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Article in Question:

## **Global warming heats up the nuclear option**

By Greg Lavine

The Salt Lake Tribune

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IDAHO FALLS, Idaho - Dangerous greenhouse gases continue to build in the atmosphere. World leaders are grasping for solutions to combat global warming. **Nuclear advocates** believe they have an answer.

Scientists in southern Idaho are at the forefront of efforts that could help make atomic energy an important option to curb the emission of greenhouse gases. Nuclear power plants emit no such gases, which advocates say makes them a great replacement - along with renewables and other cleaner technologies - for traditional coal-burning plants.

"Nuclear is increasingly very competitive with all other choices," John Grossenbacher, director of the **government-funded** Idaho National Laboratory, said in terms of cost. "It's very reliable and extremely safe."

Part of the lab's mission is to develop **safer nuclear technology**, a task growing in importance as the Bush administration **touts** nuclear as an energy solution at home and abroad. And a recent report from the worldwide Intergovernmental Panel on Climate Change (IPCC) did not rule out the use of nuclear power as part of the mix to combat global warming. A Utah governor's advisory panel on climate change last week also included limited support for developing nuclear power.

[Notice that the author selects special words (highlighted above) in providing faint praise of the nuclear power and then opens the opposition to nuclear power by using the best buzz-word of all, environmentalists, who -as a group- "remain skeptical" - see below paragraph. Who are these environmentalists? Or are we to just take his word that they are remaining skeptical? Also, why use the old, bomb-related term, "Atomic power" when nuclear power is in common usage. This is a subtle example of fear-mongering].

**But environmentalists remain skeptical.** Simply emitting no greenhouse gases doesn't make nuclear an environmental option, they contend. **Atomic power** has lingering problems, most notably the lack of a permanent repository - anywhere in the world - for long-lived, highly radioactive waste.

"It's really the only selling point they can find to make Americans even consider going that option again," said Vanessa Pierce, head of HEAL Utah, a nonprofit group that monitors nuclear issues, referring to global warming.

[Maybe the "selling point" is so well-justified that the other issues can be solved. The author assumes use of nuclear power and handling its waste products are of equal importance. The former drives the latter. Americans have been benefiting from hundreds of nuclear power plants in the U.S. over more than 25 years so there is no need for them to consider the nuclear option again. It has proven its benefit. Only people harboring old, emotional and irrational fears about nuclear power remain skeptical. Waste storage is presently under control. One day these waste products will become resources again and used in reactors of the future with even greater efficiency. There were also those who thought that if we were meant to fly, we would have evolved wings. Our technology has provided many advances that have become commonplace in the world's society today. Electricity from nuclear power is one of them. If this had not occurred, coal would have been used to add another 20% or more emissions to the atmosphere over the past 25 years. China is dealing with this problem now.]

If nuclear power is a viable answer to fighting global warming, the question boils down to this: Are Americans ready to see more cooling towers of nuclear power plants cast shadows across the nation's suburbs and farm fields?

[1. The author is advocating and encouraging NIMBY, the not-in-my-backyard syndrome that has evolved in society today, which includes: landfills, power-transmission lines, liquor stores, and red-light districts, all of which society has come to accommodate....somewhere else.

2. What about the shadows that hundreds of wind turbines make "across the nation's suburbs and farm fields"? A few versus clutter?].

By one estimate from the Massachusetts Institute of Technology, at least 1,000 new nuclear plants would be needed worldwide in the next 50 years to make a dent in global warming. Some question whether such a building spree would be possible.

[Cite the author(s) of the MIT estimate. Who are the "some" the author is talking about? "Others" say this objective is not a problem. We have more than 400 nuclear plants in the world now. Is it a reach to think of adding 600 new plants...or those 600 new reactors? The author is generalizing here].

"Nuclear technology is re-emerging as a power generation option in the face of concerns about climate change, energy demand growth and the relative cost of competing technologies," wrote the authors of a recent report by the Keystone Center, a nonprofit science-policy group that brought together nuclear power providers and environmental groups for its assessment. "After more than a decade in which no new nuclear power plants were completed in the U.S., nuclear power is now the focus of considerable attention and debate."

[1. The author fails to admit the obvious that "Nuclear technology" is a proven, safe option for producing electricity. The cited Keystone Center reports appear to conclude that nuclear power is the best selection on the basis of "concerns about climate change, energy demand growth and the relative cost of competing technologies..."

2. Only those individuals harboring residual fears of technology spun up and pandered by the adversarial groups that draw money from them to pay salaries, offices, and expenses to support the so-called "environmental industry" that constitute a very small section of society today are against nuclear power.]

**Idaho National Laboratory:** The nuclear industry can trace its roots to a small experimental reactor in southern Idaho. The facility, now on Idaho National Laboratory property, briefly powered the nearby town of Arco. Even if nuclear power does not see a renaissance in the U.S., that does not diminish the role of the research at the Idaho lab. The U.S. wants to maintain a leadership role in nuclear research, even if it benefits other nations first, Grossenbacher said.

[The author seems to be sneaking up on a point here but it is elusive early in the paragraph above. The reader's interest is piqued here to set the stage for something important, the reader hopes. He then inserts the thought that "Even if nuclear power does not see a renaissance in the U.S." he then announces the point of her rhetoric...the lab may be giving away American government secrets to "other nations first". Does this not suggest that the lab is about to commit treason during this time of "war"? If not, her reason for such statements is unknown at this point in the article.]

For two decades, the lab has been the nation's leading government research facility on nuclear issues, said Dave Hill, deputy director for science and technology at Idaho National Laboratory. The lab has other roles, including finding ways to improve battery life and energy conservation and homeland security - but nuclear ranks among its top priorities.

[Actually, the nuclear industry can trace its roots much further back than 20 years, all the way back to Enrico Fermi who achieved the world's first controlled nuclear chain-reaction at the University of Chicago's squash courts under the football stadium bleachers in 1942.]

The campus includes an advanced test reactor, lab facilities where materials can be manipulated inside a sealed room to protect scientists and fuel manufacturing facilities.

Researchers at the sprawling facility are working on next-generation nuclear power plant designs, new ways to more safely reprocess spent nuclear fuel and future uses for nuclear power. These research efforts help support the proposed Global Nuclear Energy Partnership (GNEP), which looks to expand nuclear's role around the world.

Other research includes devising new ways to make use of nuclear technology.

"We're looking at how to couple nuclear with other resources to produce liquid fuels

domestically," said Hill.

Small nuclear reactors could provide the heat needed to extract liquids from oil shale and tar sands, a way to reduce the nation's reliance on foreign fuels.

[What is the author's point in the paragraphs above? Seems that he is saying the lab is doing a great job. In his article on global warming, how does using nuclear power to extract oil from shale and sands help in reducing global warming more (or less) than nuclear power? Perhaps during the transition period away from such resources? He is silent on this matter and the reader anticipates what he presents further into the article].

For the immediate future, nuclear's main role will remain electricity production.

[OK, the reader is presented with the author's clearly stated conclusion...finally].

**Nuclear power: Good, bad and spent:** More than 400 nuclear power plants provide about 17 percent of the world's current energy needs, according to the MIT nuclear study. France is the most reliant nation, with 78 percent of its energy coming from nuclear power.

The United States has 104 operating commercial reactors, which combine to produce 30 percent of the world's nuclear energy. Nuclear provides about 20 percent of the U.S. energy mix.

But no new nuclear plants have been built in the United States in the past 30 years.

Some say the U.S. industry is still reeling from the near meltdown in 1979 at Pennsylvania's Three Mile Island nuclear power plant. Nuclear experts argue that the accident showed safety precautions work, while critics were upset that the accident occurred at all.

Investors also seem to have grown leery because of the high up-front capital costs and lengthy potential delays before a new plant ever comes on line - some plants took more than 20 years to become operational.

[1. The author revisits the basis for the fears. Who says that "they" are still reeling? The reeling is related to the fears that gripped the nation based on fear mongering by the media that interrupted the continuing development of the nuclear industry. If nuclear power had continued to expand, the climate impact would have been far less impacted than that impact provided by coal and oil & gas over the past 25 years. The fact still remains that no one was hurt...even using archaic computers and management systems that were lacking at the time. These issues have been improved over the years and the nuclear power safety record demonstrates this progress.

2. Regarding investor views, the author doesn't say this was the result of delays in permitting, and the way in which the reactors were designed. Typically, 10% of the plant was designed prior to starting construction, and each plant was unique. Today,

pre-approved, standardized designs are used, which reduce permitting and construction costs and completion time.]

The Nuclear Regulatory Commission (NRC) expects about 30 applications for new reactors through 2009, though it's unclear how many of those will be built.

[Who cares about the author's musings on the number plants that will be built?]

The Bush administration would like to see even more of the world relying on nuclear power. GNEP's broad goals are to increase the number of nuclear power plants around the world and help nations safely create nuclear power programs while preventing others from using fuel byproducts for bombs.

[The author seems to be supporting GNEP's goal to control the "fuel byproducts" from being turned into bombs, if that is reasonably possible for a rogue nation to do, that is.]

GNEP aims to limit proliferation by creating a system of fuel-producing and fuel-using countries. Nations interested in nuclear power, which may aim to create weapons programs, would be among the fuel-user states. These countries could use nuclear power, but not have fuel-making facilities, which can also be used to create weapons material.

A much-debated piece of GNEP involves reprocessing spent nuclear fuel.

Grossenbacher contends that recycling spent fuel, which is not done in the U.S., will mean less highly radioactive waste destined for a permanent repository. But reprocessing separates out weapons-usable elements, like plutonium, which opponents contend poses too great a risk of weapons proliferation.

[1. The author doesn't understand that if the U.S. begins construction of reprocessing plants, the risk of weapons proliferation decreases substantially because the U.S. government will have control of the fissionable material.

2. The author should also mention that uranium is used in nuclear weapons, not just plutonium. In addition, reprocessing of the waste fissionable material not only creates additional fuel for nuclear power plants, but also reduces the volume of waste radioactive material that needs to be disposed of. Several reactors in other countries are already using reprocessed material.]

Reprocessing also costs too much compared to traditional uranium mining, critics contend.

[This is true, at current prices. However, if it serves to reduce weapons proliferation as well as prepare fuel for use in plants, these will justify the cost.]

Even if no new nuclear plants are built, there remains the question of where to store deadly waste from reactors. Plans for the nation's first permanent repository of high-level nuclear waste in an underground facility at Yucca Mountain in Nevada remain stalled.

[1. The author once again introduces uncertainty regarding new plant construction and doesn't seem to realize that nuclear power expansion is mandatory if U.S. electricity demand is to be met, if fossil fuels are to be phased out to lessen the impact on the environment, and if U.S. reliance on the Middle East oil & gas is to be minimized.

2. On-site storage is being handled by the plants until repositories can be arranged. Opposition by naive, well-meaning citizens will melt away as the national need becomes apparent, or when the lights start to go out around the country. NIMBY will soon be placed in context with the risk and the need.

3. The author uses the term "deadly" in conjunction with "waste from reactors" and then uses high-level nuclear in the next. Terms like "deadly" are highly emotional and help to promote fear mongering. "High-level waste" is actually the correct term used in all scientific literature. ]

A proposal to use Utah's Skull Valley to temporarily store some of that waste faces a similar battle.

[While this is true, the author doesn't discuss why. Much of the delay has to do with normal permitting delays involving environmental site assessments and lawsuits brought on by anti-nuclear groups.]

More nuclear power plants could bring an increase in low-level radioactive waste to EnergySolution's Tooele facility. Spent fuel rods, which account for much of the nation's nuclear waste, remain stored at the commercial nuclear power plants where they were created. As the waste debate continues, traditional coal-fired power plants are generating more than half of the country's daily electricity. These plants emit carbon dioxide, which is a greenhouse gas that builds in the atmosphere and warms the planet. If greenhouse gases are not brought under control, the average global temperature could rise as much as 9 degrees by 2100, according to IPCC estimates.

A number of scenarios worldwide include nuclear as one piece in the puzzle to stabilize or reduce energy-related carbon emissions.

[1. The author confirms one of the justifications for nuclear power expansion in the U.S. and the world.

2. Interestingly enough, the author cites the high end, worst-case scenario of the IPCC estimate and estimates rarely achieve their top end. His selection of the end-end illustrates his naivety and tendency for exaggeration.]

**Debate over the future:** Several environmental groups would prefer to see nuclear deleted from the global warming-solution equation.

[The author fails again to mention who these groups are. Is this preference his? The author doesn't appear to understand the significance of his naivety. In his "expert" opinion does he "believe" that wind, solar and geothermal completes the equation? Has he revealed his bias?].

"It's a huge P.R. campaign to reinvent nuclear as a green and clean energy source," said Michele Boyd, energy program legislative director of *Public Citizen*, a nonprofit watchdog group. "None of the problems have been solved." This is not completely true.

[1. Finally, the author cites his primary source...an adversarial group supporting wind, solar and geothermal development.

2. Many of the plant-design and management problems and risks have been either solved or reduced to such an extent that another Chernobyl or Three Mile Island are not likely to occur in the new designs.]

Even if the Yucca Mountain repository is built, critics say there is already more waste sitting at plants across the nation than would fit into the facility.

[The volume problem is true, but the problem with Yucca Mountain is permitting. Once permitted, it could easily be expanded. That's why the site was selected - because it offers expansion.]

Even if the repository question were solved, critics doubt there would be enough resources for the world to embark on the unprecedented scale necessary to build enough nuclear plants to make a difference in defeating global warming.

[The author continues to show his naivety. Progress includes increasing fuel efficiency, recycling, and using other radioactive resources such as thorium.]

Plant safety also remains a top concern, at home and abroad.

The non-profit group *Union of Concerned Scientists* reported safety repairs required nearly 30 U.S. reactors to shut down for at least a year since the 1980s. There have been a number of near-misses the public rarely hears about, said Jon Block, a nuclear expert with the organization.

[As with any industrial facility, shutdowns are not unusual. They are typically planned in advanced for maintenance purposes. Even cars need periodic maintenance, some of which are major. Major repairs at a nuclear facility may have nothing to do with the reactor, but with the generators. The author doesn't give any examples of near-misses. Just how close were they to disaster? Sounds like more exaggeration based on the author's naivety.]

Changes in the NRC licensing process, he said, have made it more difficult for the public and opposition groups to learn critical details about potential nuclear plants. The watchdog

group is also worried the nuclear industry has too much influence over the NRC, the agency designed to monitor the power providers.

[The author doesn't state which watchdog group. Are we to assume he means the *Public Citizen*, *Union of Concerned Scientists*, or which? Several have been mentioned, and what is their stance on nuclear power? If they are adamantly opposed to nuclear power, then they are biased to the extent that they want to veto all nuclear power, no matter what. This exaggeration of bias is just as bad as having a nuclear power industry with no safety requirements. A middle ground is likely here.]

Boyd said environmental groups see a bright future in improving energy efficiency and investing more money into renewable resources, like wind, solar and geothermal. She said research is under way to make solar and wind work more like coal and nuclear in terms of reliability, regardless of the weather.

[1. The author's bias finally becomes clear. His source is a spokeswoman for *Public Citizen*.

2. While improving the use and efficiency of renewable resources is encouraged, the weather will always have the final word on the efficiency of solar and wind power. Solar simply won't work in the dark, and is very inefficient on cloudy, rainy days, and wind power won't work if there's no wind.

3. Both alternatives are not conducive to scaling up, in that an area covered by wind turbines the size of the state of Minnesota and an area covered by solar panels the size of West Virginia would be required to each meet the annual nuclear energy output of 768 billion kilowatt-hours.]

Patrick Moore, who helped found Greenpeace, said he is skeptical renewables will replace coal or nuclear as a primary power source. Moore, who began his career protesting nuclear weapons, is now pushing atomic power as an answer for global warming concerns. "No other technology is offsetting as much carbon emissions today in the U.S. as nuclear energy," said Moore, who is co-chairman of the Clean and Safe Energy Coalition, a nuclear-industry funded organization.

Moore, who heads the consulting firm Greenspirit Strategies, said the nation's repository issue is solved, but politics are preventing Yucca Mountain from opening.

Officials at Idaho National Laboratory acknowledge a role for renewable resources, but they argue that wind and solar are still only intermittent energy providers. "In the end, it's not enough," Grossenbacher said of renewables. "We still need large, concentrated energy production sources."

[So, the author finally cites credible sources of information and comes to a rational conclusion.]



With the nation's vast coal reserves, that resource must also be part of the mix, Grossenbacher said. To help fight global warming, power companies need to find ways to capture carbon emissions.

Explained Hill, the lab's deputy director for science and technology, "It's going to take some of everything. There's no one solution."

[This is probably the best, most accurate quote on the subject in this article, although the author continues to show the typical media problems: naivety, exaggeration, excessive simplification, and bias.]

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