



PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: FULL-SIZED PROJECT

THE GEF TRUST FUND

Submission Date: 4 September 2009

Resubmission Date: 4 November 2009

Resubmission Date: 22 December 2009

PART I: PROJECT IDENTIFICATION

GEF PROJECT ID:

PROJECT DURATION: 60 months

GEF AGENCY PROJECT ID: PIMS 4226; FAO 605679

COUNTRY(IES): Sri Lanka

PROJECT TITLE: Promoting Sustainable Biomass Energy Production and Modern Bio-Energy Technologies in Sri Lanka

GEF AGENCY(IES): UNDP, FAO¹

OTHER EXECUTING PARTNER(S): Ministry of Environment and Natural Resources; Forest Department (FD) Sri Lanka Sustainable Energy Authority (SEA)

GEF FOCAL AREA(S): Climate Change

GEF-4 STRATEGIC PROGRAM(S): CC-SP4: Adoption of modern and sustainable practices in biomass production, conversion and use for modern energy

NAME OF PARENT PROGRAM/UMBRELLA PROJECT (if applicable): N/A

INDICATIVE CALENDAR*	
Milestones	Expected Dates mm/dd/yyyy
Work Program (for FSP)	Mar 2010
CEO Endorsement	Mar 2011
Agency Approval Date	Apr 2011
Implementation Start	May 2011
Mid-term Evaluation	Dec 2013
Project Closing Date	Aug 2016

* See guidelines for definition of milestones.

A. PROJECT FRAMEWORK

Project Objective: Removal of barriers to realization of sustainable biomass plantation, increase of market share of biomass power generation mix and adoption of biomass based power generation technologies in Sri Lanka								
Project Components	Inv, TA, or STA ^b	Expected Outcomes	Expected Outputs	Indicative GEF Financing ^a		Indicative Co-Financing ^a		Total (\$) c = a + b
				(\$ a)	%	(\$ b)	%	
1. Policy Support for Effective Implementation	TA	Approved and implemented policies on promoting and supporting sustainable use of biomass in industrial thermal applications	- Developed policies and associated implementing guidelines/market based instruments to promote sustainable biomass markets and industrial fuel switching - Policymakers' endorsement of developed policies and implementing rules and regulations	146,250	23%	500,000	77%	646,250
2. Barrier Removal for Sustainable Fuel Wood Production and Supply	TA	- Technical support for fuel wood production including improved planting material and nurseries established. - Local biomass energy markets created	- Developed and disseminated guidelines on sustainable plantation management and quality of supply - Developed and operational information database	865,000	23%	2,950,000	77%	3,815,000

¹ Following FAO's submission of the first project, consultations were held with project proponents and the GEF Operational Focal Point in Sri Lanka. UNDP has recently submitted a similar PIF to the OFP, and it was agreed that UNDP and FAO would collaborate as co-Agencies on this new project. The MSP PIF submitted by FAO is therefore replaced by this joint proposal. **The previous FAO proposal is in the process of official withdrawal.**

			<p>on sustainable plantation management and quality of supply</p> <ul style="list-style-type: none"> - Demonstrated new biomass supply markets² - Negotiated land tenure to enable small farmers and cooperatives to engage in fuel wood plantations - Successful promotion of fuel wood supply as a livelihood option for low-income communities - Completed piloting of a certification scheme for sustainably produced fuel wood - Mechanism developed for the replication of demonstration projects 					
3. Enabling Environment for Fuel Wood Suppliers and Dendro Power Producers	TA	<ul style="list-style-type: none"> - Increased number of investment projects from commercial banks for fuel wood suppliers and dendro equipment Producers - Improved confidence among industrial sector on the feasibility, stability and economic benefits of sustainable fuel wood supply chains 	<ul style="list-style-type: none"> - Developed financial plan that combine, techno-economic feasibility, financial instruments, green funds etc to attract investment in dendro technology - Completed training courses/seminars for potential wood suppliers and commercial banks - Developed bankable proposals from fuel wood suppliers - Established and operational “One-stop shop” for information exchange, business deal reaching, investment - Completed advocacy programmes on economic benefits of switching to dendro-based energy for industrial activities 	425,000	22%	1,550,000	78%	1,975,000
4. Dendro-Power Technology Development	TA	<ul style="list-style-type: none"> - Enhanced knowledge of, and access to, dendro-power generation 	<ul style="list-style-type: none"> - Implemented total of demo for both power generation and thermal applications (total 	390,000	12%	3,000,000	88%	3,390,000

² For example, plantation waste, shelter belts, homes gardens, etc.

	technologies - Local manufacture of dendro-thermal system equipment - Local engineering firms providing quality maintenance services to dendro-thermal system facilities	4MW capacity) - Replicated independent dendro-thermal projects (total of 2 MW _e & 6 MW _{th} capacities) - Completed training programs on the local manufacture of dendro-thermal system equipment and innovative applications - Developed trouble shooting and , maintenance manuals for dendro-thermal system facilities					
5. Project Management			170,000	46%	200,000	54%	370,000
Total Project Costs			1,996,250	20%	8,200,000	80%	10,196,250

^a List the \$ by project components. The percentage is the share of GEF and Co-financing respectively of the total amount for the component.

^bTA = Technical Assistance; STA = Scientific & Technical Analysis.

B. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE and by NAME (in parenthesis) if available, (\$)

Co-financing Source	Cash	In-kind	Project
Project Government Contribution	\$ 1,250,000	\$ 2,310,000	3,560,000
GEF Agency(ies)	\$ 1,000,000	\$ 900,000	1,900,000
Private Sector	\$ 1740,000	\$ 1,000,000	2,740,000
Total co-financing			8,200,000

C. INDICATIVE FINANCING PLAN SUMMARY FOR THE PROJECT (\$)

	Previous Project Preparation Amount (a) ³	Project (b)	Total c = a + b	Agency Fee
GEF financing	0	1,996,250	1,996,250	199,625
Co-financing	0	8,200,000	8,200,000	
Total	0	10,196,250	10,196,250	199,625

D. GEF RESOURCES REQUESTED BY AGENCY (IES), FOCAL AREA(S) AND COUNTRY(IES)

GEF Agency	Focal Area	Country Name/ Global	(in \$)		
			Project (a)	Agency Fee (b) ²	Total c=a+b
UNDP	Climate Change	Sri Lanka	1,046,250	104,625	1,150,875
FAO	Climate Change	Sri Lanka	950,000	95,000	1,045,000
Total GEF Resources			1,996,250	199,625	2,195,875

PART II: PROJECT JUSTIFICATION

A. STATE THE ISSUE, HOW THE PROJECT SEEKS TO ADDRESS IT, AND THE EXPECTED GLOBAL ENVIRONMENTAL BENEFITS TO BE DELIVERED:

³ Include project preparation funds that were previously approved but exclude PPGs that are waiting for approval.

Sri Lanka depends largely on imported oil and firewood to meet its energy requirements. Large dam hydroelectric plants were once the main source of electrical energy. Today, diesel-fuelled thermal power plants provide the major share of the power requirements to the central grid.⁴

In 2005, about 48% of the primary energy supply in Sri Lanka was from biomass. According to the Sri Lanka Energy Balance Report for 2007 (Sustainable Energy Authority, 2009), a total of 12,200 tons of fuel wood was used out of which 3,800 tons were used in the industry sector. Also the use of fuel wood in the industry sector increased from 1,300 tons in 1980 to 3,800 tons in 2007, a threefold increase between 1980 and 2007.⁵ Almost 90% of Sri Lanka's industrial SMEs use wood for thermal energy^{6,7}. These are largely small and medium enterprises that convert fuel wood to thermal energy in kilns, boilers and other heat-based applications. Based on information provided by the Alternative Energy Division of the Ministry of Science and Technology, the current industrial thermal energy capacity is about 1,600 MWth. The total industrial thermal energy usage is about 10,400 GWh/year (@6,500 average annual operating hours), of which 77% is derived from fuel wood burning and 23% from petroleum fuels (mainly fuel oil).

The Action Plan of the Sustainable Energy Authority (SEA)⁸ proposes the replacement of 10% of the energy requirements of the industrial Small, Medium and Micro Enterprises (SMMEs) with biomass sourced from multiple sources –plantation fuel wood plus waste biomass. This translates in to a target of replacement of 400,000 MT (metric tons) of oil over the next five years.

The escalation of oil prices in 2008 undermined the profitability and competitiveness of many local enterprises. This has led to an increased demand for fuel wood as a source of cheaper energy. Due to the rapid and unstable fluctuation of oil prices in the recent years, demand for fuel wood has increased. The government also promotes the use of 'native' energy sources such as fuel wood against imported fossil fuels. Even larger industries, traditionally reliant on furnace oil or heavy industrial fuel have converted their processes to use wood. The increased demand for fire wood as an energy fuel has placed additional pressure upon forests (both natural and planted). A large firewood market is developing at the periphery of protected areas, especially in the biodiversity-rich wet-zone and there is a threat of increased deforestation to meet the increasing fuel wood demand. Where available, however, fuel wood is also not of required quality (especially due to high moisture content) or sufficient quantity to enable larger industries to confidently switch over to using fuel wood.

To meet this demand, and facilitate the remaining fossil fuel-using industrial SMEs move to change part of their current & future energy needs to dendro, it is necessary to develop fuel wood plantations and biomass supply chains.⁹ As for plantations, several government agencies promote multi-purpose fuel wood species which could be used as livestock feed and as soil conditioners/ mulching material. There is immense potential for fuel wood species in marginal, underutilized lands in outlying provinces and districts that are recovering from conflict- areas that largely depend on agriculture for livelihood. Much of this land is state owned, in the custody of agencies like Forest Department traditionally out of bounds to the villagers. The Forest Department is willing to sub-lease a larger extent of scrub lands in the eastern province for fuel wood/ mixed timber plantations on its existing farmer woodlot tenure sharing agreement. The use of abandoned farms or marginal lands unsuited for food crops would minimize land use conflicts.

More than 75% of the lands in Sri Lanka are owned by the State. In the Eastern province the possibilities are that State lands are being given to new settlements or given to business (individual or institutions) on long-term lease. The project will adopt a well accepted procedure to carry out long-term leases of crown lands that is in place to safe guard the interest

⁴ For power generation supply sector, by the year 2000, the total installed capacity of hydropower stations totaled about 1140 MW, and depending on the rainfall in different years, the proportion of electricity generated at hydropower plants has been varying from about 40% to 70% during the last five years. The shortfall is always provided by thermal power stations fuelled by petroleum products, such as fuel oil and auto Diesel. However the use of dendro power plants (fuel wood fired plants) supplied by fuel wood from dedicated energy plantations is still under experimentation in Sri Lanka. Source: Wijayatunga, P., Fernando, W.J.L.S., Shrestha, M.R. 2003. Greenhouse gas emission mitigation in the Sri Lanka power sector supply side and demand side options. *Energy Conversion fn Management* 44(3247-3265).

⁵ However, there are no recent estimates of the portion of sustainably produced fuel wood in the total wood consumption in industry.

⁶ Among these SMEs, electrical energy is sourced through the grid. Electrical energy is largely used for lighting/ air conditioning- while industrial thermal needs (boilers, kilns etc) are powered through wood.

⁷ Records of the Sri Lanka's Sustainable Energy Authority and Central Bank (2006/2007)

⁸ The SEA is a statutory body under the Ministry of Power and Energy

⁹ The surplus sustainably grown biomass that are available for energy production is estimated to be 3.3-5.0 million tonnes per year under the scenario characterized by: (a) an increase in the area under food production by 10 to 20% by 2010; and (b) a portion of the biomass demand projected for 2010 will be met from new plantations and the balance will be met by sustainable extraction from other sources including natural forests.

of the public as well as the investors. For the proposed project, it will be made sure that private sector investment on sustainably grown fuel wood plantation will be through the long-term leases where possibility of a conflict is remote.

Also at community level, UNDP has successfully implemented a number of community forestry projects where communities signed MOU's with Forest Department to use State lands for tree planning and income generation. A similar model also can be used to grow biomass at a larger scale for energy using state lands by organized communities (NGO mediated). At the small holding or household level, land use conflicts occur when new populations were moved in to areas previously occupied. In post conflict development, it is the previous inhabitants who are moving back to their lands. Government is already providing assistance, including the re-surveying support to re-issue their lost titles and deeds. Abandoned farm lands (small holdings) due to conflict will be re-cultivated by populations who were living in those lands before. Fuel wood cultivation will be mixed with food crop production either as under planting (such as in Coconut Cultivations) or as co-planting to provide structural support to food crops. Live fences, again using *Glycireedia* will be established to safe guard the boundaries of small plots.

In terms of sourcing other biomass, the proposed project would look towards existing entities in the agricultural and industrial sectors, including plantations, which produce a range of biomass by-products¹⁰ (currently discarded as waste and burnt in open fields) that could be converted to fuels through simple pre-processing technologies¹¹ and appropriate dendro applications.

The current biomass conversion practice in Sri Lanka is practically direct burning which is both inefficient and polluting. Direct burning leads to greater particulate pollution in addition to CO2 emissions. While modern biomass conversion technology (such as more efficient direct combustion technology and dendro gasification for thermal application or electricity) exists and has proven technological success; the general level of awareness, knowledge and expertise on dendro thermal technology in the country is confined to a very limited segment of engineering companies and few individuals.

The proposed project is intended to remove the major barriers to sustainable biomass production in dedicated fuel wood plantations; and the widespread application of dendro thermal technology both for power and thermal application purposes in the industry sector particularly the industrial Small, Medium and Micro Enterprises (SMMEs) in Sri Lanka to facilitate the realization of the significant potentials of the application of dendro-thermal energy in the sector particularly among the SMMEs. These barriers are: (1) Lack of sustainable supply of fuel wood in sufficient quantity and quality to meet the current and projected future replacement (i.e., fossil fuel to sustainable biomass) targets; (2) Lack of awareness and knowledge about modern biomass conversion technologies for industrial applications; (3) Lack of fiscal or tax incentives to bridge the gap between enabling policy and its effective implementation/enforcement; and, (4) Lack of business links or financial matching between supply and demand of sustainably grown fuel wood and other biomass resulting in a lack of confidence for local energy markets. The proposed project will address these barriers by designing appropriate policy instruments and tools, by demonstrating integrated plantation models, enhancing sustainable biomass market potentials, and efficient supply chain and fuel wood thermal conversion technologies. The project will comprise of four major components, each addressing one or more of the above mentioned barriers.

Component 1: Policy Support for Effective Coordination and Implementation – This component is intended to address barriers related to the lack of supply of sustainably produced fuel wood in the industrial sector. The main outcome is a set of approved and implemented policies that promote and support the use of sustainably produced fuel wood in industrial dendro power generation and thermal applications. The expected outputs that will help realize this outcome are: (1) Developed policies and associated implementing guidelines/market based instruments to promote sustainable biomass markets and industrial fuel switching; and, (2) Policy makers' endorsement of proposed policies and implementing rules and regulations. To deliver these expected outputs, the following probable activities will be carried out under this component: (a) setting up a coordinating mechanism within the current institutional setup to introduce the right mix of policy and market instruments, legal support and fiscal incentives through different departments and agencies working on the ground; and (b) conduct of policy advocacy activities, including lobbying with central and local authorities and important actors in the industry and forestry sectors. These activities will be carried out with the key ministries such as Environment, Energy, Plantations, Forestry, Industries and Rural Development.

¹⁰ Such as wood shavings, paddy husk, straw, coconut frond, tea pruning, etc.

¹¹ Chopping, drying and packing for transport. Items treated are coconut shells, coconut husks, paddy husk and wood chips.

Component 2: Barrier Removal for Sustainable Fuel Wood Production and Supply¹² – This component is comprised of activities that will address technical and coordination issues that hinder large scale fuel wood plantations and biomass supply chain development. It is designed to address the lack of confidence in both supply (fuel wood production/ sourcing biomass) and demand (industrial needs) sectors by raising awareness, developing standards and a mandatory certification schemes¹³, demonstrating viability of plantations through a livelihood-based approach. The aim is to demonstrate commercially viable and innovative models for fuel wood supply in partnership with the Forest Department and other land-owning agencies, i.e., plantation companies.

The envisioned activities under this component include: (a) developing a set of guidelines and information notes on quality criteria for plantation management and harvested fuel wood, including practical know-how for nursery establishment, planting cycles, harvesting, chopping drying and finally packaging and transporting the wood in a manner that lends to direct and easy use in multiple sectors; (b) pilot demonstration projects undertaken for new biomass-generating ventures such as sustainable plantations in shelter belts, homes gardens, waste biomass key agricultural sectors etc); (c) Land tenure negotiated with Forest Department to enable community organizations and small entrepreneurs to try out new business models for fuel wood plantations in scrub lands; and, (d) design, approval and implementation of a mandatory certification scheme for sustainably produced fuel wood.

Component 3: Enabling Investment Environment for Fuel Wood Suppliers and Dendro Power Producers– This component is primarily aimed at building the enabling environment for commercial investment for fuel wood suppliers and dendro power manufactures, in order to build a larger local market for sustainably grown fuel wood.¹⁴ The expected outcome from this component is increased number of investment projects from commercial banks, and increased the confidence in the industrial sector on the longer term sustainability of supply. The interventions that will be carried out under this component entails, (a) provision of support in the development of financial plans and techno-economic feasibility analyses for dendro-power producers to invest in dendro power technology; (b) conducting training courses and seminars targeting potential wood suppliers, and commercial banks, (c) development of the instruments and preparation of a pilot financial mechanism based on participating commercial banks' lending requirements¹⁵ to deliver a concrete result, which is a set of bankable dendro-thermal power project proposals for financing by the commercial banks. This component would also support information and advocacy through the establishment of a 'one-stop shop' function and office for various purposes such as updated information sharing/exchange between supply and demand sides, 'match-making' of fuel wood supplier and industry sector demand, investment opportunity seeking between financiers and industry. Advocacy programmes will also be conducted to build confidence in the financial and industry sectors with regard to the financial viability of fuel switching.

Component 4: Dendro Power Technology Development: The expected outcome of this component is the commercialization of improved and modern dendro energy technologies for heat applications in the industrial sector, especially Small, Medium and Micro Enterprises (SMMEs) in Sri Lanka. GEF resources will be used to finance incremental activities that would ensure the effective implementation of the pilot dendro-thermal power plants. The pilots are intended to demonstrate to the government and the private sector (particularly in the energy, industry, and banking/financial sectors) the techno-economic viability and benefits of dendro-thermal power generation. The demonstrations will be carried out to showcase the planning, design, engineering, financing, installation, operation, maintenance and performance evaluation of specific dendro-thermal technology applications (both for power and thermal energy production and utilization). The demonstrations will consist of an overall total of 1 MW_e installed capacity of dendro-thermal power generation units, and a collective total of 3 MW_{th} installed capacity of fuel wood-fired thermal

¹² This component will be implemented and managed by FAO (UN Food and Agriculture Organisation).

¹³ There will be a pilot to implement the scheme based on which a national level mandatory certification system will be developed.

¹⁴ One of the critical assumptions that the proposed project is making is credit or cash availability in the Sri Lankan economy for this type of industrial activity. Although solid, supporting data shall be collected and developed during the proposed PPG stage, through various consultations with the local stakeholders, it is a unanimously shared view that there is a large investment potential for this type of industrial activity. It is, if not totally, because of the heavy Sri Lankan taxation on oil. For example one liter of refined petrol in Sri Lanka is over a dollar, more than twice as expensive as the regular international market price. Thus fuel switching to native and cheap sources will remain an attractive option for Sri Lankan industry.

¹⁵ Such funds and financial assistance programs (that the project will help develop) shall form part of the project and the value of the funds allocated by the participating commercial banks, which will form part of the co-financing for the project.

equipment such as boilers, furnaces and kilns. Preliminarily, these planned demonstrations will be on the following applications for power and heat production:

- One unit 1 MW dendro-thermal cogeneration plant rated at 250 kW_e and 750 kW_{th} (for meeting simultaneously on-site electricity and thermal requirements)
- Three units of 250 kW_e dendro-thermal power generation units
- Three units of 750 kW_{th} dendro-thermal units for steam generation, product drying, and process heating in furnaces/kilns.

Below is the summary the specifications of the preliminarily identified demonstrations (electricity generation and thermal energy production)

Demo for electricity generation

Total electricity generation capacity (for 4 demo sites)	1	MW _e
Annual electricity generated	6,500	MWh
Annual CO2 emission reductions	3,900	t CO2
Annual biomass fuel needed	10,075	tonnes

Demo for thermal application

Total thermal capacity (for 4 demo sites)	3	MW _{th}
Annual thermal energy needed	70	TJ
Annual CO2 emission reductions	5,300	t CO2
Annual biomass fuel needed	4,682	tonnes

The total installed capacity for the demonstrations is 4 MW. The direct emission reductions from these demos amount to 9,200 t CO2e/year.

The direct CO2 emission reduction attributable to the project shall come from the abovementioned demonstrations that will be carried out under the project. The electricity produced from the demonstrations will displace the fossil fuel-based electricity supplied from the grid (@ 0.6 ton CO2/MWh) with the estimated annual 3,900 t CO2e emission reduction. The thermal energy produced from the 4 demos will be used for supplying thermal energy requirements such as in steam generation, process water heating, process drying, or process heating in furnaces/kilns. This will replace the fuel oil that is typically used for providing such thermal energy requirements. The estimated annual 5,300 t CO2e emission reduction translates to an annual fuel oil savings of about 1,876.4 klits.

Also as planned, there will also be independent/private dendro-thermal energy projects (power, thermal, or power & thermal) that will be directly assisted by the project during the feasibility study and basic design and possibly in the engineering design phases. Such projects are expected to collectively generate CO2 savings in the order of about 18,400 tons/year. Such amount can be attributed to the proposed project as direct-post project CO2 emission reductions.¹⁶ In total, the estimated direct and direct post project CO2 emission reductions through the demonstration will achieve about 276,000 tons.

For the supply side, the co-financing is indeed for the associated cost for dedicated plantations and producing fuel wood. For example in the case of the dendro-thermal energy demonstrations, in order to serve the total sustainably produced fuel wood that are needed (i.e., 14,757 tonnes/yr), at least 590 hectares of plantation for sustainably grown fuel wood are required. The investment cost for a plantation is on average US\$ 434/ha and the operational cost to produce sustainable

¹⁶ The financial plan for the demonstrations (investment costs, project implementation schedule) and the cost of the incremental activities that will be carried out in support of, and in facilitating the demonstrations will be finalized during the PPG exercise. The incremental costs for technical assistance/capacity building for other prospective dendro-thermal project proponents will also be finalized during the PPG exercise for this GEF-assisted project.

biomass is about US\$ 9.0/tonne . In this case, the total investment cost, which represents part of the co-financing for Component 2 is US\$ 526,000 (assuming harvesting only in the last 2 years of the project).

These are meant to increase their confidence on the technology; build local capacity to service the envisaged demand from industrial sector; and, develop capacity to manufacture and maintain dendro-thermal units. To deliver the necessary outputs that would help realize the expected outcome from this component of the project, the following activities are envisioned: (a) Development of a database of technical capacities (local and abroad) for industrial dendro thermal applications; (b) Development of the local technical expertise to identify, design, manufacture and maintain dendro thermal applications suited to local conditions; and, (c) Provision of technical assistance in the design, engineering and installation of demonstration replications and long-term sustainability of modern bio-energy technologies in Sri Lanka.

B. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH NATIONAL/REGIONAL PRIORITIES/PLANS:

The proposed project is in line with various policies and programs of the GoSL in the area of energy development and utilization, forestry and sustainable development. Primarily, it is accordance with Sri Lanka's Energy Policy (October 2006) that prioritizes indigenous forms of energy and seeks to reduce the country's dependence on fossil fuels- which are 100% imported. That policy firmly states the goal of replacing by 2015 about 10% of current industrial fossil fuel use with renewable energy sources such as solar, small hydro, wind and biomass. Of these RE resources, biomass has the highest potential to meet the replacement target in six years¹⁷. The proposed project will also benefit from introduction of a new tariff structure for the purchase of RE electricity under the Sustainable Energy Authority (SEA) of the Ministry of Power and Energy. The extremely attractive buy-back rates¹⁸ which include a portion of capital cost recovery has spurred the interest of the private sector to invest in grid-connected electricity generation from renewable energy sources such as biomass. This will create new and additional markets for locally grown and locally sourced biomass.

On the plantation development aspect, the multi-purpose fuel wood species, *Gliricidia sepium*, has been declared as the fourth plantation crop (after tea, rubber and coconut) by the Ministry of Plantation Industries. The Forest Department is currently looking at supporting energy plantation development by providing planting material and other technical support to convert scrub lands currently under Forest Department in to mixed timber/energy plantations under shared tenure with local farmers. Other land owning agencies such as Ministry of Plantation Industries is also willing to support energy crops on marginal lands in their control. All of these initiatives present a very good opportunity for the proposed project to contribute to the realization of the potential global environment benefits from the forestry and plantation sectors.

Lastly, the proposed project is in accord with Sri Lanka's Ten Year Development plan, which also looks favorably upon energy plantations. The trust of this development plan being poverty reduction, food and energy security, there is great emphasis on increasing land productivity, agricultural diversity and home-grown energy¹⁹.

C. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH GEF STRATEGIES AND STRATEGIC PROGRAMS:

This proposed project falls within the scope of SP 4 – “Promoting sustainable energy production from biomass.” As per the objectives of SP 4, it will lead to the adoption of modern and sustainable practices in biomass production, conversion and use.

The activities of this project meet the Strategic Objective 5 listed under mitigation in GEF 4, which is to *promote the provision of renewable energy for provision of rural energy services*. This project's demonstration activities for sustainable energy plantations that support rural livelihoods and protect biodiversity, and modern technologies for biomass conversion in to heat and electricity sit squarely within programme priorities. Great emphasis will be placed on the sustainability of plantations and supply side keeping in mind GEF's sustainability principles. Avoided deforestation and soil degradation as well as reduced GHG emissions will all be outcomes of the project. Demonstration of biomass supply side will be designed to address the combined issues of rural livelihood development, food and energy security

¹⁷ Discussions with Ministry of Power and Energy and Sustainable Energy Authority (2008)

¹⁸ The current buying price is around US \$ 0.07 per kWh and with the new policy biomass buying price will be around US \$ 0.13

¹⁹ In page 62 and 63, it states “Energy Security of the country ... will be treated as high priority,” and “Dendro energy projects will be developed in the dry zone as a rural industry”

with the aim of reducing stress on the remaining natural forests for fuel wood. Technology development will prioritize low-cost, low-GHG-emitting gasifiers with high efficiency ratio.

D. JUSTIFY THE TYPE OF FINANCING SUPPORT PROVIDED WITH THE GEF RESOURCES:

There will be mainly grant-based financing support for this project. Inasmuch as most of the activities are for the removal of barriers, the GEF grant are mainly allocated for such incremental activities that would help facilitate the widespread adoption of dendro-thermal power generation as an alternative form of heat and electricity production in Sri Lanka. Any other type of investment support particularly regarding application and testing of the dendro gasification technology demonstration will be done by the private sector companies as their co-financing to the project. As organizations for capacity development and technical assistance, UNDP and FAO implement these types of financing support to developing countries like Sri Lanka.

E. OUTLINE THE COORDINATION WITH OTHER RELATED INITIATIVES:

The project would build upon the experience of a number of previous donor-funded initiatives that sought to develop biomass potential in Sri Lanka. Through a Thematic Thrust Fund (TTF) funded project in 2003-2004, UNDP built the capacity of SEA (then called the Energy Conservation Fund) to successfully demonstrate the viability of biomass-to-energy technology. The project looked at different conversion technologies for wood, municipal waste and agriculture waste; at grid-connection of biomass power and technologies related to ensuring supply quality. The proposed GEF project would base its technological component on the demonstrated models of this TTF-funded initiative.

In 2005 the European Union implemented a project to popularize the used waste agricultural material and harvested wood for biomass energy through research and developing strategic alliances between Asian and European countries to share technologies and experience. The proposed GEF project would benefit from the professional capacity building and networks created through this EC funded initiative, especially the expertise of Bio Energy Association of Sri Lanka (BEASL).

Both the SEA and BEASL are core stakeholders of the proposed project and have played a key role in project development, identification of barriers and activities.

The new funding cycle of World Bank's RERED (Renewable Energy for Rural Economic Development) project would also include refinancing support for grid-connected renewable energy. RERED essentially provides support through medium to long-term loan finance to private establishments, NGOs, co-operatives and individuals for grid connected and off-grid community-based or household-based renewable energy projects. This project would bridge some financial/investment barriers for energy entrepreneurs and complement the work of the proposed GEF project especially in technology adoption and establishing ready markets for harvested and processed fuel wood.

On the biomass production side, FAO has had a long history of working with the Department of Forestry including support for development of the Master Plan for the sector. Currently, FAO is implementing an integrated agriculture, forestry, fisheries project in the east as well as a number of projects related to agriculture development. Opportunities for livelihood improvement through agroforestry development in support of biomass production will be elaborated and improved supply developed.

A concurrent project, also coordinated by the SEA is an energy policy research initiative funded by Practical Action (UK). This project would also fund some important baseline studies on bio resources availability, market and value chain analyses and suitable delivery models.

F. DISCUSS THE VALUE-ADDED OF GEF INVOLVEMENT IN THE PROJECT DEMONSTRATED THROUGH INCREMENTAL REASONING :

Without the GEF project, the barriers between policy and practice would continue to impede the development of biomass energy to its full potential. Although the Sri Lankan government's commitment and enthusiasm for modern biomass energy remain high, different segments -supply, markets and technology- would develop ad hoc through different donor-

driven projects instead of in an organically, coordinated manner. Without the project-sponsored inter-ministerial coordination it would be difficult to address issues such as sustainable planting and efficient supply chain, since these cut across mandates of multiple government agencies such as Plantation Industries, Agriculture, Environment, Power and Energy etc. The ongoing project by the World Bank, RERED, mainly focuses the financial and technology side, whereas through this GEF project, equally or more important element of stabilizing the biomass supply and fuel wood plantations will be tackled by making sure that local organizations and entrepreneurs are able to cater to the rising industrial demand. Fragmented interventions are seen but there has not yet been an activity that connects supply and demand, and increases the level of awareness and market potential of biomass based energy application.

G. INDICATE RISKS, INCLUDING CLIMATE CHANGE RISKS, THAT MIGHT PREVENT THE PROJECT OBJECTIVE(S) FROM BEING ACHIEVED, AND IF POSSIBLE INCLUDING RISK MITIGATION MEASURES THAT WILL BE TAKEN:

While all efforts will be done to ensure the successful implementation of the project, there are certain risks that are anticipated. The risks that might prevent the project objectives from being achieved include

ISSUE	LEVEL OF RISK	RISK MANAGEMENT
(1) Supply chain disruptions due to plantation production failure, time constraints, extreme weather shifts and biomass quality issues.	M	The project will build upon existing research and use local knowledge on biomass availability and work with existing local co-operatives, private sector plantation companies, government agencies that specialize in plantation techniques.
(2) timing of the availability of co-financing	L	All effort will be made to ensure the placement of co-financing from the GOSL agencies and private companies prior to beginning project activity.
(3) impact of civil conflict on enabling environment	M	Albeit the recent declaration of ending of the conflict, the project will only work on those sites that have been made sure of its safety and stability and in locations where UNDP already has adequate field presence.
(4) competition with food crops	L	Unproductive bare or marginal lands, mostly belong to State, will be used in the project. These lands are not being used for food crop production due to the low productivity and lack of sustainability. Therefore large scale energy plantations, community led initiatives and small holder level biomass production in those barren lands will not affect food production. Moreover, the national potential for Dendro power in Sri Lanka is estimated as in excess of 4000 MW that could generate about 24,000 GWh of electricity annually. This project is expected to influence the installation of a cumulative 54 MW dendro-thermal capacity for power generation in Sri Lanka 5 years after the project. This clearly demonstrates that the risk of competition with food crops is not significant.

H. DESCRIBE, IF POSSIBLE, THE EXPECTED COST-EFFECTIVENESS OF THE PROJECT:

The proposed approach of removing barriers is considered as the most cost-effective compared to other alternative approaches to facilitate the wide scale application of dendro thermal power generation. The project entails an integrated approach of addressing the barriers to dendro thermal power generation in Sri Lanka. The proposed project targets the realization of at least 10% increase²⁰ in the national energy mix, which is to be facilitated through the barrier removal activities and other described capacity building and technical assistance activities. The total direct and direct-post project CO2 emission reductions expected to be achieved by the project (assuming 10 years useful life of each installed facility) is

²⁰ Data in the year 2008 is assumed as the baseline, the total electricity demand of industrial sector is 32% (2,678 GWh of the total of 8,418 GWh in Sri Lanka). That means the project is aiming for an installed capacity of 54 MW (10% of the total electricity demand is 268 GWh to be obtained through dendro thermal operations. This 10% refers to the current electricity demand (supplied from the grid) of the industrial sector in Sri Lanka that can be replaced by electricity produced from dendro-thermal power generation. As for the thermal applications, the proposed demonstrations will facilitate the necessary actions to address the various aspects of the deployment of dendro-thermal technology (from design, financing, installation up to operation) in Sri Lanka, and to promote the application of the technology to meet both the electrical and thermal requirements of Sri Lankan industries with the use of the sustainably produced biomass/fuel wood resource.

about 276,000 tons, which translates to an approximate unit abatement cost (UAC) of US\$7.85/ton CO₂ (i.e., GEF\$ per ton CO₂). This measure of the project's cost effectiveness (i.e., UAC) will be tracked using a monitoring and evaluation system that the proposed project will develop. This preliminary UAC figure will be re-evaluated and updated during the project design particularly in quantifying the potential energy savings from the confirmed demonstration projects and projected replications and in coming up with the CO₂ emission reduction estimates. The updated CO₂ emission figures and UAC will be indicated in the project document that will be submitted later for CEO endorsement.

I. JUSTIFY THE COMPARATIVE ADVANTAGE OF GEF AGENCY:

This proposed GEF-supported technical assistance and capacity building project of the MENR along with the Sustainable Energy Authority (SEA) of Sri Lanka will be implemented through combined efforts of UNDP and FAO.

UNDP is currently implementing similar GEF-assisted projects in the Asia and Pacific region on biomass energy market transformation and technology (e.g. Thailand, India, and Malaysia). The proposed project activities do not include investment-related activities, which are the expertise and comparative advantage of the WB and ADB. The project does not require intensive investments on the part of the project partners who will benefit from the project interventions.

FAO's support to bioenergy includes the International Bioenergy Platform (IBEP) and hosting of the new Secretariat of the Global Bioenergy Partnership. The Organization also is participating in a number of relevant activities that include: (i) evaluation of productive uses of renewable energy; (ii) assessing climate change mitigation in agriculture and forestry through carbon sequestration, substitution and conservation; (iii) promoting capacity building in developing countries on climate change issues; (iv) contributing to the development and adoption of strategies promoting the sustainable management of natural and planted forests, including forest health and wildfire prevention and control; (v) evaluation of a range of options available in support of adaptation to climate change; and (vi) assessing the potential of Payments for Environmental Services to contribute to poverty reduction (also relevant to biodiversity and land degradation).

Implementation Arrangements for GEF FSP on Biomass Energy Production

The GEF agencies are FAO and UNDP. National Implementing Partner is Ministry of Environment and Natural Resources (MENR). Forest Department and Sustainable Energy Authority are the two key technical partners. Primarily FAO will work with Forest Department on the biomass supply chain development (Component 2) while UNDP will work with Sustainable Energy Authority on policy, financial barrier removal and technology development.

According to the PIF, FAO will disburse US\$ 950,000 through component two while UNDP will disburse US\$1,046,250. Project Management Costs amount to US\$ 170,000 in GEF resources. The Agency Fee (US \$199,625) will be divided between the two GEF agencies.

A project board would be set up at the PPG stage chaired by Secretary, MENR or his designate. Director General Sustainable Energy Authority, Conservator of Forests, UNDP and FAO would be permanent board members. Other agencies, projects, private sector will be co-opted as necessary.

The PPG stage of the project will be handled by UNDP. The FAO country office, in close consultation with the technical staff in the Regional Office for Asia and the Pacific and FAO Headquarters, will play a major supporting role in the development of the Project Document through regular consultations with the PPG team.

The Ministry of Environment and Natural Resources will establish a project management unit under the Planning Division. This unit will coordinate with both state agencies and report to both UN agencies on the progress of the respective components. The funding allocation, financial disbursement systems and monitoring and reporting systems will be elaborated in the Project Document prepared during the PPG.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):

(Please attach the country endorsement letter(s) or regional endorsement letter(s) with this template).

NAME	POSITION	MINISTRY	DATE (Month, day, year)
Mr. M.A.R. D Jayathilake	GEF Operational Focal Point	Ministry of Environment and Natural Resources	

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies and procedures and meets the GEF criteria for project identification and preparation.

Agency Coordinator, Agency name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
John Hough Deputy Executive Coordinator, UNDP-GEF		December 22, 2009	Takaaki Miyaguchi, UNDP Regional Technical Specialist – Climate Change	+66-2288-2674	takaaki.miyaguchi@undp.org
Barbara Cooney FAO GEF Coordinator Email: Barbara.Cooney@fao.org Tel: +3906 5705 5478			Patrick Evans, FAO Resident Representative Colombo	+94-11-2580798	Patrick.Evans@fao.org