Questions to be responded to by the firm submitting the application Why do you think this project should receive an award? How does it demonstrate:

innovation, quality, and professional excellence
transparency and integrity in the management and project implementation
sustainability and respect for the environment

Pubugou Hydropower station locates in the midstream of Dadu River, at the border of the Hanyuan County and Ganluo County in Sichuan Province of P.R.China. As the controlling project of planned cascade hydropower stations, Pubugou power station has a catchment area of 68512 km2, at 88.5% of Dadu River basin area. The project mainly consists of dam, spillway, diversion tunnels, power plant and other permanent structures. The rockfill dam is 186m high, with a gravelly soil wall inside. In the left bank, there are power intakes, an open spillway, and a deep no-pressure spillway tunnel, while in the right bank, there are a diversion structure from Niri River and a discharge tunnel. The reservoir has annual regulating capacity, with the normal storage level at 850.00 m, regulating storage level of 60 meters, and total storage capacity of 5.337 billion m³. The power station has six Francis turbine-generator units, with each capacity of 600MW, and 3600MW in total. It has firm power output of 926 MW and the average annual energy output of 14.79 billion kWh, it also has increased 215 MW the firm power output of downstream power stations, and 0.78 billion kWh electricity of dry seasons. The project has enormously increased the downstream flood control safety, decreased the river sedimentation, and improves soil water conservation and ecological environment.

The project land acquisition had involved 2 cities, 3 counties, more than 0.1 million people, about 9.88 thousand acres farmland, a county town, 10 towns, 129 factories, 28 cultural relics. The resettlement started from 2003, and lasted for more than 10 years. There are many breakthroughs in the aspects of the resettlement policy and approaches, the investigation of the real objects, and the compensation standard etc. More than 0.1 million people are properly arranged.

The project commencement date is March, 2004. In Dec, 2009 it began to send electricity and all units began to work in Dec, 2010. The whole project investment is 42.567 billion RMB, including 11.763 billion RMB in power station. The project has received the rewards of “International Milestone Project of Rockfill Dam”, “Outstanding Quality Award of Chinese Power Engineering”, “the First Prize of Science and Technology of Hydroelectric Engineering”, “The First Prize of Excellent Design of National Project Construction”. “The Anti-Seismic Design Research and Its Application in High Rockfill Dam” and “The Research and Development of Flood Discharge and Energy Dissipation and Its Application in Dam Engineering” have won the Second Prize of the
National Science and Technology Progress Awards.

1. Innovation, High Quality and Technical Excellence

(1) A new design philosophy of 200-meter-high rockfill dam with core wall on deep overburden has been firstly put forward, and accordingly a series of patented technology were applied in the investigation and evaluation of the complicated deep overburden layers of dam foundation. The project has adopted 2 high intensity and low elastic modulus cutoff walls with large spacing as for seepage prevention of dam foundation, among which one is “single wall with gallery”; another is “single wall with plug”, to connect with the earth core of dam. By the technology of gradation adjustment, the technology of heavy rolling and compaction, and the technology of reinforcing filtration protection etc., wide-grading gravelly soils with clay content of 2.5%~7.5% have been successfully used as impervious material for the gravelly soil core wall of the world's highest soilcore rockfill dam (186 meters high) on the deep overburden.

“It is a big breakthrough in dam construction technique on the deep overburden in the aspects of material application, dam height and construction speed”, this conclusion was made by the Science and Technology Bureau of Sichuan Province during the identification meeting in 2013, and it was also appraised that “The project design and construction has reached the international leading level of Science and Technology”.

(2) River closure with large discharge, steep slope on the deep overburden layer was firstly achieved by the way of end-tipped banquette and no bottom protection. The comprehensive index of earth material transportation, by the whole-tunnel, long-distance, big-fall and continuous descending belt conveyor, reaches the first ranking in the world. Furthermore, the practice of TOFD in detecting defects in the spiral casings, give rise to the new national technology standard.

(3) A new united regulation technology of cascade reservoirs is put forward and successfully solved the problem of power generation, ecology and water requirement of important industrial and mining enterprises in river downstream areas.

(4) It obtained seven patents, such as “Adjustment Method of Gravelly Soil Gradation” and a series book of “Pubugou Power Station” have been published.

(5) As a regulatory reservoir and a renewable energy resource, the dam has been built by local materials by full use of local conditions, therefore, the energy consumption has enormously reduced as well as the environmental pollution has been effectively alleviated. Therefore the water and soil conservation and ecological environment of the drainage basin has been improved.

(6) The advanced FIDIC concepts have been put into the project construction, while the state laws, codes, regulations and specifications have been strictly observed, thus a paradigm of engineering construction has been set up as “Full Responsibility System of project legal person, system of public bidding, contract management system of contractor, engineer and
The innovations and refinements of the national resettlement policy have provided theoretical and practical basis for making some new items of relevant resettlement policy on some transboundary issues. It is firstly standardized for the regulation of recheck and announcement system of property index. And many innovated resettlement measures have been introduced. In addition, it is firstly systematically put forward for reinforced comprehensive improvement in drawdown area of reservoir and security monitoring in resettlement area.

2. Sustainability and environmental respect

(1) The whole project, including pivot buildings, metal structures and electromechanical equipment has safely worked for 5 years and withstood the “Wenchuan”, “Lushan” earthquakes. All the functions and indicators meet the design requirement. This project wined Outstanding Quality Award of Chinese Power Engineering in 2013.

(2) By full use of geographic and geologic conditions, and reasonable layout, as well as expanding the scope of the damming materials for anti-seepage core wall, the project has largely reduced the site space and environmental impacts, thus the investment was also saved.

(3) As a national key project, The project of large scale and high investment, obviously promoted the economics of Sichuan Province, which created about 80000 employment opportunities, thus got obvious social and economic benefit.

(4) Through the reservoir regulation, the flood control standard has been increased and downstream sediment siltation condition also been improved.

(5) In environment protection, effective measures have been implemented including enormous fish restocking stations establishment, site and slope greening, solar energy application, artesian water supply, green construction measures such as wet crush, wet excavation process and belt conveyor etc.

3. Transparency and honesty

Project construction has implemented accorded strictly to management system of “full responsibility system of project legal person, system of public bidding, contract management system of contractor, engineer and owner”.

The relevant national laws, regulations and engineering codes have been highly honored and observed during the whole period of Pubugou Power station construction, while “Honesty Guarantee Protocol” for each constructor had been signed. The project has passed all kinds of inspection of different management departments, and according corrections have been made openly in time.

From the project commencement to its completion, no violation of honest construction had ever been appeared.
What services did the member firm provide to the project? Please describe briefly.

Owner: China Guodian Dadu River Hydropower Development CO., LTD.

Designer: PowerChina Chengdu Engineering Corporation Limited

Engineer: Sichuan Ertan International Engineering Consulting CO., LTD; Changjiang Engineering Supervision CO., LTD; Sichuan Ertan Construction Engineering Consulting CO., LTD.

Contractor: Gezhouba Group CO., LTD; Jiangnan Hydroelectric Engineering Company; Sinohydro Bureau 7,14,5,10,and 11 CO., LTD.