



**Innovative Development and Win-Win
Cooperation : a new contribution to the
sustainable development of the world's
nuclear power**

LEI Zengguang

Chief Engineer, China National Nuclear Corporation (CNNC)

Vice President, Chinese Nuclear Society (CNS)

May 18, 2015, Chiba, Japan

Content

I. The nuclear power development in China

II. CNNC's achievements in scientific and technical innovation

III. CNNC's strategy on international cooperation

I. The Nuclear Power Development in China

- **Developing nuclear power is a strategic decision:**
 - China is the largest consumer of energy. The environmental pressure is increasing sharply. It is urgent to optimize the energy mix.
 - Nuclear energy is the only clean energy that could be used massively.
 - So, nuclear will be the key energy strategy and an inevitable choice for China whether from the point of sustainable development or from environmental protection, energy conservation and green-house gas reduction.

I. The Nuclear Power Development in China

- “Action Plan for Energy Development Strategy (2014-2020)” published by State Council in 11/2014:
 - Energy strategy:
 - Placing priority on energy conservation;
 - relying on domestic supply
 - promoting green and low-carbon energy and
 - abiding by innovation-driven
 - Nuclear Power:
 - start **new builds** in eastern coastal area at an appropriate time by adopting the highest international safety standard and ensuring its safety
 - Do research on **inland** nuclear power construction

II. CNNC's New Achievements

● "Hualong-1" (ACP1000) started construction: FCD for Fuqing #5 on May 7, 2015:

- meets the advanced international safety standard
- CFD and LRF meet URD and EUR requirement
- 3 sets of active + passive system.
- 177 fuel assemblies
- Single unit layout
- Double containment resisting commercial aircraft
- Relying on China's over 20-year's experience

Hualong-1: safe, advanced and economical viable

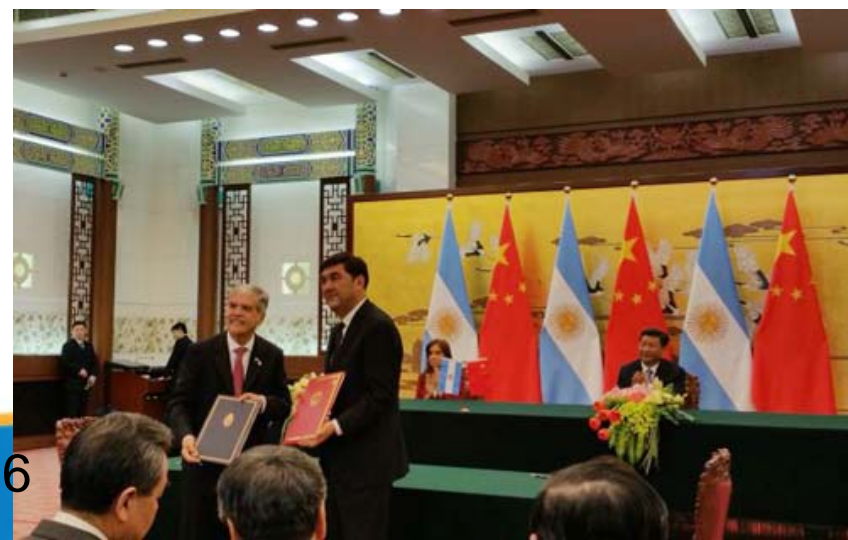
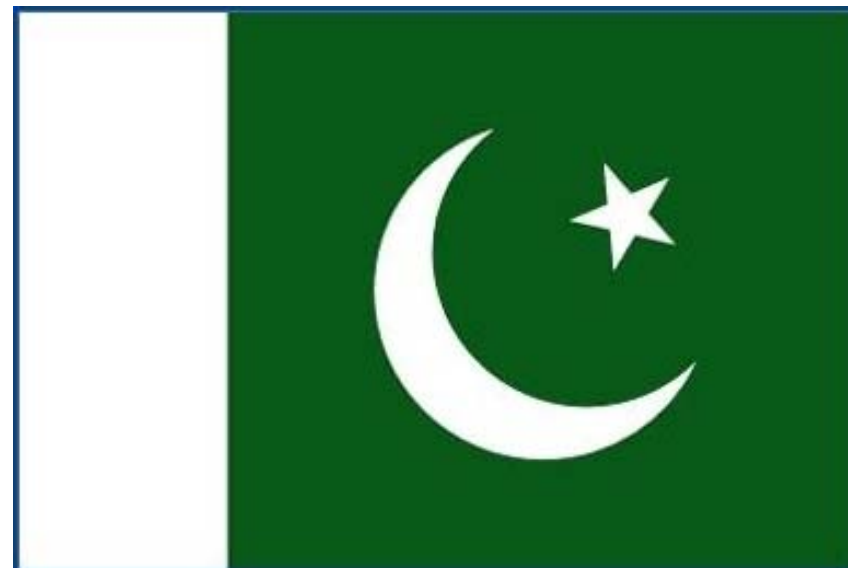


II. CNNC's New Achievements

- **International market of "Hualong-1" (ACP1000):**
 - **Landed in Pakistan**
 - **Agreement with Argentina**



Hualong-1 (ACP1000)



II. CNNC's New Achievements

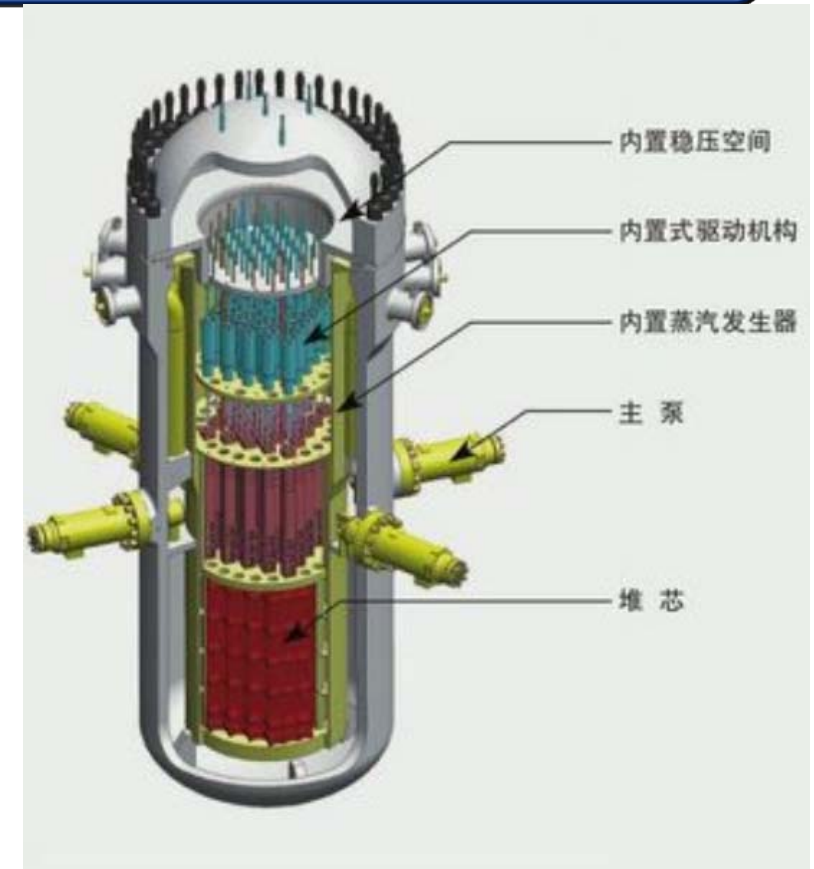
● R &D on SMR and GIF systems:

ACP100:

- Modular design emphasized
- Technology and product platform to meet a diversified demand.
- Technical option selection finished.

Fast Reactor:

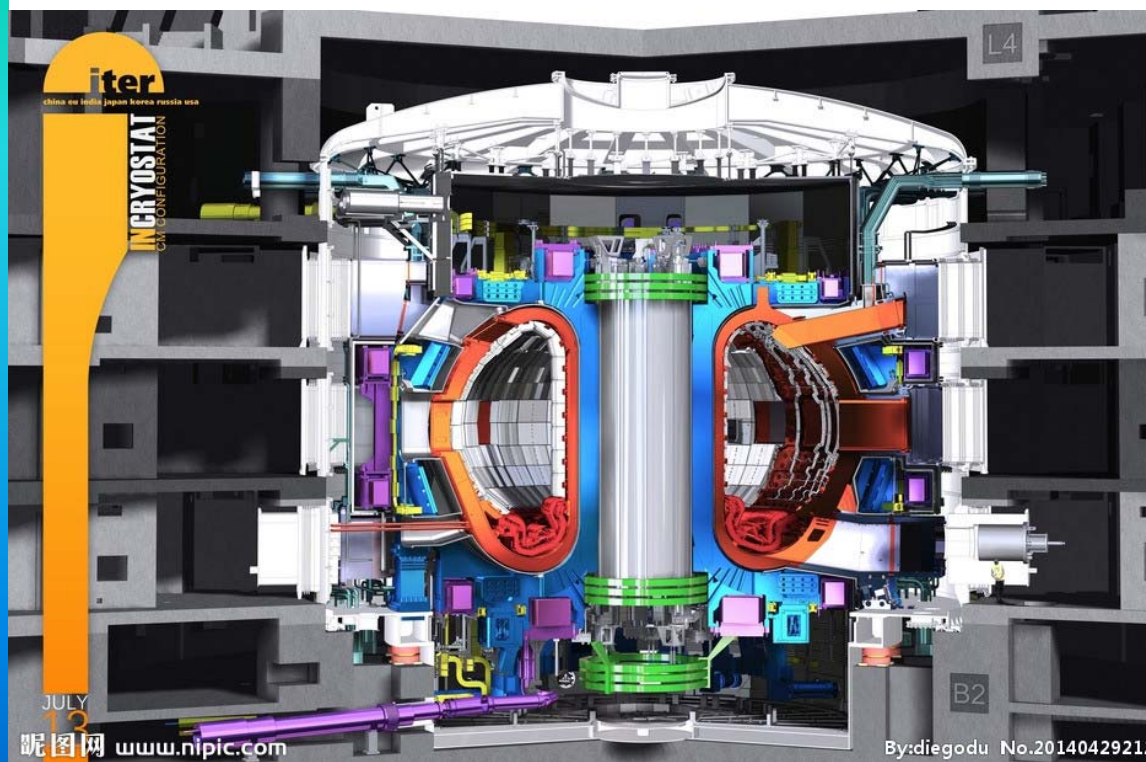
- Chinese Experimental Fast Reactor (CEFR) reached full power in December 2014 and stayed in full power level for 72 hours.
- CEFR lays a good foundation for the construction of the 600MWe demonstration fast reactor



II. CNNC's New Achievements

● R & D on Fusion:

- Achieved many innovative results in:
 - H-mode physics
 - Magnetic hydraulic dynamics (MHD) and high-energy particle physics
 - Edge localized mode (ELM) physics and transport
 - Limited cycle oscillation.
- Level among the international advanced fleet



II. CNNC's New Achievements

● R & D on many others:

- Extracted beam from the 100MeV proton cyclotron accelerator
- Breakthrough in PWR fuel element development
- Achievement in uranium geology survey and metallurgy.
- The R & D capability in the whole chain of the nuclear industry has increased dramatically.

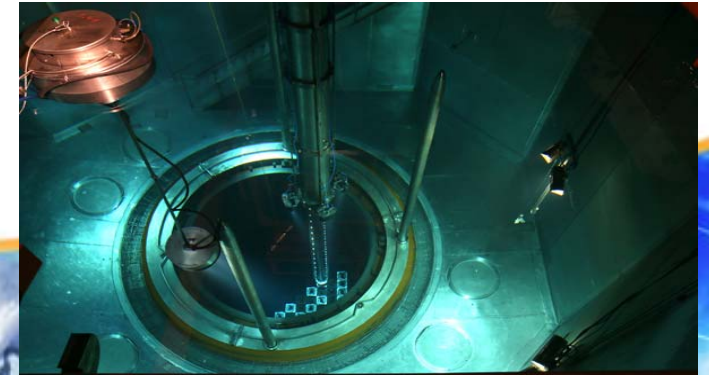
100MeV proton cyclotron accelerator



New heap leaching in U extraction



CF3 Fuel tested in reactor



III. CNNC's strategy on international cooperation



- CNNC has carried out a broad cooperation and exchange with countries in America, Europe, Asia, Africa, Latin-America and Oceanic.
- Many R & D projects with international organizations such as IAEA and WANO.
- CNNC has established good ties with Rosatom, Westinghouse, Exelon, AREVA, and EDF.



CNNC is willing to establish long-term strategic partnership with international nuclear organizations and colleagues.



Thank you !

