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Response to

The Changing Perspectives of U.S. and Japanese Nuclear Energy Policies in the Aftermath of the Fukushima Daiichi Disaster (By Daniel A. Dorfman)

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The Fukushima Daiichi disaster was a terrible tragedy that delivered a death blow to nuclear power in a series of European countries.[1] Most tragic, however, is the fact that the disaster

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1. After the Fukushima disaster, Germany decided to phase out its nuclear power plants by 2022 and will replace nuclear power with renewable energy sources. *Germany: Nuclear Power Plants to Close by 2022*, NEWS EUROPE, May 30, 2011, http://www.bbc.co.uk/news/world-europe-13592208. Switzerland will also phase out nuclear energy and will shut down its reactors by 2034, even though "Switzerland's reactor are considered safe and the country isn't prone to large natural disasters." Philippe Clavel, *Switzerland Nuclear Power Phaseout Approved by Lawmakers*, HUFFPOST GREEN, June 8, 2011, http://www.huffingtonpost.com/2011/06/08/switzerland-nuclear-power_n_8730 12.html. Italians voted against the construction of new reactors in Italy. Lee Adendorff, *Italy Says No,*WORLD NUCLEAR NEWS, June 14, 2011, http://www.world-nuclear-news.org/NP_Italy_says_no_1406111.html.

could have been prevented.[2] Yet the aftermath of the tsunami that triggered the incident was focused irrationally on the perceived inherent dangers of nuclear energy and not on Japan's failure to properly regulate its nuclear power plants or the country's lack of appropriate concern and preparedness for such a natural disaster.[3] The emotional reaction to Fukushima led to a series of protests denouncing nuclear power,[4] which spurred political decisions to phase out nuclear power. Such decisions were not based on a scientific understanding of nuclear energy; they were based on fear and prejudicial notions about the risks of nuclear energy.[5]

2. Hiroko Tabuchi, *Inquiry Declares Fukushima Crisis a Man-Made Disaster,* N.Y. TIMES, July 5, 2012, http://www.nytimes.com/2012/07/06/world/asia/fukushima-nuclear-crisis-a-man-made-disaster-report-says.html. Interestingly, the Japanese nuclear power industry seems to have survived the disaster. Japan turned away from its commitment to phase out its reliance on nuclear power by 2040 because the "business and industry leaders said the move would harm the economy by forcing firms to shift production overseas due to the high price of imported oil and gas." Justin McCurry, *Japan Drops Plans to Phase Out Nuclear Power by 2040,* THEGUARDIAN, Sept. 19, 2012, http://www.guardian.co.uk/world/2012/sep/19/japan-2040-nuclear-power-exit.

3. Tabuchi, *supra* note 2; Korva Coleman, *Report: Bad Procedures Caused the Fukushima Nuclear Disaster,* THE TWO-WAY, July 5, 2012, http://www.npr.org/blogs/thetwo-way/2012/07/05/156295055/report-bad-procedures-caused-the-fukushima-nuclear-disasterhttp (Fukushima Daiichi "was unprepared to face a major disaster - and government regulators and the Japanese utility that ran it knew for years that the plant wouldn't make it through a crisis.").

4. *See Majority of French Want to Drop Nuclear Energy-Poll,* REUTERS, Apr. 13, 2011, http://af.reuters.com/article/energyOilNews/idAFLDE73C0ZI20110413; Stephen Brown, *Anti-Nuclear Germans Protest on Eve of State Vote,* REUTERS, Mar. 26, 2011, http://uk.reuters.com/article/2011/03/26/germany-nuclear-idUKLDE72P0FG20110326; Rama Lakshmi & Simon Denyer, *Protests Disrupt India's Nuclear Energy Plan,* WASH. POST, Sept. 15, 2012, http://www.washingtonpost.com/world/asia_pacific/protests-disrupt-indias-nuclear-energy-plan/2012/09/15/ec75ca58-fdad-11e1-98c6-ec0a0a93f8eb_story.html; Hiroko Tabuchi, *Tokyo Rally is Biggest Yet to Oppose Nuclear Plan,* N.Y. TIMES, July 16, 2012, http://www.nytimes.com/2012/07/17/world/asia/thousands-gather-in-tokyo-to-protest-nuclear-restart.html.

5. *See* ORTWIN RENN, NUCLEAR ENERGY AND THE PUBLIC: RISK PERCEPTION, ATTITUDES AND BEHAVIOUR (1981), *available at* http://elib.uni-stuttgart.de/opus/volltexte/2011/5927/pdf/ren109.pdf; Melanie Windridge, *Fear of Nuclear Power is Out of All Proportion to the Actual Risk,* THEGUARDIAN, http://www.guardian.co.uk/science/blog/2011/apr/04/fear-nuclear-power-fukushima-risks (last visited Jan. 23, 2013) (demonstrating that compared with other sources of energy, nuclear power is one of the safest). For an example of a rational reaction to the Fukushima, see China and the United States. China temporarily suspended nuclear building plans after the disaster, but only to

Calling the disaster "manmade," a report released by the Fukushima Nuclear Accident Independent Investigation Commission exposed the true causes of the nuclear meltdown.[6] The report concluded that:

> on March 11, 2011, the structure of the Fukushima Daiichi Nuclear Plant was not capable of withstanding the effects of the earthquake and the tsunami. Nor was the Fukushima Daiichi Nuclear Plant prepared to respond to a severe accident. In spite of the fact that TEPCO and the regulators were aware of the risk from such natural disasters, neither had taken steps to put preventive measures in place. It was this lack of preparation that led to the severity of this accident.[7]

In addition to deficient natural disaster preparedness, the report found fault in Japan's "organizational and regulatory systems that supported faulty rationales for decisions and actions."[8] The report also blamed "collusion between the government, the regulators and TEPCO."[9] If the U.S. is to learn a lesson from the Fukushima disaster, it is not that nuclear energy is impossible to utilize safely and should be scrapped; the lesson to take home is that nuclear power can be dangerous when adequate safety measures and regulations are not in place, when equipment does not meet certain safety standards, and when regulatory bodies malfunction.

Daniel Dorfman's proposed recommendations for maximizing nuclear energy represent a sound response to the Fukushima disaster. It would certainly be advantageous to create a new agency focused on improving nuclear reactor designs and safety that is not simultaneously burdened with regulatory

assess the status of its safety regulations. Michael Bristow, *China Suspends Nuclear Building Plans,* BBC, Mar. 17, 2011, http://www.bbc.co.uk/news/world-asia-pacific-12769392. The United States' Nuclear Regulatory Commission (NRC) issued "beefed up safety requirements for U.S. nuclear power plants." Andrew Restuccia, *Feds Approve Post-Fukushima Nuclear Power Rules,* HILL, Mar. 9, 2012, http://thehill.com/blogs/e2-wire/e2-wire/215243-feds-move-forward-with-post-fukushima-nuclear-power-reforms.

6. THE FUKUSHIMA NUCLEAR ACCIDENT INDEP. INVESTIGATION COMM'N, THE NATIONAL DIET OF JAPAN 6 (July 2012), *available at* http://www.nirs.org /fukushima/naiic_report.pdf.

7. *Id.* at 26.

8. *Id.* at 16.

9. *Id.*

responsibilities. Additionally, as Mr. Dorfman suggests, if there is going to be any progress in the area of nuclear energy production, the government must invest financially in its future and must ensure that decisions are made based on hard science, not political motivations.

Mr. Dorfman also rightly points out that the U.S. must finally address the nuclear waste problem. In 2010, the plan to store high-level nuclear waste in the Yucca Mountain Nuclear Waste Repository fell through when Senator Harry Reid succeeded with his "not in my backyard" stance[10] and President Obama kept his campaign promise[11] to shut down Yucca Mountain.[12] Lamenting the loss of Yucca Mountain will not reverse the President's abandonment of the project or convince Senator Harry Reid to reconsider his refusal to accept Nuclear Waste for disposal in Nevada. Instead, Congress must devise a program that incentivizes states to host permanent nuclear waste sites, and politicians must begin to recognize the potential

10. *Issues:Yucca Mountain*, U.S. SENATOR FOR NEVADA HARRY REID, http://www.reid.senate.gov/issues/yucca.cfm (last visited Jan. 24, 2013) ("Yucca Mountain, which is 90 miles northwest of Las Vegas, is simply not a safe or secure site to store nuclear waste for any period of time.").

11. *Barack Obama Explains Yucca Mountain Stance*, LAW VEGAS REVIEW-JOURNAL (May 20, 2007), http://www.lvrj.com/opinion/7598337.html (Before elected president, Barack Obama expressed his view that "states should not be unfairly burdened with waste from other states."); Editorial, *Remember Yucca?*, N.Y. TIMES, July 4, 2012, http://www.nytimes.com/2012/07/05/opinion/remember-yucca-mountain.html ("President Obama pledged in the 2008 campaign to shut down the project, and his Energy Department withdrew its application for a license before the safety of the project could be evaluated."). The NRC declared that spent fuel rods could remain stored at power plants for sixty years once they close down. However, on June 8, 2012, "a three-judge panel of the United States Court of Appeals for the District of Columbia ruled that the [NRC] had failed to prepare an adequate analysis of the future risks, such as leaks and fires, if the used fuel rods end up being stored at nuclear plants indefinitely." *Id*

12. Dawn Stover, *The "Scientization" of Yucca Mountain*, BULLETIN OF THE ATOMIC SCIENTISTS, Oct. 12, 2011, http://www.thebulletin.org/web-edition/columnists/dawn-stover/the-scientization-of-yucca-mountain ("The [Blue Ribbon Commission] asked the Energy Department to provide its justification for shutting down Yucca Mountain, and science explicitly was not part of Energy's reasoning."). It is unclear whether the decision was entirely politically driven; there may have been scientific reasons why Yucca Mountain was not an ideal place for high level nuclear waste storage. *See* U.S. NUCLEAR WASTE TECHNICAL REVIEW BD., REPORT TO THE U.S. CONGRESS AND THE SECRETARY OF ENERGY (Jan-Dec 2002), *available at* http://www.nwtrb.gov/reports/2002report.pdf (report by an independent U.S. Nuclear Technical Waste Review Board).

benefits that nuclear waste storage can bring to their towns. The Waste Isolation Pilot Plant (WIPP), the only deep geologic radioactive waste repository in the country,[13] has been a huge success for safe nuclear waste storage.[14] WIPP also invigorated the Carlsbad, New Mexico, community. Carlsbad experienced an economic renaissance as a result of the "Department of Energy's $6 billion program," which "created 1,300 permanent jobs."[15] The project has also inspired a "yes in my backyard" attitude.[16] Carlsbad is eager to replace Yucca Mountain and accept the country's high level nuclear waste.[17] Arguably, the site may be superior to Yucca Mountain for nuclear waste storage, because of the area's salt content, which prevents leaks from seismic fissures.[18] In the meantime, unfortunately, nuclear waste is currently sitting indefinitely in reactor pools throughout the country awaiting permanent solutions.[19]

13. Christpher Helman, *Nuke Us: The Town That Wants America's Worst Atomic Waste*, FORBES, Jan. 25, 2012, pg. 2, http://www.forbes.com/sites/christopherhelman/2012/01/25/nuke-us-meet-the-town-that-wants-americas-worst-nuclear-waste.

14. *Id.*

15. *Id.*

16. *Id.*

17. *Id.* at 7. Since "New Mexico, in agreeing to WIPP, required that Congress enshrine in law a promise that the feds would not send high-level waste into the state." WIPP cannot replace Yucca Mountain "unless that issue is wrangled, and reversed, by Albuquerque, Washington or anyone else with skin in the game." *Id* at 3; *see also* Damon Scott, *Carlsbad Politicians Want More WIPP-Related Nuclear Jobs*, ALBUQUERQUE BUS. FIRST, Sept. 24, 2012, http://www.bizjournals.com/albuquerque/blog/morning-edition/2012/09/carlsbad-politicians-want-more.html; Milan Simonich, *Nuclear Waste Storage Plant Near Carlsbad Seeks Expansion,* LAS CRUCES SUN NEWS, Sept. 22, 2012, http://www.lcsun-news.com/las_cruces-news/ci_21608941/nuclear-waste-storage-plant-near-carlsbad-seeks-expansion; William H. Miller, *New Mexico Holds Nuclear Waste Key*, COLUM. DAILY TRIBUNE, Sept. 23, 2012, http://www.columbiatribune.com/news/2012/sep/23/new-mexico-holds-nuclear-waste-key; Bill Redeker, *Town Loves Nuclear Waste Dump*, ABC NEWS, Nov. 2012, http://abcnews.go.com/WNT/story?id=129987&page=1#.UGH0-o5VkWE.

18. Helman, *supra* note 13, at 3 ("Salt is nearly impervious to seismic activity, quickly healing any cracks or faults and remaining completely impermeable—with no way for any water to get in or for any radiation to escape."); *see also* Christopher M. Timm & Jerry V. Fox, *Could WIPP replace Yucca Mountain?*, NUCLEAR ENG'G INT'L (Sept. 13, 2011), http://www.neimagazine.com/story.asp?sc=2060609.

19. Robert Alvarez, *Improving Spent-Fuel Storage at Nuclear Reactors*, *in* ISSUES IN SCIENCE AND TECHNOLOGY 80 (2012), *available at* http://nonukesyall.net/pdfs/Alvarez%20Issues%20in%20Science%20and%20Tech

With climate change on the horizon, it would be a catastrophe if an exaggerated fear of nuclear power results in an increased reliance on harmful fossil fuels.[20] Compared with coal-

nology.pdf. For example, the Dairyland Power Cooperative's La Crosse Boiling Water Reactor

> was built in 1967 as part of a joint project with the federal Atomic Energy Commission to demonstrate the peacetime use of nuclear power . . . At the time, both parties believed that spent nuclear fuel would be reprocessed and would not become a long-term storage problem. Reprocessing was terminated through a presidential executive order by Jimmy Carter in April 1977.

La Crosse Boiling Water Reactor – LACBWR, DAIRYLAND POWER COOP., http://www.dairynet.com/energy_resources/lacbwr.php (last visited Jan. 13, 2013). The spent fuel has been sitting in storage pools since the plant closed in 1987, costing "Dairyland member-owners nearly $6 million a year for security, maintenance and monitoring of this site." DAIRYLAND POWER COOP., FUEL STORAGE PROJECT UNDERWAY 1 (Mar. 2012).

Whether or not using storage pools for long term waste fuel storage is safe is a topic of debate. On June 8, 2012, the United States Court of Appeals for the District of Columbia decided in a unanimous opinion that NRC "failed to properly examine future dangers and key consequences" posed by storage pools or "calculate the environmental effects of failing to secure permanent storage" when the Commission determined "that spent fuel can safely be stored on site at nuclear plants for sixty years after the expiration of a plant's license." New York v. Nuclear Regulatory Commission, 681 F.3d 471, 473-74 (D.C. Cir. 2012). Storage pools currently pose serious risks at Fukushima Daiichi. *See La Crosse Boiling Water Reactor – LACBWR*, DAIRYLAND POWER COOP., http://www.dairynet.com/energy_resources/lacbwr.php (last visited Jan. 13, 2013); Hiroko Tabuchi, *Spent Fuel Rods Drive Growing Fear Over Plant in Japan*, N.Y. TIMES, May 26, 2012, http://www.nytimes.com/2012/05/27/world/asia/concerns-grow-about-spent-fuel-rods-at-damaged-nuclear-plant-in-japan.html?pagewanted=all&_r=0 ("The public's fears about the pool have grown in recent months as some scientists have warned that it has the most potential for setting off a new catastrophe, now that the three nuclear reactors that suffered meltdowns are in a more stable state, and as frequent quakes continue to rattle the region.").

20. Justin McCurry, *Anxious Japan Prepares for Life Without Nucler Power*, THEGUARDIAN, May 3, 2012, http://www.guardian.co.uk/environment/2012/may/03/japan-nuclear-power-closure ("Critics of the nuclear shutdown have also highlighted the impact more fossil fuel power generation will have on Japan's climate change commitments."); *Fossil Fuels Rule Japan*, WORLD NUCLEAR NEWS, May 31, 2012, http://www.world-nuclear-news.org/EE_Fossil_fuels_rule_Japan_3105121.html ("The overall picture saw fossil fuels provide 90% of Japan's electricity from January to April 2012, compared to 64% in for the same period in 2011."); Peter Fairley, *Germany Folds on Nuclear Power,* IEEE SPECTRUM, Nov. 2011, http://spectrum.ieee.org/energy/policy/germany-folds-on-nuclear-power ("Most energy analysts agree that Germany will also need new fossil-fueled power plants to meet its energy demands, if only to replace aging and inefficient coal-fired stations.").

fired power plants, nuclear power is safer and cleaner.[21] Approximately fifty tons of mercury are emitted by coal-fired power plants in the U.S. annually.[22] Burning coal also releases coal ash, a radioactive byproduct, into the environment. Coal Ash is proving to be yet another health risk to people living near to coal-fired power plants or coal ash disposal sites, albeit a minor risk.[23] Additionally, the U.S. produces about two billion tons of carbon dioxide per year from coal-burning power plants, and greenhouse gas emissions from coal-fired electricity represent twenty-seven percent of total U.S. emissions.[24] Nuclear power does not contribute to greenhouse gasses[25] and its waste is more easily contained that fossil fuel emissions—and could also be stored with relative ease if politics would make way for science to lead the way.

While the revitalized commitment to renewable energy sources expressed by Germany and Switzerland is noble and should be applauded, it is difficult to imagine that a future world will be able to cope with ever soaring energy needs without embracing nuclear power. Furthermore, bringing a high standard of living to the world's growing population most necessarily requires copious amounts of cheap energy. Until the day that wind, water, and air alone, or a resource yet unimagined, can reliably and cheaply support all of the world's

21. *The Human Toll of Coal vs. Nuclear*, WASH. POST, Apr. 2, 2011, http://www.washingtonpost.com/national/the-human-toll-of-coal-vsnuclear/2011/04/02/AFOVHsRC_graphic.html.

22. *Controlling Power Plant Emissions: Overview,* EPA, http://www.epa.gov/mercury/control_emissions/index.htm (last updated Feb. 7, 2012).

23. Mara Hvistendahl, *Coal Ash is More Radioactive than Nuclear Waste,* SCIENTIFIC AM., Dec. 13, 2007, http://www.scientificamerican.com/article.cfm?id=coal-ash-is-more-radioactive-than-nuclear-waste ("The chances of experiencing adverse health effects from radiation are slim for both nuclear and coal-fired power plants—they're just somewhat higher for the coal ones."); *Disposal: Coal Ash Waste,* SIERRA CLUB, http://www.beyondcoal.org/dirtytruth/coal-ash (last visited Jan. 23, 2013); *Coal Ash, Power Plant Waste Product, Taints More U.S. Sites, Report Finds*, HUFFPOST GREEN, Dec. 13, 2011, http://www.huffingtonpost.com/2011/12/14/coal-ash-power-plant-sites_n_1147148.html.

24. *Coal and Climate Change Facts,* CENTER FOR CLIMATE AND ENERGY SOLUTIONS, http://www.c2es.org/science-impacts/basics/fact-sheets/coal-facts (last visited Jan. 23, 2013).

25. *Clean Energy*, EPA, http://www.epa.gov/cleanenergy/energy-and-you/affect/air-emissions.html (last updated Oct. 17, 2012).

energy needs without huge costs, failing to increase the role of nuclear power in our energy policy simply does not make any sense. As someone who grew up in an era that was both reliant on and mistrustful of nuclear energy, I have come to these conclusions with both caution and optimism. The first criminal case I worked on at the EPA involved a nuclear power plant that had cut numerous corners in areas of environmental compliance and security training. Unfortunately, cutting corners on the small details may produce much larger problems later on. As the U.S. evaluates its energy future, nuclear power may be the best power source to fuel the transition from coal to renewables.