Renowned Economist on Nuclear Power:
"From a business perspective, it's over. We don't have the water."

Jeremy Rifkin is the economic and social theorist, writer, activist, public speaker, political advisor to the European Union, and author of 23 books about the influence of scientific and technological changes on the economy, the workforce, society, and the environment.

At an annual investors' meeting of Germany's Wermuth Asset Management Group in October 2013, Rifkin was asked his opinion of nuclear power in view of climate change.

Rifkin said, "Frankly, I think from a business perspective it's over. Let me explain why …

"No. 1: … There are only 400 nuclear power plants [436 in 2023]. These are old nuclear power plants, but our scientists tell us [that] to have a minimum impact on climate change — which is the whole rationale for bringing this technology back — nuclear would have to be 20 percent of the energy mix to have the minimum, *minimum* impact on climate change, not six percent of the mix [10% in 2023]. That means we'd have to replace the existing 400 nuclear plants and build 1,600 additional plants — three nuclear plants have to be built every 30 days for 40 years to get to 20 percent — and by that time climate change will have run its course for us. So I think, from a business point of view, I just don't see that investment. I'd be surprised if we replace 100 of the 400 existing nuclear plants which would take us down to 1 or 2 percent of the energy [mix].

"No. 2: We still don't know how to recycle the nuclear waste and we're 70 years in. We have good engineers in the United States. We spent 18 years and $8 billion building an underground vault in Yucca Mountain to store the waste for 10,000 years, but we can't use it. It's already no good because there are cracks in the mountain. But any geologist could have told them we live on tectonic plates and you can't keep underground vaults secure.

"No. 3: We run into uranium deficits according to the IAEA [International Atomic Energy Agency] between 2025 and 2035 with just the existing 400 plants. So that means the price goes up.

"No. 4: We could do what the French generation of new plants is doing and recycle the uranium to plutonium. But then we have plutonium all over the world in an age of uncertainty and terrorism.

"No. 5: And this is the big one that people don't realize: We don't have the water. Over 40 percent of all the fresh water consumed in France each year goes to cooling the nuclear reactors. It's almost 50 percent now. When it comes back [when reactor cooling water is returned to the lakes and rivers] it's heated and it's dehydrating our ecosystems, and threatening our agriculture. We don't have the water, and this is true all over the world. We have saltwater nuclear plants but then you have to put them on coastal regions and you risk a Fukushima because of tsunamis.

"The last thing: nuclear power is centralized power, like fossil fuels. It doesn't fit a new generation that's moving with the kind of technologies that are distributed, collaborative, and laterally scaled. It's an old technology. So it's no accident Siemens [Corporation] is out [of the reactor business], Germany is out, Italy is out, Japan is now out, and I think with [French] President Holland's election — I met with him in the spring — they're moving to a Third Industrial Revolution Model in France. I'd be surprised if nuclear has much of a life left. I don't think it's a good business deal."

Over 1.3-million tons of wastewater contaminated with dozens of radioactive chemicals left from cooling three reactor core meltdowns stored in tanks at Fukushima Daiichi, in Japan.

Fukushima continued from previous page.

small the amount. It was the editors that have put words into the IAEA's mouth and turned the reporter's story into a lullaby.

Area forests are a re-contamination source

Jim Smith, a Professor of Environmental Science at the University of Portsmouth, wrote in *The Conversation*, October 23, that "Radiocaesium [cesium-137], which is the most important long-lived radioactive element emitted by the accident in terms of radiation dose, adheres to soil particles very strongly. Consequently, the decontamination of agricultural land primarily involved removing the top 5cm [about 2 inches] of topsoil. In urban areas, decontamination efforts entailed the removal of soil from sports fields", school yards and other public areas.

As much as 71% of Fukushima Prefecture is covered by forest, and most of it remains contaminated. "Restrictions on the consumption of forest products have lasted for decades following the 1986 Chernobyl incident. And they are expected to persist in many forested areas of Fukushima too," Prof. Smith wrote. Rainwater runoff from these forests creates routine downstream re-contamination of previously decontaminated areas. Additionally, forest fires can redistribute radioactivity still on trees and the forest floor creating inhalation risks.

Japanese minister under fire for calling wastewater 'contaminated'

In an August 31 "slip of the tongue," Japan's Fisheries Minister Tetsuro Nomura publicly said Tepco was dumping "contaminated water" into the Pacific. As the waste is poisoned with four dozen radioactive chemicals due to the failure of Tepco's filtration system known as ALPS, the minister was merely stating a fact. He was attacked in the press and by politicians for the "error" in not referring to "treated" water, and had to publicly apologize for the "gaffe" after being scolded by Prime Minister Fumio Kishida. **— *JML***

Nuclear Power's Magical Thinking Debunked

By John LaForge

Stewart Brand, the writer best known as the co-founder and editor of *Whole Earth Catalog*, and the writer and physicist Amory Lovins, a former chair of the Rocky Mountain Institute who's been awarded 12 honorary doctorates, have been friends for years. When Brand came out in support of nuclear power (*Whole Earth Discipline*, Viking 2009), Lovins demolished his arguments in a carefully reasoned article rebutting four main claims that nuclear advocates continue to use. The nuclear industry's case is still pushed by Brand, Jim Hansen, the Nuclear Energy Institute, the International Atomic Energy Agency, and others, in spite of the fact that they have been thoroughly refuted.

Four claims reactor construction advocates continue to use include:

- *Baseload:* Wind and photovoltaics can't keep the lights on because they can't run 24/7.
- *Footprint:* Photovoltaics need about 150-175 times, and wind farms from 600 to nearly 900 times more acreage than nuclear reactors to produce the same amount of electricity.
- *Portfolio:* We need every tool for combating climate change, including nuclear power.
- *Government role:* The climate imperative trumps economics, so governments everywhere must and will do what France did — ensure that nuclear power gets built, regardless of economics or dissent.

These claims are unsupportable, Lovins explains, but are worth reviewing because the same lies continue to be touted by young climate activists, industry greenwash groups like Generation Atomic, and others.

Lovins explains:

Baseload: The electricity system doesn't rely on any plant's ability to run continuously; rather, all plants together supply the grid, and the grid serves all loads. That's necessary because no kind of power plant can run all the time, as Stewart says they must do to meet steady loads. I repeat: there is not and has never been a need for any particular plant or kind of plant to run all the time, and none can do so. All power plants fail, varying only in their failures' size, duration, frequency, predictability, and cause. Solar cells' and wind power's variation with night and weather is no different from the intermittence of coal and nuclear, except that they affect less capacity at once, and more briefly, far more predictably, and are no harder and probably easier and cheaper to manage. In short, the ability to serve steady loads is a statistical attribute of all plants on the grid, not an operational requirement for one plant. Variability (predictable failure) and intermittence (unpredictable failure) must be managed by diversifying type and location, forecasting, and integrating with other resources. Utilities do this every day, balancing diverse resources to meet fluctuating demand and to offset outages. Even with a largely (or probably a wholly) renewable grid, this is not a significant problem or cost, either in theory or in practice — as illustrated by areas that are already 30-40% wind-powered.

Footprint: Brand understates nuclear power's land-use by about 43-fold by omitting all land used by exclusion zones and the nuclear fuel chain. Conversely, he includes the space between wind and solar equipment — unused land commonly used for farming, grazing, wildlife, and recreation. That's like claiming that two lampposts require a parking lot's worth of space, even though 99% of the lot is used for parking, driving, and walking. Properly measured, per-kilowatt-hour produced, the land made unavailable for other uses is about the same for ground-mounted photovoltaics as for nuclear power, sometimes less — or zero, for building-mounted PVs sufficient to power the world many times over. Land actually used-per-kWh is up to thousands of times smaller for wind power than for nuclear power. If land-use were an important criterion for picking energy systems, which it's generally not, it would thus reverse Stewart's footprint conclusion.

Portfolio: The one paper he cites as proof that we need all energy options (Pacala & Socolow's "Stabilization Wedges") actually says the opposite. There is no analytic basis for his conclusion, and there's strong science to the contrary. We can't afford to stuff our energy portfolio indiscriminately with some of everything, and we shouldn't: some options are less worthy and effective than others. The more you fear climate change, the more judiciously you should invest to get the most solution per-dollar and per-year. Nuclear flunks both these tests.

Government's role: If nuclear power isn't needed, worsens climate change (vs. more effective solutions) and energy security, and can't compete in the marketplace despite uniquely big subsidies — all evidence-based findings unexamined in Stewart Brand's chapter — then his nuclear imperative evaporates. Of course, a few countries with centrally planned energy systems, mostly with socialized costs, are building reactors: over two-thirds of all nuclear plants under construction are in China, Russia, India, or South Korea. But that's more because their nuclear bureaucracies dominate national energy policy and face little or no competition in technologies, business models, and ideas. Nuclear power requires such a system. The competitors beating nuclear power thrive in democracies and free markets.

— This article first appeared in Grist, www.grist.org/article/2009-10-13-stewart-brands-nuclear-enthusiasm-falls-short-on-facts-and-logic.