

China's localised AP1000 a step closer

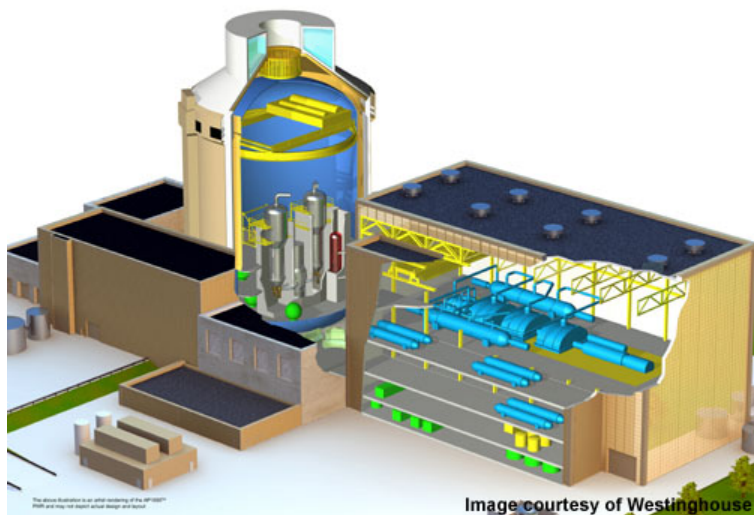
By [Paul French](#) on Mar 7, 2012

China moved a step closer this week to achieving its ultimate goal of supplying its AP1000-based nuclear reactor technology, CAP1400, to domestic and international projects. A sign that the Chinese 3G nuclear supply chain is becoming increasingly home grown pushing out established foreign players.

Chinese state media announced this week that a crucial piece of equipment for the passive core cooling system of the AP1000 - a two-loop pressurized water reactor manufactured by Westinghouse Electric Company - had been developed by China's Dongfang Electric Corporation.



Dongfang Electric Corporation



AP1000 Nuclear Power Plant

This is China's first domestically produced passive residual heat exchanger and is being installed at the first two reactors that form Phase I of the Haiyang Nuclear Plant in northern Shandong Province.

Haiyang will eventually be composed of six reactors and represents an investment of a reported US\$12.7 billion. At the moment it is expected that the two reactors that comprise Phase I at Haiyang will go into operation on May 2014 and March 2015 respectively.

Technology independence

China's energy authorities have long planned the development of an independent third-generation nuclear power technology. The go-ahead was given back in 2010 for an independent Chinese-innovated reactor technology, to be known as CAP1400.

For those in the industry many are already aware that the technology is based on the advanced AP1000 pressurized water reactor (a two-loop PWR producing a net 1154MWe) introduced into China by America's Westinghouse.

The AP1000 is now China's standard reactor for inland nuclear projects. China National Nuclear Corporation selected a consortium of Westinghouse and The Shaw Group to build four nuclear reactors for an estimated cost of US\$8bn. Westinghouse has been involved in the installation of two of these AP1000-based nuclear power projects in Shandong and Zhejiang provinces, respectively.

As technology transfer was a key part of the deal, a transfer that has allowed China to acquire the key technologies necessary to build 3G reactors. Indeed CAP1400 is intended to be an improvement on the AP1000; the world's largest passive-design pressurized water reactor and designed to boost the AP1000's 1154MWe generating capacity to 1400MWe.

After completing preliminary designs this week the fully localised AP1000, CAP1400, came a step closer.

Localised production

China's programme has been to start localising production of all the components of the CAP1400 so as to make it a completely self-sufficient Chinese reactor. China hopes ultimately to sell CAP1400 reactors globally and has been in talks with a wide variety of nations seeking reactors including Pakistan, Vietnam and Saudi Arabia.

China's nuclear programme did slow down a bit following Fukushima and a round of safety inspections, but since then the nuclear authorities in Beijing have announced that China's nuclear reactor roll out is back on track again.

Indeed, the authorities are arguing that they are well placed in terms of safety as the CAP1400 reactor is based on Westinghouse's AP1000 which, they believe, has been confirmed as the safest nuclear power technology globally following the US Nuclear Regulatory Commission's approval of the construction of a new nuclear plant using AP1000 technology at Vogtle, Georgia. That plant is operated by Southern Company (a combination of Alabama Power Georgia Power, Gulf Power and Mississippi Power).

Though this week's news concerned Dongfang Electric, Zhang Fubao, the director of the Technology Department under the State Nuclear Power Technology Corporation, says that, to date, 57 Chinese enterprises, covering six realms of the machinery, electric, material,

engineering, instrument control and service, have received certifications and become qualified suppliers for the third-generation nuclear power AP/CAP.

3G Chinese supply chain growing

Mr Zhang expects that there are additionally another 100 domestic Chinese companies that now have the ability of supporting the third-generation reactor technology but have to receive supplier certification from the relevant authorities.

Dongfang Electric Corporation (DEC) is headquartered in Chengdu, in southwest China's Sichuan province. It is a state-owned enterprise (SOE) managed by China's State Council, though is listed in Hong Kong and Shanghai.

Traditionally Dongfang's core business was boilers for the fossil fuel industry, but the company now has significant presence and divisions in nuclear as well as other renewables including solar, wind and hydro.

In nuclear Dongfang has been involved in the two unit Taishan under construction at Taishan in Guangdong province, Ningde's six 1000MW plant in Fujian province, Hongyanhe in Liaoning near the city of Dalian, Fangjiashan in eastern China's Zhejiang province and Fuqing in Fujian province.

Still there are dissenters to the idea that Dongfang's equipment supply to the CAP1400 project is really that much of a step forward.

Slower CAP1400 roll-out?

Daniel Money of the Shanghai-based Nicobar consultancy notes that "the RHR Residual Heat Removal Heat Exchanger was given to Dongfang Electric as part of their scope at the AP1000 contract signing tech transfer agreement package back in 2005 and set for localization back then."

Money adds: "Dongfang and other Chinese domestic companies have already manufactured and delivered equally and more complex equipment for the AP1000. I think we're actually going to see a much slower AP1000 rollout than originally planned. I think 2015 or 2016 at the absolute earliest we could see a CAP1400 start construction."