

# INTERNATIONAL TROPICAL TIMBER ORGANIZATION

## ITTO

### PROJECT DOCUMENT

TITLE:	DEVELOPING SUPPLY CAPACITY OF WOOD-BASED BIOMASS ENERGY THROUGH IMPROVED ENABLING CONDITIONS AND EFFICIENT UTILIZATION OF DEGRADED FOREST LANDS INVOLVING LOCAL COMMUNITIES IN NORTH SUMATRA PROVINCE OF INDONESIA
SERIAL NUMBER:	PD 737/14 <b>Rev.2</b> (I)
COMMITTEE:	FOREST INDUSTRY
SUBMITTED BY:	GOVERNMENT OF INDONESIA
ORIGINAL LANGUAGE:	ENGLISH

#### SUMMARY:

Indonesia is currently striving to increase its supply of renewable green energy and targeting to install 810 MW of renewable power generating capacity by year 2025 part of which is expected to be generated by the forest sector. This proposed project aims to **increase the contribution of the forest sector to renewable energy supply and regional economic development through increased supply of wood-based biomass energy.** Its specific objective is to improve enabling conditions for building up supply capacity of wood-based biomass energy in North Sumatra region by efficiently utilizing existing forest resources through development of energy forests on degraded lands involving local communities.

The expected outputs of proposed project are i) development of sustainable supply of energy wood initiated, ii) skillful manpower for development of wood-based biomass energy available, and iii) investment in wood-based energy industry development promoted. The project will be implemented in close collaboration with local governments, local communities, private sector and other partners.

EXECUTING AGENCY: DIRECTORATE GENERAL OF FORESTRY UTILIZATION **MANAGEMENT (BUK)**, MINISTRY OF FORESTRY

COLLABORATING AGENCY: INDONESIAN SAWMILL & WOODWORKING ASSOCIATION (ISWA)

DURATION: 48 MONTHS

BUDGET AND PROPOSED SOURCES OF FINANCING:

SOURCE	CONTRIBUTION IN US\$
ITTO	<b><u>590,352</u></b>
Govt. of Indonesia/ ISWA (in kind)	<b><u>197,150</u></b>
<b>TOTAL</b>	<b><u>787,502</u></b>

## Project Brief

Indonesia is experiencing shortage of energy supply, especially electricity. As result, many regions, including North Sumatra, have not been able to develop their economies as planned. This is particularly true in rural areas, remote regions and isolated small islands. In addition energy supply is relying heavily on coal, fossil fuel generated power plants that are not environmentally friendly and price of electricity has to be subsidized in order to be affordable by general consumer to buy.

The national policy objective is to increase share supply capacity of renewable energy from the present 7% only to 15% in 2025 by building up power plants of 810 MW across the country. To achieve this policy objective, the forest sector is expected to take part in by efficiently utilizing available forest resources.

The key problem facing the forest sector in general, in North Sumatra region in particular, is that enabling conditions for building up supply capacity of wood-based biomass energy are evidently weak due to undeveloped source, unsustainable supply of energy wood, lack of competent manpower and lack of investment. These problems therefore need to be removed if the forest sector is ever to increase its capacity in the supply of renewable energy.

The development objective of proposed project is to increase contribution of the forest sector to renewable energy supply and regional economic development through increased supply of wood-based biomass energy; its specific objective is to improve enabling conditions for building up supply capacity of wood-based biomass energy in North Sumatra region. This specific objective is to be achieved through delivery of three outputs namely, development of sustainable supply of energy wood initiated, skillful manpower for development of wood-based biomass energy available and investment in wood-based energy industry development promoted. In order to deliver these outputs, sixteen activities are planned to be implemented within a four-year project duration.

The project will be implemented in a collaborative manner. The main elements of implementation strategy to be adopted are:

- Securing long term supply of energy wood by initiating development of energy forests on unproductive state, community-owned and private lands involving local communities;
- Making available competent manpower for wood-based energy industry development by conducting training on needed skills at the technical and managerial levels. It should be understood that participants of technical trainings will be local farmers while of managerial trainings are government and industry managers;
- Promoting investment in wood-based energy development through dissemination of reliable information on markets and technologies for wood-based energy production as well as sustainability of raw material and availability of manpower;
- Establishing a stakeholder consultation forum (SCF). This forum is needed to facilitate communication and coordination among the parties concerned with wood-based energy development including government authorities, private investors and local communities. A well functioning SCF will facilitate exchange of information, experience and insights among the stakeholders; at SCF meetings, stakeholders may directly discuss various issues on wood-based energy development and provide useful inputs to enhancing policy making and improving project implementation operations; and
- Developing a sound internal monitoring plan to allow for an effective supervision of field operations that inputs to individual activities are timely procured in terms of quantity and quality, activities are completed as scheduled and any operational problems are timely detected and resolved without delay.

At project completion it is expected that the enabling conditions for wood-based energy industry development are significantly improved allowing realization of energy generation at reasonable cost and scale. In addition, job opportunity for and income of local communities will have been increased through investment in energy forest development and carbon emission reduced through tree planting on degraded lands and substitution of coal and fossil fuel with energy wood in energy production. Increased supply of renewable energy will enable rural and remote as well as isolated areas to progress more productively in their economic development.

The total budget of the project is estimated at US\$ **787,502** comprising contribution of ITTO and GOI in the amounts of US\$ **590,352** and US\$ **197,150**, respectively; the ITTO contribution is allocated **27.51 %** for project key personnel and **0.51 %** for procurement of capital items.

## List of Abbreviation and Acronyms

ASPAC Forum	=	Asia Pacific Regional Forum on Promoting Wood-based Bioenergy Using Wood Residues and Wastes, 14 -17 October 2008, Jakarta, Indonesia
CA	=	Collaborating Agency
CTA	=	Chief Technical Advisor
DG BUK	=	Directorate General of Forest Utilization Management
EA	=	Executing Agency
FS	=	Field Supervisor
IC	=	International Consultant
ISWA	=	Indonesian Sawmill & Woodworking Association
ITTA	=	International Tropical Timber Agreement
ITTO	=	International Tropical Timber Organization
LEO	=	Local Event Organizer
LG	=	Local Government
MOF	=	Ministry of Forestry of Indonesia
NC	=	National Consultant
NE	=	National Expert
NGO	=	Non-Governmental Organization
NSPFA	=	North Sumatra Provincial Forestry Agency
PC	=	Project Coordinator
PF	=	Project Finance
PFA	=	Provincial Forestry Agency
PFE	=	Permanent Forest Estate
PLN	=	The State Electricity Company
PMT	=	Project Management Team
PS	=	Project Secretary
RDI	=	Research and Development
RDPB	=	Regional Domestic Product Bruto
SCF	=	Stakeholder Consultation Forum
SFM	=	Sustainable Forest Management
UN	=	University
UNEP	=	United Nations Environment Programme

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## **PART 1. PROJECT CONTEXT**

### **1.1. Origin**

The information on national energy market recently released by the Ministry of Energy and Mineral Resources of Indonesia clearly reveals the problems facing the market which include: i) the ever growing consumption of energy and sluggish development of supply capacity, ii) high dependence of supply on fossil energy despite its limited reserve, iii) growing government subsidy on energy overtime, iv) sub-optimal utilization of renewable energies as well as weak energy conservation program, and v) weak mitigation of climate change relating to energy production and consumption processes.

In its efforts to overcome the problems, the Ministry has decided to implement policies on both the demand and supply sides of the energy market. On the demand side, the policy centers on improving efficiency in energy utilization from up-stream to down-stream, i.e. industrial, transportation, household and commercial sectors; on the supply side, the policy focuses on increasing new renewable energy share in national mix from the current 7 percent to 15 percent by year 2025. In fact, the government aims to install 810 MW of renewable biomass energy by year 2025 which include geothermal, bio-energy, hydro, wind and ocean energies.

The forest sector of Indonesia has a great potential to contribute to achieving the mentioned national energy supply target through generation of wood-based biomass energy using available forest resources. Heavy involvement of the forest sector in renewable energy supply is indeed justifiable at least for the following reasons:

- Recent in-depth assessment of the comparative economic and environmental advantages of various technologies and pathways for energy generation based on renewable energy resources (solar, wind, hydro, biomass) have delivered results very favorable for wood-based biomass;
- A comparative analysis in Germany as reported by the International Tropical Timber Organization (ITTO) to the ASPAC Forum in Jakarta in 2008 has shown that wood-based bio-energy (wood, woodchips) have a striking advantages over agriculture-based bio-energy (biofuels, biogas) in terms of CO<sub>2</sub> mitigation performance, CO<sub>2</sub> mitigation costs and other policy-relevant parameters. Therefore, there is a very reason for Indonesia to embark in wood-based biomass energy development program as a matter of priority;
- Indonesia has a huge capacity to support wood-based energy development by growing energy trees on degraded, unproductive lands both within and outside the permanent forest estates; and
- Wood-based energy development is consistent with the national development principles currently adopted by the government i.e. pro-growth, pro-jobs and pro-environment.

The origin of this proposed project is solely the initiative of ISWA and the Ministry of Forestry in their efforts to raise contribution of the forest sector to economic development through improved efficiency in use of forest resources; it is also a concrete follow-up action to the recommendation of the ITTO-sponsored "Asia-Pacific Regional Forum on promoting wood-based bio-energy using wood residues and wastes in tropical countries" held in Jakarta, Indonesia in October 2008. North Sumatra has been selected as the site for the project considering the supply shortage of electricity power that persists and the absence of commercial wood-based energy industry in the region. This project is designed for a 4-year duration to allow for observation of activities in one full rotation starting planting until harvesting.

### **1.2. Relevance**

#### **1.2.1. Conformity to ITTO's objectives and priorities**

##### ITTA 2006

The project aims to utilize unproductive lands for wood-based energy development wherein local communities will be heavily involved. The energy so developed is sustainable and will facilitate economic development of in rural and remote areas. In addition, poor farmers will have the opportunity to improve their livelihood through planting and selling of energy wood. Therefore, proposed project is consistent with Objective (c) of ITTA 2006 "contributing to sustainable development and poverty alleviation"

Under proposed project, enabling conditions for development of wood-based energy industry will be improved through provision of factors of production. In the process, employment opportunities will be

created, mostly in the supply feed the energy industry. Promotion of wood-based energy supply is amounting to promote forest industrialization and job creation. The proposed project is consistent with Objective (i) of ITTA 2006 “promoting increased and further processing of tropical timber from sustainable sources in producer member countries, with a view to promoting their industrialization and thereby increasing their employment opportunities and export earnings”.

Under proposed project, development of energy forests will be initiated. Such forests are to be established on unproductive, degraded state and community lands involving local communities. It is therefore reasonable to say that proposed project is in conformity with Objective (j) of ITTA 2006 “encouraging members to support and develop tropical timber reforestation, as well as rehabilitation and restoration of degraded forest land, with due regard for the interests of local communities dependent on forest resources”.

Under proposed project local communities, highly dependent on forest resources for livelihood, are the primary beneficiary. Poor local people will be trained on skills needed or energy forest development and for cooperative business management. The benefits accruable to poor local communities from forest resources will certainly serve as a strong incentive for these people to support sustainable forest management or sustainably manage community forest. The proposed project is, therefore, consistent with Objective (r) of ITTA 2006 “encouraging members to recognize the role of forest-dependent indigenous and local communities in achieving sustainable forest management and developed strategies to enhance the capacity of these communities to sustainably manage tropical timber producing forests”.

#### ITTO Strategic Action Plan 2013-2018

Among the project activities planned to be implemented are: to train local communities on skills for energy forest development including efficient harvesting techniques and for management of business cooperative including marketing of energy wood; to strengthened capacity at community level to add value to forest resource. It is therefore justifiable to conclude that proposed is relevant to Strategic priority 6 “build and develop human resource capacity to implement SFM and increase trade in forest goods and services from sustainably managed forests”

The proposed project deals with creating enabling conditions for development of energy forests on degraded lands involving local communities in order to increase contribution of the forest sector to national/local economies and improve livelihood as well as employment of local communities; thus the project is consistent with Strategic Priority 2 “increase the contribution of tropical forests to national and local economies, including through international trade”.

Under proposed project, energy forests will be established and sustainably managed in order to support sustainable wood-based energy industry. In this manner, forest are that is sustainably managed and legally harvested will be increasing, consistent with Strategic Priority 1 “promote good governance and enabling policy frameworks for strengthening SFM and related trade and enhancing SFM financing and investment”. Development of energy forests on degraded lands will increase the capacity to address climate change adaptation and mitigation through SFM and generate income stream from energy forests. Therefore, proposed project is in conformity to Strategic Priority 4 “reduce tropical deforestation and forest degradation and enhance the provision of environmental services.”

#### **1.2.2. Relevance to Indonesia’s policies**

The government of Indonesia has recently strengthened its policy commitment to green economy development concepts introduced by UNEP in 2011 as the basis for defining policy and strategic objectives of development programs and projects. The essential elements of the development concept are: sectoral development, including forestry, should be based on three basic foundations of green economy; i.e. low emission, resource efficiency and social inclusiveness. The proposed project deals with energy development by using energy wood planted on degraded lands; in effect, it is a means to reduce consumption of coal and fossil fuel thus lessens carbon emission. By planting trees on degraded lands, the project is also transforming the lands to become a productive asset thus increases resource use efficiency and benefits. In addition, the production of energy wood is to be accomplished with the heavy involvement of poor local communities living across the forest area. It is therefore reasonable to conclude that proposed project is consistent with the national policy on green economy development.

The Ministry of Forestry has launched eight priority programs on national forestry development for the 2010-2014 periods as follows:





ratio is much lower in some areas especially those remote districts in the south-eastern and western parts of the province and in isolated islands like Nias.

To ensure manageability of project operations, 3 out of 25 districts of the province have been selected as the project sites, namely Serdang-Bedagai, Mandailing-Natal, and Nias districts as shown on the map. It is to be noted however, that all planned outputs of the project will be applicable to the province as a whole but energy forest demonstration plots will be established only at 3 sites; and training will be carried out at these 3 sites for participants to be recruited from the entire province. That is to say that the specific objective of the project will be applicable throughout the province, not only to 3 districts selected for purpose of demonstration and training. The brief information on selected districts of project sites are presented in the sections to follow.

### 1.3.2. Social, cultural, economic and environmental aspects

#### (a). Social and cultural aspects

The extent of degraded forests and lands in North Sumatra province in 2011 was estimated by MOF (2012) at 1,14 million hectares, classified as critical (...%) and very critical (...%) condition. These degraded resources are currently of low productivity; degraded forests are poorly stocked with timber volume less than 20 M3/Ha. Most of the degraded lands are use for growing of cash crop using traditional techniques and some lands have been planted with palm oil yet with low productivity due mainly to the use of poor quality planting materials and lack of fertilization. The degraded forest resources therefore have contributed only little to local economies. Contribution of the resources can be significantly increased by adopting a better land use strategy taking into account the prevailing social, cultural, economic and environmental aspects of the project sites in view of improving livelihood of the local communities, economic as well as environmental conditions.

Compared to the crop estate sector, the role of the forestry sector in the project sites to local economies is less significant. This is particularly true in Serdang-Bedagai and Mandailing Natal districts where palm oil and rubber plantations provide significant share to the regional income. Degraded forest lands have been utilized unproductively due to employment of inappropriate agricultural techniques. It is therefore necessary to utilize degraded lands more productively in order to increase the role of the forestry sector in regional economic development.

#### Serdang-Bedagai

- Total population in 2010 was 594, 383 with a density of 313 people/sq km
- The population is dominated by Malayan ethnic (65%), followed by Javanists (13%), and Batak (10%) and some seven other ethnics

#### Mandailing-Natal

- Total population in 2011 was recorded at 413,750 people or a density of 61 people/sq km
- The population comprised primarily of Mandailing ethnic (80%), Malayan and (7%) and Javanists (6%) whom are mostly moslem

#### Nias

- The total land area is approximately 5625 sq km with a population of 700,000 or 124 people/sq km
- The population is dominated by Nias ethnic people called Ono Niha, mostly are Christian followers
- Around 90% of the population resides in rural areas doing subsistence agriculture activities

#### (b). Economic Aspect

#### Serdang-Bedagai

- The district economy grew at a rate of 5.98% between 2010-2011
- The total value of RDPB in 2011 was approximately US\$ 11 million giving per capita income of around US\$ 1,800
- The main source of income were agriculture (39%), industry (19%), trade and service (26%) and construction (10%)
- The apparent unemployment rate was recorded at 3% in 2011

### Mandailing-Natal

- The district economy grew at an average rate of 6.12% in recent years
- The RDPB in 2007 amounted to US\$ 2.3 million giving per capita income of around US\$ 546, among the lowest income in North Sumatra province
- The main source of income were agriculture (45%), trade (18%), services (15%) and manufacturing (3.5%)

### Nias

- The economic conditions of Nias in terms of growth and per capita income are probably the worst in North Sumatra province
- No official figures are available for illustration of recent economic condition. Per capita income in early 2000s was reported at US\$ 377 only. One of the Nias economic development observers indicated that Nias economy is in fact deteriorating due to the lack of economic infrastructure including electricity power and inappropriate development strategy employed
- The main source of income is agriculture sector but farming has been performed in a conventional manner, mostly for subsistence living

## **(c). Environmental aspect**

### Serdang-Bedagai

- The district does not pose with serious environmental problem due mainly to the topographic nature of land in general which varies from flat to undulating lands
- The atmosphere condition has been reported as relatively healthy with carbon dioxide concentration of around 0.03%

### Mandailing-Natal

- The elevation ranges from the sea level to 2,145 m; the topography is flat to mountainous
- A number of rivers originating from Bukit Barisan mountains flow through the district; among the big one are Batang Gadis, Siulangaling, and Perkampungan rivers
- The lands generally comprise fertile soils, invaluable asset for agricultural industry development

### Nias

- Nias island, comprising 4 districts, is blessed with rich natural resources in terms of agriculture land, tourism sites and ocean that surrounds the island
- The island was devastated by earthquake and tsunami disasters in December 2004 and March 2005 resulting in serious casualties including around 760 of deaths and heavy damage of settlements as well as social and economic infrastructure
- In fact, the earthquake and tsunami disasters have prompted international communities to help rehabilitate the island and raise attention of the central government to its development

## **1.4. Expected outcomes at project completion**

The specific objective of the project is to improve enabling conditions for building up supply capacity of wood-based biomass energy. The main intention of achieving this objective is to attract investors to make future capital investment in wood-based biomass energy development. To provide sustainable supply of the energy wood, energy forests will be developed on degraded lands with the involvement of local communities that have to be first trained on needed skills to allow for involvement.

It is therefore clear that at project completion, improved enabling conditions for development of wood-based energy industry will support achievement of national policy objectives of green energy development through efficient utilization of available forest resources. Development of energy forests on degraded lands will surely reduce carbon emission and at the same time open up larger job opportunity that will augment income of local communities. In addition, operation of power plants for manufacturing of wood pellets or generation of electricity power will also create large number of jobs thus increase income of local

communities and reduce carbon emission through reduced use of coal and fossil fuels. It is therefore reasonable to conclude that by achieving the specific objective and realizing investment in wood-based biomass energy, the project shall significantly contribute to acceleration of economic growth, creation of job opportunity and reduction of carbon emission consistent with the basic principles of national economic development adopted by the government.

## PART 2. PROJECT RATIONALE AND OBJECTIVE

### 2.1. Rationale

#### 2.1.1. Institutional set-up and organizational issues

Forest resource management is the domain of the Ministry of Forestry and its use for generation of wood-based energy is, consequently, its responsibility. In addition, district governments are also involved in the implementation of any wood-based energy development project because the Head of a district is the “landlord or land use regulator” responsible for allocating lands for forestry uses. Moreover, district governments are also the leading institutions in overall community development in their respective territories. As any wood-based energy project will engage local communities in energy wood supply related activities, involvement of local governments is inevitable.

As far as forest land use planning is concerned, there is a need to further strengthen coordination between the Ministry of Forestry and district government institutions. Lands to be allocated for energy forest development for instance need to be clearly defined by the relevant authorities in order to facilitate a realistic assessment of sustainable supply of energy wood materials. The somewhat weak past coordination between the institutions is to be strengthened under the project through formation and activation of a stakeholder forum.

It is important to note at this juncture that electricity power supply and distribution is the sole mandate of the State Electricity Company (PLN). As to date, PLN has been sourcing electricity mostly from its own-operated sources and partly from private producers through purchase contract scheme. In the event that wood-based biomass is to be converted to electricity, it is PLN that will purchase the power under agreed upon terms and conditions and it is this company that will distribute the power to general users. It must be admitted that communication and coordination between PLN and forestry authority as well as district governments are lacking to date; the issue that needs to be overcome under the project through improved communication.

**The Executing Agency of the project is the Directorate General of Forest Utilization Management (BUK) of the Ministry of Forestry; the project will be implemented in close collaboration with the Indonesian Sawmill & Woodworking Association (ISWA) and partnership with regional/local institutions including local governments, PLN, NGOs, Universities and R & D institutions.** By so doing, ownership of the project amongst stakeholders is expected to be strong and contribute to sustainability of the project.

**The institutions involved in the project implementation will be assigned well-defined tasks and responsibilities based on capacity of each in order to ensure achievement and avoid confusion as well as conflict during the implementation process. These institutions, as appropriate, will be included as members of the PSC that will meet regularly to ensure continued communication and better coordination overtime. Obviously, local communities will be playing significant role in the project by acting as trainees and laborers, as appropriate. Local communities will be equipped with needed skills for energy forest development; after project completion, these communities will serve as the suppliers of energy wood to energy industries yet to be developed under agreed upon terms and conditions.**

#### 2.1.2. Stakeholder analysis

A stakeholder consultative meeting involving the main stakeholders of wood-based energy had been organized by North Sumatra Provincial Forestry Agency (NSPFA) in Medan on 18 October 2013 during the project formulation process. The purposes of the meeting were to exchange information and experience relating to wood-based energy development, to obtain views and insights of the participants on the key problem to be addressed and to harmonize on needed interventions as well as implementation strategy.

It was found during the meeting that the main stakeholders were supportive of the project by providing invaluable information on landuse issues, their expectation from the project and effective collaborative strategy for project implementation. Results of the stakeholder analysis are summarized in Table 2.1.

Table 2.1. Results of stakeholder consultative meeting

Stake holders group	Main characteristics	Problems/needs/ interests	Potentials	Involvement in the project
<b>Primary stakeholders</b>				
<ul style="list-style-type: none"> <li>Local communities</li> </ul>	<ul style="list-style-type: none"> <li>Poor farmer</li> <li>Land hunger</li> </ul>	<ul style="list-style-type: none"> <li>Lack of skills for energy wood business</li> <li>Need alternative source of income</li> </ul>	<ul style="list-style-type: none"> <li>Farming conventional skills</li> <li>Local knowledge</li> <li>Energy tree grower</li> </ul>	<ul style="list-style-type: none"> <li>Member of SCF</li> <li>Primary beneficiary</li> <li>Trainees</li> <li>Executor of selected activities</li> <li>Respondents</li> </ul>
<ul style="list-style-type: none"> <li>Local private firms</li> </ul>	<ul style="list-style-type: none"> <li>Established market network</li> <li>Have access to capital</li> </ul>	<ul style="list-style-type: none"> <li>Lack of information on renewable energy business</li> <li>Lack of information on raw material</li> <li>Absent of skillful manpower</li> </ul>	<ul style="list-style-type: none"> <li>Investing in renewable energy industry</li> <li>Buyer of energy wood</li> <li>Forster father for community cooperatives</li> </ul>	<ul style="list-style-type: none"> <li>Member of SCF</li> <li>Primary beneficiary</li> <li>Trainees</li> <li>Participants of selected activities</li> </ul>
<ul style="list-style-type: none"> <li>District governments</li> </ul>	<ul style="list-style-type: none"> <li>Landuse regulator</li> <li>Leading institution of community development</li> <li>Strong influence but weak resources</li> </ul>	<ul style="list-style-type: none"> <li>Creating agric jobs</li> <li>Productive use of lands</li> <li>Increasing tax revenues</li> </ul>	<ul style="list-style-type: none"> <li>Can mobilize extension officers</li> <li>Adjustment to landuse plan</li> <li>Allocate needed lands</li> </ul>	<ul style="list-style-type: none"> <li>Allocation of suitable lands</li> <li>Member of SCF</li> <li>Trainees</li> <li>Primary beneficiary</li> </ul>
<b>Secondary stakeholders</b>				
<ul style="list-style-type: none"> <li>Ministry of Forestry</li> </ul>	<ul style="list-style-type: none"> <li>Responsible for forest management</li> <li>Forest policy maker</li> </ul>	<ul style="list-style-type: none"> <li>Undeveloped wood-based energy industry</li> <li>Lack of professionals</li> <li>Growing green economy</li> <li>Efficient use of forest resources</li> </ul>	<ul style="list-style-type: none"> <li>Experienced with ITTO projects</li> <li>Provided of counter budget</li> <li>Adjustment to landuse plan</li> </ul>	<ul style="list-style-type: none"> <li>Executing Agency</li> <li>Coordination</li> <li>Monitoring &amp; Evaluation</li> </ul>
<ul style="list-style-type: none"> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li>Familiar with rural conditions</li> <li>Grass root agent</li> </ul>	<ul style="list-style-type: none"> <li>Poverty alleviation</li> <li>Rural development</li> <li>Lack of material resources</li> </ul>	<ul style="list-style-type: none"> <li>Experienced field staffs</li> <li>Provider of technical assistance</li> </ul>	<ul style="list-style-type: none"> <li>Member of SCF</li> <li>Sub-contractors of selected activities</li> </ul>
<ul style="list-style-type: none"> <li>State Electricity Company (PLN)</li> </ul>	<ul style="list-style-type: none"> <li>Regularly electricity industry</li> <li>Monopoly company</li> </ul>	<ul style="list-style-type: none"> <li>Shortage of power supply</li> <li>Increasing supply of renewable energy</li> <li>Limited own supply capacity</li> </ul>	<ul style="list-style-type: none"> <li>Buyer of wood-based energy</li> <li>Investment in distribution infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Member of SCF</li> </ul>
<b>Tertiary stakeholders</b>				
<ul style="list-style-type: none"> <li>R&amp;D institutions</li> </ul>	<ul style="list-style-type: none"> <li>Strong R &amp; D mission</li> <li>Pool of knowledge</li> </ul>	<ul style="list-style-type: none"> <li>Lack of opportunity to do R &amp; D on renewable energy</li> <li>Technology development</li> </ul>	<ul style="list-style-type: none"> <li>Competence in policy analysis development</li> <li>Study on wood properties</li> </ul>	<ul style="list-style-type: none"> <li>Member of SCF</li> <li>Sub-contractor</li> <li>Trainer/consultant for selected activities</li> </ul>
<ul style="list-style-type: none"> <li>Universities</li> </ul>	<ul style="list-style-type: none"> <li>Education &amp; training oriented</li> <li>Pool of knowledge</li> </ul>	<ul style="list-style-type: none"> <li>Under used capacity</li> <li>Need broader practical opportunity</li> </ul>	<ul style="list-style-type: none"> <li>Competence in policy analysis</li> <li>Conduct training programs</li> </ul>	<ul style="list-style-type: none"> <li>Member of SCF</li> <li>Sub-contractor</li> <li>consultant</li> </ul>

Local communities, governments and private companies are the primary beneficiaries of the project. The local communities will have the opportunity to augment income through energy wood selling; local governments will be able to generate revenues from the forest sector; and private companies will be able to invest in wood-based energy industry for profit.

As appropriate, individual stakeholders will be involved in project implementation. For example, local communities will serve as respondents and trainees of particular activities; local private firms may use project findings to aid in investment decision making; and the district governments will be involved in land allocation process and approval. Involvement of stakeholders in project implementation is indeed essential for the smooth and successful project operations. It should be noted, however, that engagement of any stakeholders in implementation of particular activities should be made only through proper matching between competence and needed inputs.

### 2.1.3. Problem analysis

As highlighted in Section 1.1, the share of renewable energy in the national energy mix in 2012 was still very low, estimated at 7% only. The government is planning to increase this share to 15% by year 2025 and targeting to install 810 MW supply capacity of renewable energy. To realize this target, support and engagement of the forestry sector is very much expected.

It is well known that, as to date, North Sumatra region is experiencing short supply of energy, especially electricity, that protesting demonstrations on electricity black outs have been occurring in recent years because of its adverse effects on economic activities in general. The forest sector may contribute to lessening of this energy shortage problem through efficient utilization of forest resources for generation of wood-based energy.

Like in most regions of Indonesia, supply of wood-based biomass energy in North Sumatra region is indeed insignificant. Most of the wood-based energy is generated by existing wood industries only for own consumption primarily for boiler operation, not for public sales.

The stakeholder consultative meeting organized in Medan on 18 October 2013 and attended by forestry authorities and main stakeholders revealed that the limited supply of wood-based energy is the effect of weak enabling conditions for efficiently utilizing forest resources to supply wood-based energy. Therefore, the key problem to be addressed by proposed project is “weak enabling conditions for building up supply capacity of wood-based biomass energy in North Sumatra region”.

The stakeholder meeting identified three main causes of the key problem, namely i) sustainable supply of energy wood not secured, ii) scarce competent manpower for wood-based energy industry development, especially for energy forest plantation, and iii) lack of investment in wood-based energy industry development. It was argued by the consultative meeting that the first main cause is attributable to at least four problems, namely:

- i) Availability of land suitable for energy forest development is not identified in terms of extent and location despite the huge area of unproductive forest lands in North Sumatra, estimated at 1.14 million Ha in 2011, not all these lands are suitable and available for energy plantation forest development; energy tree species require distinct site characteristics because the species planted must be of very fast growing preferably harvestable within three years and must have high caloric content;
- ii) The tree species suitable for energy have not been adequately field tested in North Sumatra region through actual planting;
- iii) As the result of above problems, sustainable supply potential of grown energy wood is not known; and
- iv) Another causing problem is that potential supply of energy wood from non-forest sources like rubber and palm oil plantations has not been adequately assessed and documented.

**The existing degraded lands are the result of weak forest management strategy in the past including insufficient efforts and resources allocated for forest landscape rehabilitation and weak law enforcement. Efficient utilization of degraded lands is feasible through concerted actions of the primary stakeholders; i.e. the MOF, local governments, communities and private business sector.**

The second main cause of the key problem “scarce competent manpower for wood-based energy industry development, especially for energy forest plantation” was argued by the meeting participants as the consequence of three causing problems which are:

- i) The lack of interest of local communities in energy plantation forest development  
This is understandable considering the attractive land use alternatives primarily for palm oil and rubber plantation development. It is, therefore a matter of necessity to inform local communities of potential economic benefits of energy forest accruable to them. In this respect it is critical to emphasize the fact that energy forests can be established on state, community-owned and private lands. The lack of interest in energy forest is closely related to the absence of energy forest models in North Sumatra to demonstrate its growth and yield that facilitates exposition of energy forest benefits;

- ii) Lack of training on skills needed for wood-based energy development which is not surprising because this subject is a newly emerging business opportunity in the region; and
- iii) Similar to above problem, the absence of technical manuals on energy forest development which is also not surprising because energy forest was not an attractive landuse alternative for local communities and authorities.

The third main cause of the key problem “lack of investment in wood-based energy industry development” was identified by the consultative meeting as the result of five sub-causes, namely:

- i) Limited dissemination of information on wood-based energy markets and technologies. While the information might be available with different sources, it may not have reached stakeholders particularly prospective investors;
- ii) Lack of information on properties of energy wood species; the caloric content of energy wood species actually planted must be known as it will affect economic feasibility of converting the wood into energy;
- iii) Information on feasibility of investing capital in wood-based energy not available. This information is prerequisite to making investment decision; such information should exhibit long-term costs and benefits thus magnitude of expected profit from investment in alternative energy commodities like electricity and wood pellet;
- iv) Weak legal framework to promote investment at the regional and local levels. While national policy on renewable energy development is clearly developed, it is not clear yet how this policy is translated to technical policy by lower level governments. This is especially true as regards land allocation, investment licensing requirements and procedures as well as tax assessment policies; and
- v) Weak communication among stakeholders of renewable energy is weak due mainly to the lack of interest in wood-based energy business among the general stakeholders and lack of coordination by concerned authorities.

**It must be noted that the wood industry residues have been utilized mainly by the industries in generating power for own-use. Logging wastes are of low quantity as forest concessions in operation in the region are very few in number and collection cost might not justify use of logging wastes as raw material for energy industry. Therefore, the potential of wood wastes and residues in supporting renewable energy supply is obviously limited as a matter of fact.**

Above information on cause-effect relationship of the key problem is summarized in Figure 1, the problem tree. Correspondingly, solutions to the problems have been defined as summarized in Figure 2, the solution tree, which is the direct mirror of the problem tree. The solution tree has been used as the basis for defining the project elements as presented in appropriate subsequent sections noting that particular solutions presented in the solution tree diagram may require breaking down for purpose of clarity and sufficiency of activities to deliver relevant output (s).



Figure 1. Problem Tree

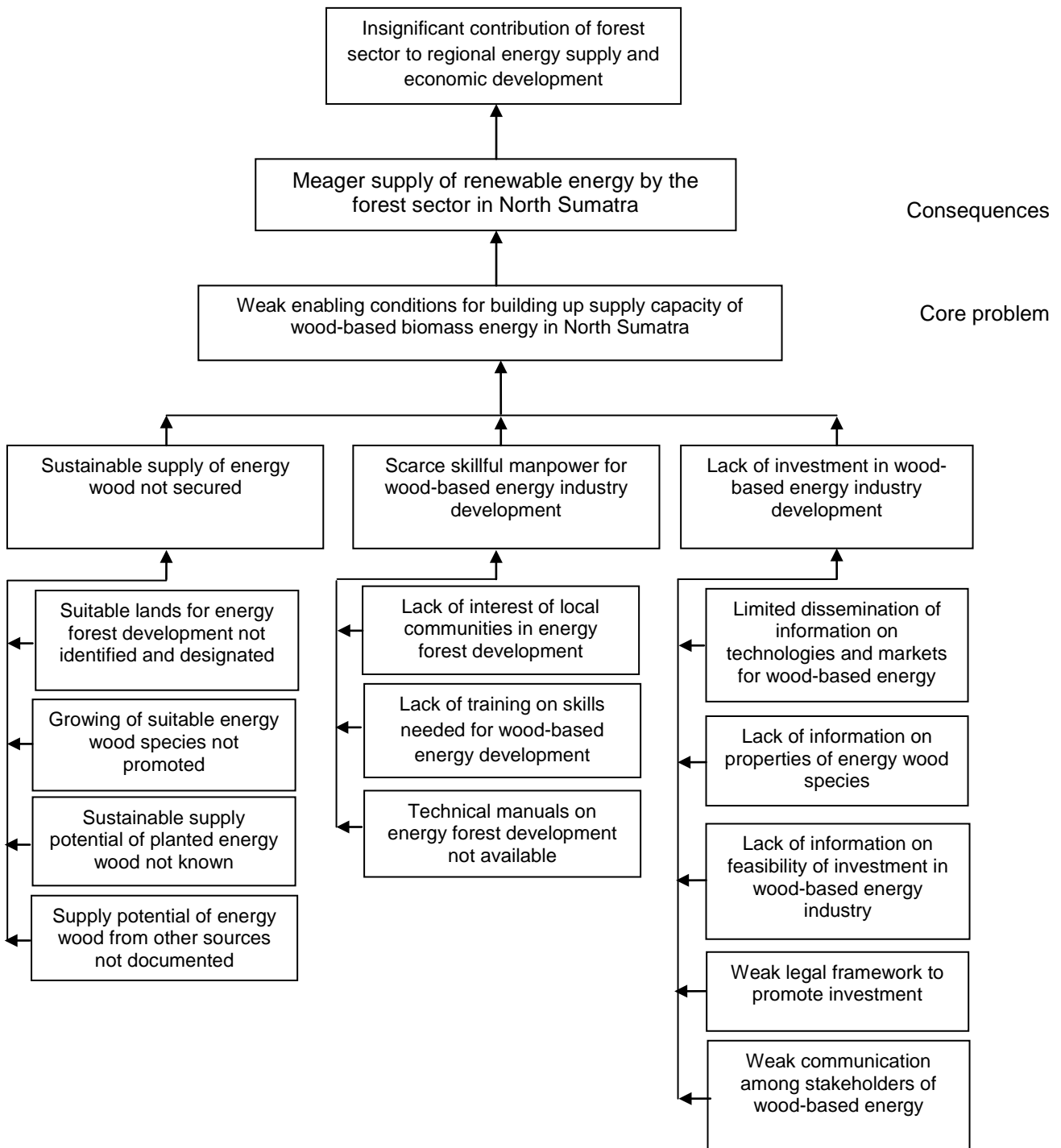
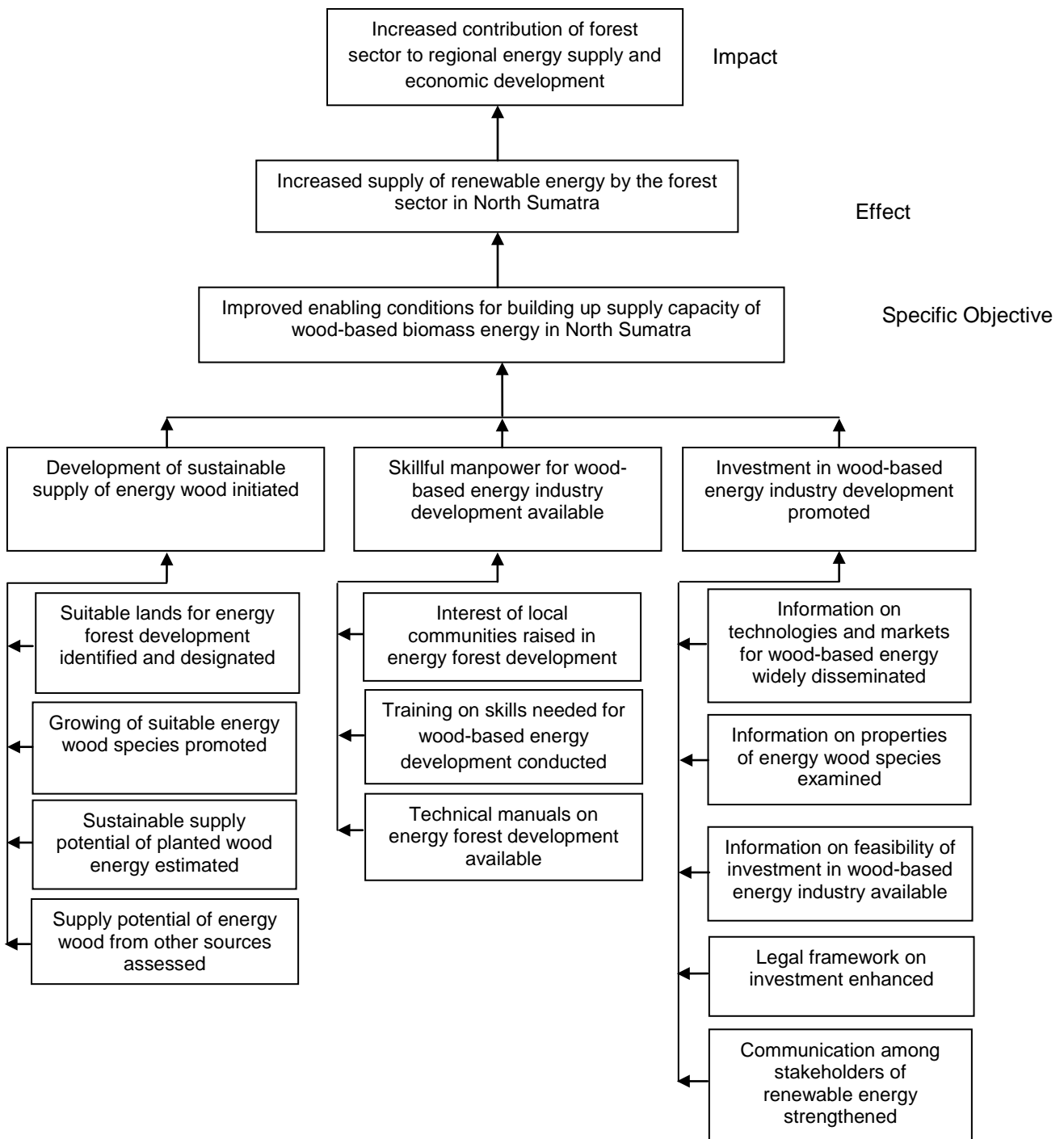


Figure 2. Solution Tree



## 2.1.4. Logical framework matrix

Project elements	Measurable indicators	Means of verification	Key assumptions
<p><b><u>Development Objective</u></b> To increase contribution of the forest sector to renewable energy supply and regional economic development through increased supply of wood-based biomass energy</p> <p><b><u>Specific Objective</u></b> To improve enabling conditions for building up capacity to supply wood-based biomass energy in North Sumatra region</p> <p><b><u>Outputs</u></b> Output 1: Development of sustainable supply of energy wood initiated</p>	<p><u>3 years after project completion:</u></p> <ul style="list-style-type: none"> <li>- At least 100 villages in 10 districts engaged in energy forest development activities</li> <li>- 2-3 companies realized investment in wood-based biomass energy</li> </ul> <p><u>By end of project:</u></p> <ul style="list-style-type: none"> <li>- Approximately 36 Ha of energy forest established and used for demonstration and training</li> <li>- At least 100 farmers leaders trained on skills for energy forest development and 50 leaders on community cooperative management</li> <li>- 2-3 companies indicated interest in making investment on wood-based energy industry</li> </ul> <ul style="list-style-type: none"> <li>- Available suitable lands for energy forest development identified and mapped in year 1</li> <li>- Lands for energy forests formally designated in year 1</li> <li>- 36 Ha of energy forests trial planted using 3 species in years 1-2</li> <li>- Estimates of sustainable energy wood supply planted on degraded lands available in year 4</li> <li>- Potential supply of energy wood from non-forest sources assessed in year 3</li> </ul>	<ul style="list-style-type: none"> <li>- Field check</li> <li>- Annual report of district government</li> </ul> <ul style="list-style-type: none"> <li>- Project completion report</li> <li>- Field check</li> <li>- Technical report</li> </ul> <ul style="list-style-type: none"> <li>- Consultant's reports</li> <li>- Joint decision of Governor and Heads of Districts</li> <li>- Field check, contractor's report</li> </ul>	<p>The enabling conditions improved</p> <ul style="list-style-type: none"> <li>- Supportive government authorities</li> <li>- Private sector interested in wood-based energy business</li> </ul> <ul style="list-style-type: none"> <li>- Supportive government authorities</li> </ul>

<p><b>Output 2:</b></p> <p>Skillful manpower for development of wood-based biomass energy available</p>	<ul style="list-style-type: none"> <li>- Dialogue with local communities of 50 villages in 25 districts conducted in year 1</li> <li>- 100 farmer leaders trained on energy forest development techniques in years 2-4</li> <li>- 50 farmer leaders trained on community cooperative management</li> <li>- 2 comparative studies on wood-based energy development conducted in years 2-3</li> <li>- 3 technical manuals on energy forest development using suitable species formulated in year 4</li> </ul>	<ul style="list-style-type: none"> <li>- Contractor's report</li> <li>- Training reports</li> <li>- Training reports</li> <li>- Study reports</li> <li>- Manual documents</li> </ul>	<ul style="list-style-type: none"> <li>- Cooperative local community</li> <li>- Farmers interested in energy forest development</li> <li>- Cooperative wood-based energy industries</li> </ul>
<p><b>Output 3:</b></p> <p>Investment in wood-based energy industry development promoted</p>	<ul style="list-style-type: none"> <li>- Website of wood-based energy operational since year 1</li> <li>- One national workshop on wood-based energy development organized in Medan in year 1</li> <li>- Data on caloric properties of 3 planted tree species available in year 4</li> <li>- Feasibility studies on investment in wood-based energy industry completed in year 4</li> <li>- Existing policy on wood-based energy development reviewed and enhanced in year 2</li> <li>- A stakeholder consultation forum operational since year 2</li> </ul>	<ul style="list-style-type: none"> <li>- Field check, consultant's report</li> <li>- Workshop proceedings</li> <li>- Research report</li> <li>- Study reports</li> <li>- Consultant's report</li> <li>- Consultant's report</li> </ul>	<ul style="list-style-type: none"> <li>- Competent professionals available in time</li> <li>- Supportive government authorities</li> <li>- Cooperative local stakeholders</li> </ul>

## **2.2. Objectives**

### **2.2.1. Development objective and impact indicators**

Development objective:

To increase contribution of the forest sector to renewable energy supply and regional economic development through increased supply of wood-based biomass energy

#### **Impact Indicators:**

3 years after project completion:

- At least 100 villages in 10 districts engaged in energy forest development activities
- 2-3 companies realized investment in wood-based biomass energy

### **2.2.2. Specific objective and outcome indicators**

#### **Specific objective:**

To improve enabling conditions for building up capacity to supply wood-based biomass energy in North Sumatra region

#### **Outcome Indicators:**

By end of project:

- At least 36 Ha of energy forest established and used for demonstration and training
- At least 100 farmers leaders trained on skills for energy forest development and 50 leaders on community cooperative management
- 2-3 companies indicated interest in making investment on wood-based energy industry

## PART 3. DESCRIPTION OF PROJECT INTERVENTIONS

### 3.1. Outputs and activities

#### 3.1.1. Outputs

- Output 1: Development of sustainable supply of energy wood initiated  
Output 2: Skillful manpower for development of wood-based biomass energy available  
Output 3: Investment in wood-based energy industry development promoted

#### 3.1.2. Activities

##### Output 1.

- Activity 1.1 To identify available suitable lands for development of energy forests in North Sumatra province  
Activity 1.2 To formally allocate lands for energy forest development on existing landuse plan  
Activity 1.3 To establish energy forest models for purpose of demonstration and training (3 sites, 3 species, 36 Ha in total)  
Activity 1.4 To provide estimates of sustainable supply potential of wood from energy forests established on degraded forest lands  
Activity 1.5 To assess long-term supply potential of energy wood from non-forest sources

##### Notes:

Activity 1.1 and 1.2 deal with problem on "land allocation"

##### Output 2

- Activity 2.1 To conduct dialogue with local communities on benefits of energy forest development (50 villages in 25 districts)  
Activity 2.2 To train local communities on technical skills for energy forest development covering planting, tree nursing and harvesting techniques (100 farmers leaders of 50 villages)  
Activity 2.3 To train local communities on cooperative management to support energy wood business development (50 farmers leaders of 50 villages)  
Activity 2.4 To conduct comparative studies on wood-based energy industry development for executives and managers (2 overseas trips @5 days @3 persons)  
Activity 2.5 To develop technical manuals on energy forest development for three tree species planted

##### Notes:

Activities 2.2 tru 2.4 concern with the problem on "lack of training on skills"

##### Output 3

- Activity 3.1 To disseminate information on technology and market for wood-based energy through website and other means  
Activity 3.2 To organize one national workshop on wood-based energy development in Medan  
Activity 3.3 To examine caloric properties of three energy wood species planted  
Activity 3.4 To conduct studies of feasibility of investment in commercial manufacturing of wood-based energy including electricity and wood pellets  
Activity 3.5 To review existing policy on wood-based biomass energy development in view of strengthening incentive for investment  
Activity 3.6 To form and operate a consultation forum on renewable energy for enhancing communication and coordination between stakeholders

##### Notes:

Activities 3.1 and 3.2 deal with problem on "limited dissemination of information"

### 3.2 Implementation approaches and methods

The main elements of implementation strategy are highlighted below.

#### i) Securing long-term supply of energy wood

The project design builds on the classical economic theory; that to produce a good or service for consumption, factors of production i.e. land, labor and capital must be made available. To produce wood-based energy, energy wood or "land" must be made available sustainably in terms of quantity and quality. To ensure quality of energy wood, it is best to plant fast-growing tree species with high caloric content. In addition to planted energy wood, other potential sources of energy wood are rubber and palm oil plantations. For instance, around 20,000 hectares of old rubber plantations in North Sumatra are removed every year for replanting; huge volume of energy wood is available at replanting areas subject to collection cost level at mill gate.

To secure sustainable supply of energy wood raw material, it is therefore indispensable to establish energy plantation forests on suitable, available lands throughout the region. To augment supply potential of planted wood, other non-forest sources will also have to be utilized in close collaboration with rubber and palm-oil growers.

#### ii) Selecting most promising energy tree species for development

The species to be promoted are *Leucaena leucocephala* (lamtoro), *Calliandra calothyrsus* (kaliandra), and *Gliricidia sepium* (gamal). The criteria employed in selecting the species are: caloric content, site requirements and silviculture techniques. Available information indicates that the caloric contents of the species are 4,464; 4,720; and 4,900 c kal/kg, respectively; the species do not require specific site conditions in terms of soil and climate; and silviculture techniques for growing the species are available and easy to practice.

#### iii) Training of manpower

At present, competent manpower in wood-based energy industry development is hardly available. Therefore, manpower training is an essential program of the project; and must cover both trainings on technical as well as managerial skills. Such training should focus on energy plantation forest development in order to secure long-term supply of planted energy wood. The topics to be covered are planting, tree nursing, harvesting and overall management of energy forests under community cooperative scheme.

In addition to farmers, executives as well as managers of concerned authorities and private sector need to be trained on managerial aspect of energy forest development and utilization. This training will be accomplished through study tours both in Indonesia and other countries like South Korea and Thailand.

#### iv) Promoting investment

Wood-based energy supply can only be realized if private sector is interested in making investment. Therefore, promoting investment is an essential component of the project. To this end, appropriate activities have to be carried out which include dissemination of information on feasibility of investment, incentive schemes to be introduced, available energy market and production technology.

#### v) Establishing of a stakeholder consultation forum (SCF)

A stakeholder forum needs to be established and operated under the project to facilitate continuous exchange of experience and information amongst stakeholders notably authorities, private executives and energy wood growers.

vi) Internal monitoring

To effectively implement project activities, it is necessary to exercise adequate monitoring of progress in implementation. Appropriate inputs to individual activities have to be made timely available in terms of quantity and quality. To ensure an effective monitoring, a field supervisor will be appointed whom will be responsible for supervising the day-to-day field operations, coordinating with executors of activities and reporting to the Project Coordinator on any operational problems that may occur.

vii) Collaborating

The project will be implemented in a collaborative manner. As appropriate, particular activities will be carried out with the involvement of local communities, private sector, NGOs, universities, R&D institutions and other competent professionals, to be selected based on qualifications and nature of works.



### 3.3 Workplan

Output/activities	Resp. Party	Year 1				Year 2				Year 3				Year 4			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Output 1</b>																	
Development of sustainable supply of energy wood initiated																	
Activity 1.1: To identify available suitable lands for development of energy forests in North Sumatra province	PC, PFA, LG, NE	V	V														
Activity 1.2: To formally allocate lands for energy forest development on existing landuse plan	PC, PFA, LG	V	V														
Activity 1.3: To establish energy forest models for purpose of demonstration and training (3 sites, 3 species, 36 Ha in total)	PC, NGO	V	V	V	V	V	V										
Activity 1.4: To provide estimates of sustainable supply potential of wood from energy forests established on degraded forest lands	PC, NC															V	V
Activity 1.5: To assess long-term supply potential of energy wood from non-forest sources	PC, NC									V	V	V	V				
<b>Output 2</b>																	
Skillful manpower for development of lwood-based biomass energy available																	
Activity 2.1: To conduct dialogue with local communities on benefits of energy forest development (50 villages in 25 districts)	PC, UN, LG	V	V	V	V	V	V	V	V								
Activity 2.2: To train local communities on technical skills for energy forest development covering planting, tree nursing and harvesting techniques (100 farmers leaders of 50 villages)	PC, NGO					V	V	V	V	V	V	V	V	V	V	V	V
Activity 2.3: To train local communities on cooperative management to support energy wood business development (50 farmers leaders of 50 villages)	PC, UN									V	V	V	V				

Output/activities	Resp. Party	Year 1				Year 2				Year 3				Year 4			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Activity 2.4: To conduct comparative studies on wood-based energy industry development for executives and managers (2 overseas trips @5 days @ 3 persons)	PC					V	V	V	V								
Activity 2.5: To develop technical manuals on energy forest development for three tree species planted	PC, NC													V	V	V	
<b>Output 3</b>																	
Investment in wood-based energy industry development promoted																	
Activity 3.1: To disseminate information on technology and market for wood-based energy through website and other means	PC, NC					V	V	V	V	V	V	V	V	V	V	V	V
Activity 3.2: To organize one national workshop on wood-based energy development in Medan	PC, LEO	V															
Activity 3.3: To examine caloric properties of three energy wood species planted	PC, RDI															V	V
Activity 3.4: To conduct studies of feasibility of investment in commercial manufacturing of wood-based energy including electricity and wood pellets	PC, IC, NC													V	V	V	V
Activity 3.5: To review existing policy on wood-based biomass energy development in view of strengthening incentive for investment	PC, NE					V	V										
Activity 3.6: To form and operate a consultation forum on renewable energy for enhancing communication and coordination between stakeholders	PC, NE					V	V	V	V	V	V	V	V	V	V	V	V

Notes:

IC = International Consultant  
LEO = Local Event Organizer  
LG = Local Government

NGO = Non-Governmental Organization  
NC = National Consultant  
NE = National Expert

PC = Project Coordinator  
PFA = Provincial Forestry Agency  
RDI = Research & Development Institute

### Notes on workplan

- i) The project is to be implemented in 4 years to allow for a full observation of one rotation since planting until harvesting
- ii) Actual planting of 3 energy species will start in Q3-4 Y1 using direct sowing method; these plantations are to be harvested in Q3-4 Y4 at 36 months of age and their caloric content examined in Q3-4 Y4
- iii) Planting will be continued in Q1-2 Y2 and trees to be harvested in Q3-4 Y4 at 30 months of age and their caloric content examined in Q3-4 Y4
- iv) Results of calor examination of different ages will be useful for determining optimal cutting age
- v) Training on planting and tree nursing will carried out from Q1 Y2 onwards utilizing all demo plots as appropriate
- vi) Training on harvesting will be carried out in Q3-4 Y4

**3.4. Budget**  
**3.4.1 Master budget schedule**

Output/Activity	Quarter	Budget Component	Inputs	Unit	Quantity									Unit Cost	ITTO Contribution					GoI Contribution (Executing Agency + Sinar Mas Forestry)					Grand Total		
					ITTO				GOI				Total		Year 1	Year 2	Year 3	Year 4	Total	Year 1	Year 2	Year 3	Year 4	Total			
					Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
<b>Output 1: Development of sustainable supply of energy wood initiated</b> Activity 1.1.: To identify available suitable lands for development of energy forests in North Sumatra province	Q1-Q2, Y1	16 31.2 33 51 61	a. National Consultant (NC) b. DSA, NC c. Local transport d. Consumables e. Miscellaneous	MM MD TD Package Meeting	2 20 20 1 1	- - - - -	- - - - -	- - - - -	- - - - 1	- - - - -	- - - - -	- - - - -	2 20 20 1 2	2.000 70 60 3.000 500	4.000 1.400 1.200 3.000 500	- - - - -	- - - - -	- - - - -	4.000 1.400 1.200 3.000 500	- - - - 500	- - - - -	- - - - -	- - - - 500	4.000 1.400 1.200 3.000 1.000			
<b>Sub-total Activity 1.1</b>															<b>10.100</b>	-	-	-	<b>10.100</b>	<b>500</b>	-	-	-	-	<b>500</b>	<b>10.600</b>	
Activity 1.2: To formally allocate lands for energy forest development on existing landuse plan	Q1-Q2, Y1	51 33 61	a. Consumables b. Local transport c. Miscellaneous	Package TD Meeting	1 15 2	- - -	- - -	- - -	1 15 2	- - -	- - -	- - -	2 30 4	1.500 60 750	1.500 900 1.500	- - -	- - -	- - -	1.500 900 1.500	1.500 900 1.500	- - -	- - -	- - -	1.500 900 1.500	3.000 1.800 3.000		
<b>Sub-total Activity 1.2</b>															<b>3.900</b>	-	-	-	<b>3.900</b>	<b>3.900</b>	-	-	-	-	<b>3.900</b>	<b>7.800</b>	
Activity 1.3: To establish energy forest models for purpose of demonstration and training (3 sites, 3 species, 36 Ha in total)	Q1 - Q4, Y1 Q1-Q2, Y2	21	a. Sub-Contract No.1 NGO b. Seed procurement	Ha kg	12 36	12 36	- -	- -	6 18	6 18	- -	- -	36 108	1.750 40	21.000 1.440	21.000 1.440	- -	- -	- -	42.000 2.880	10.500 720	10.500 720	- -	- -	21.000 1.440	63.000 4.320	
<b>Sub-total Activity 1.3</b>															<b>22.440</b>	<b>22.440</b>	-	-	-	<b>44.880</b>	<b>11.220</b>	<b>11.220</b>	-	-	-	<b>22.440</b>	<b>67.320</b>
Activity 1.4: To provide estimates of sustainable supply potential of wood from energy forests	Q3-Q4, Y4	22 31.2	a. Sub-Contract No. 2a (Specialist) b. DSA NC	Contract MD	- -	- -	- -	1 -	- -	- -	- -	0 -	1 -	5.000 70	- -	- -	- -	4.000 -	4.000 -	- -	- -	- -	1.000 -	1.000 -	5.000 -		
<b>Sub-total Activity 1.4</b>															-	-	-	<b>4.000</b>	<b>4.000</b>	-	-	-	<b>1.000</b>	<b>1.000</b>	<b>5.000</b>		
Activity 1.5: To assess long-term supply potential of energy wood from non-forest sources	Q1-Q4, Y3	22	a. Sub-Contract No. 2b (Specialist) e. Miscellaneous	Contract Meeting	- -	- -	1 -	- -	- -	- -	0 -	- -	1 -	7.500 500	- -	- -	6.000 -	- -	6.000 -	- -	- -	1.500 -	- -	1.500 -	7.500 -		



Output/Activity	Quarter	Budget Component	Inputs	Unit	Quantity							Unit Cost	ITTO Contribution					Gol Contribution (Executing Agency + Sinar Mas Forestry)					Grand Total				
					ITTO				GOI				Total	Year 1	Year 2	Year 3	Year 4	Total	Year 1	Year 2	Year 3	Year 4		Total			
					Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3														Year 4		
Activity 2.5: To develop technical manuals on energy forest development for three tree species selected	Q1-Q3, Y4	22 31.2 33 61	a. Sub-Contract 2C (Specialist)	Contract	-	-	-	1	-	-	-	0	1	10.000	-	-	-	8.000	8.000	-	-	-	2.000	2.000	10.000		
			b. DSA, NC	MD	-	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	-	-
			c. Local transport, NC	TD	-	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	-	-	-
			d. Miscellaneous	Meeting	-	-	-	-	-	-	-	-	-	-	500	-	-	-	-	-	-	-	-	-	-	-	-
<b>Sub-total Activity 2.5</b>														-	-	-	8.000	8.000	-	-	-	2.000	2.000	10.000			
<b>Total Output 2</b>														40.500	56.100	9.000	48.000	153.600	15.500	15.500	-	22.000	53.000	206.600			
<b>Output 3: Investment in wood-based energy industry development promoted</b>																											
Activity 3.1: To disseminate information on technology and market for wood-based energy through website and other means	Q1-Q4, Y2 Q1-Q4, Y3 Q1-Q4, Y4	22 41 62 14 63 51 61	a. Subcontract 2d (Specialist)	Contract	-	1	0	0	-	-	-	-	1	8.000	-	4.000	2.000	2.000	8.000	-	-	-	-	-	8.000		
			b. IT Devices (PC, Printer, etc)	Set	-	1	-	-	-	1	-	-	2	3.000	-	3.000	-	-	3.000	-	3.000	-	-	3.000	6.000		
			c. Rental provider	Month	-	6	12	12	-	-	-	-	30	200	-	1.200	2.400	2.400	6.000	-	-	-	-	-	6.000		
			d. Technician	MM	-	3	6	6	-	3	6	6	30	250	-	750	1.500	1.500	3.750	-	750	1.500	1.500	3.750	7.500		
			e. Printed materials	Copy	-	-	200	200	-	-	100	100	600	5	-	-	1.000	1.000	2.000	-	-	500	500	1.000	3.000		
			f. Consumables	Month	-	3	6	6	-	3	6	6	30	200	-	600	1.200	1.200	3.000	-	600	1.200	1.200	3.000	6.000		
			g. Miscellaneous	Meeting	-	2	-	-	-	-	-	1	3	500	-	1.000	-	-	1.000	-	-	-	500	500	1.500		
<b>Sub-total Activity 3.1</b>															-	10.550	8.100	8.100	26.750	-	4.350	3.200	3.700	11.250	38.000		
Activity 3.2: To organize one national workshop on wood-based energy development in Medan	Q1, Y1	26 61	a. Sub contract - No.6, Local Event Organizer (LEO)	Contract	1	-	-	-	0	-	-	-	1	12.000	9.000	-	-	-	9.000	3.000	-	-	-	3.000	12.000		
			b. Miscellaneous	meeting					2				2	500	-	-	-	-	-	1.000	-	-	-	1.000	1.000		
<b>Sub-total Activity 3.2</b>														9.000	-	-	-	9.000	4.000	-	-	-	4.000	13.000			

Output/Activity	Quarter	Budget Component	Inputs	Unit	Quantity							Unit Cost	ITTO Contribution					Gol Contribution (Executing Agency + Sinar Mas Forestry)					Grand Total				
					ITTO				GOI				Total	Year 1	Year 2	Year 3	Year 4	Total	Year 1	Year 2	Year 3	Year 4		Total			
					Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3														Year 4		
Activity 3.3: To examine caloric properties of the energy wood species planted under the project	Q3-Q4, Y4	27 61	a. Sub contract - No.7	Contract	-	-	-	1	-	-	-	-	1	18.000	-	-	-	18.000	18.000	-	-	-	-	-	18.000		
			b. Miscellaneous	Meeting	-	-	-	-	-	-	-	2	2	500	-	-	-	-	-	-	-	-	-	1.000	1.000	1.000	
<b>Sub-total Activity 3.3</b>														-	-	-	<b>18.000</b>	<b>18.000</b>	-	-	-	<b>1.000</b>	<b>1.000</b>	<b>19.000</b>			
Activity 3.4.: To conduct studies on feasibility of investment in commercial manufacturing of wood-based energy including electricity and wood pallet	Q1-Q4, Y4	15 31.1 32.1 16 31.2 33 61	a. International Consultant	MM	-	-	-	2	-	-	-	-	2	10.000	-	-	-	15.000	15.000	-	-	-	-	-	15.000		
			b. DSA, IC	MD	-	-	-	45	-	-	-	-	-	45	110	-	-	-	4.950	4.950	-	-	-	-	-	4.950	
			c. Air ticket IC	TD	-	-	-	2	-	-	-	-	-	2	1.500	-	-	-	3.000	3.000	-	-	-	-	-	3.000	
			d. National Consultant (NC)	MM	-	-	-	2	-	-	-	-	-	2	2.000	-	-	-	4.000	4.000	-	-	-	-	-	4.000	
			e. DSA, NC	MD	-	-	-	60	-	-	-	-	-	60	70	-	-	-	4.200	4.200	-	-	-	-	-	4.200	
			f. Local transport	TD	-	-	-	15	-	-	-	-	15	30	60	-	-	-	900	900	-	-	-	900	900	1.800	
			g. Miscellaneous	Meeting	-	-	-	1	-	-	-	-	1	2	500	-	-	-	500	500	-	-	-	500	500	1.000	
<b>Sub-total Activity 3.4.</b>														-	-	-	<b>32.550</b>	<b>32.550</b>	-	-	-	<b>1.400</b>	<b>1.400</b>	<b>33.950</b>			
Activity 3.5.: To review existing policy on wood-based biomass energy development in view of strengthening incentive for investment	Q1-Q2, Y2	18 31.4 61	a. National Expert, NE	MM	-	-	-	-	-	2	-	-	2	500	-	-	-	-	-	-	1.000	-	-	1.000	1.000		
			b. DSA, NE	MD	-	20	-	-	-	-	-	-	-	20	70	-	1.400	-	-	1.400	-	-	-	-	-	1.400	
			c. Miscellaneous	Meeting	-	2	-	-	-	-	1	-	-	3	500	-	1.000	-	-	1.000	-	500	-	-	500	1.500	
<b>Sub-total Activity 3.5.</b>														-	<b>2.400</b>	-	-	<b>2.400</b>	-	<b>1.500</b>	-	-	<b>1.500</b>	<b>3.900</b>			
Activity 3.6.: To form and operate a consultation forum on renewable energy for enhancing communication and coordination between stakeholders	Q1-Q4, Y2 Q1-Q4, Y3 Q1-Q4, Y4	18 31.4 51 55 61	a. National Expert, NE	MM	-	-	-	-	-	1	1	1	3	500	-	-	-	-	-	-	500	500	500	1.500	1.500		
			b. DSA, NE	MD	-	15	15	15	-	-	-	-	-	45	70	-	1.050	1.050	1.050	3.150	-	-	-	-	-	3.150	
			c. Consumables	Month	-	-	-	-	-	-	12	12	12	36	200	-	-	-	-	-	-	-	2.400	2.400	2.400	7.200	7.200
			d. Office Space and facilities	Month	-	-	-	-	-	-	12	12	12	36	200	-	-	-	-	-	-	-	2.400	2.400	2.400	7.200	7.200
			e. Miscellaneous	Meeting	-	2	2	2	-	-	2	2	2	12	500	-	1.000	1.000	1.000	3.000	-	1.000	1.000	1.000	3.000	6.000	
<b>Sub-total Activity 3.6.</b>														-	<b>2.050</b>	<b>2.050</b>	<b>2.050</b>	<b>6.150</b>	-	<b>6.300</b>	<b>6.300</b>	<b>6.300</b>	<b>18.900</b>	<b>25.050</b>			

Output/Activity	Quarter	Budget Component	Inputs	Unit	Quantity								Unit Cost	ITTO Contribution					GoI Contribution (Executing Agency + Sinar Mas Forestry)					Grand Total	
					ITTO				GOI					Total	Year 1	Year 2	Year 3	Year 4	Total	Year 1	Year 2	Year 3	Year 4		Total
					Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4													
<b>Total Output 3</b>														9.000	15.000	10.150	60.700	94.850	4.000	12.150	9.500	12.400	38.050	132.900	
<b>Total Project</b>														85.940	93.540	25.150	112.700	317.330	35.120	38.870	11.000	35.400	120.390	437.720	
<b>Non-activity based</b>																									
			<u>Key Personnel</u>																						
	Q1-Q4, Y1	11	a. Project Coordinator (PC)	MM	12	12	12	12	-	-	-	-	48	1.750	21.000	21.000	21.000	21.000	84.000	-	-	-	-	-	84.000
	Q1-Q4, Y2	12	b. Project Secretary and Finance	MM	12	12	12	12	-	-	-	-	48	650	7.800	7.800	7.800	7.800	31.200	-	-	-	-	-	31.200
	Q1-Q4, Y3	13	c. Financial staff	MM	-	-	-	-	-	-	-	-	-	300	-	-	-	-	-	-	-	-	-	-	-
	Q1-Q4, Y4	14	d. Technician	MM	-	-	-	-	12	12	12	12	48	500	-	-	-	-	-	6.000	6.000	6.000	6.000	24.000	24.000
		17	e. Field Supervisor	MM	12	12	12	12	-	-	-	-	48	400	4.800	4.800	4.800	4.800	19.200	-	-	-	-	-	19.200
			<u>Monitoring</u>																						
		32.2	e. Air tickets	Trip	4	4	4	4	2	2	2	2	24	250	1.000	1.000	1.000	1.000	4.000	500	500	500	500	2.000	6.000
		31.3	f. DSA Monev	MD	16	16	16	16	8	8	8	8	96	70	1.120	1.120	1.120	1.120	4.480	560	560	560	560	2.240	6.720
			g. Local transport	Trip	16	16	16	16	8	8	8	8	96	60	960	960	960	960	3.840	480	480	480	480	1.920	5.760
		33	<u>Office</u>																						
		55	i. Space	Month	-	-	-	-	12	12	12	12	48	400	-	-	-	-	-	4.800	4.800	4.800	4.800	19.200	19.200
		55	m. Facilities	Set	-	-	-	-	1	-	-	-	1	6.000	-	-	-	-	-	6.000	-	-	-	6.000	6.000
		51	n. Consumables	Month	6	6	6	6	6	6	6	6	48	200	1.200	1.200	1.200	1.200	4.800	1.200	1.200	1.200	1.200	4.800	9.600
		54	p. Utilities	Month	-	-	-	-	12	12	12	12	48	200	-	-	-	-	-	2.400	2.400	2.400	2.400	9.600	9.600
			<u>Miscellaneous</u>																						
		64	q. PSC / PTC Meetings	meeting	1	1	1	1	1	1	1	1	8	1.500	1.500	1.500	1.500	1.500	6.000	1.500	1.500	1.500	1.500	6.000	12.000
		65	r. Financial auditing	year	1	1	1	1	-	-	-	-	4	1.500	1.500	1.500	1.500	1.500	6.000	-	-	-	-	-	6.000
		63	s. Report printing	copy	50	50	50	200	-	-	-	-	350	15	750	750	750	3.000	5.250	-	-	-	-	-	5.250
		53	t. Sundries	Package	1	1	1	1	1	1	1	1	8	250	250	250	250	1.000	250	250	250	250	1.000	2.000	
<b>Total Non-activity based</b>															41.880	41.880	41.880	44.130	169.770	23.690	17.690	17.690	17.690	76.760	246.530
<b>Grand Total Project Costs</b>															127.820	135.420	67.030	156.830	487.100	58.810	56.560	28.690	53.090	197.150	684.250





### 3.4.2. Consolidated yearly budget

Category	Description	Total	Year 1	Year 2	Year 3	Year 4
<b>10</b>	<b>Personnel</b>					
11	Project Coordinator	84.000,00	21.000,00	21.000,00	21.000,00	21.000,00
12	Project Secretary	31.200,00	7.800,00	7.800,00	7.800,00	7.800,00
13	Financial staff	-	-	-	-	-
14	Technicians	31.500,00	6.000,00	7.500,00	9.000,00	9.000,00
15	International Consultant	15.000,00	-	-	-	15.000,00
16	National Consultant	8.000,00	4.000,00	-	-	4.000,00
17	Field Supervisor	19.200,00	4.800,00	4.800,00	4.800,00	4.800,00
18	National Expert	2.500,00	-	1.500,00	500,00	500,00
<b>19</b>	<b>Sub total</b>	<b>191.400,00</b>	<b>43.600,00</b>	<b>42.600,00</b>	<b>43.100,00</b>	<b>62.100,00</b>
<b>20</b>	<b>Sub contracts</b>					
21	Sub contract No. 1, NGO (Planting)					
	- Planting	63.000,00	31.500,00	31.500,00	-	-
	- Seed Procurement	4.320,00	2.160,00	2.160,00	-	-
22	Sub contract No. 2 (Specialist)					
	- Sub contract No. 2A	5.000,00	-	-	-	5.000,00
	- Sub contract No. 2B	7.500,00	-	-	7.500,00	-
	- Sub contract No. 2C	10.000,00	-	-	-	10.000,00
	- Sub contract No. 2D	8.000,00	-	4.000,00	2.000,00	2.000,00
23	Sub contract No. 3, University (Dialogue)	50.000,00	25.000,00	25.000,00	-	-
24	Sub contract No.4, NGO (training)	-	-	-		
	- Planting	60.000,00	30.000,00	30.000,00	-	-
	- Harvesting	60.000,00	-	-	-	60.000,00
25	Sub contract No.5 (cooperative)	9.000,00	-	-	9.000,00	-
26	Sub contract No.6, LEO (National Workshop)	12.000,00	12.000,00	-	-	-
27	Sub contract No.7 (wood properties)	18.000,00	-	-	-	18.000,00
<b>29</b>	<b>Sub total</b>	<b>306.820,00</b>	<b>100.660,00</b>	<b>92.660,00</b>	<b>18.500,00</b>	<b>95.000,00</b>
<b>30</b>	<b>Duty Travel</b>					
31	Daily Subsistence Allowance					
	31.1. DSA International Consultant	4.950,00	-	-	-	4.950,00
	31.2. DSA National Consultants	11.600,00	1.400,00	6.000,00	-	4.200,00
	31.3. DSA Monev	6.720,00	1.680,00	1.680,00	1.680,00	1.680,00
	31.4. DSA National Expert	4.550,00	-	2.450,00	1.050,00	1.050,00
32	Air ticket					
	32.1. Air Ticket International Consultant	3.000,00	-	-	-	3.000,00
	32.2. Air Ticket	12.000,00	1.500,00	7.500,00	1.500,00	1.500,00
33	Local Transport	12.560,00	4.440,00	3.440,00	1.440,00	3.240,00
<b>39</b>	<b>Sub total</b>	<b>55.380,00</b>	<b>9.020,00</b>	<b>21.070,00</b>	<b>5.670,00</b>	<b>19.620,00</b>
<b>40</b>	<b>Capital Items</b>					
41	IT Devices (PC, Printer, etc)	6.000,00	-	6.000,00	-	-
		-	-	-	-	-
<b>49</b>	<b>Sub total</b>	<b>6.000,00</b>	<b>-</b>	<b>6.000,00</b>	<b>-</b>	<b>-</b>

<b>50</b>	<b>Consumables items</b>					
51	Consumables	28.800,00	8.400,00	6.000,00	7.200,00	7.200,00
52	Document, material	1.600,00	-	1.600,00	-	-
53	Sundries	2.000,00	500,00	500,00	500,00	500,00
54	Utilities	9.600,00	2.400,00	2.400,00	2.400,00	2.400,00
55	Office Space and Facilities	32.400,00	10.800,00	7.200,00	7.200,00	7.200,00
<b>59</b>	<b>Sub total</b>	<b>74.400,00</b>	<b>22.100,00</b>	<b>17.700,00</b>	<b>17.300,00</b>	<b>17.300,00</b>
<b>60</b>	<b>Miscellaneous</b>					
61	Meeting	18.000,00	6.000,00	5.500,00	2.000,00	4.500,00
62	Rental provider	6.000,00	-	1.200,00	2.400,00	2.400,00
63	Report Printing	8.250,00	750,00	750,00	2.250,00	4.500,00
64	PSC/PTC Meeting	12.000,00	3.000,00	3.000,00	3.000,00	3.000,00
65	Financial Audit	6.000,00	1.500,00	1.500,00	1.500,00	1.500,00
<b>69</b>	<b>Sub total</b>	<b>50.250,00</b>	<b>11.250,00</b>	<b>11.950,00</b>	<b>11.150,00</b>	<b>15.900,00</b>
<b>70</b>	<b>Total Project</b>	<b>684.250,00</b>	<b>186.630,00</b>	<b>191.980,00</b>	<b>95.720,00</b>	<b>209.920,00</b>
<b>80</b>	<b>National management cost</b>	-	(See executing agency budget)			
<b>90</b>	Project monitoring and administration					
91	ITTO monitoring & review	20.000,00				
92	ITTO ex-post evaluation	20.000,00				
95	ITTO Programme support (70 + 91 +92) x 12%	63.252,00				
<b>100</b>	<b>Total Project Monitoring and Administration</b>	<b>103.252,00</b>				
	<b>GRAND TOTAL (70 + 100)</b>	<b>787.502,00</b>				

### 3.4.3. ITTO yearly budget

Category	Description	Total	Year 1	Year 2	Year 3	Year 4
<b>10</b>	<b>Personnel</b>					
11	Project Coordinator	84.000,00	21.000,00	21.000,00	21.000,00	21.000,00
12	Project Secretary	31.200,00	7.800,00	7.800,00	7.800,00	7.800,00
13	Financial staff	-	-	-	-	-
14	Technicians	3.750,00	-	750,00	1.500,00	1.500,00
15	International Consultant	15.000,00	-	-	-	15.000,00
16	National Consultant	8.000,00	4.000,00	-	-	4.000,00
17	Field Supervisor	19.200,00	4.800,00	4.800,00	4.800,00	4.800,00
18	National Expert	-				
<b>19</b>	<b>Sub total</b>	<b>161.150,00</b>	<b>37.600,00</b>	<b>34.350,00</b>	<b>35.100,00</b>	<b>54.100,00</b>
<b>20</b>	<b>Sub contracts</b>					
21	Sub contract No. 1, NGO (Planting)					
	- Planting	42.000,00	21.000,00	21.000,00	-	-
	- Seed Procurement	2.880,00	1.440,00	1.440,00	-	-
	Sub contract No. 2 (Specialist)					
22	- Sub contract No. 2A	4.000,00	-	-	-	4.000,00
	- Sub contract No. 2B	6.000,00	-	-	6.000,00	-
	- Sub contract No. 2C	8.000,00	-	-	-	8.000,00
	- Sub contract No. 2D	8.000,00	-	4.000,00	2.000,00	2.000,00
23	Sub contract No. 3, University (Dialogue)	40.000,00	20.000,00	20.000,00	-	-
24	Sub contract No.4, NGO (training)	-	-	-		
	- Planting	40.000,00	20.000,00	20.000,00	-	-
	- Harvesting	40.000,00	-	-	-	40.000,00
25	Sub contract No.5 (cooperative)	9.000,00	-	-	9.000,00	-
26	Sub contract No.6, LEO (National Workshop)	9.000,00	9.000,00	-	-	-
27	Sub contract No.7 (wood properties)	18.000,00	-	-	-	18.000,00
<b>29</b>	<b>Sub total</b>	<b>226.880,00</b>	<b>71.440,00</b>	<b>66.440,00</b>	<b>17.000,00</b>	<b>72.000,00</b>
<b>30</b>	<b>Duty Travel</b>					
31	Daily Subsistence Allowance					
	31.1. DSA International Consultant	4.950,00	-	-	-	4.950,00
	31.2. DSA National Consultants	11.600,00	1.400,00	6.000,00	-	4.200,00
	31.3. DSA Monev	4.480,00	1.120,00	1.120,00	1.120,00	1.120,00
	31.4. DSA National Expert	4.550,00	-	2.450,00	1.050,00	1.050,00
32	Air ticket					
	32.1. Air Ticket International Consultant	3.000,00	-	-	-	3.000,00
	32.2. Air Ticket	10.000,00	1.000,00	7.000,00	1.000,00	1.000,00
33	Local Transport	8.840,00	3.060,00	2.960,00	960,00	1.860,00
<b>39</b>	<b>Sub total</b>	<b>47.420,00</b>	<b>6.580,00</b>	<b>19.530,00</b>	<b>4.130,00</b>	<b>17.180,00</b>
<b>40</b>	<b>Capital Items</b>					
41	IT Devices (PC, Printer, etc)	3.000,00	-	3.000,00	-	-
		-	-	-		
<b>49</b>	<b>Sub total</b>	<b>3.000,00</b>	<b>-</b>	<b>3.000,00</b>	<b>-</b>	<b>-</b>

<b>50</b>	<b>Consumables items</b>					
51	Consumables	12.300,00	5.700,00	1.800,00	2.400,00	2.400,00
52	Document, material	1.600,00	-	1.600,00	-	-
53	Sundries	1.000,00	250,00	250,00	250,00	250,00
54	Utilities	-	-	-	-	-
55	Office Space and Facilities	-	-	-	-	-
<b>59</b>	<b>Sub total</b>	<b>14.900,00</b>	<b>5.950,00</b>	<b>3.650,00</b>	<b>2.650,00</b>	<b>2.650,00</b>
<b>60</b>	<b>Miscellaneous</b>					
61	Meeting	8.500,00	2.500,00	3.500,00	1.000,00	1.500,00
62	Rental provider	6.000,00	-	1.200,00	2.400,00	2.400,00
63	Report Printing	7.250,00	750,00	750,00	1.750,00	4.000,00
64	PSC/PTC Meeting	6.000,00	1.500,00	1.500,00	1.500,00	1.500,00
65	Financial Audit	6.000,00	1.500,00	1.500,00	1.500,00	1.500,00
<b>69</b>	<b>Sub total</b>	<b>33.750,00</b>	<b>6.250,00</b>	<b>8.450,00</b>	<b>8.150,00</b>	<b>10.900,00</b>
<b>70</b>	<b>Total Project</b>	<b>487.100,00</b>	<b>127.820,00</b>	<b>135.420,00</b>	<b>67.030,00</b>	<b>156.830,00</b>
<b>80</b>	<b>National management cost</b>	-	(See executing agency budget)			
<b>90</b>	Project monitoring and administration					
91	ITTO monitoring & review	20.000,00				
92	ITTO ex-post evaluation	20.000,00				
95	ITTO Programme support (70 + 91 +92) x 12%	63.252,00				
<b>100</b>	<b>Total Project Monitoring and Administration</b>	103.252,00				
	<b>GRAND TOTAL (70 + 100)</b>	<b>590.352,00</b>				

### 3.4.4. Executing Agency/ISWA yearly budget

Category	Description	Total	Year 1	Year 2	Year 3	Year 4
<b>10</b>	<b>Personnel</b>					
14	Technicians	27.750,00	6.000,00	6.750,00	7.500,00	7.500,00
18	National Expert	2.500,00	-	1.500,00	500,00	500,00
<b>19</b>	<b>Sub total</b>	<b>30.250,00</b>	<b>6.000,00</b>	<b>8.250,00</b>	<b>8.000,00</b>	<b>8.000,00</b>
<b>20</b>	<b>Sub contracts</b>					
21	Sub contract No. 1, NGO (Planting)					
	- Planting	21.000,00	10.500,00	10.500,00	-	-
	- Seed Procurement	1.440,00	720,00	720,00	-	-
22	Sub contract No. 2 (Specialist)					
	- Sub contract No. 2A	1.000,00	-	-	-	1.000,00
	- Sub contract No. 2B	1.500,00	-	-	1.500,00	-
	- Sub contract No. 2C	2.000,00	-	-	-	2.000,00
	- Sub contract No. 2D	-	-	-	-	-
23	Sub contract No. 3, University (Dialogue)	10.000,00	5.000,00	5.000,00	-	-
24	Sub contract No.4, NGO (training)	-	-	-	-	-
	- Planting	20.000,00	10.000,00	10.000,00	-	-
	- Harvesting	20.000,00	-	-	-	20.000,00
25	Sub contract No.5 (cooperative)	-	-	-	-	-
26	Sub contract No.6, LEO (National Workshop)	3.000,00	3.000,00	-	-	-
<b>29</b>	<b>Sub total</b>	<b>79.940,00</b>	<b>29.220,00</b>	<b>26.220,00</b>	<b>1.500,00</b>	<b>23.000,00</b>
<b>30</b>	<b>Duty Travel</b>					
31	Daily Subsistance Allowance					
	31.3. DSA Monev	2.240,00	560,00	560,00	560,00	560,00
32	Air ticket					
	32.2. Air Ticket	2.000,00	500,00	500,00	500,00	500,00
33	Local Transport	3.720,00	1.380,00	480,00	480,00	1.380,00
<b>39</b>	<b>Sub total</b>	<b>7.960,00</b>	<b>2.440,00</b>	<b>1.540,00</b>	<b>1.540,00</b>	<b>2.440,00</b>
<b>40</b>	<b>Capital Items</b>					
41	IT Devices (PC, Printer, etc)	3.000,00	-	3.000,00	-	-
<b>49</b>	<b>Sub total</b>	<b>3.000,00</b>	<b>-</b>	<b>3.000,00</b>	<b>-</b>	<b>-</b>
<b>50</b>	<b>Consumables items</b>					
51	Consumables	16.500,00	2.700,00	4.200,00	4.800,00	4.800,00
53	Sundries	1.000,00	250,00	250,00	250,00	250,00
54	Utilities	9.600,00	2.400,00	2.400,00	2.400,00	2.400,00
55	Office Space and Facilities	32.400,00	10.800,00	7.200,00	7.200,00	7.200,00
<b>59</b>	<b>Sub total</b>	<b>59.500,00</b>	<b>16.150,00</b>	<b>14.050,00</b>	<b>14.650,00</b>	<b>14.650,00</b>
<b>60</b>	<b>Miscellaneous</b>					
61	Meeting	9.500,00	3.500,00	2.000,00	1.000,00	3.000,00
63	Report Printing	1.000,00	-	-	500,00	500,00
64	PSC/PTC Meeting	6.000,00	1.500,00	1.500,00	1.500,00	1.500,00
<b>69</b>	<b>Sub total</b>	<b>16.500,00</b>	<b>5.000,00</b>	<b>3.500,00</b>	<b>3.000,00</b>	<b>5.000,00</b>
<b>70</b>	<b>Total Project</b>	<b>197.150,00</b>	<b>58.810,00</b>	<b>56.560,00</b>	<b>28.690,00</b>	<b>53.090,00</b>
<b>80</b>	<b>National management cost</b>	-	(See executing agency budget)			
	<b>GRAND TOTAL (70 + 80)</b>	<b>197.150,00</b>				

## Notes on budgeting:

**The ITTO personnel component cost has been reduced by USD 14,600; further reduction of this cost component is not advisable for the following reasons:**

- **The personnel employed by the project are professionals external to the Executing and Collaborating Agencies, to be hired only for 4 years**
- **The professionals so hired have been confined only the essential ones, exclusion of either one may jeopardize effectiveness of operational management**
- **The specific objective of the project is to enhance the enabling conditions in order to promote investment by private sector in renewable energy industry development**
- **It is the promoted investment that will ensure project sustainability, not the project personnel because their main tasks will be taken over by the investors and concerned government organizations after completion of the project**

## **3.5. Assumption, risk and sustainability**

### **3.5.1. Assumption and risks**

Among the crucial assumptions made in designing this project are that local communities are cooperative, local governments are supportive and private sector is interested in wood-based energy industry development. Accordingly, the associated risks are closely related to local communities, local governments and investors.

Cooperativeness of local communities should be built during the dialogue process to be carried out during the very beginning of project implementation. During the dialogue process, it must be made clear to local communities those benefits of energy forest development accruable to them; that energy forests can be planted on state, community and private lands; that energy wood harvested from such forests is harvestable by local communities for them to sell to energy producers. More importantly, local communities always think of planting rubber and palm-oil as the most promising source of income; this perception should be changed totally during the dialogue process.

As regards risk associated with unsupportive local governments, this can be reduced or eliminated through consultation. Again, many local governments may not be familiar with energy forest development especially its advantages in terms of social, economic and environmental values. It is therefore important to provide the local governments with reliable information on the various aspects of energy forest development. The national workshop to be organized at the beginning of project implementation is surely an effective forum to convey such information especially before high rank government officials attending the workshop responsible for policy formulation.

Another risk that may pose the project is that private sector is not interested in making investment in wood-based energy industry development. This is the most undesirable risk because without such investment, energy forest development has much less value in it. Therefore, interest in wood-based energy business must be promoted through wide dissemination of information especially on availability of raw material and manpower as well as market acceptance.

Table 3.1 Potential risks and planned mitigating measures

No.	Potential Risks	Mitigating measures
1.	Uncooperative local communities	Make clear during the dialogue process of the potential benefits of energy forest business accruable to local communities in the long-run
2.	Unsupportive local government	Provide reliable information on the multi-dimensional advantages of using degraded land for energy forest development through direct interaction. The national workshop and SCF are intended to cope with this risk
3.	Investors not interested in wood-based energy business	Disseminate information on energy market and technology as well as availability of raw materials and manpower; the national workshop and SCF are expected to counter this risk

### 3.5.2. Sustainability

Sustainability of the project is very much dependent on its benefits and usefulness to the beneficiaries. The job opportunities and income generated by the project through development of energy forest for instance will surely serve as a strong incentive for local communities to continue implementing relevant activities thus sustaining the project. Increased income of local communities will in turn promote local community development. Involvement of investors in wood-based energy business will again create jobs and augment income of local people as well as revenues of the local governments. That is to say that the benefits and advantages generated by the project for its beneficiaries are paramount for securing sustainability of the project.

Enhanced enabling conditions for development of biomass energy industry are in the forms of trained local people and legitimately allocated lands for energy forest development as well as increased support of concerned government organizations through adoption of adequate policy initiatives on renewable energy development. The enhanced enabling conditions coupled with profitable investment based on the feasibility study completed under the project will serve as a strong incentive for private sector to invest in biomass energy industry. Promoted investment is the key factor to sustainability of the project.

This project concerns with enabling conditions for wood-based energy industry development; improved enabling conditions are pre-requisite to promoting the industry and development of energy forests that provide raw material for the industry. That is to say that for those benefits and advantages of energy forests be accruable to beneficiaries, the specific objective of the project has to be first achieved; only then those benefits and advantages of wood-based energy industry can be enjoyed by the beneficiaries and serve as a strong incentive to sustain critical project activities even in the absence of external assistance.



## PART 4. IMPLEMENTATION ARRANGEMENTS

### 4.1. Organization structure and stakeholder involvement mechanism

#### 4.1.1. Executing agency and partner

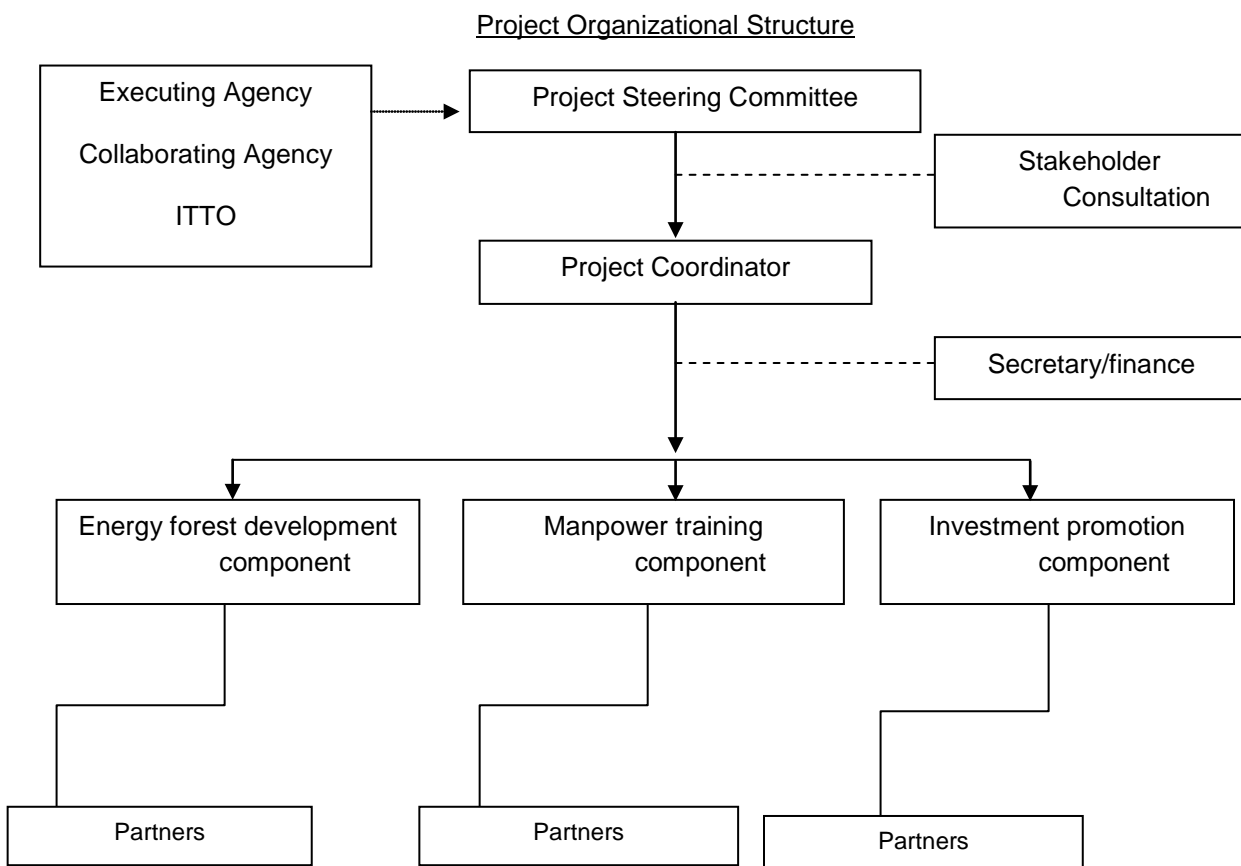
The executing agency of the project will be the Directorate General of Forest Utilization Management (BUK); it has accumulated experience in implementing ITTO-assisted pre-projects and projects during the last decade. BUK's profile appears in Annex 1. The collaborating agency will be ISWA that has acquired experience in implementing several ITTO-assisted projects. The brief information on ISWA is presented in Annex 2.

The partners of EA and CA in implementing the project will include national as well as international consultants, local governments, local communities, PLN, NGOs, universities, R&D institution and other professionals.

#### 4.1.2. Project management team

The project management team (PMT) will consist of a project coordinator (PC), project secretary & finance (PS), IT technician (IT), field supervisor (FS) and long-term national expert (LTNE). As appropriate, planned activities will be executed with the assistance of partners as indicated in the previous section.

The curricula vitae of the professional to be appointed by the EA appear in Annex 4 while their terms of reference are outlined in Annex 5. The project organizational structure is as depicted below.



#### 4.1.3. Project Steering Committee

The Executing Agency will form a Project Steering Committee (PSC); its primary roles are: i) to review operational management plans and endorse as appropriate, ii) to assess progress in implementation of activities and make the necessary recommendations for improving effectiveness of project operations, iii) to provide advices on resolution of any problems encountered in project implementation, iv) to review any changes made by the Executing Agency to the project document and approve the changes or otherwise and v) to review reports on financial and technical aspects of the project.

Membership of the PSC is:

- Chairperson representing GOI to be appointed by the Ministry of Forestry
- Representatives of ITTO and donor countries
- Representatives of North Sumatra provincial and district governments
- Representative of DG BUK
- Representative of PLN
- Project Coordinator as the secretary

The PSC will meet at least once a year. However, special meeting may be organized as need arises. Schedule of the committee meeting will be determined by EA in consultation with ITTO.

#### 4.1.4. Stakeholder involvement mechanism

A stakeholder forum will be established under the project where provincial and local authorities, local communities, NGOs, private companies, and other groups interested in wood-based energy industry development may meet periodically to exchange views and ideas, develop propositions and make recommendations to the executing agency in view of improving efficiency of project implementation. While the forum has no formal responsibility for the project execution, its advices and recommendations are invaluable inputs to the project.

### 4.2. Reporting, review, monitoring and evaluation

In accordance with ITTO Manual on standard operating procedures for the ITTO project cycle, following are the relevant activities to be accomplished:

- **Inception Report**  
To be submitted after signing of Agreement between ITTO, Executing Agency and Government of Indonesia. The Inception report contains the confirmation of the availability of office space and facilities, registered banking account, key project personnels and any changes if any and first Yearly Plan of Operation.
- **Yearly Plan of Operation**  
To be submitted a year before the commencement of project activities in the subsequent year for endorsement by PSC, as appropriate and by ITTO. The first YPO will be attached to the Inception Report. The subsequent YPOs will be submitted at least ten weeks before the beginning of the planned year. ITTO approves the YPO based on endorsement of PSC.
- **Project Progress Reports**  
To be submitted bi-annually or as requested by ITTO. This report contains information on the execution and the progress of activities during the periode covered for the report, achieved output and inputs applied.

- **Project Technical Reports**

To be submitted in accordance with the schedule and at the end of project period. The Technical Report contains technical and scientific data and information, analyses and other project results. A technical report may be produced from one or a set of activities in one Output. The report may also contain present procedure and methodologies adopted, the data generated and the results achieved.

- **Financial Report**

An audited financial report will be submitted to ITTO within three months after the end of the current fiscal year. A final audited report will be submitted within four months after the date of project completion. The project will appoint a public accountant to be submitted to ITTO for approval prior to carry out project financial auditing.

- **Project Completion Report**

A Project Completion Report will be submitted to ITTO within three months after project completion. The report contains summary of the activities executed, unexecuted (if any), inputs and expenditures, outputs achieved and objectives during the project implementation period. The report also highlights the most critical differences between planned and realized project elements using original project documents as primary reference, lessons learned from the implementation of the project.

### **4.3. Dissemination and mainstreaming of project learning**

#### **4.3.1. Dissemination of project learning**

Project learning and results will be disseminated through various means and channels during the implementation stage and after project completion, as outlined below:

- **Technical Reports**

Will be published and widely disseminated to the relevant users.

- **Technical documents/brochures**

To be published regularly and distributed within the province and other national events. The brochures and documents will contain relevant information on wood-based energy development generated under the project.

- **National Workshop**

The workshop will be organized to disseminate information on project's goals and objectives in order to gain support by stakeholders.

- **Completion Report**

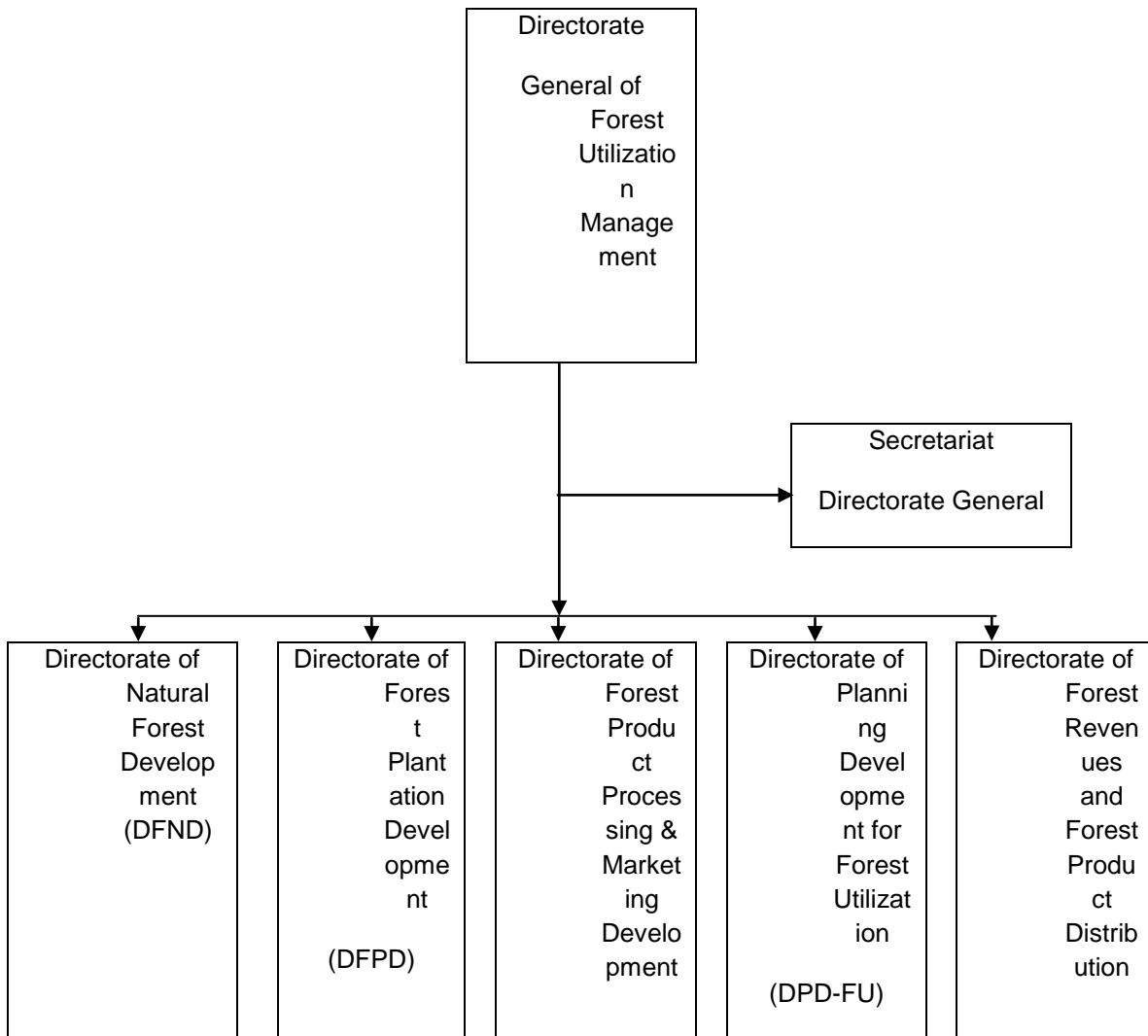
Will be distributed to interested nation-wide and ITTO member countries and other relevant institutions.

#### **4.3.2. Mainstreaming of the project learning**

Project learning and results will be having far reaching implications on national policies and plans for wood-based energy industry development. Observations on energy forest demo plots will provide data and information to be used in formulation of national policies on energy forest development. The local communities and government officials that have been trained in the various aspects of wood-based energy industry development should now have improved capacity in supporting development wood-based energy industry development. Training results will also be useful for developing sound training programs for adoption by other provinces of the country. The technical manuals on three energy wood species will be distributed nation-wide for reference by interested parties in growing the species.

## Annex 1: Profile of the Executing Agency (BUK)

The Directorate General of Forest Utilization Management, the Ministry of Forestry of the Republic of Indonesia. BUK is responsible for forest utilization activities in Production Forest Areas on a sustainable basis, and has functions in providing regulations, services and controls for all aspects related to forest utilization. It consists of five directorates and one secretariat of the directorate general. The Organization Structure as follows:



The DG main task is to provide rule and regulation, policy, planning, standard operation and technical assistance for the management and development of all type production forest. In order to ensure sustainability of the project activities, the technical Directorate of Plantation Forest Development will be the **Executing Agency for this Project, under the responsibility of the Directorate General for Forest Production Development.**

### INFRASTRUCTURE

Regarding the infrastructure, the Directorate of Plantation Forest Development is prepared to carry the project. The office is already connected to a 2 Mbps bandwidth of Internet connection and all staff has each personal computer.

## BUDGET

Within the last three years, the budget of the Directorate of Plantation Forest Production Development is as follows:

<b>Activities</b>	<b>2008 (USD)</b>	<b>2009 (USD)</b>	<b>2010 (USD)</b>
Operational and Maintenance Cost	286,619	292,425	276,222
Publication	158,388	159,589	87,687
Planning Programs	1,169,368	1,301,831	1,058,431
Training Programs	142,811	104,692	64,976
<b>TOTAL</b>	<b>1,757,186</b>	<b>1,858,536</b>	<b>1,487,316</b>

Note: USD 1 = IDR 10,500

## PERSONNEL

The personnel within the Directorate of Plantation Forest Development is described as the following:

With Postgraduate Degrees	12
With Graduate Degrees	15
Middle-level Technicians	10
Administrative Personnel	12
<b>TOTAL PERSONNEL</b>	<b>49</b>

In supporting the capacity of its staff, the Directorate of Plantation Forest Development in collaboration with the Secretariat of the Directorate General for Production Forest Development conducted several training dealing with the sustainable management of plantation forest; such training inter alia for forest planing, harvesting technics, and enterpreneurships.

## Annex 2: Profile of the Collaborating Agency (ISWA)

### 1. Background

ISA was established in 1972 and has been renamed ISWA by The National Congress held in Surabaya, Indonesia on October 31, 2002; the initial purpose was to promote the development of wood industrialization, centered on the production of sawn-timber and downstream processed products, and to assist the marketing of the processed wood products in domestic and international markets. In 1998, ISA comprised 1,465 saw-millers of various scale and was organized through seventeen Regional Coordinators stationed in each province of Indonesia where plants were located. Most of products exported between 1972 and 1988 were in the form of sawn-wood.

Imposition of high export tax of sawn-wood since 1988 has forced ISA members to develop further wood processing facilities. Indeed, downstream processing has grown rapidly since then and today, most of the products exported was in the form of semi-finished and finished products consisting of : **door & window components and engineered timber doors, solid & laminated finger joint flooring, parquet flooring, skirting and various wood profiles, ship-deck & ship flooring, solid & finger joint laminating for furniture & housing parts, scantling three layers laminating, dowel, turning, balustrade, and any kind of wood sticks.**

ISWA members today are around 500 processors, with strong export orientation. During the last decade, members of ISA have been exporting around 1.2 million m<sup>3</sup> of processed products per annum valued at US\$ 700 million. ISA members consume around 3.0 million m<sup>3</sup> (log equivalent) of wood as raw material. Most of the raw material is obtained from domestic free market in the form of rough sawn timber.

### 2. Infrastructure

ISWA Headquarters is at Manggala Wanabakti, Indonesia Forestry Center Building, occupying around 400 m<sup>2</sup> of floor. ISWA operates an information system called ISWA Wood Data Center (Pusat Data Perkayuan ISWA, widely known as PDPI). The system utilizes contemporary computer technologies and operates under the domain: [www.iwwn.com](http://www.iwwn.com). The system contains up to date information on markets of wood products and processing technologies though with some limitations, and members are free to access the system. At present the President of ISWA is Mrs. Hj. Soewarni and the Secretary General is Mr. Jimmy Purwonegoro. In total the Headquarters employs 15 staff; many of them are forestry university graduates.

### 3. Current work programmes

ISWA's working programmes, among others, are

In the supply of wood materials: to compile the resources, species usage, prices of round log and sawn timber (local market information), to increase efficiency of wood materials in line with sustainable forest management.

In production and industry: to develop efficiency and productivity in production of woodworking to obtain the maximum added value, to guide the members to maximize utilization of wood.

In marketing: to monitor the market development and trend of product commodity, to promote the products through exhibitions and our embassies abroad.

In addition, some research works have been done to find lesser-used species (LUS) for product diversification for industry. Primary information on about 60 LUS has been identified. Those programs and activities will support the project proposes which in line with sustainable wood industry in Indonesia.

ISWA has accumulated experience in the implementation of ITTO-assisted projects during the last decade; completed project include:

- PPD 57/02 (I) "Improvement of Processing Efficiency of Tropical Timber from Sustainable Sources in Indonesia" completed in 2003.
- PD 286/04 Rev. 1 (I) "Strengthening the Capacity to Promote Efficient Wood Processing Technologies in Indonesia" completed in September 2010.
- PPD 80/03 Rev. 2 (I) entitled "*Promoting the utilization of rubber wood from sustainable sources in Indonesia*" completed in 2007.
- PD 523/08 Rev. 1 (I) "Operational Strategies for the Promotion of Efficient Utilization of Rubberwood from Sustainable Sources in Indonesia" completed in July 2013.

**Annex 3: Key personnel to be provided by EA and CA**

<b>No.</b>	<b>Name/designation</b>	<b>Educational background</b>	<b>Proposed position</b>
	Mr. Jimmy Chandra	Business management and forest industry	Project Coordinator
	Dr. Hiras P. Sidabutar	Forestry management industry	Long-term National Expert
	Ms. Herlina Lesmana	Finance	Project Secretary & Finance
	Mr. Edi Setiarahman	Forestry & IT	IT Technician



## Annex 4. Curricula vitae of key personnel

### CURRICULUM VITAE

Name : JIMMY CHANDRA

Address : Jl. Ternate No. 24, Jakarta 10150  
Indonesia

Phone Number : 62.21.6311131

Fax Number : 62.21.6304366

Place / Birth Date : Pematang Siantar, December 22, 1955

Nationality : Indonesian

Status : Married

Education : Trisakti University, Faculty of Economics  
1979 – Graduated S 1

Experience : - Motorcycle spare parts manufacturing (1979 – now)  
- Woodworking and furniture manufacturer for export  
( 1982 – now )  
- Indonesian Sawmill and Woodworking Association (ISWA) -  
Board of Director ( 1983 – now )  
- Forestry Industry Revitalization Agency (BRIK) – Board of  
Director ( 2002 – now )  
- Assistant Project Leader of ITTO project PD 286/04 Rev. 1 (I)  
*“Strengthening the Capacity to Promote Efficient Wood  
Processing Technologies in Indonesia”* (2005-2009)  
- Project Coordinator of ITTO project PD 523/08 Rev. 1 (I)  
*“Operational Strategies for the Promotion of Efficient  
Utilization of Rubberwood from Sustainable Sources in  
Indonesia”* (2010-2013)

Proposed position : Project Coordinator

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## CURRICULUM VITAE

### 1. Personal Identity:

- Name: Hiras P. Sidabutar
- Place and date of birth: P. Siantar- Indonesia, 3 August 1945
- Civil status: Married with five children
- Home address: Jalan Abesin No. 71 Bogor 16124 Indonesia
- Contact numbers:
  - ❖ Home phone : 62-251-312977
  - ❖ Mobile phone : 62-0811813724
  - ❖ E-mail : [hirassidabutar@hotmail.com](mailto:hirassidabutar@hotmail.com)

### 2. Educational Background:

- 1988: PhD in Forest Resources, University of Washington at Seattle, USA  
Major: Forest Resource Economics  
Minor: Operations Research
- Feb-Jun 1985: enrolled in the Doctoral Program of Bogor Agricultural University majoring in natural resources management (uncompleted, transferred to University of Washington)
- 1984: MSc. in Forest Resources, University of Idaho at Moscow, USA  
Major: Forest Management  
Minor: Forest Sociology
- 1970 Forest Engineer, Bogor Agricultural University at Bogor, Indonesia  
Major: Tropical Forest Ecology, Tropical Silviculture  
Minors: Forest Pests and Climatology

### 3. Occupational Background

- **January 2008 – present:**
  - Has formulated, fully or partially, a number of project proposal for submission to ITTO; among others are Cambodian project on forest law enforcement, Bamboo project on model capacity building (Indonesia), Cempaka project on plantation development (Indonesia), Chinese project on sustainability of mangrove ecosystem, Tengkawang project on genetic conservation (Indonesia), Lake Toba project on conservation of catchment area (Indonesia), Cendana project on improvement of enabling conditions for cendana conservation and development (Indonesia), Betung-Kerihun project on national park conservation (Indonesia) and Thai project on trans-boundary bio-diversity conservation. All these proposals, except the Cempaka one, had been directly approved by ITTO with only minor revisions and fully funded for their implementation.
  - July-October 2012: employed by ITTO Project TFL-PD 019/10 Rev. 2 (M) “Developing collaborative management of Cibodas Biosphere Reserve in West Java, Indonesia” as the International Consultant to assess existing conflict of interests in implementing natural resource conservation and development plan and to develop an integrated management plan for the Cibodas Biosphere Reserve
  - July – August 2012: appointed by ITTO as the International Consultant on the ex-post evaluation of Project PD 275/04 Rev. 3 (I) “Improvement of the sustainable management and utilization of non-timber forest products (NTFPs) in Cambodia and on the formulation of a project on “strengthening capacity in forest law enforcement in Cambodia” which has been recently assessed and approved by the ITTO Expert Panel. Implementation of both Project PD 275/04 Rev. 3 (I) and proposed project are the responsibility of the Forestry Administration of Cambodia
  - October – December 2011: hired by ITTO Project PD 586/10 Rev. (F) “Operational Strategies for the Conservation of Tengkawang Genetic Diversity and for Sustainable livelihood of Indigenous People in Kalimantan” as the international consultant on Activity 3.3 “to conduct study on economics of Tengkawang seed processing.” His main tasks

were i) to search for existing information on Tengkawang seed processing from secondary sources including government reports, universities, publications and other sources, ii) to obtain first hand information on Tengkawang seed processing through consultation with relevant stakeholders and direct visit to local processors, iii) to specify commonly adopted processing activities and techniques including associated cost structure of processing, iv) to search for information on markets for Tengkawang seed processed products as regards types of product, quantity, quality, price, destination, etc., v) to compile and analyze the information acquired and vi) to prepare a technical report on Activity 3.3

- June 2011: appointed by JICA, Jakarta office, to formulate the ASEAN project proposal for “regional cooperation on conservation and sustainable use of mangrove”. The project would be implemented in Indonesia by the Ministry of Forestry with JICA as the proposed funding source
- June – September 2011: the International Consultant of ITTO Project PD 460/07 Rev. 2 (F) “Achieving Sustainable Management of Mangrove Forests in China through Local Capacity Building and Community Development” on the implementation of Activity 3.1: to conduct an analysis on the demand for ecotourism at the Ziangjiangkou Mangrove Nature Reserve in the Fujian Province of China. His main tasks were to compile general information on eco-tourism development in China, to develop a sound methodology for the analysis of demand for eco-tourism at the project site, to gather first hand information on visitors of the nature reserve, to provide estimate of demand for eco-tourism at the nature reserve and to write a technical report on the analysis
- June – August 2010: at the request of the Ministry of Forestry, assisted in the ex-post evaluation of three ITTO-sponsored projects implemented by the Ministry of Forestry, namely PD 286/04 Rev. 1 (I) “Strengthening the Capacity to Promote Efficient Wood Processing Technologies in Indonesia”, PD 277/04 Rev. 3 (I) “Promoting Selected Non-timber Forest Products Based on Community Participation Approach to Support Sustainable Forest Management” and PD 108/01 Rev. 3 (I) “Development of Sustainable Rattan Production and Utilization through Participation of Rattan Small-holders and Industry in Indonesia”. The international consultant of the ex-post evaluation appointed by ITTO was Dr. Antonio Manila of the Philippines
- May 2010 – present: the National Expert of ITTO Project PD 523/08 Rev. 1 (I) “Operational Strategies for the Promotion of Efficient Utilization of Rubber wood from Sustainable Sources in Indonesia”. His main tasks include: i) to assist the Project Coordinator in the day-to-day management of the project operations, ii) to advise on the development of project operational plans, and iii) to establish coordination with the main stakeholders in general, with concerned government authorities at the central, regional and local levels in particular
- October 2009 – February 2010: appointed as the International Consultant of ITTO Project PD 394/06 Rev. 1 (F) “Restoring the ecosystem functions of the Lake Toba catchment area through community development and local capacity building for forest and land rehabilitation”. His assignment was to identify the best strategy for the rehabilitation of land and forest on the Lake Toba catchment area. Among his specific tasks were to collect relevant information on the bio-physical and socio-economic aspects of the catchment area, to analyze cause-effect relationship of the main problems facing the conservation and development of the catchment area, to define relevant and effective interventions for land and forest rehabilitation along with their associated costs and to develop a mid-term strategic plan for land and forest rehabilitation of the catchment area
- June – August 2009: employed by ITTO as the Consultant on the conduct of ex-post evaluation of two ITTO-assisted projects in the Philippines
- February 2009 – August 2011: he was appointed by the Ministry of Forestry and ITTO as the ITTO Expert Panel member. During this period, he was involved in the Panels Meetings in Yokohama on the technical assessment of the project proposals submitted by ITTO member countries for funding consideration
- 2008 – present: member of National Clearing House of the Ministry of Forestry for the technical assessment of project proposals submitted by proponents for funding consideration by the International Tropical Timber Organization
- 2008 – present: trainer on formulation of project proposals for submission to ITTO, occasionally organized by the Ministry of Forestry (MOF)
- January 2008 – December 2009: CTA (Chief Technical Advisor) to ISWA-ITTO Project PD 286/04 Rev. 1 (I) “Strengthening the Capacity to Promote Efficient Wood Processing Technologies in Indonesia”

➤ **January 2003- December 2007:**

- Worked with the International Tropical Timber Organization (ITTO) as the Asia-Pacific Projects Manager for Reforestation and Forest Management. Duties and responsibilities included: i) monitoring tropical forest resources and activities related to their sustainable development; ii) assessment of project and pre-project proposals submitted by Member Countries; iii) monitoring of projects under implementation; iv) evaluation of completed projects and assessment of their impacts; v) provision of advice to Member Countries on matters in the field of Reforestation and Forest Management; vi) preparation of various reports on the work of the Organization in Reforestation and Forest Management; and vii) carrying out other tasks as appropriate
- Being a Projects Manager, he had gained experience in identifying factors affecting the success or failure of forest development projects, in analyzing specific problems facing forest resource management and in assessing risks as well as sustainability of forestry projects in the tropics. In no doubt, he has accumulated practical experience in developing sound project proposals based on his involvement in the monitoring of numerous forestry projects in the Asia-Pacific Region

➤ **1998 - 2002:**

- Advisor to the Indonesian Sawmilling & Woodworking Association (ISWA), particularly in the promotion of ISWA's international networking. Major tasks were to: i) advise the management on the current situation of international market for wood products; ii) assess overall performance of ISWA members in terms of competitiveness and advise the management on the necessary follow up actions; iii) assist the management in the development of strategic action plan; and iv) formulate project proposals for submission to international donors, particularly ITTO, for financial assistance
- As a free-lance forestry consultant serving the private companies and government organizations in matters related to policy analysis, socio-economic and environmental studies as well as project management
- Recruited as the national expert on forest industry by the ITTO Technical Mission to Indonesia in February-April 2001. The Mission was tasked by ITTO to assist the Government of Indonesia to identify needed ITTO support especially in formulating action plans to achieve sustainable forest management (SFM) in Indonesia. More specifically, the Mission had to: i) assess elements of forest programmes in Indonesia and their actual implementation and identify related shortcomings; ii) assist in formulating pilot programmes to restructure the forest industry, establishing forest plantations, recalculating timber values and decentralizing forest management; iii) assist in formulating action plan with strong measures to combat illegal logging; and iv) prepare and submit a report to ITTO with recommendations for future work in this area. He was tasked to collate and analyze data on the forest industry and prepare a background document in the context of above Mission's tasks
- Served as the Professor in Strategic Management at the Jakarta Graduate Schools of the Technological University of the Philippines (TUP), and Lecturer at the Jakarta Christian Krida Wacana University (UKRIDA). He was the major advisor to a number of students pursuing advanced degrees in the field of management science at the TUP

➤ **1994-1997:**

- Executive Director of Natres Development Co. Ltd, a private company dealt with forestry consulting services, forest plantations development and forest harvestings
- The Team Leader for more than forty feasibility studies on forestry development projects both in the government and private sectors
- The Leader of a number of contracting operations dealing with forest plantation and harvesting in Sumatra and Kalimantan islands of Indonesia
- In 1995 he founded Betras Abadi Sejahtera Co.Ltd., a contracting firm in the field of natural resources and became the management advisor to the firm.

➤ **1991-1993:**

- In June 1991 he resigned from the Ministry of Forestry at his own request
- Marketing Director of Jaakko Poyry Consulting Oy (a Finnish based company) at the Jakarta Office, dealt mainly with forestry studies in Indonesia

- During this period he was appointed as co-team leader of the Indonesia Forest Sector Project INO 1781, a feasibility study on investment in forest concession management and in watershed development in the Sulawesi island funded by Asian Development Bank, for nine months staggered in two years.
- **1972-1991:**
  - Employed by the Ministry of Forestry of Indonesia (MOF) serving various units of organization included the Forest Research Institute, the Forest Concession Management Supervisory Unit, the Non-timber Forest Products Management Unit, the Programme Planning Unit of Directorate General of Production Forest Management and the Bureau for International Cooperation in charge of multi-lateral relations
  - During his service with the Ministry, he had been participating in numerous national and international trainings, seminars, workshops and conferences
  - From 1982 to 1998 he attended University of Idaho in USA for his Master degree, Bogor Agricultural University for one semester for doctorate program on environment management and University of Washington for his Doctoral degree
  - In 1990 appointed by the Food and Agriculture Organization of the United Nations as the Consultant to Viet Nam for Forestry Sector Economy and Investment Strategy Analyses, two assignments totaling six months in duration
  - Between 1998 and 2001 he was appointed as the Project Coordinator of the Indonesia Forestry Sector Study Project which was funded by the World Bank and jointly executed by the Ministry of Forestry and FAO. The main objectives of the project were to identify policy option for forest management, to recommend appropriate programs for implementation and to prepare a portfolio of project profiles based on pre-feasibility study.

#### **4. Special Assignment:**

- 2001: Member of the ITTO Technical Mission to Indonesia tasked to collect information national forest industry development, identify main problems facing the industry and their causes and make recommendations for effective and feasible actions;
- 1991: appointed as third Secretary of the World Food Day celebration in Jakarta;
- 1990: appointed as the second Secretary and member of Steering Committee of the 1990 National Forestry Congress and as the Secretary of the Indonesia-Germany Workshop on forestry development;
- 1989-1991: appointed as the Project Coordinator of the Indonesia Forestry Studies Project funded by the World Bank and jointly executed by FAO and the MOF.

#### **5. Training**

- Participated in a number of professional trainings in Indonesia and abroad including on Economic Forecasting Models for Agricultural Products Market at Washington State University (1983), on Tropical Dendrology in Honduras, Latin America (1983) and on Management of Government Organizations at George Mason University (1982).

#### **6. Award**

- February 1999, awarded rank as Professorial Lecturer in Management Science by Technological University of the Philippines.

#### **7. Language Skills**

- Fluent in English, both speaking and writing;
- Bahasa Indonesia, mother tongue.

Proposed position : Long-term National Expert

Hiras P. Sidabutar

## CURRICULUM VITAE

### PERSONAL DATA

Name : Herlina Lesmana  
Address : Jl. Mandar Utama Blok DS 2/17  
Bintaro Jaya 3A – Tangerang 15225  
Phone : 62.21.7373755 HP : 08161347599  
Place / Date of Birth : Kuningan, February 8, 1964  
Marital Status : Married  
Religion : Catholic Rome  
Hobbies : Travelling and reading

### EDUCATION

1983 – 1986 : Academy Secretary "Tarakanita" Jakarta

### WORKING EXPERIENCE

2004 – now : Forestry Industry Revitalization Agency (BRIK) – Jakarta  
As Secretary & Finance to Board of Director

2009 – 2013 : ITTO project PD 523/08 Rev. 1 (I) "Operational Strategies  
for the Promotion of Efficient Utilization of Rubberwood  
from Sustainable Sources in Indonesia" as Project Staff

2005 – 2009 : ITTO Project PD 286/04 Rev. 1(I) "Strengthening the Capacity to  
Promote Efficient Wood Processing Technologies in Indonesia" as  
Project Staff

2004 : ITTO Project PPD 80/03 Rev. 2 (I) "Promotion the Utilization of  
Rubberwood from Sustainable Sources in Indonesia" as Project Staff

1998 – 2003 : Forum HKR – Jakarta  
As Secretary to Director

1988 – 1998 : Hutan Kurnia Raya Joint Marketing Board (BPB) – Jakarta  
As Executive Secretary

1986 – 1988 : PT. Cedef Indo – Jakarta  
As Junior Secretary

Proposed position : Project Secretary & Finance

## CURRICULUM VITAE

### Personal Data:

Name : **Edi Setiarahman**  
Address : Komp. Paspampres, Jl. Belibis II B-8 No.7 RT.011/006 Kel. Kp. Tengah - Kramat Jati, Jakarta Timur 13540  
Home Phone : 62 (021) 8408022  
Office Phone : 62 (021) 5703172  
Sex : Male  
Religion : Moslem  
Place & Date of Birth : Bogor, July 17<sup>th</sup>, 1967  
Marital Status : Married, 1 child  
Health : Good (no physical defect)  
Identification : KTP DKI Number: 09.5405.170767.8502

### Formal Education:

1986 - 1993 Faculty of Forestry, Graduated S-1, Bogor Agricultural Institute (IPB), Bogor  
1983 - 1986 SMA Negeri 4, (Senior High School), Bogor  
1980 - 1983 SMP Negeri 3, (Junior High School), Bogor

### Professional Experience:

April 1994 ~ until present

Employer : ISWA (Indonesian Sawmill and Wood Working Association) Jakarta.

Position : Staff Data Entry (EDP) & Technical of Forestry

Responsibility : General administrations, data processing, administrative work, technician of the ITTO Project PD 286/04 Rev. 1 (I) "Strengthening the Capacity to Promote Efficient Wood Processing Technologies in Indonesia" involved in Bulletin Publishing and project reporting

April 2005 ~ until present

Member of the Indonesia National Standard and Technical Committees of Wood and Furniture Products, SNI (Indonesia National Standard).

### Computer Literacy

Able to operate MS-Windows and its application (MS-Word, MS-Excel, Power Point, Publisher, Photoshop, etc.)

Proposed position : IT Technician

**Annex 5: Outlines of terms of reference (TOR) for key personnel, national experts, sub-contractors and international consultant to be paid with ITTO funds**

<b>Position</b>	<b>Main tasks</b>
<b>A. Key Personnel</b>	
Project Coordinator	<ul style="list-style-type: none"> <li>• To manage project operations on a day-to-day basis</li> <li>• To prepare plans of operation, monitoring and evaluation</li> <li>• To prepare and submit documents and reports to EA and ITTO in accordance with the project agreement</li> <li>• To select consultants and other professionals to assist in project implementation</li> <li>• To organize various meetings including on PSC and PTC on progress in implementation</li> </ul>
<b><u>Project Secretary &amp; Finance</u></b>	<ul style="list-style-type: none"> <li>• To assist PC in managing project operations</li> <li>• To organize meetings and travels</li> <li>• To do other tasks as requested by PC</li> <li>• To carry out technicalities of budget accounting in accordance with ITTO's fund GOI's procedures and techniques</li> <li>• To assist PC in preparation of documents for installment of funds</li> </ul>
IT Technician	<ul style="list-style-type: none"> <li>• To input data on information system</li> <li>• To provide data and information for PC and Consultants as requested</li> </ul>
Field Supervisor	<ul style="list-style-type: none"> <li>• To assist in developing operational plans</li> <li>• To supervise and to report implementation of activities and field operations</li> <li>• To coordinate with local authorities and partners</li> </ul>
<b><u>Long-term National Expert</u></b>	<ul style="list-style-type: none"> <li>• To assist PC in the day-to-day management of the project</li> <li>• To assist in preparation of operational plans</li> <li>• To help PC in monitoring of project operations</li> <li>• To carry out project reporting</li> <li>• To represent PC in various meetings</li> <li>• To undertake any tasks as requested by PC</li> </ul>
<b>B. National Experts (short term)</b>	
Activity 1.1	<ul style="list-style-type: none"> <li>• To study existing landuse plan and identify lands suitable for growing energy wood species</li> <li>• To identify available suitable lands for energy forests in close consultation with local governments</li> <li>• To obtain approval of local governments on lands allocated for energy forests</li> <li>• To produce maps of available suitable lands</li> </ul>
Activity 3.6	<ul style="list-style-type: none"> <li>• To carry out an analysis on the need to establish and operate a stakeholder consultation forum (SCF)</li> <li>• To develop terms of reference of SCF in close consultation with main stakeholders</li> <li>• To develop an operational plan for SCF and associated budget</li> </ul>
Activity 3.5	<ul style="list-style-type: none"> <li>• To review existing policies on renewable energy development at the national and local levels</li> <li>• To organize group discussions on appropriate incentive for investment</li> <li>• To prepare brief policy documents on proposed incentives for discussion among concerned authorities</li> </ul>



Position	Main tasks
<b>C. Sub-contractors</b>	
No. 1, NGO Activity 1.3	<ul style="list-style-type: none"> <li>• To install boundary pole marks of planting area based on the map received from the project</li> <li>• To develop planting design at 3 sites @3 species @4Ha in close consultation with field supervisor</li> <li>• To carry out planting activities</li> <li>• To monitor growth and development of plants and carry out nursing activities as appropriate till harvest date</li> </ul>
No. 2, National Consultants No. 2a Activity 1.4	<ul style="list-style-type: none"> <li>• To assist in identification of available suitable lands for energy forest development based on existing landuse plans in close consultation with local governments</li> <li>• To collect data on growth and yield from secondary sources of the species to be planted</li> <li>• To develop estimates of yield of the species planted using observed data on growth and yield and secondary sources</li> </ul>
No. 2b Activity 1.5	<ul style="list-style-type: none"> <li>• To collect data and information on potential of crop estates in North Sumatra region focusing on rubber and palm-oil plantations</li> <li>• To review replanting strategy adopted</li> <li>• To make estimates of energy wood volume harvestable from replanting areas</li> </ul>
No. 2c Activity 2.5	<ul style="list-style-type: none"> <li>• To monitor growth and development of the energy species planted</li> <li>• To collect information on the species planted from secondary sources</li> <li>• To consult with experienced persons on development of the species</li> <li>• To develop technical manuals on three species</li> </ul>
No. 2d Activity 3.1	<ul style="list-style-type: none"> <li>• To develop web design in close consultation with PC</li> <li>• To assist in procurement and installment of IT devices</li> <li>• To showcase data collection from different sources, data inputting and operation of the system</li> <li>• To develop SOP and train web operators</li> </ul>
No. 3, University Activity 2.1	<ul style="list-style-type: none"> <li>• To select target local communities in close consultation with PC and local governments</li> <li>• To develop dialogue materials</li> <li>• To conduct dialogue in a friendly and interactive manner</li> <li>• To report on dialogue results</li> </ul>
No. 4, NGO Activity 2.2	<ul style="list-style-type: none"> <li>• To develop a training program in close consultation with PC and competent resource persons</li> <li>• To develop criteria for selection of trainees</li> <li>• To conduct field training on planting and harvesting at 3 sites</li> <li>• To report on the training implementation</li> </ul>

Position	Main tasks
No. 5, University Activity 2.3	<ul style="list-style-type: none"> <li>• To develop a training program on cooperative management</li> <li>• To develop criteria for selection of trainees and training materials</li> <li>• To conduct practical training</li> <li>• To develop guidelines for community cooperative operational management</li> <li>• To report on the training implementation</li> </ul>
No. 6, R&D Institution Activity 3.3	<ul style="list-style-type: none"> <li>• To examine wood properties of 3 energy wood species focusing on properties relating to caloric content and processes of transforming wood to energy (electricity and wood pellet)</li> <li>• To examine caloric values of 3 species of 30 and 36 months of age</li> <li>• To report on implementation of the activity</li> </ul>
<b>D. International Consultant</b>	
Activity 3.4	<ul style="list-style-type: none"> <li>• To collect reliable information on wood-based energy markets and production technologies</li> <li>• To study information on wood properties generated under Activity 3.3 and sustainable supply of energy wood produced under Activities 1.4 and 1.5</li> <li>• To assess feasibility of investment in wood-based biomass energy designed to manufacture wood pellets or electricity power</li> <li>• The investment feasibility is to be assessed using common economic, social and environmental criteria</li> <li>• The studies have to be presented before an expert panel to be established by PC for comments and improvement</li> </ul>

**Annex 6. Response to the overall assessment and specific recommendations of the Forty-seventh Expert Panel**

No.	Expert Panel's comments	Modifications made
<b>A</b>	<b>Overall assessment</b>	
	<p>The panel noted that the proposal arises and builds in response to the shortage of energy supply, especially electricity in the Country, as well as the national policy to increase the supply capacity of renewable energy. Also, the Panel acknowledged the submission of the proposal is the follow-up action of ITTO Asia-Pacific Wood-Based Bioenergy Forum in Jakarta in 2008.</p> <p>The panel recognized that some small improvements need to be made to the proposal, including the need to discuss economic feasibility of the wood-based biomass energy development, to reduce ITTO budget contribution allocated for personnel and to elaborate further on the sustainability after project completion. Clarification is also needed on who will be the Executing Agency and the collaborators of the project implementation.</p>	<ul style="list-style-type: none"> <li>• Economic feasibility of the wood-based biomass energy development is yet to be assessed under Activity 3.4</li> <li>• Personnel budget component has been reduced; see Tables 3.4.1 and 3.4.3 and explanation under B below</li> <li>• Sustainability of the project after completion is elaborated under appropriate sections; see explanation below</li> <li>• The Executing Agency of the project is DG of Forest Utilization Management (BUK) of the Ministry of Forestry; the Collaborating Agency is ISWA (Indonesian Sawmill &amp; Woodworking Association) and the partners include local governments, communities, R&amp;D institution, university, NGO and State Electricity Company (PLN), based on respective competence</li> </ul>
<b>B.</b>	<b>Specific recommendations</b>	
	<ol style="list-style-type: none"> <li>1. In Section 1.3.2, add information on the situation of degraded land and its current utilization and the importance of the forestry sector in the target area. Also, elaborate more the environmental aspect, including the forest sector situation;</li> <li>2. In section 2.1.1, explain how the involved institutions work together in the project implementation, as well as involvement of local communities;</li> <li>3. In Section 2.1.3, explain how encountered problems in the issue of degraded land, also discuss the current use of wood residues from ordinary forestry and forest industry and their potential in supporting the shortage of renewable energy supply;</li> <li>4. Costs in the ITTO budget allocated to personnel is too high and should be reduced;</li> <li>5. In section 3.5.2, specify more necessary enabling factors to ensure the project sustainability. The Panel has its opinions that with the current proportion of the ITTO budget contribution, in which heavy allocation is designed for personnel, the project may be difficult to reach its sustainability after completion; and</li> </ol>	<p>Requested information is presented in Section 1.3.2; see page 5</p> <p>Involvement of institutions and local communities is elaborated in Section 2.1.1; see page 8</p> <p>Encountered problems on the utilization of degraded lands and current use of wood residues are discussed in Section 2.1.3; see pages 10-11</p> <p>ITTO budget allocated to personnel has been reduced; justifications are presented on page 32; see also Tables 3.4.1 and 3.4.3</p> <p>Project sustainability is ensured through promoted biomass energy industry development by private sector with the support of concerned government authorities; see page 32 on sustainability vs personnel cost</p>

	6. Synchronize the composition of the project management team (Section 4.1.2) with the listed personnel in the budget arrangement, Annex 3 and Annex 5. Also, elaborate also their tasks and responsibility;	Composition of the project management team (PMT) has been synchronized with the budget arrangement (see Section 4.1.2 and Annexes 3 and 4); tasks of the PMT are elaborated in Annex 5
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