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Hype on Nuclear Power is Misleading

By **BRAHMA CHELLANEY**

NEW DELHI — Talk of a "global nuclear renaissance" remains just that — all talk. Notwithstanding the strong public relations campaign by the nuclear power industry and its powerful lobbying groups, nuclear energy is hardly the answer to the twin challenges of carbon mitigation and energy security that the world confronts.

[The opening to this article makes a folksy claim by making it sound like there is something amiss with having a public relations program and "powerful" lobbying groups and then by expressing doubts that nuclear power is the answer to halting global warming and improving energy security in the world. The reader asks why does the author make such clumsy claims? The following arguments by the author should provide the support but let's see.]

Indeed, ever since the talk began in the mid-1990s, the share of nuclear power in global electricity has stagnated at 16 percent. Today, 429 power reactors worldwide generate 370 gigawatts of electricity, with just another 24 under construction, mostly in developing countries.

[The need for additional power from nuclear energy became apparent in the mid-1990s as concerns for global warming and Middle East insurgencies began to impact the general public. World nuclear power is 24% not 16% and additional permits are being submitted in the U.S. and world-wide as the general public realizes the need and utility of nuclear power.]

Yet such is the hype that Washington and New Delhi are seeking to sell a controversial nuclear deal to their skeptical publics by speciously presenting nuclear power as the answer to India's rapidly growing energy needs. Despite tax concessions and other sops, the Bush administration, however, is still trying to revive the moribund U.S. nuclear power industry, with not a single new plant currently under construction.

[The author's bias results in the use of a series of key words to influence the reader, such as: 1) "hype", 2) "seeking to sell", 3) "skeptical publics", 4) "speciously presenting", and 5) "moribund U.S. nuclear power industry."]

- 1) What is the basis of the author's use of term "hype"? Any untruths, misrepresentations, or exaggerations should be cited, but they are not.
- 2) "Seeking to sell" suggests some impropriety. What is wrong with selling? Capitalism survives in India does it not? Controversy is encouraged for discussion by the general public in a free society.
- 3) A "skeptical public" is imperative in a free society.
- 4) If something was misrepresented (or "speciously" presented) why does the author present it as only innuendo?
- 5) Why would the author employ such a misrepresentation in selecting the term "moribund" when the U.S. nuclear power industry is clearly not in a dying state, not at the point of death or not becoming obsolete or inactive? At the least the author is misrepresenting facts.]

Actually, the U.S. is counting on the deal with India to revitalize its own industry. As Secretary of State Condoleezza Rice put it, "India plans to import eight nuclear reactors by 2012. If U.S. companies win just two of those reactor contracts, it will mean thousands of new jobs for American workers. We plan to expand our civilian nuclear partnership to research and development, drawing on India's technological expertise to promote a global renaissance in safe and clean nuclear power." But in India, the deal is beginning to unravel the government, making a midterm national election a virtual certainty.

[What basis does the author have in making the claim that "Actually, the U.S. is counting on the deal with India to revitalize its own industry." Citing statements made by Rice is not proof for such a conclusion and is an exaggeration. If India chooses to reject nuclear power, then the Indian people are only to blame, not the U.S. nuclear power industry. Can the author cite a poll or other evidence that a new election is "a virtual certainty"? More unsupported claims.]

Owing to the global warming crisis, nuclear power is no longer a hobgoblin to some environmentalists. With the power sector responsible for 24 percent of all carbon-dioxide emissions in the world, cleaner means to produce electricity are necessary. Yet, for 10 distinct reasons, nuclear power is unlikely to make any real dent in global greenhouse-gas emissions or be a cost-effective answer to the growing electricity demands:

- 1) After declining for a quarter-century, the world nuclear power industry lacks the capacity to undertake a massive construction program that could make a noticeable difference to global warming.

[Contrary to the author's pronouncement, the world nuclear power industry has been stable over the past 25 years with many reactors in operation increasing in efficiency. Replacing carbon-producing sources of energy by nuclear power is more rational than allowing business as usual. Since we do not know how sensitive the environment is to anthropogenic sources (since the 1700s), it is clear that reducing carbon releases makes sense.]

- 2) While nuclear power generation itself is "clean," the nuclear fuel cycle is carbon-intensive, with greenhouse gases emitted in mining and enriching uranium with fossil fuels. Reactor construction also carries large carbon footprints. In addition, radioactive wastes from reactor operation pose technological challenges and inestimable environmental costs. While nuclear-power proponents trumpet the emission-free front end, opponents cite the back end of nuclear power that is exceptionally problematic.

[1. Contrary to the author's unsupported claim that "the nuclear fuel cycle is carbon-intensive", the relative contribution of carbons are extremely small, less than that used to create solar panels and wind turbines, although the author attempts to persuade the reader otherwise through exaggeration.

2. Although handling radioactive wastes responsibility is under intense scrutiny, the technology to handle the waste will clearly not involve "inestimable environmental costs". Once again the author exaggerates the conditions. The volume of high-level wastes presently being stored at power plants around the U.S. could be stored on one football field to a depth of less than 10 feet.

3. The author makes vague claims that un-cited opponents see the waste issues as "exceptionally problematic", which is a ludicrous and misleading way of stating that issues are still being investigated. Why wouldn't the author cite the source of his claims and enlighten the reader on the technical issues being evaluated? Likely because the author either doesn't know them or is too expedient to look into the relevant matters in more detail.]

- 3) Independent studies worldwide show that electricity generated through currently available nuclear technologies is not cost-competitive with other conventional sources. Also, nuclear power is highly capital-intensive. The reason why not a single new power reactor in the U.S. has been built after the last one ordered in 1970 is largely economics. Two separate studies by the University of Chicago (2004) and MIT (2003) computed the baseline cost of new nuclear power at 6.2 to 6.7 cents per kilowatt hour, compared with 3.3 to 4.2 cents for pulverized "clean" coal and 3.5 to 5.6 cents for a combined-cycle natural gas plant. Little surprise, therefore, that more than 100 planned reactors were canceled in the U.S. in the period since 1970. Resource-poor France and Japan remain exceptions to the global reluctance to embrace nuclear power in a major way. Despite the new intense Chinese interest in nuclear power, the reactors under construction or planned will increase the share of nuclear energy to barely 5 percent of China's total generated electricity.

[Here the author finally cites a few references to support his claims. However, if the reader were to look into the actual references cited, as we have, she would find that the citations do not support the author's representations

to any significant extent. The author has selected a few cost items and presented them out of context to make a point. To evaluate how the author has misrepresented the studies cited, see the following sources:

1. **University of Chicago Study:** <http://www.ne.doe.gov/np2010/reports/NuclIndustryStudy-Summary.pdf>
2. **MIT Study:** <http://web.mit.edu/nuclearpower/>
MIT Study: <http://web.mit.edu/nuclearpower/pdf/nuclearpower-full.pdf>
MIT Study: http://ocw.mit.edu/NR/rdonlyres/Nuclear-Engineering/22-39Fall-2006/D71FEA26-8488-4882-90D5-CE715AEC17C7/0/lec19_nt.pdf
3. **UIC Presentation:** <http://www.uic.com.au/08%20Economics%20of%20NP.pdf>
4. **NEA Plans:** <http://www.nea.fr/html/nea/strat04.pdf>].

- 4) The world's uranium stocks are limited and unless breeder technology is embraced in a big way or the higher-grade ores reserved for military programs are freed, the known uranium reserves may last barely 85 years, according to calculations published in the joint OECD-International Atomic Energy Agency Red Book.

[1. Once again, the author makes claims on subjects about which he apparently knows very little. The period over the next 20 to 30 years likely will be sufficient time to get a breeder reactor up and running. Military (weapons-grade) materials are already being evaluated as how this may be expedited.

2. 85 years is more than sufficient time to take the world to the next nuclear technology, maybe even fusion technology by then.

3. Government reserve estimates are almost always underestimated and do not include discoveries in unanticipated areas and in geological conditions not previously considered. In the 1930s, it was estimated that there was only 25 years of oil remaining. The author appears to be assuming that no new reserves can be found. The IAEA has evaluated this issue, see link below:

http://www.iaea.org/NewsCenter/News/2006/uranium_resources.html].

- 5) Nuclear-fuel costs are escalating sharply because the international price of uranium has been rising faster than any other commodity. While the price of coal, measured in a two-decade time frame, has dropped, the spot price of uranium more than quadrupled just during 2004-07. Australia holds 41 percent of the known global uranium reserves, yet has not built a single nuclear power plant.

[1. If the author would consult reliable references, he would have found that the spot price of U_3O_8 recently has decreased substantially. See links below:

http://www.uxc.com/review/uxc_Prices.aspx

<http://mdcampbell.com/BloombergEvaluation061407.pdf>

2. Many years ago, Australia chose not to build nuclear power plants because they had adequate oil & gas resources. With the new concerns for global warming, they are reconsidering building such plants, primarily because they have such large reserves of U_3O_8 and because they wish to limit carbon releases. Australia has begun to evaluate potential sites for nuclear power plants. See link cited, below:

<http://www.tai.org.au/documents/downloads/WP96.pdf>].

- 6) The lead time for construction of a power plant from any energy source other than large-scale hydropower is the highest for nuclear power. While a power reactor takes five to six years from start to finish, a gas-fired plant takes two years and a windmill even less. Because of its potentially serious hazards, nuclear power faces a uniquely stringent regulatory regime, which adds to time and liability, along with associated costs of operational safety and spent-fuel management.

[1. The statements made by the author regarding lead times are irrelevant and lead to the conclusion that windmills are preferable. Much of the lead time is the result of governmental bureaucracy.

2. The author then leaps to the discussions that nuclear power exhibits “potentially serious hazards” and faces a “uniquely stringent regulatory regime,” which connote the feeling that this is all a bad thing. The addition of safety systems and spent –fuel management programs is actually a good thing and well worth the extra time and cost.

3. The reader should note the inflammatory phrasing of the sentence all made without support of any kind that the statements are credible.]

- 7) A tiny nuclear cartel made up of a few state-guided firms controls the global reactor and fuel supplies. This constitutes the most politically regulated and monopolized commerce in the world, with little sanctity of contract, as several cases in the past have showed. That is why many countries today view the idea of an international nuclear fuel bank as institutionalizing discrimination because it would allow a handful of advanced countries to preserve their supply monopoly.

[Better a few responsible states controlling the global reactors and fuel supplies than terrorists seeking to promote agenda inconsistent with democratic ideals. The author claims that “many countries view the idea” but fails to provide evidence or the identity of those who represent these countries.]

- 8) Nuclear power involves significant external costs that the industry does not bear on its own, including costs related to accident-liability coverage, antiterrorist safeguards, radioactive-waste storage, retirement of old reactors, and international monitoring. State subsidies are not factored into the generating costs and thus remain hidden. More than half a century after the then chairman of the U.S. Atomic Energy Agency, Lewis Strauss, claimed that nuclear power would become “too cheap to meter,” the nuclear-power industry subsists on state support — from subsidies to loan guarantees.

[1. The author naively refuses to acknowledge that nuclear technology is multi-dimensional by nature in plant construction, operations, monitoring, etc. and requires government oversight, insurance coverage, waste handling and other environmental programs.

2. The industry requires some support but as the industry matures it is assuming more fiscal responsibility. The nature of the industry requires comprehensive support by industry and government providing a public service. The uranium industry representatives make a good case. See the link below:

[<http://www.uic.com.au/news304.htm>].

3. The government should oversee antiterrorist safeguards, radioactive waste storage, and retirement of old reactors is because it helps to guarantee that radioactive material is kept out of terrorist hands. It is in the public’s interest to make sure terrorists can’t get radioactive material.

- 9) Nuclear power tends to put serious strain on water resources. The Light Water Reactors (LWRs) that make up the bulk of installed nuclear-power capacity are highly water-intensive, which sets a limit on where they can be located. As they copiously use water as a coolant, the LWRs appropriate large quantities of locally available water. Worse, they pump the hot-water reactor outflow back into rivers, reservoirs and oceans in a continuous cycle, damaging or altering plant and fish ecosystems. As global warming accelerates and average temperatures and the ocean level rise, the LWRs will be particularly vulnerable and be less able to generate electricity at their rated capacity. Water shortages caused by climate change would adversely impinge on LWR operations when such reactors are dependent on waters from rivers or lakes. During the intense 2003 heat wave in France, 17 reactors had to be scaled back in operation or turned off because of the rapid rise in river or lake temperatures, while Spain’s nuclear power reactor at Santa Maria de Garona was shut for a week in July 2006 after high temperatures were recorded in the Ebro River. Reactors by the sea, of course, are better situated because they do not face similar problems in hot conditions. But what a global warming-induced rise in the ocean level would do was illustrated by the December 2004 tsunami, which inundated India’s second-largest nuclear complex and shut down the twin-reactor Madras nuclear power station.

[1. The author grossly exaggerates the impact of plant operations on water resources, when in reality, conservation has become an important factor in plant design and operation. Examples of typical water use programs are presented in the reports cited below:

<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/supplement5/tpfseis2.pdf>

http://www.mdcampbell.com/EE_H2OPaper.pdf

2. The discussion regarding the 2003 heat wave in France reflects typical responses to such conditions. The discussion regarding the Spanish reactors concerned old reactor designs that were not flexible to accommodate cooling water temperature rises.

3. The author's discussion regarding the Indian's plant impact by a December, 2004 tsunami stating that the plant was inundated is another exaggerated rendition of what actually happened. A review of what transpired is cited in the link provided below:

<http://www.dae.gov.in/press/tsunpcil.htm>].

- 10) Without a breakthrough in fusion energy or greater commercial advances in breeder reactors, nuclear power is in no position to lead the world out of the age of fossil fuels. The path to energy and climate security lies through carbon-free renewable energy, which by harnessing nature frees a nation from reliance on external sources of fuel supply. A shift toward "renewables" is critical, given that global energy demand is projected to rise by 53 percent in 2030 from 2004. To achieve the transition to a world less reliant on carbon-based fuels, a massive increase in research and development on renewable technologies is called for. Wind power is already less inexpensive than nuclear power worldwide. Given that wind power often can be more abundantly generated at night while solar power is economical in sunny hours, the two can be integrated into a common grid to help overcome intermittence. Renewables can provide both base-load power to the grid (including from hydropower and geothermal and biomass-fueled plants) and intermittent loads (such as from solar thermal generators).

[1. What basis does the author use to support the statement that nuclear power "is in no position to lead the world out of the age of fossil fuels". It already is in the primary position and ready for expansion.

2. Although nuclear energy cannot provide all the power required, renewable energy sources such as wind energy and solar power, with the exception of geothermal energy, are not sufficiently scalable to provide any major portion of the energy needs. However, remote areas with favorable characteristics (such available wind speeds and duration of sunlight) are necessary and applicable but are not applicable within the major electrical grids in the U.S. because of excessive cost to install and operate.

3. While the author recognizes the limitations of solar power, he fails to realize that winds typically die down at night, often becoming less than five miles per hour, which is typically the minimum speed needed for wind power.

4. The true objective of the author's article finally becomes apparent. He is pushing renewable energy (wind and solar) without providing evidence that supports his statements. The question should now be asked by the reader: Does the author accept funds from the wind and solar industries for research regarding these resources?]

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