DEPARTMENT OF ENERGY
ENERGY UTILIZATION MANAGEMENT BUREAU

Manuals and Guidelines
for
Micro-hydopower Development
in Rural Electrification
Volume II

June 2009
Through the Project on “Sustainability Improvement of Renewable Energy Development for Village Electrification in the Philippines” under technical assistance of Japan International Cooperation Agency (JICA), this manual was developed by the Department of Energy (DOE) reviewing the “Manual for Micro-hydropower Development in March 2003.”
Manuals and Guidelines for Micro-hydropower Development in Rural Electrification

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Volume II

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Guideline
for
Selection of Potential Sites
and Rehabilitation Sites
of Micro-Hydropower

June 2009
This guideline was developed by the Department of Energy (DOE) through the technical assistance under the Project on “Sustainability Improvement of Renewable Energy Development for Village Electrification in the Philippines” which was provided by the Japan International Cooperation Agency (JICA).
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1. SELECTION OF POTENTIAL SITES

For selection of potential sites, it is necessary to evaluate from the technical, organizational/systemic and financial viewpoint. Regarding to the evaluation, the basic data required and the method is indicated in “Project Evaluation Guideline”.

2. SELECTION OF REHABILITATION SITES

2.1 Flowchart for Selection

Rehabilitation sites must be select in accordance with the following flowchart.

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### Fill up Table on the Status of Existing Micro-Hydropower Plants (Refer to Table -1)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>Grid has not been extended</td>
</tr>
<tr>
<td>-2</td>
<td>Concerned Plants are under BEP (Include ANEC Regular Budget from DOE)</td>
</tr>
<tr>
<td>-3</td>
<td>Good Social Condition</td>
</tr>
<tr>
<td>-4</td>
<td>There are sufficient data for trouble shooting</td>
</tr>
<tr>
<td>-5</td>
<td>Cost Performance (Initial Project Cost over 100,00)</td>
</tr>
<tr>
<td>-6</td>
<td>Effectiveness for Rehabilitation/Improvement (Over 5kW)</td>
</tr>
</tbody>
</table>

Candidate Site for Rehabilitation/Improvement
### Form for Present Situation of Existing Micro-Hydropower Plant

<table>
<thead>
<tr>
<th>Energy Name or Title</th>
<th>Municipality</th>
<th>Purpose</th>
<th>Status of Geol. Connection</th>
<th>Capacity (kW)</th>
<th>Height (m)</th>
<th>Discharge (m³/s)</th>
<th>Coordinates</th>
<th>Status</th>
<th>Cause of Failure</th>
<th>Date of Commission</th>
<th>Total Project Cost (mil. $)</th>
<th>Toler. $P</th>
<th>Regular Budget of ANEC</th>
<th>LOU</th>
<th>RBC</th>
<th>ASHAD</th>
<th>IMF</th>
<th>Activity of RAPA</th>
<th>DOE/ICA Inspection</th>
<th>Unit Project Cost (mil./$)</th>
<th>Source</th>
</tr>
</thead>
</table>

**Attachment (by each site)**

1. Site Location Map (1:250,000 and 1:50,000)

2. Feature of each structure (as much as possible)

3. Report of inspections by DOE or ANEC

4. Proposal from Proponent
2.2 Fill up table on the status of existing micro-hydropower plants

For appropriate rehabilitation of existing micro-hydropower plant, the proper monitoring, which include technical aspects and social aspects, are required. If the rehabilitation is conducted without appropriate evaluation on concerned problems preliminarily, the rehabilitation will be failed due to similar cause of problems.

This guideline has been prepared on the basis that the proper monitoring has been conducted for existing micro-hydropower plants, while the table on the status of micro-hydropower plants can fill up.

2.3 Criteria for Selection

(1) Criteria –1 : “Grid has not been extended”

Final goal of rural electrification is that all of people can obtain stable supply of electricity. From this point of view, role of micro-hydro-power plant for rural electrification is supply of the electricity temporally until grid-extension.

When the grid is extended, the concerned micro-hydropower plant completes its role. As might be expected, in this case, the rehabilitation for the concerned plant is not necessary.

(2) Criteria-2 : "Concerned plant are under BEP”

Among the existing micro-hydropower plans, there are many plants, which have been constructed without technical and financial support of DOE under BEP. Basically, DOE has not responsibility for the rehabilitation for these plants. Therefore, the rehabilitation for BEP project has the priority rather than others.

(3) Criteria-3 : “Good Social Condition”

For community based electrification projects, community organization and its management is important and self-supporting efforts of beneficiaries are required. For the rehabilitation projects, healthiness or activeness of BAPA is set as one of criteria of site selection taking concept of DSA into consideration. BAPA activities must be evaluated in accordance with the following indicators.

i. Sense of ownership of beneficiaries
ii. Consciousness on maintenance of facilities
iii. Management of the existing BAPA
iv. Tariff collection
v. Management of revenue and expenditure
vi. Operation and maintenance of RE systems

(4) Criteria-4 ; “There are sufficient data for trouble shooting”

For the appropriate rehabilitation, it is essential to detect the cause of problems preliminarily. In order to detect the cause of problems, following data/information are required.
i. Location Map (Scale 1/250,000 or 1/50,000)
ii. Feature & Specification of each structure/equipment with drawings
iii. Report on Present Situation of the plant
iv. Others (Refer to Table-1)

(5) Criteria-5 : “Cost Performance – Initial Project Cost over Php. 100,000/kW)”

Although the project cost of micro-hydropower development depends on site condition, such as topographical, meteorological and social conditions, in case of the project unit cost less than Php.100,000/kWh, the plant is not sustainable.

(6) Criteria-6 : “Effectiveness for rehabilitation/Improvement (over 5kW)”

In the Philippines, many existing micro-hydropower plants have some problems. On the other hand, the supporting agencies for the rehabilitation are facing strict budgetary limitations. Therefore, the target of the rehabilitation plants limit over 5kW in this guideline.
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