

Stanford physicist: Americans should overcome doubts about nuclear power plants

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Stanford University physicist Burton Richter believes it is time for the United States to become a leader in the field of developing safe and efficient nuclear power.

(PhysOrg.com) -- Stanford's Burton Richter, a Nobel laureate in physics, calls for construction of more nuclear power plants to counter climate change.

Nuclear power should play a significant role in America's energy future, despite widespread concerns about cost and safety, according to Stanford University physicist Burton Richter.



Richter, director emeritus of the SLAC National Accelerator Laboratory and a Nobel laureate in physics, is the author of the <u>new book</u> Beyond Smoke and Mirrors: <u>Climate Change</u> and Energy in the 21st Century (Cambridge Press, 2010).

On May 5, he discussed the attributes and challenges of nuclear power at the weekly Stanford Energy Seminar. According to Richter, nuclear energy as a source of electricity is growing worldwide and should be a major component of U.S. energy policy as well. "The consequences are 100 years from now, but the most effective time to start working on this is now," he added.

Opponents of nuclear energy cite four main issues: cost, radiation and accident potential, waste disposal and the risk of weapons proliferation, Richter said. But compared to oil or coal, nuclear power produces the same amount of electricity for less money and emits no greenhouse gases. And while concerns over storing radioactive wastes and weapons proliferation are founded, Richter said, it's time for America to go green by expanding nuclear energy.

Why nuclear?

Solar panels and wind turbines have become poster children for clean energy, Richter said. But the sun isn't always shining and the wind isn't always blowing. The average <u>solar plant</u> is only 22 percent efficient, meaning that over a 24-hour period, it produces on average only 5.25 hours of electricity, he said. And the technology to efficiently store noontime electricity for the midnight hour is years away.

In contrast, he pointed out that nuclear power is clean and can provide a steady stream of electrons around the clock. France, for example, draws 80 percent of its electricity from nuclear power and produces about half the carbon dioxide emissions per dollar of gross domestic product than



does the United States, he noted.

"The main attraction for nuclear power for most of the world has nothing to do with <u>greenhouse gas</u> emissions," he added. "It has to do with available resources." The Japanese have embraced nuclear power because it gives them the energy to light Tokyo's neon signs without depending on foreign nations for fossil fuels, he said.

China syndrome

For many Americans, the threat of a meltdown is enough to discourage them from switching to nuclear power on a national scale, Richter acknowledged. But while the infamous 1986 meltdown at Chernobyl in the former Soviet Union killed or sickened scores of people, a similar accident here would have a much smaller toll, he said.

Soviet-era plants, such as Chernobyl, had little to no infrastructure for containment, he noted. In contrast, when nuclear material leaked at the Three Mile Island plant in Pennsylvania in 1979, thick surrounding shields kept radioactive material from harming plant workers and civilians, he said. "The reason why Three Mile Island makes such a big impact is because of a Jane Fonda movie called The China Syndrome," Richter said. The popular film, released days before the Three Mile Island accident, featured a reporter who uncovers safety violations at a nuclear power plant.

While the risks posed by meltdowns and other accidents are minimal, storing radioactive waste presents significant health and technological concerns, Richter conceded. Some waste material will persist in a blazing-hot radioactive state for 300,000 years, he said. The United States already has generated 60,000 tons of nuclear waste and will produce an additional 60,000 tons by the time its current reactors go offline, he said.



The United States recently abandoned plans to store much of this waste beneath Yucca Mountain in Nevada. Some have suggested building specialized reactors to gobble down spent nuclear fuel and turn it into less radioactive compounds. But most research into waste recycling is happening in foreign nations, not this country, Richter said.

When it comes to spent nuclear fuel, "We have no coherent plan," he said. "Love it or hate it, we have it."

America as a nuclear leader

In terms of national security, many nuclear power plants produce material that can fuel nuclear weapons, and securing those resources will be crucial if nuclear energy becomes widespread, he warned. But because Americans have resisted nuclear power so thoroughly, a number of countries have been unwilling to heed U.S. recommendations on the future global role of nuclear power.

The international community would be more eager to collaborate with the United States in developing safe and efficient nuclear power if the U.S. government would commit to the technology, Richter said.

It is time for the <u>United States</u> to become a leader in the field, he said, noting that America has top-notch nuclear plant designs and an excellent framework for <u>nuclear power</u> regulation. "We are very good, and people are very interested in learning how to do things from us," he said.

For Richter, the science behind sustainable energy is the easy part. The real challenge will be drafting policies that make scientific recommendations a reality. "Politics is a lot tougher than physics," he said.

More information: The Energy Seminar is sponsored by Stanford's



Woods Institute for the Environment and Precourt Institute for Energy. Gregory Jaczko, chairman of the U.S. Nuclear Regulatory Commission, will discuss the challenge of regulating nuclear power plants at a special seminar on Tuesday, May 18, at 4:15 p.m. in Building 420, Room 40. The lecture is free and open to the public.

Provided by Stanford University

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