

## Beyond Fukushima: Disasters, Nuclear Energy, and Energy Law

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### I. INTRODUCTION

Fukushima changed everything. That, at least, was a popular view espoused after the disaster of March 11, 2011—in the press, by the talking heads in the international media, and across the blogosphere.<sup>1</sup> A nuclear meltdown in such a densely populated, well-developed nation could scarcely do anything less than utterly transform how nuclear energy would be seen, used, and not used for years to come.

That was the immediate reaction. As we inch away in time from the epicenter of the nuclear crisis at Fukushima Daiichi, however, the picture has become less stark than it often was painted in the days and weeks after the earthquake sounded, the tsunami struck, and a series of misjudgments, miscalculations, and chain reactions led to a partial meltdown of the Fukushima No. 1 power plant.

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1. See, e.g., Eun Young Chough, *Fukushima Disaster: An End to the Nuclear Renaissance?*, ASIA-PAC. BUS. & TECH. REP. (June 8, 2011), <http://www.biztechreport.com/story/1349-fukushima-disaster-end-nuclear-renaissance> (“Whether the Fukushima disaster will signal the demise of the nuclear renaissance remains unclear, but countries will certainly continue to take measures to find ways to lessen their dependency on nuclear energy.”); Eben Harrell, *Fukushima: The End of the Nuclear Renaissance?*, TIME (Mar. 14, 2011, 2:17 PM), <http://tinyurl.com/4nzy2zc> (“As the continent watches in horror as Japanese officials scramble to prevent meltdown at three nuclear reactors in Northern Japan, countries that were once at the vanguard of a nuclear renaissance have begun to rethink and even, in some cases, reverse, their policies on nuclear power.”); Kevin Voigt & Irene Chapple, *Fukushima and the ‘Nuclear Renaissance’ that Wasn’t*, CNN (Apr. 15, 2011, 10:00 AM), <http://globalpublicsquare.blogs.cnn.com/2011/04/15/fukushima-and-the-nuclear-renaissance-that-wasnt/> (“A month after a devastating earthquake sent a wall of water across the Japanese landscape, the global terrain of the atomic power industry has been forever altered.”).

Nuclear power long has occupied a precarious position in our collective energy landscape. “Our country, indeed the world, has always viewed nuclear power with fear and fascination.”<sup>2</sup> When a tragedy like Fukushima transpires, this fear and fascination spike. Though the harnessing of atoms to create electricity turned “swords into plowshares” long ago,<sup>3</sup> there remains a view today that nuclear power—and its proponents—are “clearly evil.”<sup>4</sup> Nuclear disasters like Fukushima create an opportunity for those who hold such views to advocate for a new energy course: one that abandons this energy source.

Indeed, in the months after Fukushima, some nations announced their decision to forsake nuclear energy, Germany most prominent among them.<sup>5</sup> Others, like Japan, weighed the idea, only to subsequently reject it,<sup>6</sup> at least for the time being. By contrast, in the United States the non-nuclear option received little national political attention.<sup>7</sup> Why?

This Article takes up the tragedy at Fukushima Daiichi as a vehicle for parsing the role that disasters play in nuclear energy policy—and, by extension, in U.S. energy law generally. In the public discourse, energy law often orbits disasters. No one talks about our oil dependence until there is an *Exxon Valdez* or a *Deepwater Horizon*, and then it is conversation fodder for Starbucks runs. We flip switches all day long without wondering where our electrons come from, and then there is a Chernobyl, or Three Mile Island, or Fukushima, and anti-nuclear protestors take to the streets.<sup>8</sup>

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2. Joseph P. Tomain, *Nuclear Futures*, 15 DUKE ENVTL. L. & POL’Y F. 221, 225 (2005).

3. *Pac. Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm’n*, 461 U.S. 190, 193–94 (1983).

4. Louis J. Sirico, Jr., *Stopping Nuclear Power Plants: A Memoir*, 21 VILL. ENVTL. L.J. 35, 36 (2010).

5. Italy and Switzerland are the other prominent examples of nations that appear poised to join Germany in abandoning nuclear power post-Fukushima. See Daniel Aldrich, *Nuclear Power’s Future in Japan and Abroad: The Fukushima Accident in Social and Political Perspective*, PARISTECH REVIEW (Aug. 25, 2011), <http://www.paristechreview.com/2011/08/25/nuclear-fukushima-accident-social-political-perspective/>.

6. See *infra* Part III.C.

7. See *infra* Part III.B.

8. See, e.g., Leslie Kaufman, *Japan Crisis Could Rekindle U.S. Antinuclear Movement*, N.Y. TIMES, Mar. 19, 2011, at A14, available at <http://www.nytimes.com/2011/03/19/science/earth/19antinuke.html>; Justin McCurry, *Fukushima Protesters Urge Japan to Abandon Nuclear Power*, GUARDIAN (Sept. 11, 2011, 8:48 AM), <http://www.guardian.co.uk/world/2011/sep/19/fukushima-protesters-japan-nuclear-power>.

“Energy policy-making in the United States is a cyclical enterprise,” Gary Bryner observed a decade ago.<sup>9</sup> When there is a crisis on the news, “energy dominates the political agenda.”<sup>10</sup> When there is not, “it fades into the background.”<sup>11</sup> Energy disasters thus hold a tenuous relationship with energy policymaking. They create opportunities for change,<sup>12</sup> but they also risk misdirecting the debate away from the truly important questions.

This Article posits that energy disasters in the United States tend to perpetuate both of these effects. They often cause change, but this change tends to be incremental. At the same time, by “solving” the proximate causes of the disasters—and those causes alone—these modifications to energy law obfuscate the need to look more deeply at the underlying, root causes of our energy dilemmas.<sup>13</sup>

These phenomena are largely a result of the dominant energy paradigm that dictates our energy laws and policy today.<sup>14</sup> To mitigate the role that disasters play in shaping our law, disasters must be deemphasized as clarions for change. Alone, however, this will not be enough. A fundamental shift in our energy policy objectives and processes also is needed. By using nuclear energy itself as a metaphor for conceptualizing how U.S. energy law functions, this Article suggests that there are two primary changes that should be made to our system of energy governance. First, the goals of energy law should be realigned to reflect greater emphasis on sustainability. Second, energy law should employ more, and more robust, planning. Making these changes will not be easy. Nor will they solve our

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9. Gary C. Bryner, *The National Energy Policy: Assessing Energy Policy Choices*, 73 U. COLO. L. REV. 341, 341 (2002).

10. *Id.*

11. *Id.*

12. This, of course, is not unique to energy law. As Professor Hannah Wiseman has noted, “courts or legislatures often create law in reaction to events, rather than anticipating them.” Hannah Wiseman et al., *Formulating a Law of Sustainable Energy: The Renewables Component*, 28 PACE ENVTL. L. REV. 827, 827 (2011).

13. See, e.g., Jerry L. Anderson, *The Environmental Revolution at Twenty-Five*, 26 RUTGERS L.J. 395, 414 (1995) (“Environmental regulation is also needlessly complicated because it developed as Congress reacted to the environmental crisis of each particular year.”); William H. Rodgers, Jr. & Anna T. Moritz, *The Worst Case and the Worst Example: An Agenda for Any Young Lawyer Who Wants to Save the World From Climate Chaos*, 17 SOUTHEASTERN ENVTL. L.J. 295, 332 (2009) (“U.S. environmental law is already well-schooled in strategies of too late, long-since-gone, triage, sacrifice zones, and reluctance to send ‘good money after bad.’”); Amy J. Wildermuth, *The Legacy of Exxon Valdez: How Do We Stop the Crisis?*, 7 U. ST. THOMAS L.J. 130, 131 (2009) (noting environmental law’s “triage approach”).

14. See *infra* Part V.A.

energy problems in toto. But they would improve our law, and thus, potentially our society as well.

The Article proceeds in five parts. Part II describes the meltdown at Fukushima. Part III summarizes three countries' political and regulatory responses to the disaster: Germany, the United States, and Japan. Part IV conceptualizes U.S. energy law and its relation to energy disasters, using nuclear energy as a metaphor. Part V addresses critiques of our extant system of energy policy and possible responses thereto, including what such changes may mean for the future of nuclear energy in the United States. Part VI concludes.

## II. CHAIN REACTION

"Crying is useless. If we're in hell now all we can do is to crawl up towards heaven."<sup>15</sup> This was what one worker participating in the cleanup at the Fukushima Daiichi Nuclear Power Station 170 miles north of Tokyo wrote in an email barely three weeks after the disaster began.

The email captured the mood. Descriptions of Fukushima's aftermath hardly lacked for incantations of the severe. With a decommissioning process that may take as many as three decades to finalize,<sup>16</sup> portrayals of the meltdown and ensuing cleanup at this "campus larger than the Pentagon's"<sup>17</sup> as embodying a "remarkable,"<sup>18</sup> "nightmare scenario"<sup>19</sup>—even "chaos . . . explosions, fires, ruptures"<sup>20</sup>—were not in short supply. "For nuclear

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15. *Letters from Fukushima: Tepco Worker Emails*, WALL ST. J., (Mar. 28, 2011, 8:21 PM), <http://tinyurl.com/5skvh2l> (internal quotation marks omitted).

16. Early reports suggested that decommissioning would take a full decade. *See, e.g.*, Krista Mahr, *A Month After the Earthquake, the Crisis Continues and the Questions Mount*, TIME, Apr. 11, 2011, <http://tinyurl.com/3u3b3jd>; O.M., *Piecing Together Fukushima*, ECONOMIST (May 5, 2011, 8:53 AM), [http://www.economist.com/blogs/babbage/2011/05/japans\\_nuclear\\_disaster](http://www.economist.com/blogs/babbage/2011/05/japans_nuclear_disaster). More recent estimates by an expert panel enlisted by Japan's Atomic Energy Commission put the figure at closer to thirty years. *Experts Say It Will Take at Least 30 Years to Close Japan's Tsunami-Hit Nuclear Power Plant*, WASH. POST, Oct. 30, 2011, <http://tinyurl.com/66nzl6f>.

17. Evan Osnos, *The Fallout: Letter from Fukushima: Seven Months Later: Japan's Nuclear Predicament*, NEW YORKER, Oct. 17, 2011, at 46, 46.

18. O.M., *supra* note 16.

19. Simon Shuster, *Fire at Fourth Reactor: Is Worse Yet to Come in the Fukushima Nuclear Disaster?*, TIME, Mar. 15, 2011, <http://www.time.com/time/world/article/0,8599,2059232,00.html>.

20. Michael Grunwald, *The Real Cost of U.S. Nuclear Power*, TIME, Mar. 25, 2011,

evacuees,” one reporter wrote, “the very idea of rebuilding [the city and surrounding region] looks increasingly out of reach. As images are emerging from the deserted zone, where forgotten corpses rest in situ[,] . . . many evacuees are beginning to wonder when and if they’ll be able to return.”<sup>21</sup> Another reporter observed:

All that’s missing from the area is people. In their place, dogs roam the streets, abandoned by their owners. Alien figures in radiation suits, gas masks and respirators peer from passing vehicles. A police car slows and the two masks inside tell the Sakumas, father and son, to get quickly to safety. “It’s dangerous here. Please take shelter, for your own sake.”<sup>22</sup>

Offering his view of the risk that Fukushima presented in the weeks after the three active reactors at the plant melted down,<sup>23</sup> Robert Alvarez, a former U.S. Department of Energy official, was far blunter: “I’d get my butt on an airplane and get out of Japan.”<sup>24</sup>

For all the quickness to employ end-of-days imagery in describing the scene at Fukushima, however, details of precisely what went wrong at the plant were slower to emerge. Initially, only one thing was clear: the “double whammy” of the 9.0 earthquake and enormous tsunami that hit northeastern Japan on March 11, 2011 triggered the crisis.<sup>25</sup> The earthquake caused “the automatic shutdown of 11 reactors at four sites” along Japan’s northeast coast.<sup>26</sup> At Fukushima Daiichi, it took the plant off the grid, cutting off the electric power supply for its cooling systems.<sup>27</sup> Then, the tsunami disabled the semitruck-sized, diesel-fired backup generators

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<http://www.time.com/time/magazine/article/0,9171,2059603,00.html>.

21. Mahr, *supra* note 16.

22. David McNeill, *Fukushima No. 1’s Scary Shadow: Bucolic Farm Belt Now No-Go Zone of Radioactivity*, JAPAN TIMES, Mar. 31, 2011, <http://www.japantimes.co.jp/text/nn20110331f1.html>.

23. *2011 Japan Nuclear Crisis: Overview*, N.Y. TIMES, Aug. 9, 2011, <http://tinyurl.com/6fq5xh> [hereinafter *Overview*] (internal quotation marks omitted).

24. Jeffrey Kluger, *Fear Goes Nuclear*, TIME, Mar. 28, 2011, <http://www.time.com/time/magazine/article/0,9171,2059639,00.html>.

25. Howard Chua-Eoan, *How to Stop a Nuclear Meltdown*, TIME, Mar 12, 2011, <http://www.time.com/time/world/article/0,8599,2058615,00.html>. The tsunami was not a single wave but a “first large” wave that was “followed by multiple additional waves.” U.S. NUCLEAR REGULATORY COMM’N, FACT SHEET ON SUMMARY OF MARCH 2011 JAPAN EVENTS AND NRC RESPONSE (Sept. 23, 2011), <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-japan-events.html> [hereinafter “NRC FACT SHEET”].

26. NRC FACT SHEET, *supra* note 25.

27. Chua-Eoan, *supra* note 25; O.M., *supra* note 16; *Overview*, *supra* note 23.

that were designed to step in and keep the reactor cores cool by continuing water circulation.<sup>28</sup> Fukushima was built with the expectation that a tsunami could strike. Yet the original estimate was that a 3.1-meter wave might hit; in 2002, that prediction was upgraded to a 5.7 meters. The March 11 tsunami was roughly 15 meters high, flooding the backup generators located on the ground floor and in the basements of the plant.<sup>29</sup> Fukushima “had been built with large shutters facing the sea.”<sup>30</sup> As the tsunami arrived, however, water

burst through the closed shutters and swamped the buildings. . . . [It] hurled pickup trucks pinwheeling end over end into delicate pipes and equipment, . . . swamp[ing] the campus in roiling brown pools, fifteen feet deep, leaving the nuclear reactors protruding like boulders in a river. And then it recoiled into the sea.<sup>31</sup>

After the cooling systems stopped, the reactor cores began to overheat. This led to what could only be described as “surreal” sights at the facility: “two helicopters from the Japanese Self-Defense Forces hover[ing] above the crippled Reactor 3[,] . . . a huge red bucket carrying tons of seawater swaying beneath each[,] . . . dumping a total of seven tons of seawater into a depleted pool of water housing the spent fuel rods,” while on the ground “the Self-Defense Forces moved 11 trucks bearing water cannons into position to aid in the cooling effort.”<sup>32</sup> Eventually, these “last-ditch,” “Hail Mary pass”<sup>33</sup> efforts at avoiding catastrophe failed. Hydrogen gas became trapped inside the facilities, causing fires and explosions that damaged three of the main Fukushima buildings.<sup>34</sup> A separate fire also occurred in Building 4, which stored spent fuel rods in a cooling pond.<sup>35</sup>

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28. O.M., *supra* note 16; Chua-Eoan, *supra* note 25; Osnos, *supra* note 17, at 48; *Overview*, *supra* note 23.

29. O.M., *supra* note 16; Osnos, *supra* note 17, at 48.

30. Osnos, *supra* note 17, at 48.

31. *Id.*

32. *Id.*

33. Chua-Eoan, *supra* note 25.

34. O.M., *supra* note 16; Hiroko Tabuchi, Keith Bradsher, & Matthew L. Wald, *In Japan Reactor Failings, Danger Signs for the U.S.*, N.Y. TIMES, May 17, 2011, at A1, available at <http://tinyurl.com/7z964tn>.

35. O.M., *supra* note 16.

All this ultimately led to “not merely a double blow but a triple one”—a chain reaction of chain reactions that caused the worst nuclear energy incident in the world since Chernobyl.<sup>36</sup> Radioactive gas leaked into the atmosphere, eventually being measured as far away as Iceland.<sup>37</sup> It also hampered cleanup efforts. The explosions and fires “splattered radioactive and other debris . . . hither and yon,” obscuring “what the most important sources of radiation were.”<sup>38</sup>

The release of radiation forced the evacuation of approximately 86,000 people from around the facility.<sup>39</sup> The Japanese government established a six-mile evacuation perimeter, a perimeter it later doubled based in part on information it possessed at the time it set the original emergency zone.<sup>40</sup> The government’s back-and-forth on the appropriate disaster response incited sharp criticism. Early critiques deemed the Japanese government “arbitrary, unscientific, even callous” in how it handled the incident.<sup>41</sup> Later criticisms were even more pointed, assessing the government’s performance as ineffective, shrouded in secrecy, and more concerned about “avoid[ing] responsibility and, above all, criticism” than about the safety of its people.<sup>42</sup> A May 2011 poll, in fact, revealed just how deep-seated this distrust was; it showed that north of eighty percent of Japanese people “did not believe the[ir] government’s information” about the disaster.<sup>43</sup> With some residents being evacuated to areas directly in the line of what government models

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36. *Id.*; see also Beth Thomas, *Fukushima Plant Released Record Amount of Radiation Into Ocean*, SFGATE.COM (Oct. 31, 2011), [http://www.sfgate.com/cgi-bin/article.cgi?f=/g/a/2011/10/31/bloomberg\\_articlesLTWZKG6KLVR4.DTL](http://www.sfgate.com/cgi-bin/article.cgi?f=/g/a/2011/10/31/bloomberg_articlesLTWZKG6KLVR4.DTL) (“Tokyo Electric’s Fukushima station may have emitted . . . 35,800 terabecquerels of cesium 137 into the atmosphere at the height of the disaster . . . . The estimated amount is about 42 percent of that released into the atmosphere in the Chernobyl explosion in 1986 . . .”).

37. *Overview*, *supra* note 23.

38. O.M., *supra* note 16.

39. *Overview*, *supra* note 23; *Sayonara, Nukes, but Not Yet: An Anti-Nuclear Protest in Japan*, ECONOMIST, Sept. 24, 2011, at 52, available at <http://www.economist.com/node/21530147>.

40. Eric Talmadge & Mari Yamaguchi, *Japan Ignored Own Radiation Forecasts*, WASH. TIMES, Aug. 9, 2011, <http://www.washingtontimes.com/news/2011/aug/9/japan-ignored-own-radiation-forecasts/?page=all>.

41. McNeill, *supra* note 22.

42. Norimitsu Onishi & Martin Fackler, *Japan Held Nuclear Data, Leaving Evacuees in Peril*, N.Y. TIMES, Aug. 8, 2011, at A1, available at <http://www.nytimes.com/2011/08/09/world/asia/09japan.html?pagewanted=all>.

43. Osnos, *supra* note 17, at 57–58.

had predicted to be the path of radiation exposure, at least one local official went so far as to accuse the national government of acts equivalent to “murder.”<sup>44</sup> Kiwamu Ariga, an 81-year-old who at the end of World War II was enlisted as a child to search by hand for uranium for the Japanese atomic effort, certainly saw nefariousness in the government’s response: “We were brainwashed during the war, and we were brainwashed again after the war. Maybe we will get wise the third time.”<sup>45</sup>

Motives aside, what was clear about the response to Fukushima’s demise was that confusion reigned. As evening crept on March 11, workers at the plant were forced to go to nearby homes to ask for flashlights so they could see inside the plant.<sup>46</sup> The plant’s operators were unprepared. “There was hesitation, arguments and sheer confusion over what to do.”<sup>47</sup> The pressure inside Reactor No. 1 reached twice its design limit shortly after the earthquake struck. The government thus ordered the plant’s operator, Tokyo Electric Power (“TEPCO”), to begin venting gas off the reactor, but the company refused, with its employees engaging in a “shouting match” over what course of action was most appropriate.<sup>48</sup> As a consequence, one reactor meltdown began only hours after the tsunami hit.<sup>49</sup> The government, meanwhile, refused to admit the extremity of the crisis. On the night of the tsunami, then-Prime Minister Naoto Kan’s spokesperson, Yukio Edano, declared: “Let me repeat that there is no radiation leak, nor will there be a leak.”<sup>50</sup> Ultimately, the Japanese government officially acknowledged the meltdown—but not until two months after it occurred.<sup>51</sup>

Blame did not rest solely with the government, however. It cut multiple ways. Preparations at the plant were so poor that workers attempting to grapple with the initial loss of power became so “desperate for electricity . . . they fanned out into the parking lot to

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44. Onishi & Fackler, *supra* note 42.

45. Martin Fackler, *Fukushima’s Long Link to a Dark Nuclear Past*, N.Y. TIMES, Sept. 6, 2011, at A10 (quoting Mr. Ariga) (internal quotation marks omitted).

46. Osnos, *supra* note 17, at 50.

47. Tabuchi, Bradsher, & Wald, *supra* note 34 (quoting an anonymous government advisor) (internal quotation marks omitted).

48. *Id.*

49. *Bright Ideas Needed: Japan’s Power Monopolies Raise Costs and Stifle Innovation*, ECONOMIST, Sept. 17, 2011, at 65 [hereinafter *Bright Ideas Needed*].

50. Osnos, *supra* note 17, at 48.

51. *Bright Ideas Needed*, *supra* note 49, at 65.

scavenge car batteries from any vehicles that had survived the wave.”<sup>52</sup> At one point early in the crisis, Prime Minister Kan, frustrated with TEPCO’s withholding of information, stormed into the company’s headquarters, screaming, “What the hell is going on?”<sup>53</sup> When Kan later flew to the facility to see what was happening for himself, the plant manager reportedly offered to “form a suicide squad” to open the vent in Reactor No. 1.<sup>54</sup> As United States Nuclear Regulatory Commission Chairman Gregory Jaczko would later comment about his early frustration with the Japanese government’s apparent refusal to share information with his agency, “[i]t wasn’t a question of them not providing the information to us . . . . The information just didn’t exist.”<sup>55</sup>

The failure to contain Fukushima resulted in substantial environmental contamination. The scope of immediate fallout was so vast it included an area as large as Chicago.<sup>56</sup> The most contaminated area, the ten miles immediately around the plant, likely will be uninhabitable for a century-and-a-half,<sup>57</sup> but the “vagaries of wind and rain . . . scattered worrisome amounts of radioactive materials in unexpected patterns far outside the evacuation zone”—including creating radiation hotspots in Tokyo, 160 miles away.<sup>58</sup>

Plants, crops, livestock, and water in the region all were contaminated with radioactive materials. Six months after the meltdowns, local fishermen and cattle farmers were still banned from selling their yields.<sup>59</sup> Some crops were tested and cleared for consumption, although radiation was found in many “local foods like shitake mushrooms, bamboo shoots, fish, beef, and spinach,” to name only a few.<sup>60</sup> The overall result was prevailing uncertainty.

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52. *Id.*

53. *Id.* (quoting Naoto Kan) (internal quotation marks omitted).

54. Osnos, *supra* note 17, at 50.

55. *Id.*

56. *Id.* at 58.

57. *Id.* at 53.

58. Hiroko Tabuchi, *Citizens’ Testing Finds 20 Hot Spots Around Tokyo*, N.Y. TIMES, Oct. 14, 2011, <http://www.nytimes.com/2011/10/15/world/asia/radioactive-hot-spots-in-tokyo-point-to-wider-problems.html?pagewanted=all>.

59. Krista Mahr, *A Long Road to Recovery*, TIME, Aug. 29, 2011, <http://www.time.com/time/magazine/article/0,9171,2089361,00.html> [hereinafter Mahr, *A Long Road*].

60. Krista Mahr, *Do I Dare to Eat a Peach? Fukushima Citizens and Farmers Struggle with Food Safety*, ECOCENTRIC (Aug. 8, 2011, 1:50 AM), <http://ecocentric.blogs.time.com/2011/08/08/do-i-dare-to-eat-a-peach-fukushima-citizens-and-farmers-struggle-with-food->

“The exact amount and degree of contamination is still unknown.”<sup>61</sup> A half-year after the explosions at the reactors, work remained ongoing to strip local land of contaminated soil; at the same time, citizen measurements showed that three-quarters of tested schools exceeded the yearly limit of radiation exposure for employees at Japanese nuclear power plants.<sup>62</sup> One government estimate suggested that nearly 2500 square kilometers of contaminated soil would need to be cleared—an area bigger than Tokyo itself.<sup>63</sup> Consequently, the region, once a “picture-postcard”<sup>64</sup> tourist destination well known for its “verdant rice paddies and mountain hot springs,”<sup>65</sup> a place with the “feel of Maine: organic farms, pine forests, coastal towns where the air is spiked with sea salt,”<sup>66</sup> became home to scores of “nuclear gypsies” who traveled from across the country to work on the cleanup.<sup>67</sup> As one report put it, “anyone who isn’t [in Fukushima] on business simply isn’t there.”<sup>68</sup>

Ultimately, for the people of Fukushima and Japan more broadly, this lingering uncertainty may be the disaster’s most enduring legacy. Although the International Atomic Energy Agency confirmed that the site had become “essentially stable” six months after the tragedy began,<sup>69</sup> doubts about the area’s future remain. A month into the disaster, the event was provisionally escalated to a “level seven” nuclear incident, the highest level possible.<sup>70</sup> Half a

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safety/ [hereinafter Mahr, *Do I Dare*]; Mahr, *A Long Road*, *supra* note 59.

61. Mahr, *Do I Dare*, *supra* note 60.

62. Mahr, *A Long Road*, *supra* note 59.

63. *Radiation in Japan: Hot Spots and Blind Spots: The Mounting Human Costs of Japan’s Nuclear Disaster*, *ECONOMIST*, Oct. 8, 2011, <http://www.economist.com/node/21531522/print>.

64. McNeill, *supra* note 22.

65. Mahr, *A Long Road*, *supra* note 59.

66. Osnos, *supra* note 17, at 55.

67. Justin McCurry, *Fukushima Cleanup Recruits ‘Nuclear Gypsies’ from Across Japan*, *GUARDIAN* (July 13, 2011, 2:42 PM), <http://www.guardian.co.uk/environment/2011/jul/13/fukushima-nuclear-gypsies-engineers-labourers>. One report noted that many of these workers make the equivalent of 11 dollars per hour—the same as part-time help at McDonald’s in Tokyo.” Osnos, *supra* note 17, at 55.

68. Mahr, *A Long Road*, *supra* note 59.

69. Fredrik Dahl, *Fukushima Reactors Now ‘Stable,’ IAEA Says*, *REUTERS* (Sept. 12, 2011, 2:06 PM), <http://www.reuters.com/article/2011/09/12/us-nuclear-japan-iaea-idUSTRE78B5D020110912>.

70. Matt Smith, *Japan Nuclear Agency Raises Threat Level*, *CNN* (Apr. 11, 2011, 11:11 PM), <http://tinyurl.com/3tknwsb>.

year later, “the Fukushima accident isn’t over.”<sup>71</sup> A late 2011 report suggested that the disabled reactors may still be experiencing “bursts of fission,” releasing yet more radioactivity.<sup>72</sup> Trying to quell fears that cleanup efforts were ineffective at decontaminating water at the site, a government official in November took the dare of a journalist, went on television, and drank half a glass of water collected from the reactor buildings.<sup>73</sup> The Japanese government also recently acknowledged that over three dozen sensors within the twelve-mile-radius evacuation zone surrounding the plant have recorded above-acceptable radiation levels, meaning that much of the area will remain evacuated indefinitely—for decades at least.<sup>74</sup> “We cannot deny a possibility that some of the residents may not be able to return to their homes for a long time,” acknowledged Chief Cabinet Secretary Yukio Edano in an August news conference.<sup>75</sup> “We are very sorry.”<sup>76</sup>

### III. THREE RESPONSES

The destruction and devastation that Fukushima’s meltdown unleashed was horrific: a tragedy heaped on a tragedy and, worse still, an avoidable one. On this the facts are not debatable.

Where there is controversy is on the appropriate policy response to the disaster. It is hardly surprising that each nation might mark its own particular path in determining how to deal with nuclear power post-Fukushima. Considering, however, the reaction of three countries shows just how divergent political responses to energy disasters can be. For Germany, the United States, and Japan, the reactions to Fukushima hardly could have been more different.

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71. Remarks of Peter Bradford, Adjunct Professor, Vermont Law School, Nuclear Safety—Expecting the Unexpected, 19th Section Fall Meeting: The ABA Environment, Energy, and Resources Law Summit, Section of Environment, Energy, and Resources, Am. Bar Ass’n, Indianapolis, Indiana (Oct. 13, 2011) (notes in possession of author).

72. Hiroko Tabuchi, *Fears of Fission Rise at Stricken Japanese Plant*, N.Y. TIMES, Nov. 2, 2011, <http://www.nytimes.com/2011/11/03/world/asia/bursts-of-fission-detected-at-fukushima-reactor-in-japan.html?pagewanted=all>.

73. Robert Mackey & Ravi Somaiya, *Japanese Official Drinks Water from Fukushima Reactor Buildings*, N.Y. TIMES: THE LEDE (Nov. 1, 2011), <http://tinyurl.com/3qzm97a>.

74. Martin Fackler, *Large Zone Near Japanese Reactors to Be Off Limits*, N.Y. TIMES, Aug. 21, 2011, at A6; Mari Yamaguchi, *Some Areas Near Japan’s Crippled Nuke Plant to Remain Off-limits for Foreseeable Future*, ASSOCIATED PRESS, Aug. 22, 2011.

75. Yamaguchi, *supra* note 74 (internal quotation marks omitted).

76. *Id.* (internal quotation marks omitted).

*A. Germany*

“There is German angst about nuclear power.”<sup>77</sup>

Germany, to be sure, long has been antipathetic to atomic energy, despite its making up nearly a quarter of the nation’s electricity production. Since at least the 1970s, smiling yellow-and-red suns brandishing the slogan “*Atomkraft? Neine, danke*” have been cultural fixtures in Germany.<sup>78</sup> Indeed, the left-leaning anti-nuclear activists of the 1970s who so staunchly opposed Germany’s use of nuclear energy were in large part the precursors to the nation’s now politically powerful Green Party.<sup>79</sup>

Still, in the months leading up to Fukushima’s failure, nuclear energy appeared to have at least some staying power in Germany. In late 2010, German Chancellor Angela Merkel brokered a deal to extend the lives of the nation’s seventeen active nuclear power plants by twelve years.<sup>80</sup> The plan, which Merkel called a “revolution in energy provision”<sup>81</sup> to keep nuclear “desirable as a bridging technology”<sup>82</sup> was not without controversy, but it also was seen as a way to help cement Germany’s position as an economic and environmental leader. The environmental aspect was obvious given Germany’s growing renewables sector<sup>83</sup> and nuclear’s own climate

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77. Elisabeth Rosenthal, *Germany Dims Nuclear Plants, but Hopes to Keep Lights On*, N.Y. TIMES, Aug. 29, 2011, <http://www.nytimes.com/2011/08/30/science/earth/30germany.html?pagewanted=all> (quoting Hildegard Cornelius-Guas) (internal quotation marks omitted).

78. Sabine Rennefanz, *Merkel Spins Round to Lead Germany’s Anti-nuclear Movement*, GUARDIAN (June 1, 2011, 11:04 AM), <http://www.guardian.co.uk/commentisfree/2011/jun/01/angela-merkel-germany-nuclear-power>. This German phrase translates to “Nuclear power? No, thank you.” See Paul Hockenos, *Atomkraft? Neine Danke!*, PROGRESSIVE (August 2011), [http://progressive.org/atomkraft\\_nein\\_nuclear\\_power.html](http://progressive.org/atomkraft_nein_nuclear_power.html).

79. Daniel Johnson, *Why Germany Said No to Nuclear Power*, TELEGRAPH (May 30, 2011, 8:37 PM), <http://www.telegraph.co.uk/news/worldnews/europe/germany/8546608/Why-Germany-said-no-to-nuclear-power.html>.

80. Kate Connolly, *Germany Agrees to Extend Life of Nuclear Power Stations*, GUARDIAN (Sept. 6, 2010, 9:59 AM), <http://www.guardian.co.uk/world/2010/sep/06/germany-extend-nuclear-power-stations>.

81. *Id.* (internal quotation marks omitted).

82. Kate Connolly, *Angela Merkel Risks Germans’ Ire with Fresh Commitment to Nuclear Energy*, GUARDIAN (Aug. 30, 2010, 1:35 PM), <http://www.guardian.co.uk/world/2010/aug/30/angela-merkel-commits-nuclear-energy> (internal quotation marks omitted).

83. See, e.g., Lucy Butler & Karsten Neuhoff, *Comparison of Feed-in Tariff, Quota and Auction Mechanisms to Support Wind Power Development*, 33 RENEWABLE ENERGY 1854, 1859 (2008); Toby Couture & Yves Gagnon, *An Analysis of Feed-in Tariff Remuneration Models*:

change benefits.<sup>84</sup> Likewise, many suggested that the decision to keep nuclear power running put nothing less than Germany's energy independence on the line: "We urgently need to keep the plants up and running for longer," Merkel said.<sup>85</sup> "I am against shutting down our nuclear power plants only to have atomic power imported into Germany from other countries. . . . That won't happen on my watch."<sup>86</sup>

How much can change in a day. In Fukushima's wake, anti-nuclear sentiment in Germany surged to all-time highs, and Chancellor Merkel swiftly caved to the pressure. Not weeks or months but mere days after the tsunami struck Japan, Merkel announced that the government would order the shutdown of Germany's seven nuclear power plants built before 1980.<sup>87</sup> Then, in yet a further blow to the industry, the German government announced that it would phase out its remaining ten reactors, so that after 2022 no nuclear power plant would operate in Germany.<sup>88</sup> "Safety has the priority in all our deliberations," Merkel declared.<sup>89</sup> Norbert Röttgen, Merkel's environment minister, was even starker. "It's definite: the latest end for the last three nuclear power plants is 2022. . . . There will be no clause for revision."<sup>90</sup>

Together, these two decisions made Germany's the harshest of reactions to Fukushima Daiichi. In the span of a decade, this heavily industrialized nation planned to transform its electric economy, eliminating nearly a quarter of its generation supply and using

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*Implications for Renewable Energy Investment*, 38 ENERGY POL'Y 955, 956-60 (2010); Marc Ringel, *Fostering the Use of Renewable Energies in the European Union: The Race Between Feed-in Tariffs and Green Certificates*, 31 RENEWABLE ENERGY 1, 11 (2006).

84. See, e.g., RONALD E. HAGEN ET AL., U.S. DEPT. OF ENERGY, IMPACT OF U.S. NUCLEAR GENERATION ON GREENHOUSE GAS EMISSIONS 5 (Nov. 1, 2001) (reporting zero CO<sub>2</sub> emissions during the operation of a nuclear plant compared to 0.266 metric tons/MWh for coal), available at <http://tonto.eia.doe.gov/ftproot/-nuclear/ghg.pdf>.

85. Charles Lane, *Merkel's Flip-flop Logic*, WASH. POST (June 7, 2011, 4:05 PM), <http://tinyurl.com/7g6np6t> (internal quotation marks omitted).

86. Johnson, *supra* note 79 (internal quotation marks omitted).

87. Luke Harding, *Angela Merkel Switches Off Seven Nuclear Power Plants*, GUARDIAN (Mar. 15, 2011, 2:42 PM), <http://www.guardian.co.uk/world/2011/mar/15/germany-merkel-switches-nuclear-power-off>.

88. *Germany Pledges Nuclear Shutdown by 2022*, GUARDIAN (May 30, 2011, 5:24 AM), <http://www.guardian.co.uk/world/2011/may/30/germany-pledges-nuclear-shutdown-2022>.

89. Harding, *supra* note 87 (internal quotation marks omitted).

90. *Germany Pledges Nuclear Shutdown by 2022*, *supra* note 88 (internal quotation marks omitted).

massive expansion of renewables, new coal- and gas-fired plants, and aggressive efficiency measures to make up the gap. This perhaps was not entirely because of Fukushima, but there also was no denying that the change was a direct, proximate result of the meltdown of a single power plant on the other side of the globe.

The German decision was met with great domestic fanfare. Whereas a poll showed fifty-six percent of Germans opposing the extension of nuclear plants' lives in 2010,<sup>91</sup> the phaseout-by-2022 proposal rushed through the German legislature: eighty-five percent of parliamentarians supported the move,<sup>92</sup> and the vote in the lower house was an overwhelming 513-79.<sup>93</sup>

Choosing to shut down nuclear power in Germany, however, did not go entirely without dissent. Many in the international community—and a vociferous minority at home, too—blasted Merkel for what in the United States would have been labeled a clear political “flip flop.”<sup>94</sup> “Yes, this lady is for turning! For spinning, indeed,” wrote the United Kingdom’s *Guardian*.<sup>95</sup> Others likewise noted the irony of this nuclear “turnaround,”<sup>96</sup> calling it, among other things, “emotional,”<sup>97</sup> “a spectacular about-turn,”<sup>98</sup> “a drastic policy reversal,”<sup>99</sup> “politically motivated [for] tactical reasons alone,”<sup>100</sup> “[b]acktracking in the blink of an eye,”<sup>101</sup> and a measure that would force an “extreme energy makeover” for the entire nation.<sup>102</sup> Hans-Jürgen Papier, former president of Germany’s Federal Constitutional Court, cut to the quick: “Angela Merkel, the

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91. Connolly, *supra* note 82.

92. *How Germany Plans to Succeed in a Nuclear Free, Low-Carbon Economy*, GUARDIAN (July 29, 2011, 4:31 PM), <http://www.guardian.co.uk/environment/2011/jul/29/nuclearpower-energy>.

93. *Germany Votes to End Nuclear Power by 2022*, GUARDIAN (June 30, 2011, 2:16 PM), <http://www.guardian.co.uk/world/2011/jun/30/germany-end-nuclear-power-2022>.

94. Lane, *supra* note 85 (calling Merkel’s changed decision “one of the most blatant political flip-flops of all time”).

95. Rennefanz, *supra* note 78.

96. Judy Dempsey, *Siemens Abandoning Nuclear Power Business*, N.Y. TIMES, Sept. 18, 2011, <http://www.nytimes.com/2011/09/19/business/global/19iht-siemens19.html>.

97. Rosenthal, *supra* note 77.

98. *Germany Votes to End Nuclear Power by 2022*, *supra* note 93.

99. *Germany Pledges Nuclear Shutdown by 2022*, *supra* note 88.

100. Thomas Schmid, *The Hidden Fallout from Germany’s Sudden Nuclear Shutdown*, TIME, June 2, 2011, <http://www.time.com/time/world/article/0,8599,2075013,00.html>.

101. *Id.*

102. Rosenthal, *supra* note 77.

magician, pulled [this moratorium] out of her hat like a rabbit a couple of days after Fukushima.”<sup>103</sup>

“Germany, in a very rash decision, decided to experiment on ourselves,” Jürgen Grossmann, chief executive of one of Germany’s largest electricity suppliers, RWE, later said of the ban. “The politics are overruling the technical arguments.”<sup>104</sup> Early on, there appeared to be at least some truth in this statement. The other German electricity giant, and Europe’s largest power provider, E.ON, announced it would slash up to 11,000 jobs and post earnings in the red as a result of the phaseout.<sup>105</sup> Chemical powerhouse Bayer threatened to relocate production facilities outside the country.<sup>106</sup> German manufacturing conglomerate Siemens declared it would no longer produce nuclear facilities, despite having built all seventeen of Germany’s.<sup>107</sup> Moreover, with such a large swath of plants already off the grid, threats of winter blackouts loomed.<sup>108</sup> And a leading German bank estimated that the switch from nuclear to renewables would cost the nation \$340 billion over the next decade.<sup>109</sup>

All this was the case, and perhaps to little avail: since the shutdown of the seven oldest plants, Germany has met its electricity demand most days only by importing power from France and the Czech Republic—both heavy users of nuclear power.<sup>110</sup> Still, in Germany, the answer to Fukushima remained clear: a “death warrant on nuclear power.”<sup>111</sup>

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103. Schmid, *supra* note 100 (internal quotation marks omitted).

104. Rosenthal, *supra* note 77 (internal quotation marks omitted).

105. Tom Bawden, *German Nuclear Shutdown Forces E.ON to Cut 11,000 Staff*, GUARDIAN (Aug. 10, 2011, 1:01 PM), <http://www.guardian.co.uk/business/2011/aug/10/german-nuclear-shutdown-forces-eon-to-axe-11000-jobs>.

106. Ruby Russell, *Bayer Threatens to Quit Germany over Nuclear Shutdown*, GUARDIAN (Aug. 7, 2011, 1:36 PM), <http://www.guardian.co.uk/world/2011/aug/07/bayer-quit-germany-nuclear-shutdown>.

107. Dempsey, *supra* note 96.

108. *Germany Could Restart Nuclear Plant to Plug Energy Gap*, SPIEGEL ONLINE INT’L (July 13, 2011), <http://www.spiegel.de/international/germany/0,1518,774203,00.html> [hereinafter *Germany Could Restart*].

109. *Nuclear Phaseout to Cost Germany 250 Billion*, THE LOCAL (Sept. 19, 2011, 4:05 PM), <http://www.thelocal.de/money/20110919-37687.html>.

110. *Germany May Be Importing Nuclear Power to Meet Energy Needs*, SPIEGEL ONLINE INT’L (Apr. 4, 2011), <http://tinyurl.com/3mlka5h>.

111. Schmid, *supra* note 100.

*B. United States*

To Germany's anti-nuclear fervor, the United States matched caution and deliberateness—a measured, adjust-if-necessary but change-as-little-as-possible approach.

For a nation whose views on atomic energy have cycled in polarity over time—thus keeping the American energy stance firmly in the middle of the nuclear road<sup>112</sup>—this incrementalist response hardly should have been a surprise. “Support for nuclear power [in the United States] has waxed and waned over the decades, going up as the power-hungry nation looked for ways to meet demand and driven down by nuclear accidents at home and abroad.”<sup>113</sup> With Fukushima Daiichi, little changed.

U.S. leaders were quick to express concern and condolences for Japan and to offer support, including sending teams of experts from the Nuclear Regulatory Commission (“NRC”) to assist the Japanese government.<sup>114</sup> But on nuclear power itself, the official policy remained: steady as she goes. Mere days after the tragedy in Japan began unfolding, President Obama reiterated America's commitment to nuclear power as part of our generation mix. “[N]uclear power,” he said, was still “an important part of our own energy future.”<sup>115</sup> In testimony before Congress, Secretary of Energy Steven Chu echoed this view: “That position hasn't been changed.”<sup>116</sup> “To meet our energy needs . . . the administration believes we must rely on a diverse set of energy sources including renewables like wind and solar, natural gas, clean coal and nuclear power.”<sup>117</sup>

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112. See Michael Cooper & Dalia Sussman, *Nuclear Power Loses Support in New Poll*, N.Y. TIMES, Mar. 22, 2011, <http://www.nytimes.com/2011/03/23/us/23poll.html>.

113. *Id.*

114. Amy Bonaccorso, *The NRC Continues to Support Japan's Recovery Efforts*, NRC BLOG (Aug. 1, 2011), <http://public-blog.nrc-gateway.gov/2011/08/01/the-nrc-continues-to-support-japans-recovery-efforts/>.

115. Jesse Lee, *President Obama: “We Will Stand with the People of Japan,”* WHITE HOUSE BLOG (Mar. 17, 2011, 4:34 PM), <http://www.whitehouse.gov/blog/2011/03/17/president-obama-we-will-stand-people-japan> (internal quotation marks omitted); see also Jia Lynn Yang, *Democrats Step Up Pressure on Nuclear Regulators over Disaster Preparedness*, WASH. POST (Mar. 18, 2011, 1:20 PM), [http://www.washingtonpost.com/wp-dyn/content/article/2011/03/18/AR2011031800115\\_pf.html](http://www.washingtonpost.com/wp-dyn/content/article/2011/03/18/AR2011031800115_pf.html).

116. Peter Wallsten & Dan Eggen, *U.S. Takes Conservative Approach in Response to Nuclear Crisis in Japan*, WASH. POST, Mar. 17, 2011, <http://tinyurl.com/6rn8r9s> (internal quotation marks omitted).

117. Joshua Green, *Washington's Pro-Nuke Consensus*, ATLANTIC (Mar. 16, 2011, 10:54 PM), <http://www.theatlantic.com/politics/archive/2011/03/washingtons-pro-nuke->

Instead, what the Obama administration called for was a careful review of Fukushima's implications for nuclear energy in the United States.<sup>118</sup> Yet this review was much more circumscribed than it might have been. Given the administration's continuing commitment to atomic energy, big picture questions were off the table. The review most certainly was not one—as in Germany—of whether reliance on nuclear power should continue, but rather a much narrower version: an in-the-weeds inquiry of what specific triggers led to the meltdowns in Fukushima, whether those same triggers existed in the United States, and, if so, what should be done to make American plants operate more safely. “[W]hen we see a crisis like the one in Japan,” President Obama announced, “we have a responsibility to learn from this event, and to draw from those lessons to ensure the safety and security of our people. That’s why I’ve asked the Nuclear Regulatory Commission to do a comprehensive review of the safety of our domestic nuclear plants in light of [Fukushima].”<sup>119</sup>

The NRC's review, in turn, was singularly focused on this concept: safety. On Capitol Hill, NRC Chairman Gregory Jaczko repeatedly reassured Congress of the safety of America's nuclear generation fleet. “[W]e have been very closely monitoring the activities in Japan and reviewing all currently available information. Review of this information, combined with our ongoing inspection and licensing oversight, gives us confidence that the U.S. plants continue to operate safely.”<sup>120</sup> Chairman Jaczko also clarified that the NRC's post-Fukushima assessment would, consistent with the agency's duties, center on the question of operational safety. “The NRC is systematically and methodically evaluating the lessons being learned at Fukushima Daiichi as they might apply to the safety of reactors in the United States . . . .”<sup>121</sup>

The NRC decided to assess Fukushima's implications in tiers, starting with an immediate short-term review, followed by a more in-

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consensus/72577/ (internal quotation marks omitted).

118. Lee, *supra* note 115.

119. *Id.* (internal quotation marks omitted).

120. Written Statement from Gregory B. Jaczko, Chairman, U.S. Nuclear Regulatory Comm'n, to Appropriations Comm., Subcomm. on Energy & Water, U.S. Senate 3 (Mar. 30, 2011), *available at* <http://tinyurl.com/6vo7gby>.

121. Written Statement from Gregory B. Jaczko, Chairman, U.S. Nuclear Regulatory Comm'n, to Env't & Pub. Works Comm. and Clean Air & Nuclear Safety Subcomm., U.S. Senate 3 (June 16, 2011), *available at* <http://www.nrc.gov/reading-rm/doc-collections/congress-docs/congress-testimony/2011/ML11166A256.pdf>.

depth review on a slightly longer timetable, and concluding with a long-term review once Japan's own assessment of what happened at the Daiichi plant was complete. The agency's middle-term review culminated in a nearly 100-page report from a task force of six experts with a combined total of over 135 years of regulatory experience.<sup>122</sup> Their primary conclusion confirmed what both President Obama and Chairman Jaczko said all along—that while Fukushima might lead to some reforms of U.S. nuclear regulation, overall the disaster gave no reason to reconsider domestic reliance on the technology.

The Task Force finds that the Commission's longstanding defense-in-depth philosophy, supported and modified as necessary by state-of-the-art probabilistic risk assessment techniques, should continue to serve as the primary organizing principle of its regulatory framework. . . . [Nevertheless,] a sequence of events like the Fukushima accident is unlikely to occur in the United States and some appropriate mitigation measures have been implemented, reducing the likelihood of core damage and radiological releases. Therefore, continued operation and continued licensing activities do not pose an imminent risk to public health and safety.<sup>123</sup>

Specifically, the task force recommended twelve overarching changes to U.S. nuclear regulation.<sup>124</sup> None, however, contemplated closing down plants or halting new construction. Instead, the recommendations emphasized ways to "clarify" and "strengthen" existing policy, not replace it.<sup>125</sup> Virtually every one of the suggestions, moreover, was tethered directly to the problems encountered at Fukushima, rather than asking more broadly if gaps in NRC regulations existed in general. For instance, the task force recommended that nuclear operators "reevaluate and upgrade as necessary [the facilities'] seismic and flooding protection of structures."<sup>126</sup> Similarly, it urged the strengthening of "station

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122. Written Statement from Gregory B. Jaczko, Chairman, U.S. Nuclear Regulatory Comm'n, to Env't & Pub. Works Comm. and Clean Air & Nuclear Safety Subcomm., U.S. Senate 2 (Aug. 2, 2011), *available at* <http://pbadupws.nrc.gov/docs/ML1121/ML11213A279.pdf>.

123. CHARLES MILLER ET AL., RECOMMENDATIONS FOR ENHANCING REACTOR SAFETY IN THE 21ST CENTURY vii–viii (2011), *available at* <http://pbadupws.nrc.gov/docs/ML1118/ML111861807.pdf>.

124. *Id.* at ix.

125. *Id.* at vii.

126. *Id.* at ix.

blackout mitigation capability,” requiring “reliable hardened vent designs” in plants with the same reactor designs as Fukushima Daiichi’s, and pursuing “additional emergency preparedness topics related to multiunit events and prolonged station blackout.”<sup>127</sup>

These political and regulatory assurances notwithstanding, support for nuclear power in the United States post-Fukushima was hardly unanimous. A number of environmental groups seized on the incident as an opportunity to call for the phaseout of atomic energy.<sup>128</sup> Public support for the technology receded to the lowest it had been since Three Mile Island, dropping nearly fifteen percentage points from its almost sixty percent approval rating in 2008.<sup>129</sup> And at least some politicians saw in Fukushima Daiichi’s demise new fraying around the edges of the future of American nuclear power. Particularly in seismically prone California, some Democrats, such as Henry Waxman and Barbara Boxer, expressed renewed reservations about the energy source. “Japan is a technologically capable country, and they anticipated earthquakes and tsunamis, but still they didn’t have all the failsafes to stop this tragedy from occurring,” Representative Waxman noted. “So, we need a full inquiry as to how this happened, why it happened, what we can do to build in security features in the United States. Until that happens, we ought to step back from the direction that Republicans are taking, which is heavily reliant on nuclear.”<sup>130</sup>

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127. *Id.* Hardened vents allow for the release of gases from inside the reactor containment in the case of emergency, such as the loss of power. Plants in the United States using the same containment structure as that in Fukushima, the GE Mark I, installed hardened vents in the late 1980s and early 1990s. The Daiichi plant also had hardened vents installed; one aspect of the investigation into the accident is to assess whether these vents performed sufficiently. See *Venting Systems in Mark I Reactors*, GE REPORTS (May 25, 2011), <http://www.gereports.com/venting-systems-in-mark-i-reactors/>; see also MILLER ET AL., *supra* note 123, at 40–41.

128. See Kaufman, *supra* note 8; *The Nuclear Crisis in Japan*, FRIENDS OF THE EARTH, <http://www.foe.org/nuclear-crisis-japan> (last visited Nov. 1, 2011); see also Eileen O’Grady & Scott DiSavino, *Groups Step Up Call for NRC Delay After Fukushima*, REUTERS (Aug. 11, 2011, 1:47 PM), <http://www.reuters.com/article/2011/08/11/us-utilities-nuclear-idUSTRE77A2N720110811>.

129. Cooper & Sussman, *supra* note 112; see also Matthew L. Wald, *Staying the Course, Post-Fukushima*, N.Y. TIMES (May 10, 2011), <http://green.blogs.nytimes.com/2011/05/10/staying-the-course-post-fukushima/>.

130. Jessica Rettig, *Japan’s Nuclear Crisis Reignites Safety Debate*, U.S. NEWS & WORLD REP., Mar. 21, 2011, <http://www.usnews.com/news/articles/2011/03/21/japans-nuclear-crisis-reignites-safety-debate> (internal quotation marks omitted).

Despite such doubts, the overall approach to nuclear power in the United States remains largely unchanged in Fukushima's aftermath. Spurred by the need for action on climate change, calls for expanded nuclear capacity in the United States had been growing for years. After Fukushima the calls did not disappear, but the possibility that they would bear any fruit seemed increasingly improbable. At the same time, nuclear was hardly going away. "Without nuclear power," Tennessee Senator Lamar Alexander argued, "it is hard to imagine how the United States could produce enough cheap, reliable, clean electricity to keep our economy moving."<sup>131</sup> Prognosticating about nuclear power's future, Professor Robert Shrum perhaps put it most aptly: "This is not the end of nuclear power but the end of the fantasy that a nuclear *deus ex machina* can redeem our energy economy from dependence on foreign oil."<sup>132</sup>

Steady as she goes, indeed.

### *C. Japan*

If the German and American reactions to Fukushima were, respectively, an about-face and a slight nudge toward more caution, the Japanese response was one of reconsideration and reassessment. Somewhat ironically, this path of careful weighing and planning came about at least in part as a result of the sharp seesaw of Japanese politics.

Japan's initial reaction to Fukushima in many ways mirrored Germany's vitriol. After the accident, the Japanese public solidly disfavored the energy source. One newspaper poll showed seventy-four percent of Japanese supporting the phaseout of nuclear power post-Fukushima, while another sixty percent expressed little or no confidence in the safety of the technology.<sup>133</sup> For a nation that long

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131. Green, *supra* note 117 (internal quotation marks omitted).

132. Steven F. Hayward, *After Japan's Disaster, Will Nuclear Energy Have a Future in America?*, WASH. POST, Mar. 18, 2011, <http://tinyurl.com/7antox3> (internal quotation marks omitted). Professor Peter Bradford put it even more bluntly: "One can say that Fukushima is making absolutely no difference in [the] picture. The 'nuclear renaissance' in America was taking on almost every feature of a collapsing bubble even before March 11." Bradford, *supra* note 71.

133. Peter Drysdale, *Japan's Energy Options After Fukushima*, E. ASIA F. (Sept. 5, 2011), <http://www.eastasiaforum.org/2011/09/05/japans-energy-options-after-fukushima/>.

had relied on nuclear energy as a chief source of electricity, this represented a “profound reversal of [public] sentiment.”<sup>134</sup>

It was this newfound public opposition to nuclear power that, in part, spurred then-Prime Minister Kan to announce in Fukushima’s wake that the nation would move away from—and ultimately eliminate—its use of nuclear power.<sup>135</sup> This, too, was a sharp turn for national policy. Less than a year before the tsunami struck, Japan had approved a “Basic Energy Plan” that anticipated the construction of fourteen new reactors, representing an increase in reliance on nuclear energy from thirty to fifty percent by 2030.<sup>136</sup> Yet after Fukushima, Kan suggested that the nation must “start from scratch” on a new energy policy, because nuclear energy no longer had a place in Japan’s energy mix.<sup>137</sup> This announcement, however, came as a surprise, leading some officials on Kan’s cabinet to express disagreement with the Prime Minister’s position.<sup>138</sup> Ultimately, Kan was forced to clarify that his announcement of a nuclear phaseout was a “personal” preference, not an official governmental policy.<sup>139</sup>

Meanwhile, other reactors across the country were shut down so they could undergo stress tests to ensure their safety post-Fukushima. Combined with those facilities already undergoing regularly scheduled maintenance, this left only twelve of Japan’s fifty-four nuclear power plants in operation.<sup>140</sup>

To make up for this gap in power production, the Japanese government instituted *setsuden*, or energy conservation measures, throughout the summer. Industrial production schedules were

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134. *Id.*

135. *See id.*

136. *Id.*; Peter Fairley, *Japan Faces Post-Fukushima Power Struggle*, IEEE SPECTRUM (Aug. 2011), <http://spectrum.ieee.org/green-tech/solar/japan-faces-postfukushima-power-struggle>.

137. Drysdale, *supra* note 133 (internal quotation marks omitted).

138. *See Kan’s Nuclear Phase-out Plan Draws Anger over Lack of Details, Talks*, ASAHI SHIMBUN (July 14, 2011), <http://ajw.asahi.com/article/0311disaster/fukushima/AJ201107144468>; *Kan Says Call to End Nuclear Power Was Only a Personal View*, ASAHI SHIMBUN (July 15, 2011), <http://ajw.asahi.com/article/0311disaster/fukushima/AJ201107154682>.

139. *Fukushima to Scrap Nuclear Plants*, JAPAN TIMES, July 16, 2011, <http://www.japantimes.co.jp/text/nn20110716a4.html>.

140. Drysdale, *supra* note 133; *see also* Hiroko Tabuchi, *Japan Courts the Money in Reactors*, N.Y. TIMES, Oct. 10, 2011, <http://tinyurl.com/6nwfnch> (“Only about one in five of Japan’s 54 reactors . . . is still in service. The rest were damaged by the tsunami, are still being put through routine tests, or have not been restarted after such tests because of local opposition.”).

shifted from weekdays to nights and weekends. Families voluntarily unplugged their heated toilet seats and limited air conditioner use. And large businesses were required to cut electricity consumption by fifteen percent.<sup>141</sup> As a consequence, Tokyo's peak electricity consumption fell from sixty gigawatts ("GW") the year before to forty-nine GW in the summer of 2011.<sup>142</sup> Combined with the good fortune of a relatively cool summer, this meant that blackouts, which had been widely expected, never occurred.<sup>143</sup>

As the summer waned, however, the public's continued displeasure with the Japanese government, including its response to Fukushima, mounted, and Prime Minister Kan resigned. It did not take long for the government to shift course again. Kan's replacement, Yoshihiko Noda, announced, in his first speech to the nation as Prime Minister, a more nuanced approach to nuclear energy than the one previously proposed by Kan. Noda suggested that no new nuclear facilities would be built, but that existing plants would continue to be utilized. Moreover, long-term Japanese use of nuclear power would be reduced—but not eliminated altogether. "To build new reactors is unrealistic," Noda said, "and we will decommission reactors at the end of their life spans. . . . But it is also impossible to immediately reduce our dependence to zero."<sup>144</sup> As for the dozens of reactors that had been offline since the crisis in Fukushima, Noda noted that they would be restarted, but only after their safe operation was assured. "We will move ahead with restarting those nuclear plants whose safety has been thoroughly checked and confirmed, and with the condition that a relationship of trust is built with the local communities."<sup>145</sup>

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141. *Bright Ideas Needed*, *supra* note 49, at 65; Joshua Meltzer, *After Fukushima: What's Next for Japan's Energy and Climate Change Policy?* 2 (Sept. 7, 2011) (unpublished paper), available at <http://tinyurl.com/7jy7uww>. For more on *setsuden*, see, for example, Suvendrini Kakuchi, *Energy-Saving 'Setsuden' Campaign Sweeps Japan After Fukushima*, *GUARDIAN* (Aug. 22, 2011, 7:24 AM), <http://www.guardian.co.uk/environment/2011/aug/22/energy-saving-setsuden-japan-fukushima>; Yoree Koh, *Summer's Over: 'Setsuden' Summer, That Is*, *WALL ST. J.* (Sept. 13, 2011), <http://blogs.wsj.com/japanrealtime/2011/09/13/summers-over-setsuden-summer-that-is/>.

142. *Bright Ideas Needed*, *supra* note 49, at 65.

143. *Id.*

144. Hiroko Tabuchi, *Japan Leader to Keep Nuclear Phase-Out*, *N.Y. TIMES*, Sept. 2, 2011, <http://tinyurl.com/877ksrv> (internal quotation marks omitted).

145. *Idled Nuclear Plants Will Be Restarted: Noda*, *TAIPEI TIMES*, Sept. 14, 2011, at 5, available at <http://www.taipetimes.com/News/world/archives/2011/09/14/2003513256> (internal quotation marks omitted).

This time around, the Prime Minister's stated policy was echoed, not undermined, by cabinet officials. The new Environment Minister, Goshi Hosono, who is also responsible for overseeing the cleanup and compensation effort surrounding Fukushima, reiterated the policy of restarting existing power plants, albeit cautiously. "I've been suspicious of the nuclear policy we have had, especially after March 11. I don't intend to allow the reactors to be restarted one after another. I'm going to step on the brakes."<sup>146</sup> Hosono also urged creation of a new agency under the rubric of Japan's Environment Ministry to regulate the nuclear industry, as opposed to the extant model of using an agency within the nation's Ministry of Economy, Trade and Industry, which is responsible for promoting nuclear power, to do the job.<sup>147</sup>

Even more critically, Hosono suggested that the nation's energy plan would need to be revised to reflect a reevaluation of nuclear power's appropriateness. "We will have discussions at various levels and come up with the best mix of energy sources (to ensure a stable supply)," Hosono said. "How much we will reduce the use of nuclear power and when we will do so are among the issues that will be discussed."<sup>148</sup> Prime Minister Noda likewise sounded this refrain, noting that in the aftermath of Fukushima it is important for the Japanese government to retreat, reassess, and only then decide the best course for the future: "There will be a continuing necessity to secure nuclear energy that is safe and more reliable. . . . We will release a best energy mix shortly."<sup>149</sup>

#### IV. ENERGY LAW: ONE METAPHOR, TWO CONCEPTIONS

Taken together, the German, American, and Japanese responses to Fukushima convey a sense of how governments react to energy

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146. Setsuko Kamiya, *Hosono to Reshape Nuclear Policy*, JAPAN TIMES, Sept. 13, 2011, <http://www.japantimes.co.jp/text/nn20110913f1.html> (internal quotation marks omitted).

147. *Id.*; see also Osnos, *supra* note 17, at 54 (discussing agency capture of the trade ministry by the Japanese electric and nuclear industries); Hiroko Tabuchi, *Cooling Problem Shuts Nuclear Reactor in Japan*, N.Y. TIMES, Oct. 4, 2011, <http://www.nytimes.com/2011/10/05/world/asia/cooling-problem-shuts-nuclear-reactor-in-japan.html> (noting that the governor of the prefecture of Saga "rescinded his permission" to restart two reactors there post-Fukushima when it was discovered that "Kyushu Electric had tried to manipulate public opinion with fake e-mails to support" the reactors' reopening).

148. *Id.* (internal quotation marks omitted).

149. *Noda to Stress Need for Nuclear Plants at U.N.*, JAPAN TIMES, Sept. 19, 2011, <http://www.japantimes.co.jp/text/nn20110919x3.html> (internal quotation marks omitted).

disasters—of how energy law is shaped by, or is resilient to change from, the calamities that reveal the end results of an energy policy's aims. In these responses and others before them, concerns about environmental and public health risks play a role. That role, however, is not a leading one. It is at best a supporting role, sometimes even a bit part, a part that ultimately succumbs to energy law's bigger, overarching objectives. For at its core, United States energy policy is not about environmental protection and public health. Fundamentally, American energy law is about providing a stable supply of energy, in an abundant amount and at the lowest price possible.<sup>150</sup>

Energy disasters offer a chance to reevaluate energy law's prevailing goals. By showing the negative, calamitous consequences that pursuing those goals can lead to, disasters might make us as a society pause and reflect on whether, in light of events like Fukushima, *Deepwater Horizon*, the Upper Big Branch Mine, or the *Exxon Valdez*, the current course of our energy policy is the right one.<sup>151</sup> As Professor Zygmunt Plater aptly observed in the context of the *Deepwater Horizon* disaster,

The question for national energy law and policy now is whether, this time around, we will acknowledge and implement the lessons for hard systemic change largely avoided two decades ago. There are many promising areas for reform, . . . [but the] *Deepwater Horizon* tragedy will be a doubly disastrous occasion if it does not produce systemic changes for the future, as the *Exxon Valdez* spill markedly failed to do. As White House Chief of Staff Rahm Emanuel said in another context, "You never want a serious crisis to go to waste."<sup>152</sup>

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150. Again, nuclear power is a perfect example of this, as it was promoted, at least symbolically, as "too cheap to meter." *Abundant Power from Atom Seen*, N.Y. TIMES, Sept. 17, 1954, at 5 (quoting Lewis L. Strauss, Chairman, Atomic Energy Comm'n, Address at the Twentieth Anniversary of the National Association of Science Writers (Sept. 16, 1954)).

151. Cf. Bruce R. Huber, *Transition Policy in Environmental Law*, 35 HARV. ENVTL. L. REV. 91, 113 (2011) ("In times of catastrophe, political discourse is much more likely to take a punitive tone. . . . But thankfully, environmental disasters—at least of the sort that dominate headlines—are uncommon. Lesser environmental crises, of the sort that are constantly unfolding all around us, tend not to produce policy outcomes of this punitive variety.").

152. Zygmunt J.B. Plater, *The Exxon Valdez Resurfaces in the Gulf of Mexico . . . and the Hazards of "Megsystem Centripetal Di-Polarity"*, 38 B.C. ENVTL. AFF. L. REV. 391, 396 (2011).

Contrary to this possibility of transformation, however, energy disasters in the United States generally have not caused the kind of reflection and drastic course correction Professor Plater advocates. True, events like Love Canal, Three Mile Island, and the burning of the Cuyahoga River helped galvanize the environmental movement—symbolically at least<sup>153</sup>—in turn playing a role in environmental law’s “republican moment” of the late 1960s and early 1970s.<sup>154</sup> Environmental law long has held disasters out as talismans for action, change, and legal revolution. Overall, however, energy disasters have tended to produce results much like what Fukushima appears poised to yield: incremental ones. The *Exxon Valdez* disaster helped tighten liability for oil spills, but it did not lessen our dependence on oil.<sup>155</sup> The events following the explosion of *Deepwater Horizon* caused President Obama to halt offshore drilling, but in the face of intense political pressure, that ban too quickly faded.<sup>156</sup>

Focusing on disasters to shift the law’s broad sweep, moreover, can be dangerous. The constant need for an unending supply of disasters makes more troubling but less obvious problems appear less critical than they actually are. Requiring everything to sound in disaster in order to garner attention risks diluting the truth of when legal change is actually needed, especially if purported “disasters”

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153. See Jonathan H. Adler, *Fables of the Cuyahoga: Reconstructing a History of Environmental Protection*, 14 *FORDHAM ENVTL. L. REV.* 89, 91 (2002).

154. See, e.g., Daniel A. Farber, *Politics and Procedure in Environmental Law*, 8 *J.L. ECON. & ORG.* 59, 66 (1992); Michael P. Vandenbergh, *The Social Meaning of Environmental Command and Control*, 20 *VA. ENVTL. L.J.* 191, 212 (2001).

155. See, e.g., Sanne Knudsen, *A Precautionary Tale: Assessing Ecological Damages After the Exxon Valdez Oil Spill*, 7 *U. ST. THOMAS L.J.* 95 (2009); Jules Lobel & George Loewenstein, *Emote Control: The Substitution of Symbol for Substance in Foreign Policy and International Law*, 80 *CHI.-KENT L. REV.* 1045, 1075 (2005) (“The Exxon Valdez oil spill . . . was one of the worst environmental disasters in American history, inciting a nationwide public protest, a massive volunteer effort to assist in clean up, and the passage of the Oil Pollution Act . . . .”); Noël Wise, *Personal Liability Promotes Responsible Conduct: Extending the Responsible Corporate Officer Doctrine to Federal Civil Environmental Enforcement Cases*, 21 *STAN. ENVTL. L.J.* 283, 330 (2002) (“Congress swiftly enacted the Oil Pollution Act of 1990 in response to the massive spill of approximately eleven million gallons of oil into Alaska’s Prince William Sound from the *Exxon Valdez*, which has been widely viewed as one of the worst environmental disasters in history.”).

156. Oliver A. Houck, *Worst Case and the Deepwater Horizon Blowout: There Ought to Be a Law*, 24 *TUL. ENVTL. L.J.* 1, 11 (2010); Peter Baker & John M. Broder, *White House Lifts Ban on Deepwater Drilling*, *N.Y. TIMES*, Oct. 13, 2010, at A1, available at <http://www.nytimes.com/2010/10/13/us/13drill.html>.

turn out not to be. And overemphasizing disasters gambles with energy policy's future—pushing the law in ways that are neither optimal nor efficient, in directions attuned more to the flashy than the essential. As Professor Jim Rossi has astutely observed, “Legislation in reaction to a crisis . . . does not guarantee the public a comprehensive, sound, and sustainable energy policy.”<sup>157</sup>

This is as true for nuclear energy policy as it is for other areas of energy law, despite the enormous risks that the use of atomic power presents. It can be seen, indeed, in how the United States, Japan, and even Germany responded to Fukushima's demise.

U.S. regulators, as noted, seized on improving safety post-Fukushima—specifically, to avoid the exact problems that TEPCO encountered and their possible corollaries in U.S. plants.<sup>158</sup> The NRC task force's recommendations, for instance, urged regulations to account for a prolonged total loss of station power at nuclear facilities, to anticipate the possibility of multiple natural disaster events, and to assure that there will not be venting problems with the reactor type used both in Daiichi and here in the United States, the GE Mark I.<sup>159</sup> These recommendations said nothing about what nuclear power's role in the United States should be after Fukushima. Even in the face of a tragedy as horrific as this, U.S. regulators and policymakers appear to have followed the traditional American path for responding to disasters. They have resisted the temptation to make big, long-lasting changes in response to a high profile event.

The Japanese response revealed a similar paradigm, though perhaps somewhat less pointedly. Attempting a Merkel-like maneuver to use an anti-nuclear stance to preserve his own political power, Prime Minister Kan declared the end of atomic energy in Japan after Fukushima.<sup>160</sup> Yet this did not last. Kan was ousted, and his successor took a far more measured approach. Nuclear utilization may not grow in Japan, new Prime Minister Noda acknowledged, but it was not going away either.<sup>161</sup> For a heavily populated island

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157. Jim Rossi, *Lessons from the Procedural Politics of the “Comprehensive” National Energy Policy Act of 1992*, 19 HARV. ENVTL. L. REV. 195, 239 (1995).

158. See *supra* Part III.B. Perhaps this should not be surprising. It is not uncommon, after all, that a “big accident becomes a laboratory for studying how to prevent the next one.” Osnos, *supra* note 17, at 52.

159. See *supra* notes 123–127 and accompanying text.

160. See *supra* Part III.C.

161. See *supra* Part III.C.

nation lacking sufficient indigenous energy resources, nuclear power simply plays too important a role in electricity supply to just recede away.

Even in Germany's anti-nuclear response, some resistance to transforming the law's path in reaction to a single event came through. True, the German government seized on Fukushima as a chance to eliminate nuclear power from the scene,<sup>162</sup> but that was hardly the end of the story. Germany was able to make this choice only because of its surging renewable energy production<sup>163</sup> and because, prior to making the decision, it boasted substantial excess generation capacity that it exported to other parts of Europe.<sup>164</sup> With the nuclear ban in place, those exports went away; blackouts became a real threat that could not just be brushed aside; huge infrastructure investments became immediately necessary; and stopgap measures to bide time—including relying on nuclear power from other nations—became unavoidable.<sup>165</sup> Germany was willing to make this gamble, but there were no illusions that it was not rolling the dice.

What explains the heavy resistance to fundamentally altering the law in response to headline-grabbing energy disasters? There is a common thread running through each of these nation's reactions to Fukushima: the critical role that supply stability, its abundance, and economic performance play in energy policy. To a large degree, this is why the United States, with nuclear energy constituting nearly twenty percent of its generating portfolio,<sup>166</sup> did not meaningfully weigh phasing nuclear energy out. It is why in Japan, with a thirty percent nuclear electric fleet,<sup>167</sup> Prime Minister Noda so quickly reversed Prime Minister Kan's stance. It is why in Germany Jürgen Grossmann called the nation's nuclear ban an "experiment on ourselves."<sup>168</sup>

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162. See *supra* Part III.A.

163. See *supra* note 83 and accompanying text.

164. See Helen Pidd, *Germany to Shut All Nuclear Reactors*, GUARDIAN (May 30, 2011, 2:18 PM), <http://www.guardian.co.uk/world/2011/may/30/germany-to-shut-nuclear-reactors>.

165. See *Germany Could Restart*, *supra* note 108; *supra* text accompanying note 110.

166. Energy Info. Admin, U.S. Dep't of Energy, *Electricity in the United States*, EIA.GOV (July 21, 2011), <http://tinyurl.com/3lyuzsa>.

167. Hiroko Tabuchi, *Japan Premier Wants Shift Away from Nuclear Power*, N.Y. TIMES, July 14, 2011, at A6, available at <http://www.nytimes.com/2011/07/14/world/asia/14japan.html>.

168. Rosenthal, *supra* note 77, at A1.

These three nations' respective responses to Fukushima thus expose a larger truth about energy law and policy itself. They do so through the perspective of nuclear energy. Admittedly, the atomic lens yields a distorted image. It is skewed by numerous factors that are not present, or are not nearly as prominent, in other energy realms.<sup>169</sup> Nevertheless, the nuclear view of energy policy lays bare a dominant trait of virtually every aspect of U.S. energy law: assuring energy supplies, as an overarching objective of energy policy, tends to reign. Even in disasters as dramatic as Fukushima, with the world watching on live television as one percent of the global nuclear

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169. Nuclear power, for instance, packs heavy historical baggage. Its use conjures heavily symbolic images of its origins: flashing explosions in the dead night of the American West's deserts, downwinders and Native Americans burdened by those tests and the extraction of uranium for them, and mushroom clouds over Hiroshima and Nagasaki. *See generally, e.g.*, MICHAEL A. AMUNDSON, *YELLOWCAKE TOWNS: URANIUM MINING COMMUNITIES IN THE AMERICAN WEST* (2002); STEPHANIE COOKE, *IN MORTAL HANDS: A CAUTIONARY HISTORY OF THE NUCLEAR AGE* (2009); *THE ATOMIC WEST* (Bruce Hevly & John M. Findlay eds., 1998); CHIP WARD, *CANARIES ON THE RIM: LIVING DOWNWIND IN THE WEST* (1999); John M. Findlay, *The Nuclear West: National Programs and Regional Continuity Since 1942*, 24 J. LAND RESOURCES & ENVTL. L. 1 (2004); Don Hancock, *The Nuclear West: Which Road to the Future?*, 24 J. LAND RESOURCES & ENVTL. L. 29 (2004). As Fukushima itself makes clear, nuclear power also presents environmental and health risks on a scale unimaginable for other energy sources. And nuclear's silence and invisibility complicate the picture: neighbors of a coal plant may not know what precisely the smoke billowing from the facility will do to their health, but they can see it. Radiation cannot be comprehended in the same way. *See generally* SPENCER R. WEART, *NUCLEAR FEAR* (1988). *See also* Jorge Contreras, *In the Village Square: Risk Misperception and Decisionmaking in the Regulation of Low-Level Radioactive Waste*, 19 *ECOLOGY L.Q.* 481, 500-03 (1992) (noting fear of radioactivity generally); Amanda Leiter, *The Perils of a Half-Built Bridge: Risk Perception, Shifting Majorities, and the Nuclear Power Debate*, 35 *ECOLOGY L.Q.* 31, 48-63 (2008) (assessing the role that risk perception might play on the utilization of nuclear energy technology). At the same time, nuclear power also lacks, or lacks in pertinence, concerns critical for other energy sources. Despite its potentially catastrophic consequences, the nuclear industry boasts a safety record that is the envy of other energy producers. *E.g.*, JOHN M. DEUTCH ET AL., *UPDATE OF THE MIT 2003 FUTURE OF NUCLEAR POWER: AN INTERDISCIPLINARY MIT STUDY 10* (2009), <http://web.mit.edu/nuclearpower/pdf/nuclearpower-update2009.pdf>; U.S. DEP'T OF ENERGY, *NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ROADMAP* vi (2010), [http://nuclear.gov/pdfFiles/NuclearEnergy\\_Roadmap\\_Final.pdf](http://nuclear.gov/pdfFiles/NuclearEnergy_Roadmap_Final.pdf). It has a smaller land consumption footprint than other energy sources. Clinton J. Andrews, *Does the Fukushima Accident Significantly Increase the Nuclear Footprint?*, *ELECTRICITY J.*, July 2011, at 36, 39 ("[A]lthough nuclear is still ahead in the land-intensiveness game, its lead may not last. One more major accident in the next 20 years is all it will take to make nuclear as land-intensive as solar . . ."). It likewise has earned the moniker of a "clean" energy source, at least in many camps, because of its meager climate change impacts. *See generally, e.g.*, Fred Bosselman, *The Ecological Advantages of Nuclear Power*, 15 *N.Y.U. ENVTL. L.J.* 1 (2007); Bentley Mitchell, Note, *Diffusing the Problem: How Adopting a Policy to Safely Store America's Nuclear Waste May Help Combat Climate Change*, 28 *J. LAND RESOURCES & ENVTL. L.* 375 (2008).

capacity goes up in smoke, supply's dominance in energy policy shines through.

To understand how controlling this policy goal can be, deeper examination of the idea of supply in energy law is necessary. To embark on this exploration, a metaphor, and two ensuing conceptions of U.S. energy law, prove useful.

#### *A. A Metaphor*

The very idea of nuclear energy provides a helpful metaphor for considering energy law and its conventions. Although, as with any metaphor, the equation of nuclear power with energy law is not a perfect one, this metaphor does offer an effective way of simplifying, and thus thinking about, both how energy law operates and what critiques are lodged against it.

In severely oversimplified terms, nuclear energy works this way: Enriched uranium pellets are loaded into thin metal rods. Those rods are then organized into a reactor core, typically hexagonal or rectangular in shape. Inside the reactor core, neutrons strike uranium-235 atoms, which then split the atoms into lighter elements and more neutrons. The released neutrons then strike other atoms, perpetuating the cycle: a chain reaction.<sup>170</sup> Importantly, this reaction also releases energy in the form of heat, which is used to warm water that, in turn, spins a turbine to create electricity.<sup>171</sup> Control rods made of boron, cadmium, and other materials that absorb neutrons are lowered and raised in and out of the core to control the speed of the chain reaction.<sup>172</sup>

Energy law itself might be thought of in terms of a nuclear reactor's function. In this metaphor, the reactor's fuel is energy law's driving force: the field's normative goals and policy objectives. The electricity produced by the reactor is the effect of how energy law is carried out: the field's impact on society. And the control rods, which limit how quickly the reactor's chain reaction occurs, are the constraints that energy law faces: the limits placed on the field's goals by other legal disciplines and political influence.

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170. Energy Info. Admin., U.S. Dep't of Energy, *Nuclear Explained*, EIA.GOV (June 6, 2011), [http://www.eia.gov/energyexplained/index.cfm?page=nuclear\\_home](http://www.eia.gov/energyexplained/index.cfm?page=nuclear_home).

171. *Id.*

172. *Id.* For a pictorial representation of the process, see Energy Info. Admin., U.S. Dep't of Energy, *Nonrenewable: Uranium (nuclear)*, EIA.GOV, [http://www.eia.gov/kids/energy.cfm?page=nuclear\\_home-basics](http://www.eia.gov/kids/energy.cfm?page=nuclear_home-basics) (last visited Dec. 1, 2011).

This representation of how energy law works, metaphorical as it is, proves useful because it offers a way of considering the role that disasters play in shaping our energy choices. Policy proposals, including those inspired by disasters, may ultimately change the kind of reaction that is happening in the power plant's reactor core. But in doing so, the proposal inevitably will be shaped by the fuel firing that core. Unless the proposal changes the fuel itself, the power plant continues to produce electricity in the same manner it always has, through a radioactive chain reaction.

Different nuclear power plants use different mechanisms for producing electricity, of course. The two dominant methods employed in the United States are boiling water reactors and pressurized water reactors.<sup>173</sup> Challenges to the prevailing model of energy law thus might also suggest not simply a change in fuel type but also in reactor methodology—not only in substance but in process too.

Part V takes up both types of critiques lodged against energy law today—substantive and procedural. First, however, it is important to understand how energy law functions.

### *B. Energy Law: A Simplified Conception*

One, perhaps simplified, conception of how U.S. energy law works is that its metaphorical reactor core is filled with three fuel types: a trilogy of energy aims. They are for our energy policy to achieve an (1) abundant, (2) secure, and (3) inexpensive supply of energy. American energy policy often is expressed this way. “A fundamental objective of U.S. energy policy,” Allan Wendt told Congress twenty-five years ago, “is to assure an adequate supply of energy at reasonable cost while avoiding undue dependence on any

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173. U.S. NUCLEAR REGULATORY COMM'N, REACTOR CONCEPTS MANUAL 1-10, <http://www.nrc.gov/reading-rm/basic-ref/teachers/01.pdf>.

single fuel or supplier.”<sup>174</sup> In the quarter century since, little has changed.

In this conception of energy law, the field’s three aims operate to produce a mutually optimal result. That is, the reactor seeks to maximize each of the goals simultaneously. If it cannot, then an abundance of a supply tends to dominate, with price being maximized secondarily and security third. Such an ordering might occur where the three objectives of energy law compete—where, for instance, one choice might yield a supply that is more abundant or secure than another but that is also more expensive. Thus, policy proposals in the field of energy law generally seek to maximize these aims.<sup>175</sup>

Fukushima illustrates this. If the disaster at Fukushima is considered (again, in oversimplified terms) to be the neutron that starts the reactor’s chain reaction—in other words, a policy proposal seeking to change energy law’s results—the effect it produces must bear the marks of the reactor’s fuel. It will come forth only after passing through the core’s controlling normative objectives. Consequently, U.S. energy law’s incremental response to the disaster is wholly unsurprising.<sup>176</sup> For a U.S. system focused so heavily on energy availability, proposals like Germany’s to eliminate nuclear power would affect supply abundance too dramatically to have any

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174. E. Allan Wendt, *The Oil Market and U.S. Energy Security*, 86 DEP’T ST. BULL. 51, 53 (statement made before the Senate Committee on Energy and Natural Resources, Mar. 25, 1986); see also *National Energy Strategy: A New Start: Hearing before the Subcomm. on Energy and Power of the H. Comm. on Energy and Commerce*, 102d Cong. 10 (1991) (statement of Daniel Yergin noting national energy policy objectives of “cheap energy, secure energy, and clean energy”); PEW CTR. ON GLOBAL CLIMATE CHANGE, INNOVATIVE POLICY SOLUTIONS TO GLOBAL CLIMATE CHANGE 9, available at [http://www.pewclimate.org/docUploads/energy\\_policy\\_brief.pdf](http://www.pewclimate.org/docUploads/energy_policy_brief.pdf) (“While U.S. energy policy has many sources, forms, and influences, it is nevertheless possible to identify four traditional objectives on which U.S. energy policy has focused: (1) a secure, plentiful, and diverse primary energy supply; (2) a robust, reliable infrastructure for energy conversion and delivery; (3) affordable and stable energy prices; and (4) environmentally sustainable energy production and use.”); Michael W. Grainey, *Recent Federal Energy Legislation: Toward a National Energy Policy at Last?*, 12 ENVTL. L. 29, 34 (1981) (“Among the Department of Energy’s responsibilities . . . [is] the assurance of an adequate and reliable supply of energy at the lowest reasonable cost.”).

175. Cf. Chandler L. Van Orman, *The National Energy Strategy—An Illusive Quest for Energy Security*, 13 ENERGY L.J. 251, 254 (1992) (“While energy security, which by definition includes reasonable price maintenance, historically tops every administration’s list of national objectives, the methods of achieving this nirvana have constantly shifted.”).

176. See, e.g., Amory B. Lovins, *Energy Strategy: The Road Not Taken?*, 55 FOREIGN AFF. 65, 65–66 (1976) (noting U.S. energy policy’s reliance on “incremental past practices” rather than “long-term goals”).

salience domestically. Instead, the kind of suggestions that tend to prevail in the United States are those that do not harm supply at all, and that foster greater security while raising price only marginally, if at all.<sup>177</sup> That, of course, is exactly what U.S. regulators have suggested in Fukushima's wake: make U.S. nuclear plants safer, so they keep supplying electricity just as much as they do today.<sup>178</sup>

Manifestations of this simplified model can be seen at multiple turns in American energy law. Utilities' duty to serve is a foremost example. Historically, the pact that utilities have made in exchange for an exclusive service territory is to provide energy to any and all customers in that area. The assumption is that the level of energy demand in the territory is irrelevant because the supply the utility provides will be abundant and secure. The law compels utilities to abide by energy policy's overarching objectives—including to assure abundant power supplies. As courts have repeatedly held, “[T]he term ‘public utility’ implies a public use, carrying with it the duty to serve the public and treat all persons alike, without discrimination, and it precludes the idea of service which is private in its nature, whether for the benefit and advantage of a few or of many . . . .”<sup>179</sup>

Another manifestation of the model is unitization. Although the law today leaves petroleum markets largely to their own devices,

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177. See, e.g., Thomas C. Jepperson & Michael B. McGinley, *The “Marketable Location” Rule and Energy Policy Considerations*, 24 J. LAND RESOURCES & ENVTL. L. 323, 326 (2004) (“During the 1970s, chronic natural gas shortages led to an overhaul of federal energy policy with the passage of the Natural Gas Policy Act of 1978 (NGPA) and the creation of the Federal Energy Regulatory Commission (FERC). One of FERC’s primary objectives was to foster a competitive gas supply system . . . . Underlying this objective was the belief that if price signals could be clearly and timely transmitted between buyers and sellers, market economics would assure an adequate supply of natural gas to meet market demand.”); Joseph T. Kelliher & Maria Farinella, *The Changing Landscape of Federal Energy Law*, 61 ADMIN. L. REV. 611, 622 (2009) (“Energy policy seeks to assure that the United States has an adequate electricity supply to meet the needs of consumers and a growing economy and that the price of that electricity is just and reasonable. Energy policy may also encourage fuel diversity in our electricity supply mix.”); Scott H. Segal, *Fuel for Thought: Clean Gasoline and Dirty Patents*, 51 AM. U. L. REV. 49, 76 (2001) (“[F]ederal antitrust policy also underscores the objective of protecting consumer welfare through maintaining adequate energy supply and reasonable prices.”); David M. Smolin, *The Paradox of the Future in Contemporary Energy Policy: A Human Rights Analysis*, 40 CUMB. L. REV. 135, 172 (2009) (“Conventional energy policy seeks to facilitate an adequate supply of energy at a low price in order to facilitate economic activity and growth.”).

178. See *supra* Part III.B.

179. *Devon-Aire Villas Homeowners Ass’n, No. 4 v. Americable Assocs., Ltd.*, 490 So. 2d 60, 63 (Fla. Dist. Ct. App. 1985) (quoting *Higgs v. City of Fort Pierce*, 118 So. 2d 582, 585 (Fla. Dist. Ct. App. 1960)).

where it does interfere, it generally does so to amplify supplies. This is the case with oil and gas unitization. Through unitization, disparate ownership tracts overlying a common pool resource such as oil or gas are treated as a single unit, with the royalties from extraction divided proportionally. The idea is that managing the pool as one will be more effective at extracting the resource than allowing multiple entities to withdraw individually, which might reduce overall field pressure and thus decrease the total amount of resource ultimately removed.<sup>180</sup> The idea, in other words, is to maximize supply by avoiding waste. The Kansas Supreme Court has explained:

It is now common knowledge that this tired old world of ours, and our country in particular, is faced with the frightening and progressive energy crisis due principally to a shortage of petroleum reserves. . . . Under these severe conditions we feel that it is incumbent on all persons . . . to assist in the preservation and conservation of our natural petroleum resources including production methods which will minimize waste.

Pooling and unitization are basically conservation measures adopted either by forced regulation in some states or by voluntary agreement. . . . The primary purpose of unitized operations is to permit proper and maximum development of the unit lands without reference to ownership boundaries and with a minimum of waste.<sup>181</sup>

A third example comes from a more recent change in energy law. In the summer of 2003, approximately fifty million people in New York, Pennsylvania, Ohio, Michigan, and Ontario lost power as a result of cascading transmission and generation failures: an unprecedented blackout.<sup>182</sup> Partially in response to this event, the Energy Policy Act of 2005 (“EPAAct 2005”) gave the Federal Energy Regulatory Commission (“FERC”) authority to oversee the reliability of the United States’ bulk transmission system.<sup>183</sup> Notably,

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180. *E.g.*, Owen L. Anderson & Ernest E. Smith, *Exploratory Unitization Under the 2004 Model Oil and Gas Conservation Act: Leveling the Playing Field*, 24 J. LAND RESOURCES & ENVTL. L. 277, 280–83 (2004).

181. *Classen v. Fed. Land Bank of Wichita*, 617 P.2d 1255, 1262 (Kan. 1980).

182. *See generally* U.S.-CANADA POWER SYSTEM OUTAGE TASK FORCE, FINAL REPORT ON THE AUGUST 14, 2003 BLACKOUT IN THE UNITED STATES AND CANADA: CAUSES AND RECOMMENDATIONS (April 2004), <https://reports.energy.gov/BlackoutFinal-Web.pdf>.

183. FERC regulates hydropower under Part I of the FPA and electricity rates under Sections 205 and 206 of Part II. *See* 16 U.S.C. §§ 792–824w (2006).

this bestowal of authority did not take place until eighty-five years after Congress created FERC's predecessor, the Federal Power Commission. That is, for nearly a century, federal electricity law focused on other areas, including supply through hydropower regulation and price through FERC's control of just and reasonable wholesale electricity prices.<sup>184</sup> Only after a crisis forced transmission reliability to the forefront did federal law take up the question of transmission security. And then the response to the disaster of the 2003 blackouts was very much like that to Fukushima. Rather than asking broader questions about the state of the nation's transmission system—including whether massive new capacity was needed or how to solve the problem of siting lines in a NIMBY world<sup>185</sup>—the authority granted by EAct 2005 hewed closely to the proximate cause of the disaster. It gave FERC power to certify an “electric reliability organization” that would enforce operating standards, not the authority to reassess the structure of the transmission system altogether.<sup>186</sup> Incrementalism prevailed.

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184. *See id.* § 824p.

185. *See generally, e.g.*, Steven Ferrey, JAMES A. HOLTKAMP & MARK A. DAVIDSON, TRANSMISSION SITING IN THE WESTERN UNITED STATES (2009), <http://tinyurl.com/743pmjx>; *Restructuring a Green Grid: Legal Challenges to Accommodate New Renewable Energy Infrastructure*, 39 ENVTL. L. 977 (2009); Joshua P. Fershee, *Misguided Energy: Why Recent Legislative, Regulatory, and Market Initiatives Are Insufficient to Improve the U.S. Energy Infrastructure*, 44 HARV. J. ON LEGIS. 327 (2007); Jim Rossi, *The Trojan Horse of Electric Power Transmission Line Siting Authority*, 39 ENVTL. L. 1015 (2009). “NIMBY” refers to the “not in my backyard” phenomenon—that although everyone benefits from facilities such as electrical transmission lines, no community prefers to have them sited locally. Some critics of NIMBYism suggest that it is one factor causing the overburdening of minority and lower income communities with environmental harms. *See generally, e.g.*, Michael B. Gerrard, *The Victims of NIMBY*, 21 FORDHAM URB. L.J. 495 (1994).

186. The authority granted to FERC in the 2005 Act, however, is rather circumscribed. One commentator has summarized:

To be sure, the law did not grant FERC plenary power to site transmission facilities with no state involvement. The agency can only issue a siting permit in areas designated as “National Interest Electric Transmission Corridors” by the Department of Energy (based on transmission congestion) and then only if a state where the transmission facilities are to be located either does not have authority to approve their siting (or to consider the interstate benefits of the project), has such authority but has withheld approval for more than one year, or approved the project with unreasonable conditions.

Jeffery S. Dennis, *Twenty-Five Years of Electricity Law, Policy, and Regulation: A Look Back*, 25 NAT. RESOURCES & ENV'T 33 (2010); *see also* *Piedmont Envtl. Council v. FERC*, 558 F.3d 304 (4th Cir. 2009), *cert. denied*, U.S. No. 09-343 (Jan. 19, 2010). This limited authority has been cited as one impediment to clean energy development in the United States. In addition, a recent decision by the Seventh Circuit, *Illinois Commerce Comm'n v. FERC*, 576 F.3d 470,

In these examples and others, energy law's priority on supply shines through. This simple conception of energy law thus appears to answer the question of why disasters only nudge the law rather than transform it. It also demonstrates how a focus on disasters as a catalyst for legal change perpetuates that incrementalism: even tragedies as striking as Fukushima can be "solved" by adding new legal safeguards that address the specific issue that led to the disaster, without ever weighing the root causes and systemic conditions that made the disaster possible in the first instance.

What this model of energy policy does not answer, however, is why the law does not focus on more abundant resources than those that presently dominate our energy consumption. Renewable resources such as the sun, wind, and waves are far more abundant than any nonrenewable resource we use today. If supply is king, why does the law not push society harder to harness these resources, which offer both a more abundant and a more secure energy supply than oil, gas, coal, and nuclear combined? To answer that question, a slightly more complex conception of energy law is required.

### *C. Energy Law: A Fuller Conception*

Two decades ago, Professor Joseph Tomain delineated this competing, fuller conception of energy law.<sup>187</sup> In his view, energy law's reactor core does not contain three fuel types but six. Tomain posited that this "dominant paradigm" of energy policy does not seek simply to maximize supply, price, and security in that order, but rather, aims to maximize supply and price simultaneously—and that it does so in a very specific way.<sup>188</sup> As Tomain noted, energy policy in the United States emphasizes established, archetype fuels and firms as a way to ensure supply, abundance, and security. It then relies primarily on markets to guarantee efficiencies in cost:

Domestic energy policy from the late nineteenth century to the present is based on the fundamental assumption that a link exists between the level of energy production and the gross national product. . . . As a consequence, domestic energy policy favors

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476 (7th Cir. 2009), has been singled out as an impediment to getting renewables onto the grid. *See, e.g.*, Hannah Wiseman et al., *supra* note 12, at 859.

187. Joseph P. Tomain, *The Dominant Model of United States Energy Policy*, 61 U. COLO. L. REV. 355, 374 (1990).

188. *Id.*

large-scale, high-technology, capital-intensive, integrated, and centralized producers of energy from fossil fuels. These archetype energy firms are favored over alternatives such as small solar or wind firms because energy policymakers believe that the larger firms can continue to realize economies of scale. . . . This belief may or may not be true. Nevertheless, it persists . . . . Thus, the dominant energy policy has the following general goals:

- (1) to assure abundant supplies;
- (2) to maintain reasonable prices;
- (3) to limit the market power of archetype firms;
- (4) to promote inter- and intrafuel competition;
- (5) to support a limited number of conventional fuels (oil, natural gas, coal, hydropower, and nuclear power); and,
- (6) to allow energy decisionmaking and policymaking to develop within an active federal-state regulatory system.<sup>189</sup>

Plainly, Professor Tomain was describing how energy policy actually functions, not what he would like it to become.<sup>190</sup> Nevertheless, his conception of energy policy is important because it explains the field's lack of emphasis on renewables. Many of the technologies that use those resources are not as well established as fossil fuel technologies—they are not conventional fuels—and they generally have higher marginal costs than incumbent facilities—so they lose out to other options in the marketplace on which the dominant paradigm traditionally has relied.

Tomain's conception of energy law also is consistent with our understanding of why disasters like Fukushima do not move the law very far. In fact, his conception may offer an even better explanation of this phenomenon than the more simplified version. As with the simpler conception, the meltdown at Fukushima should not fundamentally change energy law under Professor Tomain's model, because doing so would be inconsistent with the objective of assuring a secure (here, already existing in the nuclear fleet) and abundant (again, already existing in the provision of twenty percent

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189. *Id.* at 374–76.

190. *Cf.* JOSEPH P. TOMAIN, ENDING DIRTY ENERGY POLICY: PRELUDE TO CLIMATE CHANGE 243 (2011) (“Our energy future no long resides in fossil fuels; it resides in a substantial ramping up of energy efficiency and renewable resources.”).

of American electricity) supply of power. Unlike the simpler model, however, the model laid bare by Professor Tomain also helps explain why, in the wake of Fukushima, Germany abandoned nuclear power entirely and Japan at least weighed the option, but the United States did not even put the option on the table. Ditching nuclear to go heavily renewable as Germany did violates multiple additional pillars of Tomain's framework, including the tendency to rely on a few conventional fuels and archetype firms. The simpler model lacks these pillars. Culture, moreover, matters in shaping those pillars. The energy culture of the United States is different than Germany's; we emphasize archetype fuels while they increasingly favor renewables.<sup>191</sup> In Tomain's fuller conception of American energy policy, in other words, the German option is a chain reaction the U.S. energy policy reactor cannot produce.

Still, the model described by Tomain does not account for a growing area of energy law that, facially, appears to undermine this six-pronged concept. In 1978, Congress adopted the Public Utility Regulatory Policies Act ("PURPA"),<sup>192</sup> which affirmatively sought to counteract the dominance of large, vertically integrated, incumbent electricity suppliers and their reliance on traditional fuels. PURPA required utilities to purchase power from smaller—and renewable—generators at premium prices, referred to in the statute as "avoided cost" rates.<sup>193</sup> Likewise, since the 1990s, there has been an explosion of state laws promoting renewable generation.<sup>194</sup> These laws, generically referred to as renewable portfolio standards, or "RPSs," compel electric utilities to provide a given percentage of

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191. Germany has used an aggressive "feed-in" tariff to promote renewable energy for years now. See *supra* note 83 and accompanying text. By contrast, the United States has proposed a national renewable portfolio standard literally dozens of times—and never succeeded in passing it. See Lincoln L. Davies, *Power Forward: The Argument for a National RPS*, 42 CONN. L. REV. 1339, 1365 (2010); Mary Ann Ralls, *Congress Got It Right: There's No Need to Mandate Renewable Portfolio Standards*, 27 ENERGY L.J. 451, 452 n.11 (2006).

192. Pub. L. No. 95-617, § 2, 92 Stat. 3117, 3119 (codified as amended in scattered sections of titles 7, 15, 16, and 30 U.S.C.).

193. 16 U.S.C. §§ 796(17), 824a-3(a).

194. See, e.g., Lincoln L. Davies, *Is There a "Race," and Is It "To the Top"?*, 3 SAN DIEGO J. CLIMATE & ENERGY L. (forthcoming 2011) (unpublished manuscript on file with author); BARRY G. RABE, PEW CTR. GLOBAL CLIMATE CHANGE, RACE TO THE TOP: THE EXPANDING ROLE OF U.S. STATE RENEWABLE PORTFOLIO STANDARDS 7 (2006), available at <http://www.pewclimate.org/docUploads/RPSReportFinal.pdf>.

their sales from renewable-based generators.<sup>195</sup> Nearly three quarters of states now have these laws on the books.<sup>196</sup>

PURPA and RPSs both seem like ill fits with Tomain's conception of U.S. energy policy. Both force adoption of more expensive technologies. Both promote nontraditional fuels, often from non-archetype firms. And both meddle in markets by changing the decisions that utilities would make but for the laws. Do these counterparts disprove his model?

One answer is that the model described by Tomain is too rigid and that the simpler, three-part conception more accurately encompasses the whole of energy law and the flexibility that such a broad scope implies. Tomain's model, in other words, might accurately describe U.S. energy policy in some but not in all instances. Given the intransigence of archetype fuels and energy firms over the last 100 years, however, this explanation seems unlikely. Despite laws like PURPA and RPSs, our nation continues to rely heavily on fossil and other nonrenewable fuels.<sup>197</sup> In that light, laws like PURPA and RPSs come across more as anomaly than as customary.

Returning, however, to the reactor core metaphor may offer an alternate view that allows for Tomain's conception to coexist with renewables-promotion and other such energy laws that do not fit perfectly within its six-pronged framework. Seeing the question this way, laws like PURPA and RPSs are not traditional energy laws as such. Rather, they represent a gradual evolution in modern energy policy in which historical energy law aims have begun to meld with environmental objectives.<sup>198</sup> That is, these laws do not just try to assure abundant, cheap, and secure supplies of archetype fuels but demand also that environmental impacts be simultaneously

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195. See, e.g., Cal. S.B.X1-2 (2001), amending CAL. PUB. UTIL. CODE § 399.15(b)(2)(B); MD. CODE ANN., TRANSP. § 7-703(b)(17) (West 2011); N.C. GEN. STAT. § 62-133.8(b) (2011).

196. See *RPS Policies*, DSIRE (Feb. 2011), [http://www.dsireusa.org/documents/summarymaps/RPS\\_map.pptx](http://www.dsireusa.org/documents/summarymaps/RPS_map.pptx).

197. Lincoln L. Davies, *Energy Policy Today and Tomorrow—Toward Sustainability?*, 29 J. LAND RESOURCES & ENVTL. L. 71, 75 (2009).

198. See, e.g., Davies, *supra* note 191, at 1390-96; Jim Rossi, *The Limits of a National Renewable Portfolio Standard*, 42 CONN. L. REV. 1425, 1447 (2010). See generally Lincoln L. Davies, *Alternative Energy and the Energy-Environment Disconnect*, 46 IDAHO L. REV. 473 (2010) [hereinafter Davies, *Alternative Energy*]; Amy J. Wildermuth, *Is Environmental Law a Barrier to Emerging Alternative Energy Sources?*, 46 IDAHO L. REV. 509 (2010).

mitigated. As Professor Jim Rossi has noted, the merger of “the goals and regulatory tools [of] environmental and energy law . . . has been occurring over the past thirty years.”<sup>199</sup> Laws like PURPA and RPSs are one reflection of this.

In this view, then, the fuller model still prevails. The reactor fuel, so to speak, remains dictated by Tomain’s six-sided frame. It is only that laws like PURPA and RPSs constitute some of the control rods that are lowered into the core chamber to moderate the reaction. They infuse additional policy goals that constrain, but are not part and parcel of, the reactor fuel itself.

#### V. ENERGY FUTURES, NUCLEAR FUTURES: CRITIQUES AND REFORMATIONS

Thinking of energy law in terms of a nuclear reaction that produces an important social good—electricity—but that also risks devastating consequences—meltdowns—offers another benefit. It provides a platform for understanding the typology of both (1) the critiques that have been lodged against U.S. energy policy and (2) how the field might be reformed in light of those critiques. This Part summarizes those critiques and suggestions for reform. It concludes by returning to the example of Fukushima, assessing its likely impact on nuclear energy in general and on energy law in the United States specifically.

##### *A. Critiques*

The most prevalent critique of American energy law today is that it is unsustainable. By focusing on primarily short-term economic effects, the argument goes, energy law risks undermining the land, resources, and social, natural, and economic systems on which we rely. The critique is thus that energy law is short-sighted: that it overemphasizes the here and now at the cost of our future. This sustainability tack is the primary substantive critique on energy law. In addition, there are procedural criticisms as well.

##### *1. Substance*

Putting it in terms of our running metaphor, the unsustainability critique of energy law is that the reactor core is loaded with the

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199. Rossi, *supra* note 198, at 1447.

wrong kind of fuel. The solution is to swap out the existing fuel, comprised of the six-pronged dominant paradigm exposed by Professor Tomain, with a new power source that emphasizes not only immediate economic returns but also long-lasting human, economic, and ecological health. Professor Gary Bryner cast the choice this way:

If one begins with the assumption that economic growth is the primary imperative in American politics . . . then one must simply learn to live with and adapt to whatever ecological consequences occur. However, if one begins with the view that ecological sustainability is the primary political goal and a prerequisite for every other activity, then energy policy must be shaped in ways that are consistent with that overriding imperative.<sup>200</sup>

This unsustainability critique comes in two primary versions, one environmental and one economic. At its broadest, the environmental critique echoes the choice highlighted by Professor Bryner. It is that our unquenchable energy appetite threatens the natural systems on which we rely, yet energy law does little to reign in that appetite while simultaneously failing to account fully for the costs the appetite imposes on society.

This version of the critique is ubiquitous in the modern literature and current political debates,<sup>201</sup> most prominently in the form of calls for climate change regulation.<sup>202</sup> The critique, however, runs more broadly than climate change alone, for as much as some might want to make energy policy become climate policy, it is not. Energy policy, whether “clean” or not, by necessity must remain much broader than the single question of climate. As Professor Amy Wildermuth recently observed,

The question [is] how we can craft an energy strategy that takes into account both our energy needs and the environmental

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200. Bryner, *supra* note 9, at 342.

201. See generally, e.g., TOMAIN, *supra* note 190; John C. Dernbach et al., *Progress Toward Sustainability: A Report Card and a Recommended Agenda*, 39 ENVTL. L. REP. NEWS & ANALYSIS 10,275, 10,278 (2009); Irma S. Russell, *The Sustainability Principle in Sustainable Energy*, 44 TULSA L. REV. 121 (2008).

202. See generally, e.g., Ned Farquhar, *Energy, Security, Climate: Converging Solutions*, 29 J. LAND RESOURCES & ENVTL. L. 1 (2009); Victor B. Flatt, *Adapting Energy and Environmental Policy for Climate Change*, 11 VT. J. ENVTL. L. 655 (2010); Mark E. Rosen, *Energy Independence and Climate Change: The Economic and National Security Consequences of Failing to Act*, 44 U. RICH. L. REV. 977 (2010).

consequences of each energy source. Given that all energy begins as a natural resource of some kind . . . it would make sense to attempt to balance energy production's environmental impacts with questions of the energy's cost and availability.<sup>203</sup>

The economic version of the unsustainability critique is that energy law is inefficient. One way energy law might be inefficient is by ignoring the long-term depletion of resources, and thus, not preparing society for what is sure to be a very bumpy transition to new fuels.<sup>204</sup> The retort, of course, is that the market will correct itself—that once fuels become sufficiently scarce, their price will increase and the incentive to switch to (and to innovate) new technologies that can counteract the trend will rapidly occur. Nevertheless, advocates, for instance, of addressing peak oil<sup>205</sup> insist that the current system allows the intransigence of archetype fuels too long, and that it extends their natural life through subsidies, favoritism, and other mechanisms.<sup>206</sup>

Alternatively, the economic critique of energy law suggests that the system is inefficient because it is too “large.” These arguments, made famous by Amory Lovins, contend that our very energy infrastructure should be reshaped to allow for smaller, more

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203. Amy J. Wildermuth, *The Next Step: The Integration of Energy Law and Environmental Law*, 31 UTAH ENVTL. L. REV. 369, 379 (2011).

204. See, e.g., Marc B. Mihaly, *Recovery of a Lost Decade (or Is It Three?): Developing the Capacity in Government Necessary to Reduce Carbon Emissions and Administer Energy Markets*, 88 OR. L. REV. 405, 431–33 (2009); Evan N. Turgeon, *Triple-Dividends: Toward Pigovian Gasoline Taxation*, 30 J. LAND RESOURCES & ENVTL. L. 145, 150–55 (2010).

205. Peak oil can be defined as the point when “worldwide, long-term oil production will follow the famous ‘Hubbert curve’ and thereafter inevitably decline.” Jacqueline Lang Weaver, *The Traditional Petroleum-Based Economy: An “Eventual” Future*, 36 CUMB. L. REV. 505, 508 (2006). The debate over when peak oil will occur (or whether it already has) can be fierce, but there is an emerging consensus that it is a problem that should be addressed. Cf., e.g., Joshua P. Fershee, *Struggling Past Oil: The Infrastructure Impediments to Adopting Next-Generation Transportation Fuel Sources*, 40 CUMB. L. REV. 87, 88 n.9 (2010) (“Although the concept of Peak Oil is not universally accepted, ‘one must accept Peak Oil as a working hypothesis while respecting the competing analyses that have been espoused by others.’” (quoting Richard D. Cudahy, *The Bell Tolls for Hydrocarbons: What's Next?*, 29 ENERGY L.J. 381, 387 (2008))); Diana M. Liebmann, *Recent Developments in Texas and United States Energy Law*, 4 TEX. J. OIL GAS & ENERGY L. 363, 436 (2009) (“Peak oil is a hotly debated topic, but no matter where one stands on this issue, there are reasons to expect that the supply in the U.S. will not meet the growing pace of demand.”).

206. See generally, e.g., KENNETH S. DEFFEYES, *BEYOND OIL: THE VIEW FROM HUBBERT'S PEAK* (2005); PAUL ROBERTS, *THE END OF OIL: ON THE EDGE OF A PERILOUS NEW WORLD* (2005).

distributed, “softer” energy paths.<sup>207</sup> They suggest, among other things, that we waste huge amounts of energy by moving it long distances from central power stations to load centers, and that by moving generation closer to home, the delivery of electricity would be both less costly and more environmentally sensible.<sup>208</sup> In any case, they acknowledge that to pursue this kind of more efficient energy system, we also need a different energy law—a new kind of reactor fuel.

## 2. Procedure

Finally, some commentators have critiqued not only energy law’s goals but also its process—not just of the reactor fuel itself but also of the way the reactor produces electricity.

One emerging critique on this front is that energy law fails to coordinate with environmental law as well as it should.<sup>209</sup> In the alternative energy context, for instance, energy law and environmental law often work at cross-purposes.<sup>210</sup> Advancing renewable energy technologies simultaneously reduces pollution and enhances energy security; if pursued more vigorously, it would advance the objectives of both fields. Yet to a large degree, energy law has failed to effect any real change on this front, the multiple state efforts at promoting renewables through RPSs and other measures notwithstanding. “[T]he fact that energy law and environmental law promote different goals clearly has restrained the adoption of more renewables. Both energy law’s focus on reliability and its emphasis on cost temper any incentive that environmental law might create for alternative energy production.”<sup>211</sup>

An undue emphasis on crises, or disasters, is itself another form of the process-based critique of energy law.<sup>212</sup> Energy law, like environmental law, tends to be “reactive in [its] approach.

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207. See generally AMORY B. LOVINS, *SOFT ENERGY PATHS: TOWARD A DURABLE PEACE* (1977).

208. See, e.g., Shannon Baker-Branstetter, *Distributed Renewable Generation: The Trifecta of Energy Solutions to Curb Carbon Emissions, Reduce Pollutants, and Empower Ratepayers*, 22 VILL. ENVTL. L.J. 1 (2011).

209. See generally, e.g., Davies, *Alternative Energy*, *supra* note 198; Wildermuth, *supra* note 198.

210. Davies, *Alternative Energy*, *supra* note 198; Wildermuth, *supra* note 198.

211. See Davies, *Alternative Energy*, *supra* note 198, at 502 (footnote omitted).

212. See, e.g., Rossi, *supra* note 157, at 239.

Environmental laws often ‘appear to be performing triage; they are the equivalent of an emergency response to environmental problems, an ER or Urgent Care.’ Likewise, energy law is often playing catch-up with the latest crisis be it Enron or climate change.”<sup>213</sup> By focusing on crises and disasters, two deleterious effects may result for energy law. First, the process employed can be too hurried, potentially making the outcome achieved suboptimal. Second, honing in on emergencies can skew the law’s vision, so that pressing problems receive an inordinate amount of attention and those that are in fact more critical—but slower-burning—are pushed to the side. Certainly, the latter could be used to characterize Fukushima’s impact on nuclear policy in the United States. It is likely that some rules for reactor licensing and operation will change. That in itself is not untoward; likely, quite the contrary. Despite these efforts, however, more difficult problems remain—including forging a solution for long-term nuclear waste disposal.<sup>214</sup>

### *B. Reformations*

Addressing the critiques of energy law requires matching solutions to infirmities. This applies to both substance and process: the reformation demanded by the charge that energy law is unsustainable is to make it more sustainable—to switch one fuel for another. The change demanded by the critiques of energy law’s process is to create a new process—not to swap out the reactor fuel, but to alter the way the reactor makes electricity.

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213. Wildermuth, *supra* note 203, at 381 (footnote omitted) (quoting Wildermuth, *supra* note 13, at 149).

214. *See, e.g.*, Hannah Northey, *Court Reveals Timeline for Case That Could Affect Fate of Repository*, GREENWIRE (Nov. 7, 2011) (discussing status of litigation over the Obama administration’s attempted withdrawal of the permit application for the proposed Yucca Mountain high-level nuclear waste depository). *See generally* Lincoln L. Davies, *Skull Valley Crossroads: Reconciling Native Sovereignty and the Federal Trust*, 68 MD. L. REV. 290, 331–32 (2009) (summarizing the dilemma of nuclear waste disposal and Congress’s reaction thereto with passage of the Nuclear Waste Policy Act); Richard B. Stewart, *U.S. Nuclear Waste Law and Policy: Fixing a Bankrupt System*, 17 N.Y.U. ENVTL. L.J. 783, 804–09 (2008) (discussing nuclear waste disposal challenges at Yucca Mountain); Cinnamon Gilbreath, Note, *Federalism in the Context of Yucca Mountain: Nevada v. Department of Energy*, 27 ECOLOGY L.Q. 577 (2000).

### *1. Sustainability*

One obvious way to make energy law focus more on sustainability is to replace its current short-term, economically-focused objectives with broader, longer-view aims. There are multiple possible iterations of this option.

A “deep,” or bedrock-level, change designed to make energy law more sustainable would be to elevate ecological sustainability and make all other objectives subordinate to it. This is the version of sustainability that Professor Bryner referred to when he argued for making energy “decisions . . . driven by ecological preservation” and then to “live with and adapt to whatever energy supplies and prices result from those decisions.”<sup>215</sup>

At the other end of the spectrum is a weaker form of sustainability, a kind of “sustainability lite.” Arguably, this is what the “control rods” of environmental regulation already impose on energy law, at least to the degree they actually capture the externalities of energy production and consumption.<sup>216</sup>

Finally, in between these two poles is a middle ground—what might be referred to as “mainstream” sustainability. Mainstream sustainability, or “sustainable development” as it often is called, seeks to maximize a “triple bottom line.”<sup>217</sup> In environmental circles, this typically is referred to as the “three Es”: environment, economy, equity.<sup>218</sup> In corporate realms, it is the “three Ps”: profit, people,

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215. Bryner, *supra* note 9, at 342.

216. *Cf., e.g.*, Craig Anthony (Tony) Arnold, *Fourth-Generation Environmental Law: Integrationist and Multimodal*, 35 WM. & MARY ENVTL. L. & POL'Y REV. 771, 874 (2011) (noting that “[m]any of the [modern] developments towards integrationist multimodality in U.S. environmental law are at the edges of environmental law, where environmental law interacts or engages with other fields of law, policy, and collective action,” including energy law).

217. *See generally* Ben Boer, *Institutionalising Ecologically Sustainable Development: The Roles of National, State, and Local Governments in Translating Grand Strategy into Action*, 31 WILLAMETTE L. REV. 307, 317–19 (1995) (interpreting sustainable development); John C. Dernbach, *Sustainable Development: Now More Than Ever*, in STUMBLING TOWARD SUSTAINABILITY 45, 45 (John C. Dernbach ed., 2002) (defining sustainability).

218. *See* J. William Futrell, *Defining Sustainable Development Law*, 19 NAT. RESOURCES & ENV'T 9, 9 (2004) (“For more than a decade the term ‘sustainable development’ has denoted an effort to meld concerns for environmental protection, economic well-being, and social justice.”); U.N. Conference on Environment and Development, Rio de Janeiro, Braz., June 3–14, 1992, *Promoting Sustainable Human Settlement Development*, ¶¶ 7.1–4, U.N. Doc. A/ CONF.151/26/Rev.1 (Vol. I), Annex II (1993) (identifying considerations in the

planet.<sup>219</sup> In either case, the core idea of sustainability is to advance all three of the objectives over a long timeframe, creating prosperity both now and in the future.

The objective of sustainable development . . . is to achieve a social framework in which economy, environment, and equity all are sustainable in perpetuity over all geographic scales. . . . It is not sufficient merely to strike a balance between economy, environment, and equity that brings the three into harmony for the moment; rather, we must [do so] over time . . . .<sup>220</sup>

The advantage of substituting sustainability for energy law's current objectives is that it could lead to what energy law so far has failed to obtain: true energy independence. For instance, a sustainability-based energy law might push harder and faster toward renewables. To the extent it did, both energy law's current aims of supply abundance and security, and the environmental goals of better ecological protection, could be achieved. This, of course, would require a major reorienting of energy policy. Rather than the current prevailing paradigm, a new one would need to emerge. This paradigm, which we might call an "alternative energy paradigm,"<sup>221</sup> would borrow some pillars from the extant model but infuse ideas of sustainability of its own. It might look like this:

- 1) Assure sustainable supplies of energy;
- 2) Maintain reasonable prices, based on real and internalized costs;
- 3) Harness the power of archetype firms to overhaul our energy structure and begin cultural change;
- 4) Promote a deliberate move to renewable energy sources, based on hard science, not politics; and
- 5) Support competition among fuels.<sup>222</sup>

Indeed, a sustainability-based energy law would not measure economic success on mere profits, but also on whether the energy

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context of sustainable human settlement development).

219. *E.g.*, PETER FISK, PEOPLE, PLANET, PROFIT: HOW TO EMBRACE SUSTAINABILITY FOR INNOVATION AND BUSINESS GROWTH (2010).

220. J.B. Ruhl, *Sustainable Development: A Five-Dimensional Algorithm for Environmental Law*, 18 STAN. ENVTL. L.J. 31, 39, 43 (1999).

221. Davies, *supra* note 197, at 74.

222. *Id.* at 83.

supplies and technologies it was delivering would last for the long run. In this way, a sustainable form of energy law would also tend to further the merger of energy law and environmental law, and thus, potentially solve some of the process concerns raised about energy law today. If the objectives of both fields were married into a unified framework, they would no longer undermine each other.<sup>223</sup>

One problem, however, with injecting sustainability into energy law is that it might make the decisionmaking calculus more complex. Today, energy outcomes, or their general direction at least, are fairly certain. If they do not comport with the dominant paradigm, they are less likely to occur. Make sustainability the new model and the results become more indeterminate. Just as there is an ordering problem in the simpler, three-part conception of energy law—where, for instance, supply abundance and price efficiency potentially stand at odds—the same dilemma exists if sustainability’s triple bottom line becomes the controlling paradigm. Indeed, disentangling all the things that national energy policy is supposed to achieve, and balance, is no easy task. As the Carter administration noted, energy problems are “a complex tangle of sometimes competing national goals—market efficiency and greater production, equity among income classes and regions, environmental protection, national security, economic growth, and inflationary restraint. It [is] difficult, and sometimes impossible, to reconcile all these goals.”<sup>224</sup>

Should renewables be promoted because they provide a more abundant long-term supply of energy, or should coal be utilized more heavily because it has a higher energy value, is less expensive, and thus frees resources that could be used on further research and development for other technologies? Should tar sands and oil shale be tapped because they are available domestically and are located far from population centers, or are their environmental consequences too great? Should more bulk-scale transmission be built, or should we focus on transforming our energy infrastructure by promoting smaller scale distributed generation projects? There are no easy answers to these questions, whether framed in terms of sustainability

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223. Davies, *supra* note 191, at 1390–96.

224. U.S. GEN. ACCOUNTING OFFICE, GAO/RCED-93-29, ENERGY POLICY: CHANGES NEEDED TO MAKE NATIONAL ENERGY PLANNING MORE USEFUL 29 (1993) (quoting the 1979 national energy plan).

or otherwise. Better energy law processes may help, although alone they too may fall short of the task.<sup>225</sup>

## 2. Planning

Beyond moving energy law substantively toward sustainability, another option would be to change some of the processes the field now uses. Here, a key question is the role of planning.

Presently, energy law leaves many choices to free market mechanisms. Even in the field of electricity, once heavily regulated and dominated by natural monopolies, this has become the case.<sup>226</sup> President Reagan finished off oil price controls,<sup>227</sup> and the Clinton-era FERC drove cost-of-service ratemaking to the periphery, for wholesale power sales at least.<sup>228</sup> Perhaps this was inevitable. The dominant energy paradigm heavily favors markets after all. In any case, the shift from cost-based to market-based regulation in energy law is one that generally has been lauded for making the law more

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225. Professor Robert Adler makes the parallel point in the water context. “A disaster prevention strategy designed to reduce vulnerability to drought may require changes to deep-rooted economic policies in the agricultural and other sectors of the economy. At the most basic level, it will require us to rethink what conditions we consider a ‘disaster,’ as opposed to the normal range of variability in weather and other conditions within particular regions.” Robert W. Adler, *Balancing Compassion and Risk in Climate Adaptation: U.S. Water, Drought and Agricultural Law*, FLA. L. REV. (forthcoming 2011), available at <http://ssrn.com/abstract=1809946>. The same might be said about energy choices. Under the disaster lens, at what point does the risk of another Fukushima outweigh the cost of climate change?

226. For accounts of deregulation—or restructuring—in the electric industry, see, for example, Richard J. Pierce, Jr., *Completing the Process of Restructuring the Electricity Market*, 40 WAKE FOREST L. REV. 451, 463–64 (2005); Jim Rossi, *Redeeming Judicial Review: The Hard Look Doctrine and Federal Regulatory Efforts to Restructure the Electric Utility Industry*, 1994 WIS. L. REV. 763, 781 n.70; Joseph P. Tomain, *Electricity Restructuring: A Case Study in Government Regulation*, 33 TULSA L.J. 827, 829–37 (1998).

227. See Exec. Order No. 12,287, 3 C.F.R. 124 (1981); Joseph P. Tomain, *Toward a Sustainable Energy-Environmental Policy*, in ENERGY LAW AND POLICY FOR THE 21ST CENTURY 6-1, 6-24 (2000) (noting that President Reagan’s action was “largely symbolic, however, because [the price controls] were scheduled to terminate on October 1st of that year”).

228. See RICHARD F. HIRSH, POWER LOSS: THE ORIGINS OF DEREGULATION AND RESTRUCTURING IN THE AMERICAN ELECTRIC UTILITY SYSTEM (1999); Bernard S. Black & Richard J. Pierce, Jr., *The Choice Between Markets and Central Planning in Regulating the U.S. Electricity Industry*, 93 COLUM. L. REV. 1339, 1343–48 (1993); Joseph D. Kearney & Thomas W. Merrill, *The Great Transformation of Regulated Industries Law*, 98 COLUM. L. REV. 1323, 1325 (1998); David B. Spence, *Can Law Manage Competitive Energy Markets?*, 93 CORNELL L. REV. 765, 767–69 (2008). On historic regulation of the electricity industry, see, for example, Suedeen G. Kelly, *Electricity*, in ENERGY LAW AND POLICY FOR THE 21ST CENTURY, *supra* note 227, at 12-10 to -11.

efficient, directionally at least if not in every execution of the general plan. Today there are not widespread calls for this revolution's wholesale reversal.<sup>229</sup>

One possible counterpart to free markets, nevertheless, is careful planning. Energy law already incorporates some planning. PURPA encourages states to engage in integrated resource planning with their utilities, so that truly least-cost options are chosen, demand-side management is not ignored, and environmental concerns are not overlooked.<sup>230</sup> At a much broader level, the Energy Reorganization Act requires a national energy plan to be prepared and submitted to Congress biennially—a process that helps set our national energy priorities, theoretically if not actually.<sup>231</sup>

There are, however, two clear deficiencies in this national planning process. First, it has not been particularly effective. A 1993 study showed that no national energy plan prepared as of that date had complied with the law's requirement to set forth five-year and ten-year objectives for energy supply and demand.<sup>232</sup> Moreover, the Energy Policy Act of 1992 modified the law. Following these amendments, the plan cannot simply examine energy possibilities holistically but must tilt heavily toward cost; it is compelled to recommend the "least cost" resources for use.<sup>233</sup>

Second, this planning process has limited impact. It is process and little more: it sets no binding mandates, it imposes no limits on environmental effects or costs, and it is subject to the whim of the prevailing political winds of the time. It also may be a rather hollow process. At least one analysis revealed that virtually every national energy plan has made similar recommendations, only ordered differently from year to year.<sup>234</sup> It thus should not be surprising that

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229. This of course does not mean that the shift to market-based regulation in energy has gone without criticism. Compare, e.g., Richard D. Cudahy & William D. Henderson, *From Insull to Enron: Corporate Re(regulation) After the Rise and Fall of Two Energy Icons*, 26 ENERGY L.J. 35, 108 (2005) (calling electricity restructuring "on balance a success"), with Todd J. Zywicki, *Is Forum Shopping Corrupting America's Bankruptcy Courts?*, 94 GEO. L.J. 1141, 1158 n.89 (2006) (reviewing LYNN M. LOPUCKI, *COURTING FAILURE* (2005)) (deeming it a "fiasco"), and Robert Kuttner, *Keynote Address*, 15 GEO. J. ON POVERTY L. & POL'Y 417, 421 (2008) (finding it a "palpable failure").

230. See 16 U.S.C. §§ 2602(19), 2621(d)(7) (2006).

231. Department of Energy Organization Act, 42 U.S.C. § 7321.

232. U.S. GEN. ACCOUNTING OFFICE, *supra* note 224, at 3.

233. Energy Policy Act of 1992, Pub. L. No. 102-486, § 1602, 106 Stat. 2776, 2999–3001 (codified at 42 U.S.C. § 13382).

234. Van Orman, *supra* note 175, at 264.

some participants in the process have suggested that the steps of making the plan are more valuable than the plan itself.<sup>235</sup>

This, however, could change. Energy law could mandate a high-level, binding planning process that produces goals enforceable at multiple levels of government. A new law could, for instance, use nationally set and administered generation portfolio targets—much like state-level RPSs do for renewables but for all classes of generation fuels. This would make energy law’s objectives both clearer and more comprehensive.<sup>236</sup> Because the goals would have actual effect, debate over what they should be and how they should be carried out should be more robust. The use of this kind of planning process would not dictate outcomes; the plan could embrace the objectives of the existing energy paradigm or a more sustainability-based one. It also could pursue efficiency, operating via markets for each resource, so that each utility could employ the generation mix most efficient and economically optimal for it.

In this way, energy law could achieve its objectives in a more orderly, calculated, and measurable way. It would not by itself alter the underlying objectives of the field, but it might make the process of achieving those goals more efficient—and, because they are more measurable, more effective too.

### *C. Fukushima’s Shadow: Nuclear Power and the Future of Energy Law*

Only months before the tsunami struck Fukushima, two observers of U.S. energy policy wrote this of nuclear energy’s future:

A serious accident at an existing nuclear plant—anywhere in the world—would have a dampening effect on the public’s acceptance of nuclear power plants. The new plants have safety features and designs that greatly lessen or eliminate the chance of a catastrophic accident, however, convincing the public of that fact could be extremely difficult if there is another Three Mile Island or Chernobyl.<sup>237</sup>

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235. U.S. GEN. ACCOUNTING OFFICE, *supra* note 224, at 33.

236. Of course, the difficulty in transforming our national energy landscape rests not just with changing technology but with combatting the “deceptively difficult” problem of infrastructure as well. Joel B. Eisen, *Residential Renewable Energy: By Whom?*, 31 UTAH ENVTL. L. REV. 339, 339 (2011).

237. Nancy A. Wodka & Salo L. Zelermyer, *Using the Nuclear Option to Find Middle Ground on Energy Policy*, ELECTRICITY J., May 2010, at 19, 24.

Their assessment was not an isolated one. Before Fukushima, many concurred that the “nuclear renaissance” long anticipated in the United States was unlikely to arrive anytime soon.<sup>238</sup>

After Fukushima, the future of nuclear energy is even more uncertain.<sup>239</sup> Six years ago, Joseph Tomain charted three possible paths forward for the nuclear industry and, by extension, for energy law itself.<sup>240</sup> One path, he wrote, was of a “Promotional Nuclear Policy”—a path in which the government affirmatively advocated for and supported “the use of nuclear power over coal to generate electricity.”<sup>241</sup> The second path was one of a “Precautionary Nuclear Policy”—a path that “emphasizes coal over nuclear power” because it focuses so heavily on nuclear “safety including the disposal of radioactive wastes and the avoidance of the various nuclear catastrophes.”<sup>242</sup> Finally, Professor Tomain argued for a “Smart Energy Policy”—an alternative path to either of the nuclear-dependent options, a path that relies more on distributed generation, emphasizes renewables and efficiency, and excises nuclear power from the equation.<sup>243</sup>

Tomain readily acknowledged that both of the nuclear-reliant futures he foresaw “accept the dominant model of energy policy with its reliance on large-scale, capital-intensive energy producers.”<sup>244</sup> His suggestion was that the “Smart Energy Policy” leads toward a more prosperous future in part because it abandons this prevailing paradigm.

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238. *E.g.*, *Is It Time to Abandon Talk of a Nuclear ‘Renaissance’?*, ELECTRICITY J., Dec. 2010, at 1; *Nuclear Costs: Clouded, but Rising*, ELECTRICITY J., Oct. 2010, at 1; Steve Thomas, *Competitive Energy Markets and Nuclear Power: Can We Have Both, Do We Want Either?*, 38 ENERGY POL’Y 4903 (2010).

239. John Rowe, CEO of Exelon, the largest owner of nuclear facilities in the United States, recently put the odds of a domestic nuclear renaissance at fifty percent. Hannah Northey, *Exelon CEO Says Renaissance Has ‘50-50’ Chance*, GREENWIRE, Nov. 9, 2011 (“Most of us have spent our lives believing there has to be a nuclear revolution, and I still think that’s a 50-50 possibility.’ . . . ‘Trouble is, it’s always 15 years away.”); *see also* Keith Bradsher, *China Marches on with Nuclear Energy, in Spite of Fukushima*, N.Y. TIMES, Oct. 10, 2011, <http://tinyurl.com/cnfpfpl> (assessing the chance of nuclear expansion in different regions); Stephanie Cooke, *After Fukushima, Does Nuclear Power Have a Future?*, N.Y. TIMES, Oct. 10, 2011, <http://tinyurl.com/7taednw> (same).

240. Tomain, *supra* note 2.

241. *Id.* at 237. In a later commentary, Professor Fred Bosselmann endorsed this path, largely on environmental grounds. *See* Bosselmann, *supra* note 169.

242. Tomain, *supra* note 2, at 237.

243. *Id.* at 246–48.

244. *Id.* at 237.

While the question remains of what will become of the U.S. nuclear industry post-Fukushima,<sup>245</sup> it seems unlikely that the accident will foment a sea change in energy policy overall. Fukushima instigated overhaul in Germany, but so far in Japan<sup>246</sup>—and even more so here at home—the response has been much more measured. It would be alarming if NRC regulation of existing and new nuclear facilities is not amended and updated in some way as a result of Fukushima. But a reformation of energy law as a whole would be more remarkable still. At least on President Obama's watch, it seems clear we can count that out.<sup>247</sup>

Whether that result is salutary depends on perspective. Plainly, American energy law and policy could benefit from an injection of both reformed goals and modified processes. Nevertheless, achieving this undoubtedly will be a long process. It is unlikely, Eric Freyfogle wrote nearly two decades ago, that “Congress will . . . arise one morning to reweave, deftly and coherently, the environmental portions of the legal fabric.”<sup>248</sup> It is equally unlikely that Congress will awake one day to change out the entire fuel core of energy law's reactor. With all that energy touches in our economy, with the human tendency to focus on the short-term, and with the role that immediate results play in preserving political power, simply too much is on the line.

What we might expect, then—what we might hope for—is not a total shift in energy law but a gradual one. Certainly energy law and environmental law are moving closer together, even if slowly. If disasters like Fukushima have something to say about what that merger should look like, or how quickly it happens, all the better. Much of what environmental law aims to do is to calculate risks, as

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245. As one observer put it, “[T]he Fukushima disaster handed no easy victories to either side of the nuclear debate: defenders can no longer pretend to have engineered away the risks of generating a billion watts in a concrete building, and opponents cannot easily suggest that a meltdown will produce the huge number of immediate casualties that the public imagines.” Osnos, *supra* note 17, at 61.

246. *Id.* (“By fall, a consensus had taken hold among Japanese politicians and intellectuals: there would not be a sudden end to nuclear power in Japan. The country would possibly close some of its oldest plants, but the rest—by one estimate, thirty-six of the fifty-four reactors—would endure.”).

247. *See supra* Part III.B.

248. Eric T. Freyfogle, *The Ethical Strands of Environmental Law*, 1994 U. ILL. L. REV. 819, 846.

difficult as that is.<sup>249</sup> There is no reason why energy law should not account carefully for those risks too.<sup>250</sup>

More narrowly, what Fukushima might teach us is that our continued reliance on disasters as a heavy driving force for weighing what energy law should be is not healthy. Disasters are a relevant consideration in any area of the law, but they should not dominate. There are many problems with focusing on disasters to encourage legal change, least among them the reflexive reactions they can elicit. How else can the multiplicity of “[h]asty [n]uclear [u]-[t]urn[s]” that took place in Fukushima’s wake be explained<sup>251</sup>—first Germany’s flip from extending the life of its plants to banning them altogether, then Japan’s flop in declaring that it would phase out nuclear energy, only to clarify that stance as a “personal” and not political position, and only then to backtrack further to a posture of wait and see? With all the drama they pack, disasters have a tendency to push against reason, not just in the popular view of what government should do, but in the appraisal of where and how resources should be allocated in altering the law as well. In Fukushima, we can see a partial answer to this problem.

U.S. energy law could use more planning. True, planning is inherently imperfect. And true, a longstanding maxim of energy policy is that all energy predictions end up wrong after the fact.<sup>252</sup> Both points make potential overreliance on planning a warning worth taking. They do not, however, justify foregoing the exercise altogether. More planning in energy law could add significant benefits to the system, including clarifying what our actual objectives as a society are, measuring whether we are meeting those objectives, specifying those objectives in terms of an ideal generating mix, and involving the public in the process. Planning also could help assess what role technologies—sometimes quite controversial ones—should play in our energy future. By definition, this much more holistic assessment would include the benefits and risks different energy resources pose. Planning, in short, can be a partial response to the sensationalism of disasters.

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249. For one primer on risk assessment, see DANIEL A. FARBER ET AL., *DISASTER LAW AND POLICY* 249–90 (2d ed. 2010).

250. Arguably, this is what the NRC licensing process does now for nuclear power.

251. *Germany’s Hasty Nuclear U-Turn Likely to Come at a Steep Price*, *ELECTRICITY J.*, Aug.–Sept. 2011, at 3.

252. Bosselman, *supra* note 169, at 52.

This kind of energy planning hardly would be a cure-all.<sup>253</sup> But it would be a step forward. In the shadow of Fukushima, at least that much should be clear.

## VI. CONCLUSION

A tragedy like Fukushima offers an opportunity to reassess—to step back, take stock, and evaluate more broadly where, as a community and as a society, we stand. For some, the perspective this exercise offered was obvious. Germany, for one, took a hard turn in Fukushima’s aftermath. For others, the view was murkier. In the United States, Fukushima, if anything, appeared as a “grim reminder of the calculated risk associated with nuclear power.”<sup>254</sup> We take great benefit from nuclear energy, yet the potential costs of those benefits are, though rather remote, exceedingly high. Decades from now, Fukushima will still be shorthand for that proposition.

Ultimately, Fukushima does not fundamentally alter the calculus of the nuclear energy risk. The tragedy may shift perceptions, but no nuclear facility built today—or on March 10, 2011, for that matter—would use the design of the Fukushima Daiichi plant. The critical question thus is not simply what Fukushima means for the future of the nuclear industry in the United States but what it means for the future of United States energy law. Energy disasters should not be the primary drivers of our law; that much is plain. But if we do not use them as a chance to at least reconsider what our energy law should be, they are a wasted opportunity indeed.

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253. For an excellent critique of the deficiency of planning in environmental law, see Dave Owen, *Probabilities, Planning Failures, and Environmental Law*, 84 TUL. L. REV. 265 (2009).

254. Chirag Rathi, *A Pause in the Growth of Nuclear Energy*, ELECTRICITY J., July 2011, at 48, 52.

