Re: China Promotes Another Boom: Nuclear Power

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From: Uno (*uno_at_max.com*)
Date: 01/23/05

Date: Sun, 23 Jan 2005 04:48:22 GMT

"habshi" <habshi@anony.com> wrote in message
news:41f2dac0.3847612@news.clara.net...
> *Can India really generate 500,000 MW (half of US total*
> *generating capacity) with fast breeders ? India graduates 250,000*
> *engineers a year compared to US 50,000 so it might*
>
Very few American study Engineering in the college. There are too much work in the engineering college. Most of them drop out. However, most American company hires many engineers without engineering graduate requirement. Most of the engineer position can be from any fields that make US has unlimited engineers.

> *excerpts*
>
> *http://www.guardian.co.uk/business/story/0,,1396163,00.html*
> *Wipro, he says, can chose from 280,000 engineering graduates every*
> *year, with another 200,000 college diploma−holders who are "easily*
> *trainable".*
>
> *"In the United States annually there are just 50,000 engineering*
> *graduates. In fact, colleges produce more sports therapists than*
> *engineers. Perhaps because America is a sporty country; a lot of*
>
> *Net electricity generation in the United States reached 3883 billion*
> *KWh in 2003, 0.6% higher than in 2002, according to Electric Power*
> *Annual 2003, released Friday by the Energy Information Administration*
> *(EIA). This growth rate is significantly below the average annual*
> *growth rate of 2.4% between 1992 and 2003, due mainly to a cooler*
> *summer than the previous year.*
> *freontlineonnet.com*
> *How important are the fast breeder reactors in ensuring India's energy*
> *security?*
>
> *Fast breeder reactors are more important to India than other countries*
> *that have capabilities in nuclear power technology. This is because of*
> *the nuclear resource profile we have in the country. Our uranium*
> *reserves, as per the present state of exploration, will be able to*

> *support 10,000 MWe generating capacity, which is not large. But it is*
> *the starting point for setting up fast reactors. When the same*
> *uranium, which will support 10,000 MWe generating capacity in the*
> *PHWRs, comes out as spent fuel and we process that spent fuel into*
> *plutonium and residual uranium, and use it in the fast reactors, we*
> *will be able to go to an electricity generation capacity that will be*
> *as large as 5,00,000 MWe. This is due to the breeding potential of the*
> *fast reactors, using the plutonium−uranium cycle. That is the*
> *importance of the fast breeder reactors under Indian conditions,*
> *compared to other countries.*
>
> *The world is watching with interest our entry into the breeder reactor*
> *programme. Countries such as France, the United States and the United*
> *Kingdom have not persisted with their breeder reactor programme.*
> *France has closed its Superphoenix fast breeder reactor. There are*
> *allegations that the Japanese have falsified their data with regard to*
> *their breeder reactor programme. Japan's Monju breeder reactor is now*
> *shut down. Are we entering an area from where others have backed out?*
>
> *That is not true. There is a programme called Generation Four*
> *Initiative Forum, GIF for short. This is led by the U.S. in which 10*
> *other countries are participating. They have nuclear power reactor*
> *configurations that are important for the future. They have identified*
> *a total of six configurations, six reactors. Out of that, three or*
> *four are fast reactors. So the importance of fast reactors in future*
> *energy requirements is recognised worldwide. In fact, in Russia, an*
> *800 MWe fast reactor is under construction. The ground reality now is*
> *that uranium is available at a much cheaper price internationally. In*
> *this situation of plenty of uranium availability, there is no urgency*
> *for these countries to move on to fast breeder reactor technology.*
> *This, however, is not the case with us.*
>
> *How many breeder reactors will we build in the near future? The IGCAR*
> *is designing a 1,000 MWe fast breeder reactor.*
>
> *It is like this. We are making a beginning with the first 500 MWe and*
> *we will complete it by 2010. After that, we will build more such*
> *units. We have planned four in the programme up to 2020. The*
> *development of the fast breeder technology will go on at the IGCAR. In*
> *this development, we will proceed in two directions.*
>
> *One will be based on metallic fuel?*
>
> *I will come to that. One direction is to go for higher capacity*
> *reactors, maybe developing 1,000 MWe reactors. The other direction is*
> *to use the reactor design and its associated fuel cycle, which will*
> *have a shorter doubling time because we get into a higher and higher*
> *generating capacity through the breeding process. The faster the*
> *breeding, the quicker will be the rise in the fast breeder reactor's*
> *capacity. So we should pursue both the directions: one is the higher*
> *reactor unit size, and the other, the fuel cycle, which has a shorter*

> *doubling time. In this we have drawn the entire road map, including*
> *R&D activities, the development that should be done and, the new*
> *energy systems to be built.*
>
> *The Prime Minister promised full support to the third stage of the*
> *country's nuclear electricity programme, which will use thorium as*
> *fuel. The 300 MWe Advanced Heavy Water Reactor (AHWR), which will use*
> *thorium as fuel, is your pet project. Its construction was to begin*
> *before the end of last April. Why is the delay?*
>
> *The fast breeder reactors constitute the second stage of our*
> *programme. While we have scarcity in terms of uranium, our thorium*
> *resources are abundant. [The third stage of our programme using]*
> *thorium−uranium 233 fuel can run in a sustained mode for a long time.*
> *So we have made this our third stage after we have sufficient capacity*
> *through breeder reactors. For if you irradiate thorium at a higher*
> *capacity level, then you will have a very long programme at a higher*
> *capacity level. We are also working on the development [of reactors]*
> *that will allow growth with the thorium fuel cycle. Besides, we have*
> *programmes on other applications of thorium, such as the high*
> *temperature energy generation. All this constitutes the third stage of*
> *our nuclear power programme, that is, demonstrating large−scale*
> *electricity generation using thorium.*
>
> *A second part of this programme is to demonstrate our ability to build*
> *systems where thorium−based electricity generation can grow. The third*
> *part is to build advanced energy systems where we can get energy from*
> *fission at high temperature. This will be done by primarily using*
> *thorium. We have prepared plans for this as well. We have published*
> *this as a DAE document called "Shaping the Third Stage of Our Nuclear*
> *Power Programme". This will be essentially an R&D and technology*
> *development programme. There is a lot of work to be done on this. As*
> *we commercialise the second stage, we have to complete the entire R&D,*
> *and technology, and be ready with it when it is time for*
> *commercialisation of the third stage. We are very happy with the*
> *support promised by the Prime Minister.*
>
> *The AHWR will be one of the first elements in the third stage. Its*
> *design is complete. We have prepared the project report. We have*
> *completed a peer review by knowledgeable people other than those who*
> *designed it. A fairly large amount of R&D work has been completed.*
> *There is more R&D work to be done. It is true that we should have*
> *started the AHWR construction this year. But we felt that since the*
> *reactor will be ultimately implemented in the public domain, it is*
> *important that its design is also reviewed by the Atomic Energy*
> *Regulatory Board [which keeps a tab on safety in nuclear power*
> *facilities in the country]. So we have now created an arrangement*
> *wherein for such developments [reactors], which will ultimately go out*
> *of the BARC for use by society or industry, the safety aspects should*
> *be entrusted with the AERB. We are in the process of making that*
> *arrangement now.*

> *Is that the reason for the delay?*
>
> *This took a little time. We will go through the AERB review. We have deliberately withheld [the construction] because we have safety in our mind. The AHWR has an innovative concept. It should be looked at by all the safety people. I cannot predict the time [when its construction will start]. I am sure the safety review will be completed soon enough for us to decide on further steps.*
>
> *We have launched R&D activity on accelerator driven systems, which will enable the growth of higher capacity thorium reactors. We have made a beginning with the third part of the third stage with a compact high temperature reactor (CHTR). We are at this moment going through material development, which will allow us to construct such reactors. The idea is that if we are able to generate fission energy, say at 1,000°C, you can make splitting of water by thermo−chemical means an economic reality.*
>
> *What is its use?*
>
> *Once you get hydrogen, you get a fluid fuel substitute. Hydrogen*
>
> *On October 23, Prime Minister Manmohan Singh inaugurated the construction of the 500 MWe Prototype Fast Breeder Reactor at Kalpakkam in Tamil Nadu. It marked the start of the second stage of the country's nuclear electricity programme, which involves the building of a series of breeder reactors to ensure India's energy security. The same day, the Prime Minister took part in the commemoration function of the Department of Atomic Energy's (DAE) golden jubilee celebrations at the Indira Gandhi Centre for Atomic Research (IGCAR) at Kalpakkam.*
>
> *In a recent interview to T.S. Subramanian, the Chairman, Atomic Energy Commission and Secretary, DAE, Anil Kakodkar listed not only the achievements of the DAE in the last 50 years but the challenges it faced. Excerpts:*
>
> *What are the achievements and failures of the DAE in the last 50 years?*
>
> *In the last 50 years, one important thing is that we have a large, capable human resource pool of scientists and technologists. This is a formidable force, which can deliver the goods. This, I think, is a very important achievement.*
>
> *The second important achievement is that our programme on the basis of self−reliance has demonstrated that we can take our R&D [research and development] efforts, carried out in our laboratories, to a commercial scale of excellence in the market place. So there is the confidence that this can be done.*

> *>*
> *> The third achievement is that the first stage of India's nuclear power*
> *> programme, currently consisting of 12 Pressurised Heavy Water Reactors*
> *> (PHWRs), is completely in the industrial domain. It will grow on its*
> *> own steam.*
> *>*
> *> Lastly, as a result of the consolidation of the entire work done in*
> *> the last 50 years, we now have a clearly defined road map for future*
> *> R&D, and its commercialisation.*
> *>*
> *> In terms of "failures" − I will not call them failures, but we did see*
> *> several challenges. For example, embargoes have been a major*
> *> challenge. Embargoes have not deterred us from making progress; in*
> *> fact, they have made our self−reliance that much more robust.*
> *> Obviously, the dimensions of our programme would have been bigger if*
> *> we had been able to do things at a much faster pace*
> *>*
> *>*
> *> At the end of 2003, total net summer generating capacity was 948*
> *> gigawatts, an increase of 4.8% from 2002. The industry added 48*
> *> gigawatts of new capacity, the second largest amount of capacity added*
> *> in any single year behind 2002 when 58 gigawatts were added. Following*
> *> the recent trend in large natural gas−fired capacity additions, 80% of*
> *> the new unit capacity added in 2003 was natural gas−fired. Natural gas*
> *> and dual−fired (units that can use either natural gas or petroleum)*
> *> capacity together now account for 40% of the total generating*
> *> capacity. Hydroelectric and nuclear each has a 10% share of the total.*
> *> Although coal−fired plants in 2003 maintained the largest share of*
> *> U.S. electric generating capacity, their share of capacity continued*
> *> its long decline and now accounts for 33% of the total U.S. capacity*
> *> (down from 41% in 1992).*
> *>*
> *>*
> *> Although coal's share of capacity continued to decline, coal plants*
> *> still accounted for 51% of generation. Nuclear plants accounted for*
> *> 20% of generation in 2003, nearly unchanged from 2002. Usage of other*
> *> fossil fuels accounted for another 20% share of total generation (3%*
> *> from petroleum and 17% from natural gas).*
> *>*
> *>*
> *> In 2003, the weighted On 22 Jan 2005 12:34:43 −0800, ano457@yahoo.com*
> *> (ano457) wrote:*
> *>*
> *> China Promotes Another Boom: Nuclear Power*
> *>*
> *> THE NEW YORK TIMES January 15, 2005 By HOWARD W. FRENCH*
> *>*
> *>*
> *>*
> *> Current plans − conservative ones, in the estimation of some people*
> *> involved in China's nuclear energy program − call for new reactors to*

> *be commissioned at a rate of nearly two a year between now and 2020, a*
> *pace that experts say is comparable to the peak of the United States'*
> *nuclear energy push in the 1970's.*
>
> *"We will certainly build more than one reactor per year," said Zhou*
> *Dadi, director of the central government's Energy Research Institute,*
> *which has strongly supported the country's nuclear program. "The*
> *challenge is not the technology. The barriers for China are mostly*
> *institutional arrangements, because reactors are big projects. What we*
> *need most is better operation, financing and management."*
>
> *By 2010, planners predict a quadrupling of nuclear output to 16*
> *billion kilowatt−hours and a doubling of that figure by 2015. And with*
> *commercial nuclear energy programs dead or stagnant in the United*
> *States and most of Europe, Western and other developers of nuclear*
> *plant technology are lining up to sell reactors and other equipment to*
> *the Chinese, whose purchasing decisions alone will determine in many*
> *instances who survives in the business.*
>
> *France, which derives about a third of its energy from nuclear power,*
> *is the only Western country committed to a large−scale nuclear energy*
> *program. It is in a building lull now, but will need to begin*
> *replacing aging reactors within a decade or so.*
>
> *Japan derives about 10 percent of its energy from nuclear sources and*
> *was once among the most favorably disposed toward nuclear energy. But*
> *a string of scandals involving comically shoddy practices, like mixing*
> *radioactive materials in a bucket, and near accidents have turned*
> *public opinion in many areas strongly antinuclear.*
>