 2.2 | | Continuous | - | Ongoing | 0 |
| | 2.1, | | Continuous | - | Ongoing | 0 |
| Sub-Total | | | | | | 175 000.00 |

8. Monitoring and Evaluation Support Tools

| | | | | | | |
|------------------|-----|--|------------|-----------|----------------|---------------------|
| 5 | 5.1 | Tour of project sites (per diem) | Continuous | Various | Ongoing | 150 000.00 |
| | 5.1 | Quarterly partners' meetings | Continuous | ad hoc | | 40 000.00 |
| | 5.1 | Purchase of digital cameras (5 pcs) | 30-Mar | 20-Feb | Done | 100 000.00 |
| | 5.1 | Purchase spring balances (5 pcs, 10-25kg range) | 30-Mar | 20-Feb | Done | 3 500.00 |
| | 5.1 | Production of DVD clip (10-15 min) on project activity | 30-Dec | - | In Progress | 300 000.00 |
| | 5.1 | Developing C-sequestration models for 3 eco-zones | 30-Jun | 24-Apr | Done | 398 000.00 |
| | 5.1 | Emission factor determination for GHGs for stoves | 30-Jun | Cancelled | Exploring VERs | 300 000.00 |
| | 5.1 | Mid Term Review (MTR) | 30-Sep | - | Done | 244 200.00 |
| Sub-Total | | | | | | 1 535 700.00 |

9. Improved Management and Coordination at PMU

| | | | | | | |
|------------------|-----|--|------------|---|------------|---------------------|
| 4 | 4.1 | Develop partner project information system | 30-Mar | - | Planned | 25 000.00 |
| | 4.1 | Annual meeting of all project/field teams | 15-Dec | - | Planned | 70 000.00 |
| | 4.1 | PMU & Marketing Officers Salaries | Continuous | | Continuous | 4 920 000.00 |
| Sub-Total | | | | | | 5 015 000.00 |

Office Support

| | | | | | | |
|------------------|------------------------|------------|--|--|------------|---------------------|
| 4.1 | Rent | Continuous | | | 720 000.00 | |
| 4.1 | Utilities | Continuous | | | 30 000.00 | |
| 4.1 | Fuel | Continuous | | | 300 000.00 | |
| 4.1 | Insurance | Continuous | | | 260 000.00 | |
| 4.1 | Office Expansion (MFI) | | | | 100 000.00 | |
| 4.1 | Equipment Maintenance | Continuous | | | 120 000.00 | |
| 4.1 | Telecommunications | Continuous | | | 360 000.00 | |
| 4.1 | Administrative Costs | Continuous | | | 125 000.00 | |
| Sub-Total | | | | | | 2 015 000.00 |

ADDITIONAL ACTIVITIES (Not envisaged)

| | | | | | | |
|------------------|--|---------|---------|-------------------|---|----------|
| | PM and CO measurement in kitchens | 30-Jun | 30-Jun | MSc student | 0 | |
| | Participation at Africa Carbon Forum, Dakar, Senegal | 3-5 Sep | 3-5 Sep | NTO attended | 0 | |
| | International Travel | 3-5 Sep | 3-5 Sep | Air fare to Dakar | 0 | |
| Sub-Total | | | | | | 0 |

APPENDIX IV: TABLES OF RESULTS FROM STUDY ON GHG EMISSIONS REDUCTION ACHIEVED IN SCHOOLS AFTER CHANGING FROM TRADITIONAL TO IMPROVED WOOD STOVES (Ngeywo, 2008)

Table 4.0: Mean enrollment and fuelwood consumption rates (Kg cap . 1 day . 1) for schools with traditional and improved stove

| Category | Mean enrolment | Mean consumption rate (Kg cap . 1 day . 1) |
|-----------------------------------|----------------|--|
| Well-maintained Improved stoves | 536 ± 263 | 0.45 ± 0.13 |
| Poorly maintained improved stoves | 738 ± 408 | 0.44 ± 0.10 |
| Traditional Stoves | 188 ± 126 | 0.80 ± 0.55 |

Table 4.5: Projected national student enrollment rates and annual fuelwood consumption for primary and secondary schools in Kenya

| Year | 2007 | 2008 | 2009 | 2010 | 2011 |
|--|------------------|------------------|-------------------|-------------------|-------------------|
| Primary schools | 8355100 | 8734400 | 9113700 | 9493000 | 9872300 |
| Secondary Schools | 1016600 | 1070400 | 1124200 | 1178000 | 1231800 |
| Total enrollment | 9,371,700 | 9,804,800 | 10,237,900 | 10,671,000 | 11,104,100 |
| Fuelwood demand (tons/yr)* | 1,543,519 | 1,614,851 | 1,686,182 | 1,757,514 | 1,828,845 |
| Equivalent eucalyptus forest lost (ha) | 2,836,308 | 2,967,384 | 3,098,460 | 3,229,536 | 3,360,612 |

* Estimates are for firewood only.

$\beta = (WI - (Up + A))/WI$, where β was the correction factor, WI was the initial weight of fuelwood before being burned, Up were the remaining unburned pieces of fuelwood and A were the ash and char generated from the burned pieces.

Table 4.7: Projected fuelwood demand and equivalent Eucalyptus forest lost from 2006 to 2011

| Year | 2007 | 2008 | 2009 | 2010 | 2011 |
|--|-----------|-----------|-----------|-----------|-----------|
| Fuelwood demand (tons/yr) | 1,543,520 | 1,614,850 | 1,686,180 | 1,757,510 | 1,828,850 |
| *Actual fuelwood demand (tons/yr) | 1,450,910 | 1,517,960 | 1,585,010 | 1,652,060 | 1,719,120 |
| Equivalent eucalyptus forest lost (ha) | 2,666,130 | 2,341,790 | 2,912,550 | 3,035,760 | 3,158,980 |



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Equivalent volume of eucalyptus forest saved on
s.

| | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|-----------|-----------|-----------|-----------|-----------|
| *Actual Fuelwood saved (tons/yr) | 832,490 | 870,960 | 909,430 | 947,910 | 986,380 |
| Equivalent eucalyptus forest saved (ha) | 1,529,750 | 1,600,440 | 1,671,140 | 1,741,830 | 1,812,530 |

*Indicates the amount of fuelwood that has been subjected to correction factor

Table 4.13: The annual greenhouse gasses emission estimates and their GWC avoided on switching from traditional stoves to improved institutional stoves.

| Year | Fuel ^a saving(t)/year | Greenhouse gases Avoided (t)/year | | | | 100-year Global Warming Commitment(tCO ₂ eq) | | | | | |
|------|-------------------------------------|---|---|--|--|---|------------------------------------|-------------------------------------|-------------------------------------|--------------------------------|--------------------------------|
| | | ^b CH ₄ lower Limits | ^c CH ₄ upper Limits | ^b N ₂ O upper Limits | ^c N ₂ O lower Limits | CH ₄ lower Limits | CH ₄ upper Limits | N ₂ O lower Limits | N ₂ O upper Limits | Total GWC lower limit | Total GWC Upper limit |
| 2006 | 638960 | 1280 | 6010 | 96 | 96 | 29390 | 138140 | 28270 | 28270 | 57760 | 166510 |
| 2007 | 691300 | 1380 | 6500 | 104 | 104 | 31800 | 149460 | 30590 | 30590 | 62490 | 180150 |
| 2008 | 723250 | 1450 | 6800 | 108 | 108 | 33270 | 156370 | 32000 | 32000 | 65380 | 188480 |
| 2009 | 755190 | 1510 | 7100 | 113 | 113 | 34740 | 163270 | 33420 | 33420 | 68270 | 196800 |
| 2010 | 787140 | 1570 | 7400 | 118 | 118 | 36210 | 170180 | 34830 | 34830 | 71160 | 205130 |
| 2011 | 819090 | 1640 | 7700 | 123 | 123 | 37680 | 177090 | 36250 | 36250 | 74050 | 213450 |

a Indicates fuelwood saved at 0% moisture content.

b Lowest Values of emission factors were used in the estimations of greenhouse gasses

c Highest values of emission factors were used in the estimations of greenhouse gasses

Source: Emmanuel Cyoy NGEYWO, 2008: *Investigating the Impact of Improved Cookstoves in Kenyan Schools on PM₁₀, CO, CO₂, CH₄ and N₂O Levels*. MSc Dissertation, Department of Chemistry, School of Physical Sciences, University of Nairobi, Kenya, October 2008

TESTED BY EVALUATION TEAM

| | | |
|------------------------------------|--|---|
| Tuesday October 21st | Mr. Charles Gitundu | RETAP/PMU |
| Tuesday October 21 st : | Dr. Charles Nyandiga Mrs. Rose Mushudi | UNDP CO UNDP CO |
| Thursday October 23 | Mrs. Makau Mrs. Shifra Mariuki Mr. Ndegwa Mrs. Mutiso | Head Teacher, St. Mary's School, Kileleshwa, Nairobi Proprietor, Alimus L.F. Academy, Nairobi Director, Catering SME, Buffet Park Hotel, Nairobi Proprietor, St. Catherine's Girls School, Machakos |
| Friday October 24 | Mrs. Mungai Mrs. Kamau Mrs. Njagi Mrs. Muthiu | Director, Juja Preparatory Academy Cateress, Mang'ari High School, Mang'ari Principal, Kathanthatu Day Secondary School Principal, Uruku Girls Secondary School |
| Saturday October 25 | Mrs. Wachira Mr. Maina Kabiru Mr. Kiama Mr. Oyuma | Represented by. Teacher/Dep Woodlot Manager, Hillview Academy, Represented by Teacher/Woodlot Manager, Bridgewater Girls Secondary School. Marketing/Loans Rep. RETAP, Nakuru Proprietor, Blessed Kids Academy, Nakuru (only visited the woodlot; could not meet with Mr. Oyuma as it was raining heavily) |
| Sunday October 26 | Dr. Charles Nyandiga Mr. Charles Gitundu Dr. Evans Kituyi | UNDP RETAP/PMU RETAP |
| Monday October 27 | Engr. I. Kiva Mr. Paul Mbuthi Mrs. Faith Odongo Mr. Gitahi Muikamba Mr. Paul Kirai Mr. Charles K. Shiharo | Ministry of Energy Ministry of Energy Ministry of Energy Interim Chair, Kenya Improved Stove Association & Chairman, Kamukunji Jua Kali Association Director, ECM Centre (Private Consultant) Secretary-General, Kenya Federation of Jua Kali Assoc. |
| Tuesday October 28 | Mr. Gishu Mr. Benson Kanyi Mrs. Rose M. Ileri | Deputy Director, Kenya Forest Service Programme Manager, TBPT Programme Marketing & Extension Manager, TBPT |
| Wednesday October 29 | Mr. Stephen Mutimba Dr. Dominic Walubengo Mr. Ashington Ngigi Mr. Stephen Njenga | Managing Director, Energy for Sustainable Dev., Kenya (Private Firm) Director, Forest Action Network, Karen Managing Director, Integral Advisory Ltd. (Consultant) Managing Director, Top-End Consultants Ltd |
| Thursday October 30 | Mr. David Kamau Mr. Fred Pertet | Rural Technologies Enterprises Limited, Rongai Olekasasi Tree Nursery, Rongai (Private Entrepreneur / Member, Tree Propagators Association) |

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CENTRAL, MI KENYA AND RIFT VALLEY REGIONS COVERED BY FIELD TRIP OF EVALUATION TEAM





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THE PRESENTATION OF PRELIMINARY FINDINGS BY CONSULTANT ON FRIDAY 31ST OCTOBER AT THE SAFARI CLUB, LILIAN TOWERS, NAIROBI

| | |
|------------------|----------------------------------|
| Charles Nyandiga | UNDP (Chairman) |
| Charles Gitundu | RETAP |
| Evans Kituyi | RETAP |
| Faith Odongo | Ministry of Energy |
| Paul Mbuthi | Ministry of Energy |
| Paul Njeru | Tree Biotechnology Program Trust |
| Stephen Njenga | Top-End Consultants Ltd |
| David Kamau | Rural Technology Enterprises Ltd |
| Olusegun Areola | Consultant (Presenter) |



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