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**LAO PSEMD/PMUPLE’S DEMOCRATIC REPUBLIC**

**PEACE INDEPENDENCE DEMOCRACY UNITY PROSPERITY**

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**Ministry of Energy and Mines**

**Department of Electricity** **No: ...................../MEM.DOE**

**Vientiane Capital, Date…………**

**RURAL ELECTRIFICATION PHASE II PROJECT (REP II)**

**and**

**GEF RURAL ELECTRIFICATION PHASE II PROJECT (GEF REP II)**

**DEPARTMENT OF ELECTRICITY COMPONENT**

### Environmental Management Framework

### For Other Off-Grid Technologies

**January 2011**

### Environmental Management Framework

### For Other Off-Grid Technologies

**A. Types of Other Off-Grid Investments**

* *Biogas Digesters for electrification:* This is a small anaerobic masonry digester constructed below ground level. The system will be used to convert animal wastes and plant wastes through anaerobic digestion processes to produce energy that can be converted to electricity. Investment may comprise a buried masonry anaerobic digester which provides gas to lamps and cook stoves and possibly a small engine.
* *Village-Hydro:*  This is a run-of-the-river hydroelectric plant. Run-of-the river projects do not require the construction of a reservoir and can be installed in places where the water drop and the steady flow rate are high enough. It will involve construction of canals, tunnels, penstocks, access roads, power-house and transmission lines. Key investment includes some civil works to allow access to the run of the river, a penstock, a 10-50 kW turbine-generator, and a low voltage network.
* *Village Biomass Gasification:* Biomass fuel encompasses diverse fuels derived from timber, agriculture and food processing wastes or from fuel crops that are specifically grown or reserved for electricity generation. Given the capacity of biomass to regenerate, electricity derived from biomass gasification is considered renewable. Burning crop residues, food wastes or manure to generate electricity can also offer environmental benefits in the form of waste reduction and landfill space preservation. Key investment comprises a gravity feed hopper, gasifier chamber, modified gas engine (5-20 kW), generator, and low voltage network.
* *Mini-grids:*  Mini-grids would be built to distribute generated capacity form village-hydro or biomass plants. They would contain poles, transformers and low voltage lines.

**B. Potential Impacts and Mitigation Measures**

In general, the impacts of the off-grid subprojects are expected to be relatively minor and mostly temporary in nature, and can be easily managed through good engineering design and construction practices, and good housekeeping measures during project implementation. Below discusses the potential negative impacts of these technologies and its potential mitigation measures to be implemented under REP II and GEF REP II.

* ***Biogas Digester for electrification.*** Many studies have shown that electricity generated from biogas production is considered CO2 neutral, assuming that biogas is recovered properly. Under the REP II and GEF REP II, no significant environmental impact is expected for the development of biogas generation facilities. The only minor potential environmental impacts are associated with dust and noise during construction and improper waste handling during operation. However, identification of impacts for potential projects will be conducted following the process specified in this ESSF. These impacts, however, will be avoided /mitigated using good housekeeping measures or other measures needed.
* ***Village Hydro.*** Potential negative impacts: include dust, noise, and increased pH during construction reduced fish mobility & eco-systems, and erosion and sedimentation. During the site selection, planning, and design of the system, the following actions will be undertaken to avoid the following impacts:
  + damage to aquatic ecosystems in case the reserved minimum flow conditions in the river are not ensured and too much water is directed into diversion channel;
  + damage to fish stocks if no proper fish by-passes are installed or if no proper precautionary measures are implemented to avoid fish being sucked in the turbines;
  + littering of territories adjacent to the installation if the trash collected at the screens in front of the water intakes is not handled properly;
  + erosion if no proper landscaping is done during and after completion of construction of water intake;
  + alteration of habitats in backwater areas due to inadequate design;
  + damage to the river bed and habitats and increase in erosion due to badly selected routing of the headrace and tailrace channels.
* ***Village Biomass.*** Potential negative impacts of these schemes will depend on type and size of the activities as well as the location of the site, especially when the project is designed to serve more than one village. Key issues may include inappropriate site location of these schemes may create disturbance to the protected/sensitive areas or post safety risk to community; significant modification of river/stream may affect fish migration or other natural habitats; inappropriate planning and management of raw materials of Village Biomass may create local demand for forest clearance. To mitigate these risks, the following actions will be carried out:
  + DOE will ensure that al the contractors/consultants involved in the planning, design, and operation of these schemes understand and compliance with DOE’s obligation on safeguard required under REP II and GEF REP II .
* DOE through its contractors/consultants will conduct an environmental screening during the pre-feasibility and feasibility studies for the proposed subproject. If the project site is located in protected and/or other sensitive area, rapid assessment will be conducted and the required mitigation measures will be integrated into the project planning and site selection process. None of the subprojects to be implemented under the off-grid component of REP II and GEF REP II will require an IEE or EIA however if an IEE or EIA is required by the EIA regulation being revised by the Government, the IEE or EIA will be carried out in line with the Government requirement.

***Mini-Grids.*** Minor environmental impacts are expected by the construction and operation of mini-grids for distributing power generated by biomass or village-hydro subproject. The main impacts are likely to occur during construction, and include issues of dust, noise, land clearing, cutting and trimming of trees, and some temporary use of land for storage of materials. However, these impacts are expected to