

Prospects of Nuclear Power Development in China

Yu Jianfeng

Director General

Department of Nuclear Power, CNNC

Mar.23, 2004



Prospects of Nuclear Power Development in China

Respected Mr. Chairman,

Dear guests, ladies and gentlemen,

I am greatly honored to be present at this PBNC. Two years ago, we met in Shenzhen, China. Today, it's a great pleasure to meet all the old and new friends here at this picturesque Honolulu. On this occasion, please allow me, on behalf of the CNNC, to extend my warm congratulations for this convention.

Prospects of Nuclear Power Development in China

It reveals a rousing development of nuclear energy in the circum-pacific region in recent years. Nuclear energy also has a bright future in China. The development of nuclear undertakings in China will actively promote the development of nuclear energy in the circum-pacific region and the rapid development of peaceful uses of nuclear energy in the world.

Prospects of Nuclear Power Development in China

The ambitious strategic target and major task of China is to construct a well-off society in an all-round way. This grand target poses new requirements to the development of energy industry in China . Furthermore, energy source is an important material basis for Chinese economic construction, social development and people's quality of life. It could be foreseen that nuclear energy will be one of the mainstay for the growth of national economy in the future.

I. Demand of Chinese Energy Market

With the fast and sustained development of the national economy, and continuous improvement of people's living standard, the demand for electricity keeps fast growing in China. From 1978 through 2002, the annual power consumption of the whole society increased by an average of 8.15%, and the annual power installed capacity increased by an average of 7.92%. For the moment, there is some shortage of power supply in China. In the light of the

I. Demand of Chinese Energy Market

magnificent plan to quadruple the GNP by 2020 on 2000's figure, governmental departments concerned put forth that the total power installed capacity will reach 900 GW by 2020, in which nuclear will account for 4% (i.e. 36 GW). That means additional 27 GW of nuclear capacity will be installed on the present figure. Therefore, nuclear energy has a great potential and bright future in China. [\[Note1\]](#)

[\[Note1\]](#) Data collected from the presentation by Mr. Ouyang Changyu, Deputy Director of the Strategic Planning Department of the State Grid Corporation, at the China Electric Power Development International Workshop '2003.

II. Strategy of Nuclear Power Development in China

The technical route for China to develop nuclear power shall be based on China's present circumstances and the foundation formed in the past years, and also in the wake of the trend of present nuclear power development in the world. Therefore, our technical route is to develop PWR in the near term, fast neutron reactor in the mid term and thermonuclear reactor in the long term.

II. Strategy of Nuclear Power Development in China

Taking into full consideration the present nuclear power technical base and R&D capability of China, the manufacturing capacity, experience and performance of major nuclear equipment, the issue for the linkage to the next generation of advanced PWR technologies, China will continue to construct PWRs in the near term. Through the construction of 300 MW, 600 MW and 1000 MW PWR units, China will establish the basic type of

II. Strategy of Nuclear Power Development in China

reactor for China's nuclear power development. In the principle of "mainly relying on our own while pursuing Sino-foreign cooperation, and introducing technology while forging ahead with localization", cooperative partners will be selected for new nuclear power projects by international tendering. Through standardized, serialized and batch

II. Strategy of Nuclear Power Development in China

construction, we could shorten the construction period and reduce the cost, so as to meet the needs of power development in China, and gradually give impetus to the localization of large PWR NPP construction. At present, the Sanmen NPP in Zhejiang and Ling Ao Phase II in Guangdong (altogether 4 units) are in line for the official approval by the government.

II. Strategy of Nuclear Power Development in China

In addition, we are keen on and will actively study the technologies of new generation of PWR NPPs, trace the international Generation IV technologies, and attach importance to the development of fast and fusion reactors.

III. The Status of Nuclear Power Development in China

China now has formed a complete nuclear fuel cycle system involving uranium exploration, mining and milling, conversion, isotope separation, fuel element fabrication and spent fuel reprocessing, and CNNC acts as the operator of this system. With a multi-professional and well-structured team, we can design and construct 300 MW and 600 MW PWR NPPs independently, and we are capable of design and construction of 1000 MW PWR NPPs through international cooperation.

III. The Status of Nuclear Power Development in China

So far, there are totally 6 NPPs (11 units) in China, among which 8 were put into commercial operation while the remaining 3 are under construction. They are expected to put into commercial operation by the end of 2005. Till then the total nuclear installed capacity will add up to 8700 MW.

III. The Status of Nuclear Power Development in China

The self-designed, self-operated and managed 300 MW Qinshan NPP Phase I, with major equipment manufactured, installed and commissioned all by our own, has been safely operating for 12 years. A record of continuous safe operation for 443 days was created during the 7th fuel cycle. The Unit 1 of the 600 MW Qinshan NPP Phase II was put into commercial operation 47 days ahead of the schedule and has been operating well, with 80% annual load factor. Unit 2 was connected to grid on March 11 and is

III. The Status of Nuclear Power Development in China

expected to put into commercial operation in June 2004. Adopting international management mode, Qinshan NPP Phase III has created several world's records among the same kind of units during the construction period. Unit 2 was put into commercial operation in July 2003, 112 days ahead of the time schedule as specified in the main contract. The two units of Tianwan NPP will be put into commercial operation in 2004 and 2005 respectively. Daya Bay and Ling Ao NPPs are operating smoothly with good performance.

III. The Status of Nuclear Power Development in China

NPP	Installed capacity	Commencement and operation time
Qinshan Phase I	300 MW PWR Self-designed and constructed	Started in March 1985 Connected to grid on December 15, 1991
Daya Bay	2°900 MW PWR Framatome	Started in 1986 Unit 1 and 2 put into operation on January 1, 1994 and in June 1994 respectively
Qinshan Phase II	2°600 MW PWR Self-designed and constructed	Started in June 1996 Unit 1 put into operation in April, 2002, unit 2 to be put into operation in June 2004
Qinshan Phase III	2°728 MW PHWR Canadian CANDU-6	Started in June 1998 Unit 1 and 2 to be put into operation in December 2002 and July 2003 respectively
Ling Ao	2°984 MW PWR Similar to Daya Bay	Commenced on May 15, 1997 Unit 1 and 2 to be put into operation in April, 2002 and March 2003 separately
Tianwan Phase I	2°1000 MW PWR Russian VVER-1000	Commenced on October 20, 1999 Unit 1 and 2 to be put into operation in 2004 and 2005 separately

III. The Status of Nuclear Power Development in China

Through 20 years' scientific R&D and technical renovation, China has formed an independent scientific R&D, design, equipment manufacturing system for self-construction of small and medium-size PWR NPPs. China has mastered the basic manufacturing techniques of major equipment, and has possessed a technical

III. The Status of Nuclear Power Development in China

team with certain self-design and construction capability. Now three major power equipment manufacturing bases have been established in the Northeast, Southwest and Shanghai separately, which laid a foundation for localization of equipment. China has primarily established the foundation for self-design of large 1000 MW-class PWR units and the localization of equipment.

III. The Status of Nuclear Power Development in China

For the moment, the R&D on new generation of PWR technologies has initiated. Certain progress has been made in the R&D on fast and fusion reactors, and accelerator driven subcritical systems. By international cooperation and our own efforts, China will, together with other countries, make its due contributions to the development of nuclear power technologies worldwide.

III. The Status of Nuclear Power Development in China

As a clean and safe energy source, nuclear power is providing inexhaustible energy for the improvement of people's life. We are willing to make joint efforts with other countries for the benefit of peaceful uses of nuclear energy.

Finally I wish this convention a great success.

III. The Status of Nuclear Power Development in China

Thanks for your attention

