Feasibility Studies with the Aim of Developing a Bilateral Offset Credit Mechanism FY2011

Studies for Project Exploration and Planning

Program exploration research of
Run-of-river micro hydro power project

New Energy and Industrial Technology Development Organization (NEDO)
Seabell International Co., Ltd.
Sojitz Machinery Corporation
Recycle One, Inc.
Feasibility Studies with the Aim of Developing a Bilateral Offset Credit Mechanism, FY2011

Studies for Project Exploration and Planning

Program exploration research of Run-of-river micro hydro power project
Aims of the F/S

To Clarify the spread possibility of Seabell’s Run-of-river micro hydro power technology in rural areas lacking in stable electricity supply in India.

To clarify issues on developing carbon credits by installing this technology under existing carbon credits system as well as to develop MRV methodology under “Bilateral Offset Credit Mechanism”.

Introduction of technology outline

**Ultra Low Head (ULH) Micro hydro turbine system**

Seabell’s Run-of-river ULH micro hydropower plant can be effectively used in areas with low head drop (less than 3m) or small water volume. This technology is for open waterways to produce electricity (photo). It is unitized for easy assembly and installation without compromising its technical efficiency.
Study items

• Research on the situations and policies of climate change in India as well as the overview of market and related policies for this technology in India.
• A project plan development and evaluation for spread of this technology in India.
• The feasibility of the project environment such as financial requirements and etc.

Focused States

Identified four northern states, i.e. Uttarakhand, Punjab, Uttar Pradesh and Bihar as states with the high potential of ULH micro hydropower, that have agricultural terrains with modest natural slope.

• Though electrification of rural areas have seen substantial leap in the last ten years, stable electricity supply remains as a predominant issue, especially at the tail end of grid – potential for spread of technology.
• Pilot installation of ULH micro hydropower generating system at a irrigational canal in Dehradun, UK completed together with the State of Uttarakhand.
• ID cluster installation sites of 5-10 units in each focused states for implementation in the next phase after initial study.
Features of our MRV methodology

We have found there are 1,625 potential sites of the unit’s installation in FOUR FOCUSED STATES. If we installed 1,625 UNITS, the emission reduction calculation will be as follows.

**Maximum Emissions Reduction Potential [tCO2e/year]**

\[
\text{Maximum Emissions Reduction Potential} = \text{Generated Electricity [MWh/y]} \times \text{Grid Emission Factor [tCO2e/MWh]} \\
\text{=} \text{Generator [unit]} \times \text{Generation Capacity [kW/unit]} \\
\text{=} \text{X Operating Time [hours/year]} \times \text{Load Factor [%]} \times \text{Grid Emission Factor* [tCO2e/MWh]}
\]

\[
\approx 154,000 \text{ [tCO2e/year]}
\]
**Phase One**

**Aug. 2011-Feb. 2012**

**Desired Outcome**
Comprehensive understanding of potential ULH micro hydropower system in India. ID sites for business modeling

**Deliverables**
- Installation potential of “STREAM” (10kW) in India (4 States)
- One pilot installation (Bijapur)
- Identification of key stakeholders
- ID potential sites for phase II
- Device feasible schemes for installation
- Business Plan for 3 coming years (i.e. 2012-14)

**Target States**
- Primarily Uttarakhand
- Punjab, Uttar Pradesh, Bihar

**Primary Resources**
- METI/NEDO sponsored FS
- MNRE, AHEC-IITR, UREDA, IRR. DEPTT. UR
- Project Consortium, Recycle One, Sojitz

**Made in Japan**

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**Phase Two**

**Mar 2012-Sept. 2013**

**Desired Outcome**
4-5 projects with cluster installations of STREAM 10kW x 50 units = 500kW with workable project schemes.

**Deliverables**
- Installation of “STREAM” (10kW) x 10 units x 5 clusters in India (4 Initial States)
- Implementation of planned schemes
- Analyze business plan and actual and revise as necessary (2012-14)
- FS 4 add. States incl. potential sites for installation
- Monitor social impact thru implementation

**Target States**
- (4 Initial States) Uttarakhand, Punjab, Uttar Pradesh, Bihar
- (4 Add. States) Himachal Pradesh, Gujarat, J&K, Kerela

**Primary Resources**
- METI/NEDO
- MNRE AHEC-IITR
- State RE Nodal Agencies
- Project Consortium

**< 50% Made in India**

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**Beyond Phase Two**

**Desired Outcome**
Non-cluster unit marketing and sales
Generation II units w/higher efficiency
Market expansion both India and neighbours

**Targets:**
- Uttarakhand, Punjab, Uttar Pradesh, Bihar, Himachal Pradesh, Gujarat, J&K, Kerela
- NE States, MP, Kanartaka
- Bordering Countries i.e. Nepal, Bangladesh, Bhutan, Sri Lanka
- African Continent, Middle East, Eastern Europe

**Made in India**