



# EC-ASEAN ENERGY FACILITY (EAEF)



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## SUMMARY OF PROJECT IMPLEMENTED UNDER EAEF CO-FINANCING

**DATE OF SUMMARY:** 28 February 2007

**Contract:** 102-2004  
**Title of Project:** Feasibility Study for Distributed Generation (DG) and Renewable Energy Portfolio (REP) of a Distribution Utility: Case study in the Philippines  
**Beneficiary:** Cagayan Electric Power & Light Co. (CEPALCO) (Philippines)  
**Partners:** Energy Economy Environment Consultants Co. Ltd. (Thailand)  
IT Power Ltd. (United Kingdom)  
Centric Austria International (Austria)  
**Project Start:** 3 March 2005  
**Project End:** 2 September 2006  
**Facility:** 3 Feasibility Study **Sector:** Electricity/RE  
**Total planned project cost:** EUR 995,879  
**Endorsed/contracted EC contribution:** EUR 497,939 representing 50%  
**Realised total project cost:** EUR 926,729.24  
**EC contribution:** EUR 463,364.62

### 1. Summary of the project

The project was designed to map out a distributed generation (DG) and renewable energy (RE) strategy for a distribution utility under a restructuring power sector. The activities conducted were grouped into four phases: Phases 1 and 4 comprised the project inception and regional dissemination, respectively while Phases 2 and 3 were the main project activities. Phase 2 included the conduct of national and regional background studies and surveys on renewable energy potential, progress of power sector restructuring in the ASEAN, distributed generation and European experiences in order to set the stage for the case study. Phase 3 was devoted to the conduct of the feasibility studies of the RE and DG of Cagayan Electric Power and Light Company (CEPALCO), a distribution utility in the Philippines, which happened to be the project beneficiary.

### 2. Objectives

The project envisaged to contribute to the following overall objectives:

- Increase the security of energy supply of ASEAN countries by exploring RE distributed as a supply option;
- Increase the economic exchanges between EU and ASEAN countries by promoting technology transfer in renewable energy investments in the ASEAN;
- Improve the environment at local and global levels by taking advantage of the environmental benefits of renewable energy technologies;
- Facilitate the implementation of the ASEAN Plan of Action for Energy Cooperation 2004-2009 in particular Programme Area No. 5 RE strategy to promote the development and contribution of NRE in energy supply.

### 3. Activities

PHASE I: Project Kick-off Meeting  
PHASE II: Background Studies and Survey

- Renewable Energy potential in the Philippines and ASEAN
  - Power Sector Restructuring in the Philippines and ASEAN
  - European experiences in RE energy strategies under competitive electricity markets
  - Role of distributors and renewable energies in restructuring ASEAN electricity markets
  - Technical Visits to EC-funded RE projects in Southeast Asia and dialogue with project stakeholders and national energy officials
  - Regional workshop on distributed generation, RE and power sector restructuring
- PHASE III: Project Feasibility Studies of RE Portfolio and Analysis of RE Distributed Generation Strategy
- Market analysis: energy supply, demand and infrastructure
  - Local resources supply and distribution infrastructure assessment
  - Technical Analysis and design of the energy plant
  - Investment appraisal and analysis of financing options, including carbon finance
  - Analysis of socio-economic aspects and contribution to national sustainable development goals
  - Environmental Impact Assessment
  - Analysis of RE distributed generation strategy: technical, policy and commercial aspects
  - Formulation of an action plan for RE distributed generation strategy
- PHASE IV: Regional Dissemination
- Regional Dissemination workshop in the Philippines

#### **4. Outputs**

- Project kick-off meeting held on 2-3 May 2005 at Cagayan de Oro City, Philippines
- A report entitled “Survey of Renewable Energy Resources, Policies, Plans and Programmes in ASEAN” was prepared which provided background information for the assessment of a RE and DG option in the framework of a distribution utility’s operation and strategy.
- A background study of power sector restructuring in the Philippines and ASEAN was written which served as input to the feasibility studies of renewable distributed generation options and strategy for CEPALCO.
- A review of the most common energy support policies used by the EU member states to support the development of RE technologies in competitive market environments was prepared.
- Diagnostic studies on the role of distributors and RE in restructuring ASEAN Electricity Markets using the Philippines as a case were conducted.
- Technical site visits held from 25 to 26 October 2005 to the following sites; (a) 53 MW bagasse-fired cogeneration plant in Dan Chang, Suphanburi, Thailand; (b) 9.2 MW rice husk-fired cogeneration plant owned by PRG Granary Co. Ltd. in Thailand participated by 40 people. 21 evaluated the site visits.
- A workshop entitled “Workshop on Opportunities for Renewable Energy Distributed Generation in ASEAN” was held on 27 October 2005 at the Narai Hotel, Bangkok, Thailand with 81 participants.
- A Market, energy supply, demand and infrastructure Analysis Report on CEPALCO was prepared by the project team
- An evaluation of the available renewable energy resources for the three projects proposed (Cabulig mini-hydro, Mariano Polytechnic State College Rooftop PV and Pineapple waste-fired cogeneration plant in Del Monte Cannery) was conducted which included a thorough survey of fuel sources, logistics as well as laboratory analyses to ascertain the characteristics of the fuel.
- Individual Feasibility reports were prepared for these resources

- An Analysis of renewable energy distributed generation strategy relative to the technical, policy and commercial aspects was performed to determine the benefits as well as the challenges to be faced by a distribution utility relative to a full-scale implementation of distributed generation with renewable energy systems in its distribution network.
- An Action Plan was prepared for CEPALCO focusing on strategic approaches and business models, and ways to mitigate risks. The plan likewise proposed the most prudent and effective organisational and project specific structure.
- A workshop entitled “Regional Dissemination Workshop on Opportunities for Renewable Energy Distributed Generation in ASEAN” was held last 24 August 2006 at the Hyatt Hotel, Manila, Philippines participated by 128 people.

## **5. Impacts**

### **5.1 Energy impact:**

Not immediately applicable. However, implementation of the proposed projects would result to generation of electricity from renewable energy sources thereby substituting the conventional fossil fuel-based generation. The Projected annual electricity at 65% load factor using the different options are as follows: for hydro- 34,905,154 KWh (1 x 7 MW) or 39,891,605 (2 x 4 MW); solar (25.46 kWp) 35,641 KWh or 110,894 (90 kWp). For biomass at 95% load factor, the annual electricity projected to be exported to CEPALCO based on the two options considered are: 23,858 MWh (4.24 MW back-pressure system) or 68,537 (10 MW full condensing system). Relative to steam, annual amount to be exported to Del Monte registered at 259,920 tons assuming a 95% load factor.

### **5.2 Environmental impact:**

Not immediately applicable. However, implementation of the proposed projects would result to the following annual CO<sub>2</sub> emission reductions: Mini-hydro (1 x 7 MW) 13,124 or 14,999 (2 x 4 MW); Solar (25.46 kWp) 12.3 or 38.4 (90 kWp). For Biomass, the expected annual CERs at 100% load factor are 52,189 tons

### **5.3 Business impact:**

CEPALCO is committed to pursue implementation of the RE portfolio created during the project implementation and has already given the go signal to conduct the bidding for the Cabulig mini-hydro project. For the solar PV project, MPSC President is now coordinating with CEPALCO’s technical group on how to conduct the interconnection as well as the financing for the project. For the biomass project, discussions with Del Monte Cannery is on-going.

CEPALCO is currently conducting discussions with potential partners and CER buyers regarding the project structure as well as possible sources of funds.

The workshops implemented by the Project became platforms for discussions among the key stakeholders which led to the formulation of policy inputs relative to RE-DG portfolio management.

The network and linkages created by the project opened doors for CEPALCO in pursuing localised energy generation in the various industries within its service territory.

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