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J-POWER

## **Start of Consulting Services for the Planning of the PILIS Hydroelectric Power Station in Costa Rica.**

The Electric Power Development Company (J-POWER) received an order from the Costa Rica Institute of Electricity ("ICE") for consulting services relating to the detailed design of the Pilis Hydroelectric Power Station and the general supervision and management of the construction work.

The services provided by J-POWER include a review of the detailed design of the project and the offering of technical advice for the supervision and management of the construction work.

Starting in July of this year, J-POWER's services on this project will span over a six-year period until the end of June 2009.

The service contract is worth approximately 800 million yen.

The hydroelectric power development project is one of the largest in Costa Rican with a design output of 128,000kW, a concrete dam over 100m in height, an 11km long tunnel and a head in excess of 800m.

### **1. Project Background**

Costa Rica currently depends on energy imports to cover about 45% of its energy needs. The Costa Rican government has therefore prioritized energy development from national resources, with the vision that the replacement of imported energy will help Costa Rica to be less dependent on foreign imports and steer the national economy onto the road of a more balanced and sustainable development.

The specific national energy resources that are to be developed are hydropower and geothermal power. The country has abundant hydroelectric resources that has been developed only on a minor scale of about 10% or so. Costa Rica also has extensive geothermal resources concentrated on the Nicaraguan border. ICE is committed to the aggressive development of these resources.

The feasibility study for the Pilis Hydropower Development Project was carried out on the basis of a technical cooperation project of the Japanese government by the Japan International Cooperation Agency (JICA) from 1989 through 1992, with J-POWER being involved as a consultant. After the feasibility study, the ICA as the project owner conducted an additional geological survey that was

followed by the basic design activities with the technical advice of J-POWER from 1995 through 1998.

Based on the basic design report that came out of these activities, the Costa Rican government approached the Japanese government with the request for a yen loan for the construction of this project. In April 2001, the Japanese government approved the request with the decision to make available to the Costa Rican government a yen loan with a ceiling amount of 16,683 million yen.

As part of the practical implementation of this project, the ICE then placed a specific order with J-POWER to review the detailed design and provide technical advice on the supervision and management of the construction process. In the ensuing contract negotiations, the two parties reached agreement on the contractual conditions and the order was finalized.

## 2. General Description of the Project

This project envisages the construction of a concrete gravity dam (RCC dam; height: 113m; Capacity: 710,000 m<sup>3</sup>; effective storage capacity: 30 million m<sup>3</sup> in the middle reaches of the Pilis river flowing some 30km south of Costa Rica's capital San Jose (a location roughly 30km upstream of the confluence of the Gran de Candelaria and the Pilis river). The annual inflow volume will be controlled from this dam. From the water intake point on the left bank of the dam water will be drawn off at a maximum rate of 18 m<sup>3</sup>/sec. and conducted to the power plant situated on the left bank via a roughly 11km headrace tunnel and a roughly 700m long penstock steel pipe to generate a maximum output of 128,000kW and supply an annual 560 million kWh of electric energy.

### Design Specifications

River basin area	248.5 km <sup>2</sup>
FULL level of dam	1,205 m
LOW level	1,160
Available water depth	45 m
Effective capacity	30 million m <sup>3</sup>
Design flood volume	2,350 m <sup>3</sup> /s
Dam type	Concrete gravity dam (RCC)
Dam crest elevation	1,208 m
Height	113 m
Volume	710,000 m <sup>3</sup>
Length of headrace tunnel	10.5 km
Length of penstock steel pipe	742 m
Length of discharge tunnel	262 m

Maximum water consumption	18 m <sup>3</sup> /s
Effective head	829 m
Plant output	128,000 kW
Turbine type	Pelton turbine (2 units)
Annual electric power output	560 million kWh

### 3. Highlights of Contractual Conditions

#### (1) J-POWER's contractual partner

Costa Rica Institute of Electricity (ICE)

#### (2) Details of Contractual Services

##### 1) At the detailed design stage

1. Review of detailed design documentation
2. Review of bidding documentation
3. Review of Evaluation Criteria Report

##### 2) In the construction supervision/management stage

1. Assistance in bidding procedures
2. Advice on construction drawing approval
3. Support in witnessed inspection procedures for construction equipment, machines, and materials
4. Advice in supervision and management of construction and installation work
5. Advice on environmental matters

#### (3) Service Period (Contract Period)

From July 2003 until June 2009 (6 years)