

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

### **1. The project shows innovation, quality and professional excellence.**

North China Power Engineering Co., Ltd. of China Power Engineering Consulting Group (NCPCE) is responsible for the design of the project, including determination of the technical principle, preparation of the technical proposal, determination of techno-economic indications, conceptual design, technical negotiation of the equipment tender, design of construction drawings and technical service support during the construction, installation and commissioning of the project.

For the design of the project, NCPCE sends many consulting engineers to join the design team of the project to direct and participate in the overall planning and innovation of the project. 51 optimization and innovation items have been realized in the general layout, optimization of the equipment and system, land saving, energy saving, emission reduction and environment protection. 37 province- and ministry-level awards have been won. The project is put into operation with its various indications up to the international level, as shown in the followings:

1.1 Based on the principle of using clean energy, being green and environment-friendly, the project has achieved its various indications up to the international level by means of gas turbine combined cycle power generation, low NOx combustion and denitrification.

1.2 Through the advanced design and technical innovation, such as F-type gas turbine + "Two on One" configuration, steam turbine with SSS clutch, 100% bypass, operation without steam turbine and waste heat recovery, the unit can be made to have a maximal heat supply capacity and to bring about the best economic benefit.

1.3 With the "anti-haze type inlet air filtering system", the gas turbine has an improved capability of continuous and stable operation in bad weathers like haze, rain or snow and has supplied steady and reliable heat and electricity to the city.

1.4 With " R&D and application of intelligent production management system for a smart power plant operating under all working conditions", the power plant can be started up and shut down by pressing one button and can be operating in an intelligent way.

1.5 By using the reclaimed water from the urban waste water treatment plant as its service water, the project can utilize over 6,000,000 tons of urban waste water each year. The water saving can be realized to the maximal extent through the cascade recovery and repeated recovery technology.

1.6 The general layout of the plant area is designed to have centralized functional area, combined type building, transformers arranged under the ground and power cable outgoing through the underground tunnel so that the spaces above and under the ground can be fully utilized. The land area occupied for the production facilities is only 0.063m<sup>2</sup>/KW and the facilities are arranged in a safe and rational way.

1.7 The technical features of the project have been specially introduced in the global journal "POWER" (Edition of Sep. 1, 2014 ) as an example of the Chinese gas turbine power plants.



and enduring.

friendly project using clean energy and with low CO<sub>2</sub> emission. It has contributed to the Beijing's Blue Sky Program and to the reduced global climate change. The project has also played an important role in promoting the sustainable economic and social development of Beijing.

2.1 The project plays a supporting role in heat supply and electricity generation to Beijing.

To improve the environment of the Beijing area, during 2012 and 2014, Beijing municipal government shut down six 100MW and four 220MW coal-fired units located in the west of Beijing and the coal-fired boiler houses located in the southwest of the city, which has affected the heat supply to about 30,000,000m<sup>2</sup> area and 1480MW of electricity supply. There was a large demand for the heat supply and electricity supply.

Since Feb. 2013 when it was put in operation, the project has been in steady operation with the heat supply area of over 14,000,000m<sup>2</sup> and supply load of 838MW. More than 500,000 residents in this city have been benefiting from it by living in their warm houses through the long cold winters. Those surrounding industries have also been benefiting from the project with sufficient electricity supplied from it.

2.2 The project is constructed by using clean energy and with lower CO<sub>2</sub> emission.

To meet the requirement of the Beijing's Blue Sky Program, it was decided that the project would be constructed to be a green and environment-friendly power plant using clean energy. The combined innovative technologies of gas turbine combined cycle power generation, low NO<sub>x</sub> combustion and denitrification have led to a great reduction of the environment pollutions from the project. Compared with the coal-fired power stations of the same capacity, the project can replace 3,000,000 tons of fuel coal each year and can reduce the emission of SO<sub>2</sub> by 54,000t, emission of NO<sub>x</sub> by 49,000t and emission of smoke dust by 540,000t each year.

2.3 The buildings in the plant area are designed like folk houses to achieve a harmonious style with the surrounding houses and buildings.

The project is located in the south 4<sup>th</sup> ring road of Beijing and is near the downtown of the city. The construction site is very narrow and is located near the residential quarter, which requires much for the plant buildings in space, arrangement and balanced style with the surroundings. A compact and rational arrangement of the power plant is achieved by combined functions, adjoining buildings and underground arrangement. With the decorated outer walls and resemblance to folk houses, the plant buildings have been in harmony with the surroundings. Enclosure, isolation and noise reduction are used to control the noise at the plant boundary to be lower than 45dB, much lower than the noise from the surrounding roads and commercial and office buildings.

2.4 The project has driven GDP and development of the upstream and downstream industrial chains.

The project has promoted the sustainable development of Beijing national economy and resource utilization as well as GDP and employment of the local people. The project has improved the local financial income and development of the related enterprises and has pushed forward the construction of the environment-improved and resource-saved society.

The project has brought about very good social benefit by sufficient and reliable electricity supply to the local industrial production and contribution to the development of the industrial chains.

By using the reclaimed water from the urban waste water treatment plant, the plant has utilized over



each year, which has indirectly increased the output and benefit of the

in winter in a centralized way to the southwest area of Beijing, resulting in cancellation of scattered heating supply from the coal-fired boiler houses. The living standard of the local people has thus been improved with such a centralized heating system.

2.5 The Chinese government and Beijing municipal government have paid much attention to the construction and operation of the project which is key to Beijing.

On Dec. 28, 2013, the China's President Xi Jinping, Mayor of Beijing Guo Jinlong and the other government leaders came to visit the project site for inspection of its operation and heat supply.

### **3. The principle of transparency and integrity have been carried out in the management and project implementation**

(1) The advanced ideas of FIDIC contract management, risk management and sustainability have been applied in the project. An integrated management work mechanism has been established. The related regulations and procedures are followed in the course from the registration, check, commencement, construction, design tender, equipment tender to construction tender of the project.

(2) The tendering process of engineering consulting service is performed in a transparent and competitive way. The design firm supplies quality, professional and objective services and proposals to the owner of the project.

(3) The professional ethics system for the consulting engineers has been established so that the principle of technology and quality coming first is stucked to in the tendering process of the construction and procurement to safeguard the owner's interest.

#### **What services did the member firm provide to the project? Please describe briefly.**

North China Power Engineering Co., Ltd. of China Power Engineering Consulting Group provides design service to the project, including determination of the technical principle, preparation of the technical proposal, determination of techno-economic indications, conceptual design, technical negotiation of the equipment tender, design of construction drawings and technical service support during the construction, installation and commissioning of the project.