ITTO PD 737/14 Rev. 2 (I)

Developing Supply Capacity of Wood-based Biomass Energy through Improved Enabling Conditions and Efficient Utilization of Degraded Forest Lands Involving Local Communities in North Sumatera Province of Indonesia

1. Project Identities

Project number	: PD 737/14 Rev.2 (I)
Project 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
Project registration number	: 2CU5BDTA
Host Government	: Government of Indonesia
Executing Agency	: Directorate of Production Forest Business Management

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Collaborating Agency	: Indonesian Sawmill & Woodworking Association (ISWA)
Project Management Unit (PMU)	: Established pursuant to the MoU signed by PHPL and ISWA on 18 September 2017
Starting date	: 1 October 2017
Project duration	: 48 months
Project budget	: USD 487,100

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2. Project Design

a. 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

b. Specific Objective

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

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c. 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**

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d. Activities

Output 1	
Activity 1.1:	**To identify available suitable lands for development of energy forests in North Sumatra province**
Activity 1.2:	**To identify suitable lands in 3 FMUs for energy forest development**
Activity 1.3:	**To establish energy forest models for purpose of demonstration and training (3 sites, 3 species, 36 Ha in total)**

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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**
Output 2	
Activity 2.1	**To conduct dialogue with local communities on benefits of energy forest development (50 villages in 13 districts)**

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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)**

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Activity 2.4:	**To conduct comparative studies on wood-based energy industry development for executives and managers**
Activity 2.5:	**To develop technical manuals on energy forest development for three tree species planted**
Output 3	
Activity 3.1	**To disseminate information on technology and market for wood-based energy through website and other means**

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Activity 3.2:	**To organize one national workshop on wood-based energy development in Medan (to be adjusted)**
Activity 3.3:	**To examine caloric properties of three energy wood species planted**
Activity 3.4:	**To conduct studies on feasibility of investment in commercial manufacturing of wood- based energy including electricity and wood pellets**

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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**

3. Results of Implemented Activities

Activity #	Main result
1.1	Suitable lands for growing gamal, Kaliandra and lamtoro identified and mapped: - 1.42 M Ha inside state production forest lands - 1.25 M Ha on crotical lands
1.2	32,054 Ha of suitable lands for growing gamal, kaliandra and lamtoro identified and mapped in 3 FMUs
1.3	33 Ha demo plantations of gamal, kaliandra and lamtoro established in 3 FMUs (92% of the target)

Activity #	Main result
1.4	Yield at age 36 months: - Gamal 21-38 tonnes/Ha - Kaliandra 22-59 tonnes/Ha - Lamtoro only grew up to 16 months of age
1.5	Total potential supply of woody biomass from non-forest sources in North Sumatera was estimated at 4,043,000 tonnes/a

Activity #	Main result
2.1	Dialogues with 527 villagers of 49 villages on energy forest plantation development completed (98% of the target)
2.2	205 farmers trained on technical skills for growing gamal, kaliandra and lamtoro (100% of the target)
2.3	35 farmer leaders trained forming and managing village cooperatives (70% of the target)
2.4	3 overseas comparative studies carried out to Vietnam and China
2.5	Technical Manuals for growing gamal, kaliandra and lamtoro developed and distributed to FMUs and farmers.

Activity #	Main result
3.1	Collection, collation and dissemination of information on energy forest development and wood biomass production carried out during the project duration.
3.2	One national workshop on wood-based energy development organize in Siantar City in December 2017 involving 52 participants
3.3	Caloric content of Gamal and kaliandra examined in collaboration with the forestry R & D Agency
3.4	The feasibility study on investment in wood pellet industry in North Sumatera region completed in mid. 2019; the investment was technically and financially feasible
3.5	Existing policies on bio-energy development reviewed involving experts and practitioners; the policies required improvement
3.6	A stakeholder forum at FMU level was established involving the main stakeholders.

4. Achievements

a. The outputs

The matching of defined indicators of individual outputs with results of the activities under each output indicate that:

- Output 1 was only partially achieved as one species (lamtoro) did not grow till end of the project
- Output 2 was fully delivered
- Output 3 was not fully delivered as no investment in wood pellet industry was realized till end of the project

b. The Specific objectives

- **The project proponent conceptualized that delivery of all defined outputs should achieve the specific objective; above assessment clearly indicated that all outputs had been delivered thus the specific objective should have been delivered, partially**
- **The matching of pre-defined indicators of the specific objective with results of the interventions confirmed that the specific objective was indeed achieved, partially.**

5. Major problems encountered

- **The Humbang demo site was not suitable for growing the chosen tree species due to: too low light intensity, too low average air temperature for gamal, kaliandra and lamtoro species and too high elevation for lamtoro species;**
- **No investment in wood pellet industry was realized during the project duration as planned which seriously disappointed the local communities and FMUs**

6. The main lessons learned

- Prior to planting any tree species, performing a thorough species-site matching analysis is a must in order to avoid future big loss on investment due to poor yield of the species planted
- For growing gamal, kaliandra and lamtoro, light intensity, air temperature and elevation are among the site factors thath require specific attention to.

7. Project Sustainability

- In its efforts to overcome the national energy problems, the MoEMR decided to implement policies on the supply side that focused on increasing renewable energy share in national energy mix from the current 7 percent to 23 percent in 2025. It was claimed by the government that the forest sector had a great potential to contribute to achieving the targeted share of renewable energy by utilizing available forest resources in a sustainable manner

- The project is potentially sustainable: the lands and labourers needed for growing energy forests to yield energy wood are now available while investment in wood pellet industry in the project area was assessed as feasible through the study conducted under the project;

- **Prerequisite to sustaining the project is to realize investment in either wood pellet or wood chip industry in the project area; realized investment will secure market for energy wood and serve as a strong incentive for local communities and forest management units to produce the wood in an even larger volume which will also contribute to fueling the local economies and eventually lead to project sustainability.**

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Thank you very much