Nuclear Power in Asia Is a Matter of Survival

by Marsha Freeman

> We now have come to a situation, in which the entire planet's existence depends upon the use of nuclear power.... China and India are making great investments in nuclear power, and therefore, are ranked among the probably remaining sane populations on the planet, in terms of economic policy. They do it, because they need it.
>
> *—Lyndon LaRouche, Nov. 10, 2010, LPAC-TV Weekly Report, www.larouchepac.com*

Dec. 15—While nuclear power advocates in the United States lament that the "nuclear renaissance" here has "stalled," the nations of Asia are proceeding full steam ahead. For especially the emerging economic giants, China and India, the aggressive push to build nuclear power plants is not an "option," but an absolute necessity. While President Obama blathers on about how we can't let the Chinese "out-compete" us with wind and solar technology, he and his backers are covering up the real story—these two Asian nations, with 2.5 billion people between them, are racing toward survival by going nuclear.

These are not "vanity" programs, to garner international prestige by taking on the challenge of leading-edge technologies. With more than one-third of the world's population, a large percentage of which lives in abject poverty, and without the most basic economic infrastructure—such as electricity—India and China have no other choice, but to go nuclear.

Both nations have well-established nuclear programs, and significant cadres of scientists and engineers. Nuclear energy has long been part of their national energy plans. But now, with the physical breakdown of the economies of the trans-Atlantic "advanced sector" nations, the commitment to carry out their national nuclear energy programs has taken on a greater urgency.

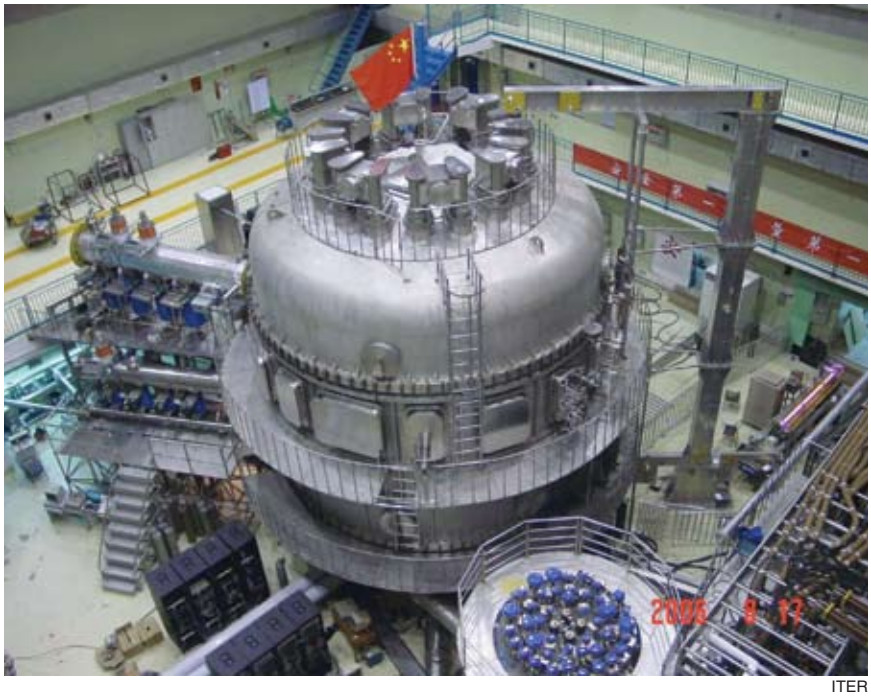
Although these ambitious nuclear programs will not come to fruition in a world that is careening toward a new Dark Age, the nuclear power policy of Asia is "a marker,"

LaRouche stated on Dec. 1, indicative of their support for a new global credit system, based on a Glass-Steagall financial reorganization, which is a prerequisite to a global economic recovery, and Asia's very survival.

China: Nuclear in Breadth and Depth

China made its first plans to deploy civilian nuclear power in the 1970s. Construction of its first nuclear power plant, imported from France, began in 1987, with the first of two reactors coming on line in 1994.

As the program proceeded, China made plans to have 40 gigawatts (GW) of nuclear-generated electricity on line by 2020. (One GW is the approximate output of one, large nuclear plant.) But as China's rate of economic growth accelerated, its shortage of power became acute.



ITER

China's Experimental Advanced Superconducting Tokamak fusion device undergoes testing at the Institute of Plasma Physics in Hefei.

In 2005, China's nuclear program began a rapid expansion phase. As of June 2010, 70-80 GW are planned by 2020—approximately double the earlier target. Added to the approximately 10 GW of nuclear capacity now on line, this would bring China up to a level comparable to current U.S. nuclear capacity, although nuclear would still remain a relatively small percentage of total Chinese energy production.

The current plan is for at least 200 GW of nuclear capacity by 2050, and more than 1,400 by the end of the century. However, as China continues to gear up its nuclear power plant manufacturing capability, it is likely that these projections will continue to increase.

The Chinese nuclear strategy—similar to that of its space, maglev, and other frontline science and technology programs—incorporates both international collaboration and domestic capability. Indicative of both its international outreach, and stature as a developing, world nuclear power, China, for the first time, hosted the annual World Nuclear Association's International Nuclear Symposium, from Nov. 23-25, 2010, in Beijing. For the past 35 years, the conference had been held in London.

At the same time that China continues to import nuclear power plants from abroad, it has designed, developed, manufactures, and also exports, its indigenous nuclear reactors.

Faced with domestic reserves of uranium that only provide about half of its need for nuclear fuel, China is concluding agreements with countries that have large mineral reserves, while it is also developing a range of more advanced nuclear technologies to meet greatly increased future fission fuel needs. These include more efficient high-temperature reactors, breeders that can produce fuel while producing electricity, and reactors that can burn thorium, rather than less plentiful uranium.

China's fast-paced nuclear building program is being supplemented with a renewed focus on greatly expanded nuclear manufacturing factories, research and development, and applications. In March 2010, the China National Nuclear Corporation launched a new initiative, "China Nuclear Power City," in Haiyan, on the Yangtze River Delta. The location, in Zhejiang province, is near five currently operating nuclear power plants, and two more are under construction. The city is about 70 miles from Shanghai.

China will reportedly spend $175 billion over the next ten years, to develop an industrial park, to accommodate 18 leading nuclear equipment suppliers, and branch offices of all of its major nuclear design institute and construction companies. The complex will also focus on nuclear training and education, and applied nu-

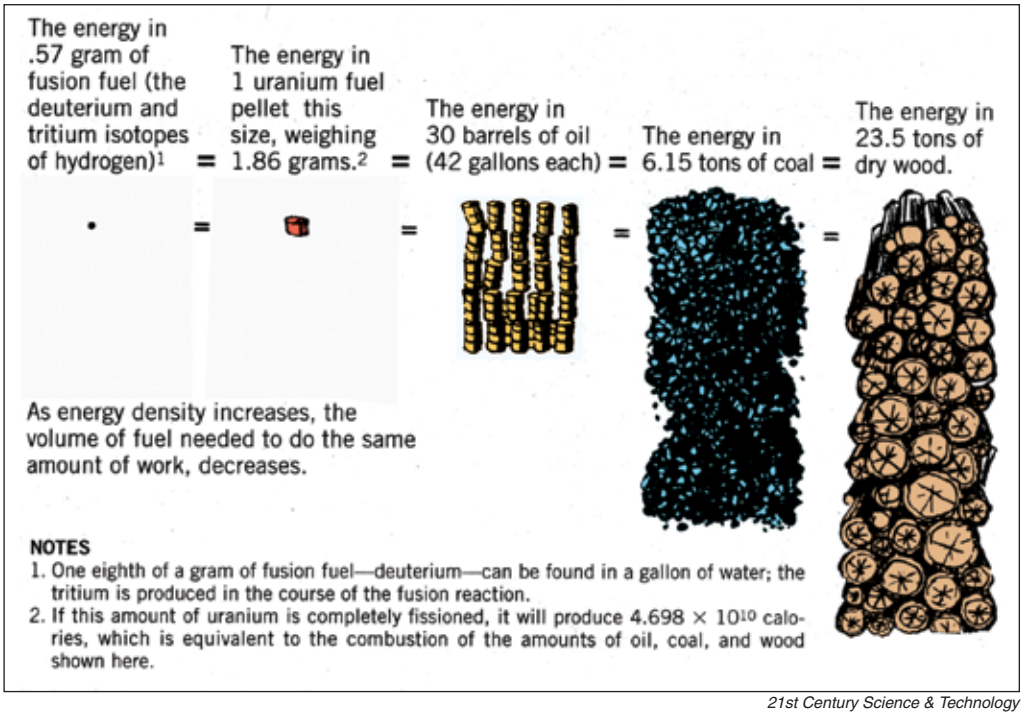
clear science industries, such as medicine and agriculture.

Next, Fusion

It is recognized by China's economic planners that in the not-distant future, nuclear fission will have to be superceded by qualitatively more advanced thermonuclear fusion. Lyndon LaRouche explained, in his Oct. 13 LPAC-TV Weekly Report, why "we are now at the stage where we can not maintain this planet without nuclear power." (http://www.larouchepac.com/node/16080)

In an Oct. 16 paper, "The Truth of the Matter: The Week of Despair," LaRouche wrote: The progress in the world economy that is required, "is expressed, most typically, by increase of the intensity of the choice of form of 'fire,' as from fireside burning of trash for cooking and warmth, through charcoal, coke, oil, natural gas, and then, nuclear and thermonuclear power." The figure of merit is energy density, per capita, and per square kilometer. Fusion will be the next step. (See **Figure 1**.)

FIGURE 1
Fuel and Energy Comparisons



21st Century Science & Technology

Speaking at the annual meeting of Fusion Power Associates, on Dec. 1 in Washington, Academician Yuanxi Wan reported that fusion scientists at the Institute of Plasma Physics in Hefei, China are working on a proposal to design and develop a Fusion-Driven Hybrid Multi-Functional Reactor to supply fuel for fission reactors, and as an interim step toward full energy-producing fusion reactors. The hybrid reactor could also be used to transmute the spent fuel of nuclear power plants, he stated.

China plans to continue to carry out experiments on its own EAST experimental superconducting fusion tokamak, while working as a partner on the International Thermonuclear Experimental Reactor (ITER), which is being built in France, Dr. Wan explained. China's scientists will propose the fission-fusion hybrid project to the government for full funding and development, after the design work is completed. They hope to have a prototype in operation by 2020.

This reactor would push forward state-of-the-art technologies in fusion engineering, toward full development of a commercial fusion reactor, while more efficiently producing fuel for operating fission power plants. It is a "bridging" approach that was developed by the fusion community the United States in the late 1970s, but never pursued.

India: A 'Platform' for Economic Progress

> The traditional, very poor of India . . . [represent] a majority of the population with no infrastructure support. Now, we can fix that, despite the fact that this poor part of the population has very little skill. . . . If we can supply a greater concentration of usable power, to assist the economy, . . . we can sustain the improvement of the general Indian population. And, therefore, the Indians are committed, full steam, to nuclear power.
>
> *—Lyndon LaRouche, Nov. 10, 2010, LPAC-TV Weekly Report (http://www.larouchepac.com/node/16408)*

IAEA/Petr Pavlicek

A fast-breeder test reactor at the Kalpakkam Nuclear Complex in India.

Leaders of India recognized, as early as the 1950s, that nuclear power was fundamental to revolutionizing the economy and culture of that post-colonial nation.

"Speaking in general terms," LaRouche states in "The Truth of the Matter," "this requirement is typified by increasing the relative capital intensity of the system of existence of a specific form of a particular societal culture. That latter is what is identified by me as a 'platform' of economic progress in development,"

He explained further, on Nov. 10, that Asia is "actually moving ahead, in terms of economic policy, because it is solving the problem of underdeveloped portions of the population, by increasing the energy-flux density available for infrastructure, and for modes of production. Thus, even a poor population, with enhanced infrastructure, and limited skills can progress.... So you build a platform of progress underneath the population, even the very poor."

Although India's first commercial nuclear power plant, imported from the United States, went on line in 1969, progress has been slow. This is largely due to the 34-year exclusion of India from international nuclear trade in power plants and materials, due to its refusal to sign the Nuclear Non-Proliferation Treaty. Therefore, unlike China, India has, until last year, had to rely almost entirely on an indigenously developed nuclear infrastructure.

Presently, India has approximately 4 GW of nuclear electric capacity on line, in 15 or so operating plants. There are 6 nuclear plants now under construction, and 40 more have been proposed. Like China, the growing pace of economic expansion in India has led to an upward revision in its targets for future nuclear capacity.

In 2004, the plan was to have 20 GW of nuclear capacity operating by 2020. But in 2007, Indian Prime Minister A.P.J. Abdul Kalam, a rocket scientist, described this plan as "modest," and said that, with international cooperation, that target could be doubled.

Presently, India is aiming to have 22 GW on line five years earlier, by 2015, and projects 60 GW of nuclear-generated electric capacity, by 2032. While a few years ago, the plans looked toward the nation being 25% nuclear by 2050, now the aim is for 50% nuclear. (For comparison, the U.S. is about 20% nuclear.)

India's nuclear program has also focused, from the beginning, on making use of its extensive reserves of thorium. Lacking large reserves of uranium, India has been dependent upon imports to fuel its fission reactors, which has left it unable to operate the plants at full capacity. India is in the midst of a three-phase thorium development program (see Ramtanu Maitra, "India Nuclear Program at a Crossroads," *EIR*, Jan. 23, 2009), which, when operational, will make it virtually nuclear-energy independent.

The thorium program, alone, requires that India master not only the production of usable energy from the fission process, but also the operation of fast neutron reactors and breeders, and fuel fabrication facilities.

Fully aware of nuclear as a unique and qualitatively superior energy source, India is also designing a Compact High-Temperature Reactor, and a hybrid Nuclear Desalination Demonstration Plant. Recently, a barge-mounted desalination unit was commissioned, which uses 4 MW of electricity from the Madras nuclear power station, to produce freshwater. It was developed to address water shortages in coastal areas of India.

India is also determined to play a significant role in global nuclear technology development. On Dec. 3, the

Press Information Bureau of India

German Chancellor Angela Merkel welcomes Indian Prime Minister Dr. Manmohan Singh to Berlin, Dec. 11, 2010. The two discussed future cooperation in India's nuclear power sector.

chairman of the Indian Atomic Energy Commission, Srikumar Banerjee, announced that the Jhajjar district of India would host a Global Center for Nuclear Energy Partnership. It will be established with assistance of France, Russia, and the United States, and will consist of four schools, specializing in Advanced Nuclear System Studies, Nuclear Security, Radiation Safety, and the application of Radioisotopes and Radiation Technology, in health care, agriculture, and food.

Nuclear Diplomacy

The pace of recent economic diplomacy throughout Asia, and including Russia, has been unprecedented. Nuclear companies and experts, and highest-level government officials, accompanied by large industrial and commercial delegations, have been criss-crossing China, India, South Korea, Japan, Vietnam, the Philippines, Malaysia, and elsewhere, to help bring about an Asia-centered global nuclear revival.

Longstanding nuclear supply companies, including Europe's Areva, and Japanese-owned and American-based Westinghouse, have joined Russia's Rosatom in the rush to secure foreign orders for nuclear power plants, especially in Asia. Joining the competition most recently have been South Korea and Japan.

During French President Nicolas Sarkozy's early-December trip to India, five nuclear energy agreements were signed. In addition to a framework agreement to build two French-made European Pressurized Reactors in India, the two nations will cooperate in nuclear science and technology development.

One week later, German Chancellor Angela Merkel met with Indian Prime Minister Manmohan Singh, and the Prime Minister thanked Germany for its support in ending restrictions on India's access to international nuclear technology. He added that the two leaders had discussed "the possibilties of entering into bilateral cooperation in civil nuclear energy."

India's world-class heavy engineering and construction firm, Larsen & Toubro, is meanwhile preparing to enter the world market for nuclear plant components. It has, for four decades, been a supplier to the Indian nuclear industry, and is now accreditied to supply components internationally. On Dec. 7, India's *The Economic Times* reported that Russia's state-owned Atomstroyexport was holding talks with Larsen & Toubro about setting up a joint venture in India to manufacture components for Russian nuclear reactors being built there.

China and India are currently in the midst of discussions concerning expanded trade and investment, and their strengths in nuclear technology could easily be complementary.

To prepare the smaller nations of Asia to own, operate, and maintain their first nuclear plants, cooperation in education and training is underway.

At an international nuclear conference in the Philippines on Dec. 10, it was reported that Cambodian Prime Minister Hun Sen had opened the first nuclear energy department at a Cambodian university that very week.

South Korean President Lee Myung-Bak, during his recent trip to Malaysia, told business leaders that South Korea's expertise in nuclear energy will be able to help Malaysia's future energy plans.

Vietnam, which is poised to become the first nation in Southeast Asia to build and operate a nuclear power plant, has taken on the responsibility to educate and train the hundreds of scientists, engineers, and technicians that its nuclear program requires. Building on its base of experience operating a research reactor at the Dalat Nuclear Research Institute, Vietnam has teamed up with Japan's nuclear industry to carry out nuclear training courses, and a broad public education campaign. It plans to begin construction of its first reactor in 2014, and have it operating six years later.

The Western nations that were leaders during the first 50 years of nuclear power development are now ceding that leadership to the nations of Asia.