

A COMPARISON OF THE PUBLIC PARTICIPATION MECHANISMS IN THE LICENSING OF NUCLEAR  
POWER PLANTS IN CHINA AND THE UNITED STATES

## INTRODUCTION

Every day we read about China's budding economy,<sup>1</sup> its rapidly expanding middle class,<sup>2</sup> and the phenomenal feats of infrastructure it has accomplished, ranging from extensive high-speed rail networks<sup>3</sup> to massive dams.<sup>4</sup> One of the consequences of this unprecedented growth is an ever-increasing demand for energy.<sup>5</sup> In order to fulfill this demand, and to curb its use of coal, China has explored a variety of different energy sources including nuclear power.<sup>6</sup> Like many other of its infrastructure projects, China's plans for nuclear power are extremely ambitious.<sup>7</sup>

Given the speed and scope of China's nuclear expansion, however, safety may be comprised in favor of economic development. One tool that may combat this potential oversight is the participation of the public in the licensing of nuclear power plants. Public participation has traditionally had little impact on decision-making mainly due to the substantial imbalance in power between proponents of the project and the citizenry.<sup>8</sup> However, China has recently been

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<sup>1</sup> Tom Orlik, *China's Growth Slows to 8.1%*, WALL ST. J., Apr. 13, 2012, <http://online.wsj.com/article/SB10001424052702304356604577340532337050116.html>.

<sup>2</sup> Kenneth Rapoza, *Within a Generation, China Middle Class Four Times Larger Than America's*, FORBES, Sep. 5, 2011, <http://www.forbes.com/sites/kenrapoza/2011/09/05/within-a-generation-china-middle-class-four-times-larger-than-americas/>.

<sup>3</sup> Keith Bradsher, *China Sees Growth Engine in a Web of Fast Trains*, N.Y. TIMES, Feb. 13, 2010, <http://www.nytimes.com/2010/02/13/business/global/13rail.html?pagewanted=all>.

<sup>4</sup> Peter Bosshard, *China's dam-building will cause more problems than it solves*, THE GUARDIAN, Mar. 4 2011, 11:10am), <http://www.guardian.co.uk/environment/2011/mar/04/china-dams-emissions-carbon-hydropower>.

<sup>5</sup> *Led by Demand in China, Energy Use Is Projected to Rise 53% by 2035*, BLOOMBERG NEWS, Sep. 19, 2011, <http://www.nytimes.com/2011/09/20/business/energy-environment/energy-demand-is-expected-to-rise-53-by-2035.html>.

<sup>6</sup> Robert V. Percival, *China's "Green Leap Forward" Toward Global Environmental Leadership*, 12 VT. J. ENVTL. L. 633, 650 (2011) (citing Climate Change is at the top of the Twelfth FYP's environmental section. Deborah Seligsohn & Angel Hsu, *How Does China's 12th Five-Year Plan Address Energy and the Environment?*, World Resources Inst. (Mar. 7, 2011), <http://www.wri.org/stories/2011/03/how-does-chinas-12th-five-year-plan-address-energy-and-environment>).

<sup>7</sup> *Id.*

<sup>8</sup> Yuhong Zhao, *Public Participation in China's Eia Regime: Rhetoric or Reality?*, 22 J. ENVTL. L. 89, 92 (2010) [hereinafter Zhao, *Rhetoric or Reality*].



adopting a more democratic and inclusive approach in its decision-making.<sup>9</sup> With the hope that this trend continues into the future, this paper seeks to provide a set of improved mechanisms that would incorporate the public's input into the decision-making regarding nuclear power plant licensing. Many of the mechanism are drawn from the United States where the public has had mixed success participating in the licensing of nuclear power plants.

Part I of this paper explores the nuclear industries in both China and the United States while Part II provides a summary of the nuclear regulatory framework used in each country. Part III evaluates how each country has addressed the public's involvement in the licensing or relicensing of nuclear power plants. Part IV provides a number of suggestions for both the Chinese public as well as Chinese regulators as how to improve their system based on lessons learned both in the United States as well as in China.

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<sup>9</sup> *Id.* at 119.



## I. OVERVIEW OF NUCLEAR POWER IN CHINA AND THE UNITED STATES

### A. Energy Demand and Available Options

China's rapid growth has been remarkable in its scope, its pace, and its resilience to withstand even the Great Recession.<sup>10</sup> Over the last twenty years in China, per capita incomes have increased and the middle class has grown substantially.<sup>11</sup> The combination of rapid industrialization and improvements in the standard of living has resulted in astronomic increases in energy consumption.<sup>12</sup> Since 2000, energy consumption in China has doubled.<sup>13</sup> Recently, China surpassed the United States as the largest energy consumer in the world.<sup>14</sup> The majority of this energy comes from fossil fuel sources.<sup>15</sup> As of 2008, 71% of China's total energy consumption came from coal, 19% came from oil, and 1% came from nuclear.<sup>16</sup>

The country's heavy use of coal has resulted in a number of devastating consequences. The National Resource Defense Council (NRDC) states that there were more than 6,000 mining-related deaths in China in 2004.<sup>17</sup> Coal pollution also creates a constant source of air pollution, contributes to acid rain, and has contaminated drinking water supplies.<sup>18</sup> The sulfur dioxide produced in coal combustion alone contributes to an estimated 400,000 premature deaths a

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<sup>10</sup> *China Analysis*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/countries/cab.cfm?fips=CH> (last updated May 2011). China's real gross domestic product grew at approximately 10% in 2010. Furthermore, China averaged 10% growth between 2000 and 2009.

<sup>11</sup> *The Effects of Increasing Chinese Demand on Global Commodity Markets*, OFFICE OF INDUSTRIES, U.S. INTERNATIONAL TRADE COMMISSION 2-3 (Jun. 2006), available at <http://www.usitc.gov/publications/332/pub3864-200606.pdf>.

<sup>12</sup> RENEWABLE Energy and Energy Efficiency in China: Current State and Prospects for 2020, WORLDWATCH INSTITUTE 8 (2010).

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

<sup>17</sup> *NRDC Strives to Minimize the Toll from Coal in China*, NATIONAL RESOURCES DEFENSE COUNCIL, 2 (Apr. 2007), <http://www.nrdc.org/international/china/coal.pdf>

<sup>18</sup> *Id.*



year.<sup>19</sup> Not only has coal pollution adversely affected human health in China, but it has also led to a nearly 6% reduction in economic growth.<sup>20</sup> Furthermore, most of the coal reserves in China are located in the northwest portion of the country.<sup>21</sup> Bringing the coal from these remote locations to population center causes the complex logistical problem of transporting coal or the electricity from the resource centers to the major cities in the eastern portion of China.<sup>22</sup> Based on the many drawbacks of coal, China has sought to further diversify its energy prospects.

To meet its growing energy needs and to reduce its dependence on coal, China is developing nuclear, hydroelectric, solar, and wind projects. Currently, approximately 9 percent of the country's total primary use comes from renewable resources.<sup>23</sup> China provides more installed hydroelectric capacity than any country in the world, producing 18.5% of the world's total.<sup>24</sup> China's capacity to develop wind and solar power has been growing rapidly as well.<sup>25</sup> The country's capacity to generate wind power has doubled each year between 2005 and 2009.<sup>26</sup> Along with the rapid development of wind, solar, and hydropower, China has engaged in a rapid expansion of nuclear power.<sup>27</sup>

While solar, wind, and hydropower appear to be more favorable in terms of safety and cost, nuclear power has certain advantages over these other technologies. First, nuclear, unlike hydroelectric, solar, and wind power, does not depend on metrological variability. Therefore,

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<sup>19</sup> Keith Bradsher & David Barboza, *Pollution from Chinese Coal Casts a Global Shadow*, N.Y. TIMES, Jun. 11, 2006, <http://www.nytimes.com/2006/06/11/business/worldbusiness/11chinacoal.html?pagewanted=allat>

<sup>20</sup> THE WORLD BANK & STATE ENVTL PROT. ADMIN., P.R. CHINA, COST OF POLLUTION IN CHINA xvii (2007).

<sup>21</sup> China: Analysis Report, U.S ENERGY INFO. ADMIN., <http://www.eia.gov/countries/cab.cfm?fips=CH> (last updated May 2011).

<sup>22</sup> *Nuclear Power in China*, WORLD NUCLEAR ASS'N., <http://www.world-nuclear.org/info/inf63.html#References> (updated Nov. 30 2011).

<sup>23</sup> WORLDWATCH INSTITUTE, *supra* note 12, at 26.

<sup>24</sup> 2011 Key World Energy Statistics, INTERNATIONAL ENERGY AGENCY 18 (2011), *available at* [http://www.iea.org/textbase/nppdf/free/2011/key\\_world\\_energy\\_stats.pdf](http://www.iea.org/textbase/nppdf/free/2011/key_world_energy_stats.pdf)

<sup>25</sup> WORLDWATCH INSTITUTE, *supra* note 12, at 28.

<sup>26</sup> *Id.*

<sup>27</sup> *Nuclear Power in China*, *supra* note 20.



nuclear, like coal, can provide China with base-load power regardless of the weather. Second, due to their dependence on natural resources, many of the hydroelectric, solar, and wind projects are located in the western portions of China, far away from the population centers on the coast. Nuclear power plants, on the other hand, can be sited along coastlines closer to the population centers. Because of its ability to provide base-load power and because nuclear power plants can be located near population center, nuclear power is an appealing option to the Chinese.

Proponents of nuclear power also argue that renewable energies such as wind and solar power in addition to energy efficiency will not solve the crises of energy and climate change.<sup>28</sup> Furthermore, nuclear energy advocates argue that new technologies mitigate the previous problems of nuclear waste and that, when considered in relation to the overall safety implications of fossil fuels, nuclear is a safer energy option.<sup>29</sup>

## B. Drawbacks of Nuclear Power

### i. Health and Safety

The specter of nuclear accidents at Three Mile Island, Chernobyl, and Fukushima underscore the most serious drawback of nuclear energy: risk to human health. Human health risks can be divided into two large categories: acute and chronic risks. Acute risks stem from accidents at nuclear power plants such as the accidents that occurred at Chernobyl and Fukushima Daichii. These accidents typically arise from flaws in design that fail to take into consideration a certain event or series of events.<sup>30</sup> For instance, those who designed the reactors at Fukushima Daiichi in

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<sup>28</sup> BENJAMIN K. SOVACOO, *CONTESTING THE FUTURE OF NUCLEAR POWER* 135 (2011). (citing BARRY BROOK AND IAN LOWE, *WHY VS. WHY: NUCLEAR POWER* 34(2010)

<sup>29</sup> *Id.*

<sup>30</sup> Evan Osnos, *Letter from Fukushima, The Fallout*, *THE NEW YORKER*, Oct.17, 2011, at 46. At Fukushima, the earthquake damaged the infrastructure of the town and the plant such that the normal power supply was cut off. Normally, this would not be a significant issue as several emergency power generators located in the basements of the buildings would supply the energy necessary to circulate water in order to prevent a meltdown. However, the



Japan did not anticipate that an earthquake and tsunami would occur within the space of a few hours.<sup>31</sup> A recent study found that there have been ninety-nine accidents at nuclear power plants worldwide.<sup>32</sup> However, some argue that “[a]part from Chernobyl, no nuclear workers or members of the public have ever died as a result of exposure due to a commercial nuclear reactor incident” despite hours upon hours of the operation of nuclear power plants.<sup>33</sup> Others argue that deaths have occurred at numerous other accidents.<sup>34</sup>

In addition to the risk presented by nuclear accidents, many are concerned with the chronic risks associated with living or working too close to nuclear power plants. A National Cancer Institute study indicated that there was “no general increased risk of death from cancer for people living in the 107 U.S. counties containing or closely adjacent to 62 nuclear facilities.” However, other studies, including a study conducted near a German nuclear power plant, have showed that there may be a greater incidence of cancer for those living in close proximity of a nuclear power plants.<sup>35</sup>

## ii. Environmental Damage

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tsunami flooded the basements of the buildings, rendering the emergency generators inoperable. Therefore, a lack of power prevented the circulation of cooling water. This series of events, though simplified, led to the meltdown at Fukushima Daiichi.

<sup>31</sup> *Id.*

<sup>32</sup> Benjamin K. Sovacool, *A Critical Evaluation of Nuclear Power and Renewable Electricity in Asia*, 40 J. OF CONTEMP. ASIA 369, 393–400 (Aug. 2010) [hereinafter *A Critical Evaluation of Nuclear Power*]. Accidents are defined as incidents that resulted in the loss of human life or more than US \$50,000 in property damage.

<sup>33</sup> Stuart T. Arm, *Nuclear Energy: A Vital Component of Our Energy Future*, AM. INST. OF CHEM. ENG. 32 (2010) [http://www.aiche.org/uploadedFiles/About/Press/Articles/1007\\_Nuclear\\_Energy\\_Preprint.pdf](http://www.aiche.org/uploadedFiles/About/Press/Articles/1007_Nuclear_Energy_Preprint.pdf). The accident at Chernobyl occurred in 1985 when a steam explosion and fire killed 31 people and caused significant nuclear fallout. As a result of the public’s and worker’s exposure to radiation, the death toll has risen to approximately 56 people.

<sup>34</sup> Benjamin K. Sovacool & Anthony D’Agostino, *Nuclear Renaissance: A Flawed Proposition*, AM. INST. OF CHEM. ENG. 33 (2010) [http://www.aiche.org/uploadedFiles/About/Press/Articles/1007\\_Nuclear\\_Energy\\_Preprint.pdf](http://www.aiche.org/uploadedFiles/About/Press/Articles/1007_Nuclear_Energy_Preprint.pdf).

<sup>35</sup> Alfred Korblein & Wolfgang Hoffmann, *Childhood Cancer in the Vicinity of German Nuclear Power Plants*, 6 MED. & GLOBAL SURVIVAL 18, 18 (1999).



Furthermore, an astounding number of environmental implications arise from nuclear energy. From adverse impacts from uranium mining, to radioactive effluent emissions in waterways and the air, to waste heat, the environmental drawbacks are numerous. Furthermore, there is the unsolved issue of long-term nuclear waste storage. The following discussion identifies just a few of the many environmental problems associated with nuclear power.

Mining operations use a variety of technology to pry uranium from the ground.<sup>36</sup> The most common method of extraction, called “open-pit mining,” involves removing upper layers of rock to enable access to the underlying rock that holds minerals containing uranium.<sup>37</sup> Other methods of uranium mining including in situ leaching—involving the injection of acid into bedrock to mobilize uranium—and underground mining, which involves digging shafts into the earth to extract the minerals that contain uranium.<sup>38</sup> During these processes, the workers at uranium mines are exposed to significant amount of radiation.<sup>39</sup>

The byproducts of mining also cause significant environmental impacts. Miners will generate over 500,000 tons of waste rock, 100,000 tons of tailings, 144 tons of solid waste, and 1,343 cubic meters of liquid waste from just approximately 25 tons of usable uranium.<sup>40</sup> This waste material contain a number of hazardous substances including uranium, thorium, radium, and radon, which render land inhabitable and can often leach into drinking water supplies.<sup>41</sup> While

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<sup>36</sup> CONTESTING THE FUTURE OF NUCLEAR POWER, *supra* note 28, at 135.

<sup>37</sup> *Id.*

<sup>38</sup> *Id.*

<sup>39</sup> *Id.* at 137.

<sup>40</sup> *Id.* at 135 (citing David Thorpe, *Extracting a disaster*, THE GUARDIAN (Dec. 5, 2008) <http://www.guardian.co.uk/commentisfree/2008/dec/05/nuclear-greenpolitics>).

<sup>41</sup> David Thorpe, *Extracting a disaster*, THE GUARDIAN (Dec. 5, 2008) <http://www.guardian.co.uk/commentisfree/2008/dec/05/nuclear-greenpolitics>.



the United States and other developed countries monitor and regulate these chemicals, other less developed countries do not or do not have the means to implement enforcement.<sup>42</sup>

A raft of additional environmental implications arises during the construction and operation of nuclear power plants.<sup>43</sup> For example, most nuclear power plants require enormous quantities of water to cool reactors as well as to cool the spent fuel rods.<sup>44</sup> In addition to consuming large amounts of water, nuclear power plants alter the temperature of the water bodies on which they are located.<sup>45</sup> Furthermore, several radioactive isotopes including tritium, cesium-137, and strontium-90 have been detected in groundwater surrounding nuclear power plants. Tritium, a radioactive byproduct of nuclear power plants, has leaked from forty eight of the sixty five nuclear power plant sites in the United States.<sup>46</sup> These various impacts that nuclear power plants have on water supplies has had a widespread, adverse effect on aquatic ecosystems.<sup>47</sup> Furthermore, despite the industries' claim that nuclear power is "clean energy," many argue that, when considering the entire life-cycle of nuclear power, nuclear power contributes significantly to climate change.<sup>48</sup>

### iii. Other Economic, Social, and Political Drawbacks

In addition to the health, safety, and environmental downsides of nuclear power, opponents cite a number of economic, social, political drawbacks of using nuclear power. Nuclear opponents argue that nuclear power is the most expensive option on the energy market when one

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<sup>42</sup> *Id.*

<sup>43</sup> CONTESTING THE FUTURE OF NUCLEAR POWER, *supra* note 28, at 146.

<sup>44</sup> *Id.* at 147.

<sup>45</sup> *Id.* at 151.

<sup>46</sup> Jeff Donn, *Radioactive tritium leaks found at 48 US nuke sites*, ASSOC. PRESS (Jun. 21, 2011) [http://www.msnbc.msn.com/id/43475479/ns/us\\_news-environment/t/radioactive-tritium-leaks-found-us-uke-sites/#.T4hmmauqD9Y](http://www.msnbc.msn.com/id/43475479/ns/us_news-environment/t/radioactive-tritium-leaks-found-us-uke-sites/#.T4hmmauqD9Y).

<sup>47</sup> CONTESTING THE FUTURE OF NUCLEAR POWER, *supra* note 28, at 149–50.

<sup>48</sup> *Id.* at 153–158.



considers all the different costs of nuclear power including mining, processing, plant construction, plant decommissioning and waste management.<sup>49</sup> Additionally, the security risks at nuclear power plants as well as during the transport of nuclear material, the possibility of weapons proliferation, and the marginalization many communities around nuclear power plants are forced to deal with are only some of the other common criticisms of nuclear power.<sup>50</sup>

### C. Nuclear Power in China

Although China began developing nuclear technology as early as 1954, it was not until 1991 that China connected its first nuclear power plant to the electrical grid.<sup>51</sup> China currently operates fourteen nuclear power reactors, has more than two dozen under construction, and is planning to build numerous other nuclear reactors.<sup>52</sup> Prior to the accident at Fukushima Daiichi, China had estimated that it would increase its nuclear power, currently estimated to be approximately 11.3 GWe to, 70-80 GWe by 2020 and 400-500 GWe by 2050.<sup>53</sup>

The power plants are built and operated by two state-run companies: the China National Nuclear Corporation (CNNC) and China Guangdong Nuclear Power Group (CGNPG).<sup>54</sup> CNNC is the largest nuclear power company in China.<sup>55</sup> Once responsible for the development of China's atomic bomb, the CNNC now supports nuclear national defense efforts as well as the

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<sup>49</sup> *Id.* at 126.

<sup>50</sup> *Id.* at 171-203.

<sup>51</sup> Daogang Lu, *The Current Status of Chinese Nuclear Power Industry and its Future*, 2 E-JOURNAL OF ADVANCED MAINT. 1 (2010), available at <http://www.jsm.or.jp/ejam/Vol.2.No.1/GA/12/article.html>.

<sup>52</sup> *Nuclear Power in China*, WORLD NUCLEAR ASSOCIATION, <http://www.world-nuclear.org/info/inf63.html> (last updated Apr. 2012).

<sup>53</sup> *Id.*

<sup>54</sup> *Id.*

<sup>55</sup> Keith Bradsher, *Nuclear Power Expansion in China Stirs Concerns*, NY TIMES, Dec. 15, 2009, [http://www.nytimes.com/2009/12/16/business/global/16chinanuke.html?\\_r=2&partner=rss&emc=rss&pagewanted=all](http://www.nytimes.com/2009/12/16/business/global/16chinanuke.html?_r=2&partner=rss&emc=rss&pagewanted=all).



development of nuclear power plant.<sup>56</sup> Although it is state-owned, answers directly to the state council,<sup>57</sup> the CNNC functions as an economic corporation.<sup>58</sup> The CNNC operates under a number of subsidiary companies over twenty provinces and autonomous regions and employees more than 100,000 employees.<sup>59</sup>

Not only is China rapidly developing the construction of nuclear power plants, the CNNC and its subsidiaries are also developing their own nuclear technology. A number of schools and research institutes, some funded by the CNNC, engage in a variety of nuclear research.<sup>60</sup> China is developing many of its new technologies including the “pebble bed” modular technology, which, although it is still in the early planning stages, may be able to provide more energy than a conventional reactor without the risk of overheating as well as without the need for the quantity of water normally required of reactors.<sup>61</sup> In December 2011, Bill Gates, the Microsoft co-founder, announced that TerraPower, a company he has largely funded, is currently in talks with CNNC to develop a new kind of nuclear reactor that will be cheaper, safer, and generate less waste than the reactors currently being used around the world.<sup>62</sup>

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<sup>56</sup> About Us, CHINA NATIONAL NUCLEAR CORPORATION, <http://www.cnncc.com.cn/tabid/643/Default.aspx> (last visited Apr. 15, 2012).

<sup>57</sup> China’s Program for Science and Technology Modernization: Implications for American Competitiveness, THE U.S.-CHINA ECON. & SEC. REVIEW COMM’N 82 (2011), available at [http://www.uscc.gov/researchpapers/2011/USCC\\_REPORT\\_China's\\_Program\\_forScience\\_and\\_Technology\\_Moder\\_nization.pdf](http://www.uscc.gov/researchpapers/2011/USCC_REPORT_China's_Program_forScience_and_Technology_Moder_nization.pdf).

<sup>58</sup> *Id.*

<sup>59</sup> *Id.*; CNNC Profile, CHINA NAT’L NUCLEAR CORP.(2005), <http://www.cnncc.com.cn/tabid/164/Default.aspx>.

<sup>60</sup> *Government Structure and Ownership*, WORLD NUCLEAR ASSOC., [http://www.world-nuclear.org/info/inf63ai\\_chinanuclearstructure.html](http://www.world-nuclear.org/info/inf63ai_chinanuclearstructure.html) (last updated Apr. 2012).

<sup>61</sup> *Id.*

<sup>62</sup> *Bill Gates developing nuclear reactors with China*, ASSOC. PRESS, Dec. 7, 2011, <http://news.yahoo.com/bill-gates-developing-nuclear-reactor-china-104529282.html>



However, China's nuclear future was, at least for a time, uncertain in the aftermath of the accident at Fukushima Daiichi. As a result of the accident at Fukushima<sup>63</sup>, many developed countries such as Italy, France and Japan, halted their nuclear programs.<sup>64</sup> Germany and Switzerland both voted to close existing nuclear power plant altogether.<sup>65</sup> However, other countries, mainly those that are developing and are experiencing growth such as India and Brazil, have not taken such steps.<sup>66</sup>

China, located less than 1,000 miles from Fukushima Daiichi, did for a time slow its nuclear development. In March 2011, Chinese officials announced that they would temporarily stop the review and approval of new nuclear power plants while National Nuclear Safety Administration (NNSA), the National Energy Administration and China Earthquake Administration conducted a safety review of existing nuclear power plants.<sup>67</sup> According to a press conference held in March 2012, the results of the safety inspection have yielded "problems in 14 areas" that "need to be resolved."<sup>68</sup> However, the details of what the problems were and how they were to be resolved

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<sup>63</sup> On March 11, 2011, a magnitude 9 earthquake of the east coast of Japan created a series of large tsunamis that struck the east coast of Japan. The combination of the earthquake and the tsunami caused extensive damage to the Fukushima Daiichi plant located along the east coast of Japan. As a result of the damage, operators lost power, reactor control, and many of the emergency communications devices that were designed to be used in such situations. The loss of these systems eventually resulted in a large amount of radiation being released into the environment. Osnos, *supra*, note 30 at 46.

<sup>64</sup> Keith Bradsher, *China Marches on with Nuclear Energy, in spite of Fukushima*, N.Y. TIMES (Oct. 10, 2011) [http://www.nytimes.com/2011/10/11/business/energy-environment/china-marches-on-with-nuclear-energy-in-spite-of-fukushima.html?pagewanted=1&\\_r=1](http://www.nytimes.com/2011/10/11/business/energy-environment/china-marches-on-with-nuclear-energy-in-spite-of-fukushima.html?pagewanted=1&_r=1).

<sup>65</sup> *Id.*

<sup>66</sup> *Id.*

<sup>67</sup> Xie Yu, *Building of nuclear plants to resume*, CHINADAILY, Mar. 8, 2012, [http://www.chinadaily.com.cn/bizchina/2012-03/08/content\\_14785334.htm](http://www.chinadaily.com.cn/bizchina/2012-03/08/content_14785334.htm).

<sup>68</sup> Peter Ford, *China's nuclear power plant review: 'problems in 14 areas' found*, CHRISTIAN SCIENCE MONITOR, Mar. 12, 2012, <http://www.csmonitor.com/World/Global-News/2012/0312/China-s-nuclear-power-plant-review-problems-in-14-areas-found>.



was not revealed during the press conference.<sup>69</sup> However, the official did note that the review and approval of nuclear power reactors in China would continue sometime in 2012.<sup>70</sup>

#### D. Nuclear Power in United States

After its military use of nuclear power in World War II, President Eisenhower and Congress determined that nuclear power should be used for peaceful purposes.<sup>71</sup> By enacting the Atomic Energy Act of 1954, Congress authorized the civilian use of nuclear power.<sup>72</sup> The AEC was created to oversee both the propagation of nuclear power for civilian uses as well as for the regulation of nuclear power.<sup>73</sup> In 1957, the AEC and Duquesne Light Company joined efforts to open the first commercially operating nuclear reactor in the United States.<sup>74</sup> The nuclear power plant movement gained momentum in the 1960s as plant orders become more numerous and the plants themselves generated more power.<sup>75</sup> The 1970s proved a more contentious time for nuclear energy.<sup>76</sup> The environmental movement, the realization of the safety and proliferation risks associated with power plant development, and radioactive waste disposal made nuclear power plants less popular both politically as well as in the private marketplace.

In 1974, Congress enacted the Energy Reorganization Act, which split the AEC into two separate organizations: the Nuclear Regulatory Commission (NRC) and the Energy Research Development Agency (ERDA), a precursor to the Department of Energy.<sup>77</sup> The NRC was tasked

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<sup>69</sup> *Id.*

<sup>70</sup> *Id.*

<sup>71</sup> JAY M. GUTIERREZ & ALEX S. POLONSKY, FUNDAMENTAL OF NUCLEAR REGULATION IN THE UNITED STATES, 49 (2d ed. 2007)

<sup>72</sup> *Id.* at 4.

<sup>73</sup> *Id.* at 5.

<sup>74</sup> ELIZABETH S. ROLPH, NUCLEAR POWER AND THE PUBLIC SAFETY 55 (1979).

<sup>75</sup> *Id.* at 79–80.

<sup>76</sup> GUTIERREZ & POLONSKY, *supra* note 71, at 6.

<sup>77</sup> *Id.*



with regulating nuclear energy while the ERDA was tasked with the military and promotional responsibilities that the AEC once bore.

By the late 1970s, a combination of factors including the arrival of the environmental movement led to a decline in the number of nuclear power plants being built in the United States. The accidents at Three Mile Island and at Chernobyl cooled nuclear power plant development in the 1980s and the 1990s. However, around the turn of the millennium, concerns about climate change and reliance on fossil fuels from overseas made many think again about nuclear power in the United States.<sup>78</sup>

However, due to economic concerns and the trepidation about the disposal of spent nuclear fuel, many believed that the so called nuclear renaissance is dead.<sup>79</sup> While many other developed countries swore off or reduced their reliance on nuclear power after the accident at Fukushima, the United States, which had already reduced plans to build thirty nuclear power plants down to four before the accident, did not appear to waiver in its support for nuclear power.<sup>80</sup> As of 2011, the United States operates 104 nuclear reactors that provide approximately 19.7% of the country's energy.<sup>81</sup> Many of the 104 existing nuclear reactors are decades old and face the prospect of decommissioning. Furthermore, many experts expect the cost of operating nuclear power plants to go up in the wake of Fukushima as safety standards are likely to tighten

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<sup>78</sup> Mark Cooper, *The Economics of Nuclear Reactors: Renaissance or Relapse 4* (June 2009) (unpublished manuscript), available at <http://www.vermontlaw.edu/Documents/Cooper%20Report%20on%20Nuclear%20Economics%20FINAL%5B1%5D.pdf>.

<sup>79</sup> Michael Grunwald, *The Nuclear Renaissance: Still Dead*, TIME SWAMPLAND (Apr. 20, 2011) <http://swampland.time.com/2011/04/20/the-nuclear-renaissance-still-dead/>.

<sup>80</sup> Stephen Cooke, *After Fukushima, Does Nuclear Power Have a Future?* N.Y. TIMES, Oct. 10, 2011, [http://www.nytimes.com/2011/10/11/business/energy-environment/after-fukushima-does-nuclear-power-have-a-future.html?pagewanted=2&\\_r=1](http://www.nytimes.com/2011/10/11/business/energy-environment/after-fukushima-does-nuclear-power-have-a-future.html?pagewanted=2&_r=1).

<sup>81</sup> CONTESTING THE FUTURE OF NUCLEAR Power, *supra* note 28, at 22.



and fall under increased scrutiny.<sup>82</sup> Furthermore, opinion polls indicate that, after a period in which the public was increasingly receptive to the idea of the development of new nuclear power plants<sup>83</sup>, the accident in Japan reduced public support for the development of nuclear power plants in the United States.<sup>84</sup> Today, the Obama administration currently envisions nuclear power as part of its energy future.<sup>85</sup> In February 2012, the NRC voted to approve the first construction permit for a nuclear reactor in over 35 years.<sup>86</sup>

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<sup>82</sup> *The Future of the Nuclear Fuel Cycle*, MASS. INST. OF TECH., xv (2011), [http://web.mit.edu/mitei/research/studies/documents/nuclear-fuel-cycle/The\\_Nuclear\\_Fuel\\_Cycle-all.pdf](http://web.mit.edu/mitei/research/studies/documents/nuclear-fuel-cycle/The_Nuclear_Fuel_Cycle-all.pdf).

<sup>83</sup> Disaster in Japan raises Nuclear Concerns in U.S., GALLUP, Mar. 16, 2011, <http://www.gallup.com/poll/146660/disaster-japan-raises-nuclear-concerns.aspx>.

<sup>84</sup> Poll: Support for New Nuclear Power Plants Drops, CBS NEWS, Mar. 22, 2011 [http://www.cbsnews.com/8301-503544\\_162-20046020-503544.html?tag=latest](http://www.cbsnews.com/8301-503544_162-20046020-503544.html?tag=latest).

<sup>85</sup> Matthew Fuld, *U.S. Support New Nuclear Reactors in Georgia*, N.Y. TIMES Feb. 16, 2010, <http://www.nytimes.com/2010/02/17/business/energy-environment/17nukes.html>.

<sup>86</sup> Lucia Graves, *Vogtle Nuclear Power Plant Wins First Reactor Construction Permit in a Generation*, HUFFINGTON POST, Feb. 9, 2012, [http://www.huffingtonpost.com/2012/02/09/federal-regulators-approve-nuclear-reactor\\_n\\_1266100.html](http://www.huffingtonpost.com/2012/02/09/federal-regulators-approve-nuclear-reactor_n_1266100.html).



## II. EXISTING NUCLEAR SAFETY REGULATION IN CHINA AND THE UNITED STATES

### A. China

#### i. Overview

Chinese nuclear safety law comes from a variety of sources including statutes, regulations, departmental rules, and international agreements. The basic law in the area is the Law of the People's Republic of China on Prevention and Control of Radioactive Pollution.<sup>87</sup> This law, promulgated in 2003, covers the prevention of the release of radioactive substances through existing nuclear power plants, through the use of nuclear technology, as well as during the mining of uranium and other radioactive substances.<sup>88</sup>

Second, the state council has developed a number of regulations that cover different aspects of the operation of nuclear power plants. Most importantly, there is a regulation on the nuclear materials control, which was promulgated in 1987 regarding the permitting of the nuclear material.<sup>89</sup> Additionally, there are regulations on the safety of civilian nuclear facilities. These regulations involve the safety supervision of existing power plants. The regulations involving emergency measures for accidents at nuclear power plants, promulgated in 1993, outline the existence of emergency organizations, their responsibilities and the necessary countermeasures, as well as protective actions that should be in place at nuclear power plants.

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<sup>87</sup> Law of the People's Republic of China on Prevention and Control of Radioactive Pollution (promulgated by the Standing Comm. Nat'l People's Cong., Dec. 28, 1990, effective Oct. 1, 2003), *available at* <http://www.lawinfochina.com/display.aspx?id=2889&lib=law&SearchKeyword=Prevention%20and%20Control%20of%20Radioactive%20Pollution&SearchCKeyword=>.

<sup>88</sup> *Id.*



The rules and regulations are drawn up by the China Atomic Energy Agency (CAEA), which is tasked with regulating peaceful uses of nuclear power.<sup>90</sup> The CAEA is charged with regulating nuclear safety, promoting research and development, and applying nuclear techniques to other non-power uses such as medical applications.<sup>91</sup> The CAEA is controlled by the Commission for Science, Technology & Industry for National Defense.<sup>92</sup> The CAEA, which was split from the CNNC in 1998, has been instrumental in promoting nuclear energy throughout China.<sup>93</sup> The State-Owned Assets Supervision & Administration Commission (SASAC) along with the National Development and Reform Commission (NDRC) together plan the development of nuclear power plants throughout China.<sup>94</sup> Once plans are in place, the state-owned corporations take over development of the power plants. The National Nuclear Safety Administration (NNSA), which is part of the CAEA but reports directly to the State Council, manages safety issues as well as licensing.<sup>95</sup>

## ii. Licensing

In China, the NNSA is in charge of the licensing of nuclear power plants. The licensing process involves three steps.<sup>96</sup> First, operators must conduct a site evaluation of the nuclear power plants in the feasibility study stage.<sup>97</sup> At this stage, the applicants are instructed to submit general site impact and environmental impact materials to NNSA. Once these have been

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<sup>90</sup> *Main Function*, China Atomic Energy Agency, <http://www.caea.gov.cn/n602670/n621894/n621895/32165.html> (last visited May 1, 2012).

<sup>91</sup> *Id.*

<sup>92</sup> *Government Structure and Ownership*, World Nuclear Assoc., [http://www.world-nuclear.org/info/inf63ai\\_chinanuclearstructure.html](http://www.world-nuclear.org/info/inf63ai_chinanuclearstructure.html) (last updated Apr. 2012).

<sup>93</sup> *Id.*

<sup>94</sup> *d.*

<sup>95</sup> *Id.*

<sup>96</sup> *The People's Republic of China Nuclear Material Control Regulations* (promulgated Mar. 3, 2004, effective Mar. 3, 1004), <http://www.fmprc.gov.cn/eng/wjb/zzjg/jks/cjkk/2622/t70276.htm>.

<sup>97</sup> **ATTEMPTING TO FIND CITATIONS FOR THIS SECTION**



reviewed, the NNSA will issue a recommendation about whether to go forward with the licensing. The NNSA will report its finding to the Development and Reform Commission, a department of the State Council.

The second step in the process involves the application and issuance of a construction licensing permit. After the first step described above, which involves the approval of the feasibility of the nuclear power plants, a formal application of the construction license is submitted to NNSA. At the same time, the operator should also submit a Preliminary Safety Analysis Report (PSAR), environmental impact report of the construction stage of the project, a quality assurance outline (the design and construction stage) to the NNSA to be evaluated. After the completion of these reports, the NNSA will hear the experts' advisory opinions of the committee of nuclear safety and radiation environmental safety. The NNSA will then give a construction permit (CP) to the applicant.

Third, the operator of the power plant must submit an application to obtain a permit prior to loading fuel into the reactors. Depending on how fast the reactor is constructed, the operator should submit this application at least twelve months before the prospective loading of the fuel. With the fuel loading application, the operator then submits a Final Safety Analysis Report (FSAR), environmental impact report, the construction process report, and a quality assurance report. After all these documents are reviewed and the experts' advisory opinions are heard, NNSA will provide a FFLP (First Fuel Loading Permit) to the applicant. The operator will then load the fuel into the reactor and begin the adjusting work until the nuclear power plant is at full power and ready to begin the trial run. The NNSA will supervise these processes.



### iii. Operation

A permit is also required for the operation of a nuclear power plant. After the nuclear power plant is operated at full power for one year, the operator then must submit a formal application for an operation license (OL) to NNSA. At the same time, the operator should also submit a report on whether the FSAR or other reports are in conformance with the first year of plant operation. After all the relevant reviews are done and the experts advisory opinions of the committee of nuclear safety and radiation environmental safety are heard, NNSA will give an OL to the applicant. Inspections are conducted annually by the China Atomic Energy Authority.<sup>98</sup>

## B. United States

### i. Overview

The NRC regulates all the civilian use of byproduct, source and special nuclear material for the purposes of protecting citizens' health and safety.<sup>99</sup> Among the NRC's responsibilities is the licensing of new nuclear power plants.<sup>100</sup> However, it is not the NRC that initiates the licensing process. Nuclear power plants in the United States are generally conceived, constructed and operated by private companies.<sup>101</sup> Typically, these private entities are utilities.<sup>102</sup> The decision to seek a license or permit rests with the entity that intends to own and operated the facility.<sup>103</sup>

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<sup>98</sup> Huang Wei, Ratification and Implementation of Amendment to CPPNM in China, CHINA ATOMIC ENERGY AUTH., 7 (Nov. 18, 2010), <http://www-ns.iaea.org/downloads/security/cppnm/reg-infr-process-china-huang.pdf>.

<sup>99</sup> U.S. NUCLEAR REGULATORY COMM'N, STAFF REPORTS: FREQUENTLY ASKED QUESTIONS ABOUT LICENSE APPLICATIONS FOR NEW NUCLEAR POWER REACTORS (NUREG/BR-0468), 1 (2009) [hereinafter **NUREG 0468**], available at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0468/>.

<sup>100</sup> *Id.*

<sup>101</sup> U.S. NUCLEAR REGULATORY COMM'N, OAK RIDGE NATIONAL LABORATORY, OWNERS OF NUCLEAR POWER PLANTS (NUREG/BR-6500), 1 (2001) [hereinafter **NUREG 6500**], available at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr6500/r2/cr6500.pdf>.

<sup>102</sup> *Id.*

<sup>103</sup> NUREG 0468, *supra* note 99, at 2.



The NRC, and its predecessor the AEC, have licensed all of the 104 nuclear reactors operating in the United States.<sup>104</sup> The NRC licensed these plants under a two-step process, under Title 10 of the Code of Federal Regulations Part 50, requiring first a permit to construct a power plant followed by a separate review process for operating the plant.<sup>105</sup> This two-step process is known as the “Part 50” process. While all the power plants in the United States were licensed under the Part 50 process, the NRC has since established an alternative means of licensing called the Combined Process, which combines aspects of a construction permit and an operating license.<sup>106</sup>

ii. Two-Step Licensing: The Pre-1989 Process

The first step in the Two-step process is filing for a construction license. The construction license has three general requirements: a preliminary safety analysis, an environmental review, and financial and anti-trust statements.<sup>107</sup> When the NRC determines that all the necessary information is present for a construction permit, the NRC will publish a notice in the Federal Register.<sup>108</sup> After conducting several meetings with the public near the location of the proposed site,<sup>109</sup> the NRC reviews and makes findings on the elements permit.<sup>110</sup> Through a combination of requirements set forth in the Atomic Energy Act and standardized guidance created by the NRC itself, the NRC will review the preliminary safety analysis and make findings on its

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<sup>104</sup> GUTIERREZ & POLONSKY, *supra* note 69, at 49.

<sup>105</sup> NUREG 0468, *supra* note 99, at 2.

<sup>106</sup> *Backgrounder on Nuclear Power Plant Licensing Process*, NUCLEAR REG. COMM’N, 1 (Jul. 2005), <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/licensing-process-bg.pdf> [hereinafter *Backgrounder on Nuclear Power Plant Licensing Process*].

<sup>107</sup> U.S. NUCLEAR REGULATORY COMM’N, BROCHURE: NUCLEAR POWER PLANT LICENSING PROCESS (NUREG/BR-0298, Rev. 2), 2 (2004) [hereinafter **NUREG 0298**], available at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0298/br0298r2.pdf>.

<sup>108</sup> *Id.*

<sup>109</sup> *Id.* at 3.

<sup>110</sup> NUREG 0298, *supra* note 107, at 2.



suitability. Additionally, the Advisory Committee on Reactor Safeguards (ACRS), a group of technical experts independent of the NRC or the applicant, reviews and comments on each application.<sup>111</sup>

The environmental review is conducted in accordance with a distinct environmental law called the National Environmental Policy Act (NEPA). The NEPA process broadly focuses on not only environmental issues such as air, water, vegetation, animal life and natural resources but also the effect the nuclear power reactor will have on the areas from historical, archaeological, or architectural significance.<sup>112</sup> The report weighs the environmental costs versus the perceived benefits of the plan.<sup>113</sup> After this review, the NRC will issue a draft environmental impact statement (EIS). The report will be made available to the public including other state, local and federal agencies. The NRC will then issue a final EIS, which addresses all the comments that the NRC receives.

Based on the findings of the NRC, the ACRS, and the public, the Atomic Safety and Licensing Board (ASLB) will hold a public adjudicatory hearing where the license is either accepted or rejected.<sup>114</sup> An applicant can appeal the ASLB opinion to the United States Circuit Court of Appeal for the District of Columbia<sup>115</sup>.

Once the construction permit is accepted, the applicant may begin to construct the power plant.<sup>116</sup> However, the applicant may not operate the plant until it receives an operating license. The principle component of an operating license application is the Final Safety Analysis Report

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<sup>111</sup> *Id.*

<sup>112</sup> *Id.*

<sup>113</sup> Gutierrez & Polonsky, *supra* note 71, at 63.

<sup>114</sup> 42 U.S.C. § 2241 (2009).

<sup>115</sup> 42 U.S.C. § 2239 (2009); 28 U.S.C. § 2342 (2009).

<sup>116</sup> *Backgrounder on Nuclear Power Plant Licensing Process, supra* note X, at 1.



(FSAR).<sup>117</sup> The FSAR supplements the PSAR and provides a host of new information regarding the design, construction, and operation of the plant. In addition to submitting the FSAR, the applicant is required to update the EIS. Like the construction permit, a decision is made by the ASLB or to the NRC, which can then be appealed to the United States Circuit Court of Appeal for the District of Columbia<sup>118</sup>.

### iii. Combined Permitting Process

In 1989, the NRC crafted an alternative route for nuclear power plant licensing.<sup>119</sup> Under the Combined Licensed (COL) approach, the applicants combine the construction and operating authorization into a single license. In the application, the applicant must address: the design of the plant, any environmental impacts, safety issues, financial and technical specification, emergency plans, security plans, quality insurance plans, and other factors relating to the design and maintenance of the proposed power plant.<sup>120</sup> As was the case with the two-step process described above, the bulk of the COL is safety information. The applicant is required to submit a safety report similar to the FSAR described above in the two-step process.<sup>121</sup> The applicant must also submit an EIS under NEPA.<sup>122</sup>

The NRC will then review the application, which can take up to several years to complete.<sup>123</sup> During the review process, several public meetings occur.<sup>124</sup> In addition to being involved in

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<sup>117</sup> *Id.*

<sup>118</sup> 42 U.S.C. § 2239 (2009); 28 U.S.C. § 2342 (.2009)

<sup>119</sup> NUREG 0298, *supra* note 107, at 4. The new process, created under 10 CFR Part 52 was established in 1989; however, no plant has been licensed using this new procedure.

<sup>120</sup> NUREG 0468, *supra* note 99, at 10.

<sup>121</sup> *Id.*

<sup>122</sup> *Id.*

<sup>123</sup> *Id.*

<sup>124</sup> *Id.*



public meetings, the public can participate by providing comments to the application and participating in the hearing process.<sup>125</sup>

After the NRC reviews the application, the Atomic Energy Act requires that at least one public hearing be completed before a license is approved.<sup>126</sup> If the license is approved, construction may commence. At the conclusion of construction, the NRC will verify that the applicant has completed the required instructions.<sup>127</sup> Once the NRC has verified that the applicant has completed the instructions per the acceptance criteria set forth in the COL, the applicant may begin operation of the plant.<sup>128</sup>

The COL process also allows for an “Early Site Permit” or “ESP” that allows the applicant to obtain approval for the siting of nuclear power plant without specifying the design of the reactor.<sup>129</sup> The purpose of the ESP is to resolve safety and environmental problems well in advance of plant construction reducing licensing uncertainty and aiming to resolve issues relating to siting before construction and investment are expended.<sup>130</sup>

Another alternative under the new COL system is the “Design Certification,” which allows for a standard nuclear power plant design to be approved up to 15 years before the COL permit is submitted.<sup>131</sup> This option, like the ESP, allows applicants to plan ahead and aims to mitigate

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<sup>125</sup> *Id.* at 11.

<sup>126</sup> *Id.*

<sup>127</sup> *Id.*

<sup>128</sup> *Id.*

<sup>129</sup> *Id.*

<sup>130</sup> *Id.* This approach allows applicants to complete an ESP for up to 20 years before submitting the COL license.

<sup>131</sup> *Id.*



licensing uncertainty regarding new, previously unapproved designs.<sup>132</sup> Currently eighteen COL applications have been submitted to NRC.<sup>133</sup>

### III. PUBLIC PARTICIPATION IN NUCLEAR DECISION-MAKING

Across the world, countries, private industries, and individuals have been secretive about the inner-workings of nuclear power plants. While legitimate motives exist for keeping certain elements of nuclear technology private, other information, such as siting decisions and risk from nuclear fall-out, should be communicated to the public. Both China and the United States have endeavored to strike a balance between providing the public with an opportunity to participate in these decisions that may affect their lives and not divulging too much information or creating unnecessary delays to projects that they believe to be necessary and time-sensitive. This Part first describes the methods of public participation that citizens may use in both China and the United States when determining whether to build or continue to operate nuclear power plants. Because of China's current rapid development of nuclear power plants, the Chinese focus of this Article centers on the licensing of nuclear power plants. However, the American focus of this Part will concentrate on the relicensing procedures in the United States due to the relative lack of licensing application as well as the multitude of nuclear power plants that have been or will soon be up for relicensing. Then, this part will compare the two methods of public participation and lastly propose a number of steps to improve the public participation process in China.

#### A. Public Participation in China

Throughout history, the concept of “mass participation” has been an important and widespread theme in Chinese governance, including the ways in which China has addressed

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<sup>132</sup> *Id.*

<sup>133</sup> *Combined License Applications for New Reactors*, U.S. NUCLEAR REGULATORY COMM'N, <http://www.nrc.gov/reactors/new-reactors/col.html> (last updated Mar. 29, 2012).



environmental protection.<sup>134</sup> In 1973, during China’s first National Conference on Environmental Protection, a policy statement noted that “environmental protection relies on the masses and the joint efforts of all.”<sup>135</sup> However, the idea of “mass participation” does not equate to the western conception of “public participation.”<sup>136</sup> While the western notion of public participation focuses on the rights of individuals to be informed and participate in government processes, the idea of Chinese “mass participation” connotes a program of forced cooperation and agreement with government action.<sup>137</sup> However, increasing contact with the international community, including projects that made development or funding contingent on input from the public, instigated the use of the western conception of public participation in China.<sup>138</sup> In the early 1990s, a number of Chinese agencies, ministries, commissions began a campaign to strengthen public participation, particularly relative to environmental impact assessments.<sup>139</sup> While the impact of public participation on decision-making in China may be limited, the Chinese officials tasked with making key decision are requesting that the public participate more in decisions.<sup>140</sup> Furthermore, there is some evidence that the decision-making in China has become “more democratic and participatory.”<sup>141</sup>

The main law governing the licensing of nuclear power plants, the Law of the People's Republic of China on Prevention and Control of Radioactive Pollution, does not explicitly

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<sup>134</sup> Zhao, *Rhetoric or Reality*, *supra* note 8 at 92.

<sup>135</sup> *Id.*

<sup>136</sup> *Id.*

<sup>137</sup> *Id.*

<sup>138</sup> *Id.*

<sup>139</sup> *Id.* at 93 (citing National Environmental Protection Agency, the State Planning Commission, the Ministry of Finance and the People's Bank of China, *Circular on Strengthening the Management of EIA for Construction Projects Funded by International Financial Organizations* (21 June 1993)).

<sup>140</sup> Zhao, *supra* note 8 at 93.

<sup>141</sup> *Id.*



provide for a public participation component.<sup>142</sup> However, as part of the licensing process, those seeking to build a nuclear power plant must file an environmental impact assessment (EIA).<sup>143</sup> Furthermore, as part of the EIA process, applicants are required to include a public participation element.<sup>144</sup> Therefore, for those looking to participate in the licensing of a nuclear power plant, the EIA may provide the most effective means of participation.

i. Environmental Impact Assessments in China

In China, the Environmental Protection Law of 1989 provided the initial governmental initiative for project developers to conduct Environmental Impact Assessments (EIA).<sup>145</sup> However, the 2002 Environmental Impact Assessment Law currently provides the statutory structure under which EIAs are completed.<sup>146</sup> In principle, construction activity of all sizes as well as government land use and development plans will trigger requirements under China's EIA

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<sup>142</sup> Law of the People's Republic of China on Prevention and Control of Radioactive Pollution (promulgated by the Standing Comm. Nat'l People's Cong., Dec. 28, 1990, effective Oct. 1, 2003), *available at* <http://www.lawinfochina.com/display.aspx?id=2889&lib=law&SearchKeyword=Prevention%20and%20Control%20of%20Radioactive%20Pollution&SearchCKeyword=>.

<sup>143</sup> Environmental Impact Assessment Law (promulgated by Standing Comm. Nat'l People's Cong., Oct. 28, 2002, effective Sept. 1, 2003), ch. 2, *available at* [http://www.sepa.gov.cn/law/law/200210/t20021028\\_84000.htm](http://www.sepa.gov.cn/law/law/200210/t20021028_84000.htm) (P.R.C.).

<sup>144</sup> *Id.*

<sup>145</sup> Zhao, *Rhetoric or Reality*, *supra* note 8 at 92; Environmental Protection Law of the People's Republic of China (promulgated by the Standing Comm. Nat'l People's Cong., Dec. 26, 1989, effective Dec. 26, 1989), art. 6 *available at* [http://www.lawinfochina.com/display.aspx?id=1208&lib=law&SearchKeyword=environmental%20protection%20aw&SearchCKeyword=](http://www.lawinfochina.com/display.aspx?id=1208&lib=law&SearchKeyword=environmental%20protection%20law&SearchCKeyword=) (stating that "[t]he EIA report of a construction project shall assess the pollution caused by the project and its impact on the environment, provide control measures and submit to the relevant environmental protection authorities for approval after a preliminary examination by the project supervisory authority. The relevant planning authority must not examine or approve any construction project until the project proponent has obtained approval of its EIA report by the environmental protection authority").

<sup>146</sup> Zhao, *Rhetoric or Reality*, *supra* note 8 at 93.



law.<sup>147</sup> The largest projects require completion of an environmental impact report (EIR) while smaller project may merely require developers to fill out a form.<sup>148</sup>

The public participation component of EIAs is largely controlled by regulations called the “Measures on Public Participation in Environmental Impact Assessment” and the Provisional Measure on Public Participation in Environmental Impact Assessment.”<sup>149</sup> The regulations require that the public is informed of either a hearing or the details about the project in a media outlet.<sup>150</sup> When a project is planned in an environmentally sensitive area, the applicant must disclose certain information to the public including basic information regarding the project, a description of environmental impacts, ways in which those impacts will be mitigated, and information regarding how the public can be further involved.<sup>151</sup> The regulations require that this information must be provided in a way that is easily accessible to the public.<sup>152</sup> The public may attend a hearing—if one is determined to be necessary—or, if no hearing is deemed necessary, they then may send comments to the applicants and the regulators in charge of approving or rejecting the EIR in a variety of forms.<sup>153</sup> The regulations then mandate that the applicant and the

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<sup>147</sup> Jesse L. Moorman & Zhang Ge, *Promoting and Strengthening Public Participation in China's Environmental Impact Assessment Process: Comparing China's Eia Law and U.S. Nepa*, 8 VT. J. ENVTL. L. 281, 297–99 (2007) (citing Yan Wang et al., *Environmental Impact Assessment of Projects in the People's Republic of China: New Law, Old Problems*, 23 ENVIRON. IMPACT ASSESSMENT REV. 543, 545 (2003)).

<sup>148</sup> *Id.* at 299.

<sup>149</sup> Zhao, *Rhetoric or Reality*, *supra* note 8, at 91 (citing Provisional Measures on Public Participation in Environmental Impact Assessment (promulgated by SEPA, Feb. 14, 2006, effective Mar. 18, 2006 and The Provisional Measures on Public Participation in Environmental Impact Assessment 2006 (adopted by SEPA on 14 February 2006, effective on 18 March 2006))).

<sup>150</sup> *Id.* at 103.

<sup>151</sup> *Id.* at 104.

<sup>152</sup> *Id.* at 105.

<sup>153</sup> *Id.* at 101.



governing agency gather input from the public for a minimum of ten days.<sup>154</sup> After this period, the agency makes its decision.<sup>155</sup>

While the public participation in the EIA has progressed significantly, many contend that the measures in place are not enough. First, while the EIA law notes that “the state encourages relevant units, experts and the public to participate in the EIA process in a proper way,” public participation in the EIA process is limited to only the largest projects.<sup>156</sup> As of 2007, only 5.5% of projects conducting EIAs were large enough to require a public participation component.<sup>157</sup> Second, the process suffers from a lack of accurate and adequate information.<sup>158</sup> Specifically, several regulations<sup>159</sup> exempt “government information” from being disclosed during the public participation process.<sup>160</sup>

The construction of nuclear power plants in China typically requires the most intensive public participation requirement: completion of an EIR.<sup>161</sup> For nuclear power reactors, Among EIRs must include information such as the amount of radiation emitted as well as how much low-level liquid waste will be discharged.<sup>162</sup> The projected emissions are compared with a

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<sup>154</sup> *Id.* at 109.

<sup>155</sup> *Id.*

<sup>156</sup> Environmental Impact Assessment Law (promulgated by Standing Comm. Nat'l People's Cong., Oct. 28, 2002, effective Sept. 1, 2003), ch. 2, available at [http://www.sepa.gov.cn/law/law/200210/t20021028\\_84000.htm](http://www.sepa.gov.cn/law/law/200210/t20021028_84000.htm) (P.R.C.).

<sup>157</sup> *Id.* at 108.

<sup>158</sup> Yuhong Zhao, *Assessing the Environmental Impact of Projects: A Critique of the Eia Legal Regime in China*, 49 NAT. RESOURCES J. 485, 496 (2009) [hereinafter Zhao, *Assessing the Environmental Impact of Projects*].

<sup>159</sup> Measures on Disclosure of Environmental Information (For Trial Use) (promulgated by SEPA, Apr. 11, 2007, effective May 1, 2008); Regulation on Disclosure of Government Information (promulgated by the State Council, Apr. 5, 2007, effective May 1, 2008).

<sup>160</sup> Zhao, *Assessing the Environmental Impact of Projects*, *supra* note 158, at 500.

<sup>161</sup> Country Profiles: China, INT'L ATOMIC ENERGY AGENCY, [http://www-pub.iaea.org/MTCD/Publications/PDF/CNPP2011\\_CD/countryprofiles/China/China2011.htm#1](http://www-pub.iaea.org/MTCD/Publications/PDF/CNPP2011_CD/countryprofiles/China/China2011.htm#1) (last updated July 2010).

<sup>162</sup> Liyong Wenhui and Zhang Ling, Nuclear Power Plant Siting and Environmental Impact Assessment, China Nuclear Power (No. 3-2009), available at <http://www.dynabondpowertech.com/en/nuclear-power-news/scientific-articles/116-china/2422-nuclear-power-plant-siting-and-environmental-impact-assessment>.



number of existing regulations regarding the discharge of radioactive material including Radiation Protection Requirements of Nuclear Power Plants.<sup>163</sup> Additionally, the applicant must demonstrate that the plant complies with a number of regulations regarding emergency management of nuclear power plants.<sup>164</sup> One of the key provisions of the regulation provides that there cannot be more than 100,000 people living within 10 kilometers of the proposed nuclear power plant.<sup>165</sup>

Information regarding whether citizens have used the EIR procedures in the licensing of nuclear power plants was not available; however, opposition to the construction of a nuclear power plant in Pengze demonstrates that the public may be using other tools to voice their opinions regarding nuclear power.

#### ii. Pengze Nuclear Power Plant

As of 2012, all of China's operating nuclear power plants were located on coastlines near population centers and the abundant cooling waters of the Yellow Sea. However, in its effort to expand nuclear power to other parts of the country, China is constructing or planning to build a number of plants inland. One such plant, called the Pengze Nuclear Power plant, is planned to be built in Jiangxi Province, immediately across the Yangtze River from Anhui Province.<sup>166</sup> Construction of the Pengze nuclear power plant was approved two years ago, but further progress on nuclear power plants was halted throughout China following the accident at

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<sup>163</sup> Regulations for Environmental Radiation of Nuclear Power Plant (promulgated by the , effective date Sept. 1, 2011) [http://english.mep.gov.cn/standards\\_reports/standards/Catalogue\\_Standards/201109/t20110908\\_217121.htm](http://english.mep.gov.cn/standards_reports/standards/Catalogue_Standards/201109/t20110908_217121.htm).

<sup>164</sup> See Liyong & Zhang *supra*, note 160.

<sup>165</sup> *Id.* (citing Nuclear Power Siting and Population (HAD101/0) and Regulation on Nuclear Power Radiation Protection (GB6249-86)).

<sup>166</sup> Cui Zheng, *Ex-official Battle Plan to Build Nuclear Project*, CAIXIN ONLINE (Mar. 9, 2012) [http://english.caixin.com/2012-03-09/100366298\\_all.html](http://english.caixin.com/2012-03-09/100366298_all.html). (hereinafter CAIXIN].



Fukushima.<sup>167</sup> If completed as planned, the Pengze plant will operate six reactors with a capacity of 8 GWe.<sup>168</sup> While officials in Jiangxi have been quick to point out that the plan, which is estimated to cost 100 billion Yuan (\$15.87 billion), will be a boon to the economy,<sup>169</sup> the construction of the plant is being met by mounting opposition.<sup>170</sup> The campaign against Pengze started with four retirees who lived in Wangjiang County in Anhui Province, and now it has blossomed into a movement that is backed by the local government.<sup>171</sup>

Before the accident at Fukushima, opposition to nuclear power in China was rare or was kept relatively quiet.<sup>172</sup> According to the government, the public purportedly voiced its support of a nearby nuclear power plant in Chizhou in a public forum held as part of an environmental impact assessment.<sup>173</sup> However, as the Chinese watched the Fukushima disaster on their televisions, skepticism and fear regarding nuclear power grew.<sup>174</sup> Among those who took notice of the implications of nuclear power were four retired bureaucrats from Wangjiang, a city of 620,000 people located in Anhui Province.<sup>175</sup> The pensioners, who all retired from relative positions of power within the government, submitted an 11-page petition in which they voiced their opposition to the plant.<sup>176</sup> The petition was based on an independent study they conducted.<sup>177</sup> Their study revealed that many statements in the first environmental impact

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<sup>167</sup> Lan Xinzhen, Pressing the Nuclear Restart Button, BEIJING REVIEW (Mar. 1, 2012)  
[http://www.bjreview.com/quotes/txt/2012-02/27/content\\_427860\\_2.htm](http://www.bjreview.com/quotes/txt/2012-02/27/content_427860_2.htm)

<sup>168</sup> China faces civic protests over new nuclear power plants, MSN NEWS (Feb. 17, 2012)  
<http://news.in.msn.com/international/article.aspx?cp-documentid=5854560>

<sup>169</sup> *Id.*

<sup>170</sup> CAIXIN, *supra* note 164.

<sup>171</sup> *Id.*

<sup>172</sup> *Id.*

<sup>173</sup> *Id.*

<sup>174</sup> Leslie Hook, China nuclear protest builds steam, FIN. TIMES (Feb 28, 2012)

<http://www.ft.com/intl/cms/s/0/d733c466-5eab-11e1-a04d-00144feabdc0.html#axzz1s7KFL028>

<sup>175</sup> *Id.*

<sup>176</sup> CAIXIN, *supra* note 150.

<sup>177</sup> *Id.*



assessment were false. Specifically, they claimed that the number of people living within 10 kilometers of the plant is actually more than 150,000 people, well above the limit of 100,000 people within 10 kilometers that is set forth in government regulations.<sup>178</sup> Furthermore, identifying a number of recent earthquakes in the area, the petition noted that the proposed plant is located in a tectonically active area that is prone to future earthquakes.<sup>179</sup> The petition also accused the applicants of bribing villagers during a public opinion survey.<sup>180</sup>

The retirees sent this petition to the State Council, the Ministry of Environmental Protection as well as to other officials in local and provincial government.<sup>181</sup> Several months later, the local county government completed its own report, which corroborated the findings of the petition.<sup>182</sup> The county members sent this report to provincial officials for review.<sup>183</sup> However the county government, which was sent to the provincial level in November 2011, did not receive a response from Anhui Province officials until the document was published on-line where it caused concern among the population.<sup>184</sup> After the document was published, Anhui Province officials announced that they had forwarded the document to the National Development and Reform Commission (NDRC), the national level planning department.<sup>185</sup> As of April 2012, the NDRC has yet to comment. If the media blitz that the retirees have caused does not halt the plant's construction, the retirees plan on suing "whichever departments approved construction of the Pengze nuclear plant."<sup>186</sup>

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<sup>178</sup> MSN NEWS, *supra* note 165.

<sup>179</sup> *Id.*

<sup>180</sup> CAIXIN, *supra* note 150.

<sup>181</sup> *Id.*

<sup>182</sup> *Id.*

<sup>183</sup> *Id.*

<sup>184</sup> *Id.*

<sup>185</sup> *Id.*

<sup>186</sup> *Id.*



While this opposition movement has not yet achieved its goal, it has made significant progress as the opposition report has now made it to the highest level of Chinese government. Four elements of this movement have been instrumental in the retirees' success thus far. First, they had the time and the money to gather the relevant information and write a petition. The 11-page petition they wrote contained data they collected including information relating to population density and earthquake activity. While this information is not hyper-technical, retrieving data such as this requires time, money, and an educated workforce, all of which the retirees had. Furthermore, as retired public officials, they also have the respect from the public officials to be heard.

Second, the retirees were able to get the attention of the media. While the petition got the attention of the county government, the provincial government did not take notice of the issue until the document was leaked over the internet. Since then, the issue has been widely publicized not only within China but also internationally in publications such as the *Financial Times*.<sup>187</sup> This type of publicity has turned Pengze into a national and international issue and has forced government officials to take the claims of the retirees and the county more seriously.

Third, the opposition movement was able to make opportune use of the timing of the disaster at Fukushima. The events at Fukushima have caused governments in China and abroad to evaluate the ways in which they regulate nuclear power. While China has not forsaken nuclear power as other countries such as Germany<sup>188</sup> has, it did halt the planning and approvals of

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<sup>187</sup> Hook, *supra* note 180.

<sup>188</sup> Judy Dempsey & Jack Ewing, *Germany, in Reversal, Will Close Nuclear Plants by 2022*, N.Y. TIMES, May 30, 2011, <http://www.nytimes.com/2011/05/31/world/europe/31germany.html>.



nuclear power plant until safety evaluations of existing plants could be conducted.<sup>189</sup>

Furthermore, Fukushima has prompted the Chinese enact new legislation regarding nuclear power.<sup>190</sup> By voicing their opposition in the midst of this calibration in nuclear planning, the opposition's voice is more likely to be heard.

Fourth, the opposition was able to quickly gain the support of the local government. In fact, after the opposition provided the local government with the petition, local officials proceeded to investigate the matter further on their own. Furthermore, the local government was able to take the opposition's claim first to the provincial and then the national level, acts that would have been more difficult had the opposition not had the support of the county government. Moreover, because the plant is located in Jiangxi Province, which is located across the river from Anhui Province where Wangjiang is located, the local government officials who endorsed the retirees' cause would not stand to gain as much economically as government officials in Jiangxi would. Therefore, the officials in Anhui do not have much to lose by opposing the plant, while officials in Jiangxi would have much to lose if plans to build the plant are canceled.

B. Public Participation of the Licensing and Relicensing of Nuclear Power Plants in the United States

The Atomic Energy Act (AEA), the statute that controls nearly all nuclear-related activity in the United States, authorizes the NRC to regulate nuclear power in the United States including the public participation procedures involved with the licensing of nuclear power plants.<sup>191</sup> The AEA provides that the NRC hold a hearing “upon the request of any person whose interest may

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<sup>189</sup> James T. Areddy & Brian Spegele, *China Halts Plant Approvals In New Nod to Safety Issues*, WALL ST. J., Mar. 17, 2011, <http://online.wsj.com/article/SB10001424052748703899704576204110852886104.html>.

<sup>190</sup> Hook, *supra* note 180.

<sup>191</sup> 42 U.S.C. §§ 2011, 2013, 2014 (2000).



be affected” whenever the NRC grants a license, license amendment, or a renewal of a license.<sup>192</sup> When most of the existing nuclear power plants were first permitted in the 1960s and 1970s, the Atomic Energy Agency (AEC), the predecessor of the NRC, interpreted this provision by mandating that formal, “on-the-record,” rulemaking hearings be performed.<sup>193</sup> These hearings, resembling federal court trials, proved to be incredibly time-consuming, lasting as long as seven years.<sup>194</sup>

However, in 1998, when faced with a large number of license renewals for plants receiving licenses in the 1960s, the NRC began to change the hearing processes.<sup>195</sup> In 2001, the NRC suggested a major revision in a notice of proposed rulemaking, taking the position that section 2239 did not require a formal, “on-the-record,” hearing, but rather required the less time-consuming process of informal rulemaking.<sup>196</sup> In 2004, this rule became final.<sup>197</sup> The regulations that were written subsequent to the final rule are much less elaborate and streamlined.<sup>198</sup> Under these regulations, discovery is prohibited and examination of witnesses is generally undertaken by the hearing officer and not the parties.<sup>199</sup> These changes in addition to the streamlining of the combined licensed process<sup>200</sup> theoretically enable for faster review of nuclear power plants.<sup>201</sup>

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<sup>192</sup> 42 U.S.C § 2239(a)(1)(A) (2009).

<sup>193</sup> *Citizens Awareness Network, Inc. v. United States*, 391 F.3d 338, 343 (1st Cir. 2004) (citing Hearings Before the Subcommittee on Legislation, Joint Committee on Atomic Energy, 87th Cong. 60 (1962) (letter of AEC Commissioner Loren K. Olsen)).

<sup>194</sup> *Id.*

<sup>195</sup> Richard Webster & Julia LeMense, *Spotlight on Safety at Nuclear Power Plants: The View from Oyster Creek*, 26 PACE ENVTL. L. REV. 365, 366 (2009)

<sup>196</sup> *Citizens Awareness Network*, 391 F.3d at 343 (citing Changes to Adjudicatory Process, 66 Fed. Reg. 19610-01 (proposed Apr. 16, 2001) (codified 10 C.F.R. §§ 1, 2, 50, 51, 52, 54, 60, 70, 73, 75, 76, and 110 (2003))).

<sup>197</sup> *Id.*

<sup>198</sup> *Id.* at 344.

<sup>199</sup> *Id.*

<sup>200</sup> See discussion *supra* Part II.B.iv.

<sup>201</sup> Christopher C. Chandler, *Recent Developments in Licensing and Regulation at the Nuclear Regulatory Commission*, 58 ADMIN. L. REV. 485, 496 (2006).



However, many commentators argue that these changes diminish the public's ability to participate in licensing decisions, particularly in relicensing procedures.<sup>202</sup> These critics opine that the NRC harbors deep-seeded misgivings regarding public participation, and that any participation is seen as a "necessary evil."<sup>203</sup> Similarly, others believe that NRC eschews public participation in order to hasten the licensing process.<sup>204</sup> These objectors claim that the "core of the changes implemented by the NRC were to impose a series of barriers to any member of the public able to participate in the hearing process and inflict severe limitations on the issues that could be raised in the licensing hearing, including both substantive and procedural barriers."<sup>205</sup> Specifically, in order to participate in a relicensing proceeding, the public must file for leave to intervene.<sup>206</sup> The NRC then may grant the party intervener status if the party has standing and if the party meets several other detailed and vague requirements.<sup>207</sup> Furthermore, the NRC imposes strict time limitations for public participation relicensing process.<sup>208</sup> Interveners must raise any and all contention within sixty days of receiving an application.<sup>209</sup> Any contentions raised later in the process may not necessary be included in the process.<sup>210</sup> Potential interveners face a number of other hurdles, many of which are costly and resource intensive, and then must contend with a "truncated and convoluted hearing" process.<sup>211</sup> Based on this costly, elaborate, and prejudicial process, opponents of nuclear power in the United States have sought other means to prevent the

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<sup>202</sup> See e.g. Anthony Z. Roisman, et. al., *Regulating Nuclear Power in the New Millennium (the Role of the Public)*, 26 PACE ENVTL. L. REV. 317, 318 (2009)

<sup>203</sup> *Id.*

<sup>204</sup> *Id.* at 333 (citing In the Matter of Shaw Areva Mox Services (Mixed Oxide Fuel Fabrication Facility) Memorandum and Order (Ruling on Contentions and all Other Pending Matters), LB-08-11, Docket No. 70-3098-MLA (June 27, 2008) (Farrar, J., concurring)).

<sup>205</sup> *Id.* at 336.

<sup>206</sup> 10 C.F.R. § 2.309.

<sup>207</sup> 10 C.F.R. § 2.309(f).

<sup>208</sup> Anthony Z. Roisman, et. al., *supra* note 184, at 340 (citing 10 C.F.R. §§ 2.309(c), (f)(2)(iii) (2008)).

<sup>209</sup> *Id.*

<sup>210</sup> *Id.*

<sup>211</sup> *Id.* at 341.



licensing or relicensing of nuclear power plants. One way in which the public has been successful has been through the political process.

i. Shoreham Nuclear Power Plant

The example of Shoreham Nuclear Power Plant in Long Island, New York illustrates the public's effective use of the political process to have their voice heard. Between 1973 and 1984, Long Island Lighting Company (LILCO) obtained the necessary permits and constructed a nuclear power plant in East Shoreham, New York.<sup>212</sup> In the 1960s when LILCO first proposed the plant, regulators and the public all generally supported its construction.<sup>213</sup> However, the events at Three Mile Island and Chernobyl in addition to Hurricane Gloria, which came ashore near the plant in 1985, turned the tide of public sentiment.<sup>214</sup> By 1986, seventy-four percent of Long Island residents opposed operation of the plant.<sup>215</sup> Specifically, the residents distrusted the NRC and LILCO, particularly relative to a contentious emergency evacuation plan.<sup>216</sup> However, the residents' eventual success in preventing the plant from operating was not related to pressure imposed upon the NRC to act, rather the residents, through the Governor of the State of New York, applied sufficient power upon LILCO to come to an agreement to sell the plant to the State of New York.<sup>217</sup> The success of the public at Shoreham demonstrates that, with media attention and assistance from local officials, the citizenry can impact major decisions regarding nuclear power subsequent to the official public participation process during licensing. However, media

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<sup>212</sup> JOAN ARON, LICENSED TO KILL: THE NUCLEAR REGULATORY COMMISSION AND THE SHOREHAM POWER PLANT 3–9 (Bert A. Rockmann, ed., 1997).

<sup>213</sup> *Id.* at 10.

<sup>214</sup> *Id.* at 44, 89.

<sup>215</sup> Dennis Hevesi, *Nora Bredes, Who Fought Long Island Nuclear Plant, Dies at 60*, N.Y. TIMES, Aug. 22, 2011, <http://www.nytimes.com/2011/08/23/nyregion/nora-bredes-60-dies-fought-shoreham-nuclear-plant.html?ref=atomicenergy>.

<sup>216</sup> ARON, *supra note 193*, at 131–132.

<sup>217</sup> *Id.* at 107–110.



attention and the support of government officials does not universally prompt the type of changes the public desires, as the recent example of Vermont Yankee Nuclear Power Plants suggests.

ii. Vermont Yankee

In 1966, the Vermont Yankee Nuclear Power Plant Corporation applied for a permit to build a nuclear power plant in the far southeastern corner of the State of Vermont on the banks of the Connecticut River.<sup>218</sup> One year later, the AEC, the predecessor agency of the NRC, granted a permit to build the plant and consequently the plant applied for an operating license.<sup>219</sup> A prominent environmental non-profit organization, the Natural Resources Defense Council (NRDC), opposed the issuance of an operating license.<sup>220</sup> Although a hearing was held in 1971, the environmental effects of the fuel cycle at the power plant—an important point for opponents of the power plant—was excluded from consideration during the hearing.<sup>221</sup> Although the hearing procedures regarding the licensing caused a flurry of litigation, the Vermont Yankee Nuclear Power Station (Vermont Yankee) obtained a forty-year Facility Operating License in 1972.<sup>222</sup>

When Vermont Yankee opened, it was owned by Vermont Yankee Nuclear Power Corporation, which consisted of eight retail utilities including Green Mountain Power and Central Vermont Public Service, both of which were based in Vermont.<sup>223</sup> In addition to holding a license issued by the Atomic Energy Committee (AEC), the owners of the plant held a

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<sup>218</sup> Gillian E. Metzger, *The Story of Vermont Yankee: A Cautionary Tale of Judicial Review and Nuclear Waste*, in *ADMINISTRATIVE LAW STORIES* 125, 125 (Peter L. Strauss ed., 2006).

<sup>219</sup> *Vermont Yankee Nuclear Power Corp. v. Natural Res. Def. Council, Inc.*, 435 U.S. 519, 527 (1978)

<sup>220</sup> *Id.*

<sup>221</sup> *Id.* A dispute regarding whether courts can impose rulemaking procedures on a federal agency was eventually settled in the United States Supreme Court, which found that the Administrative Procedure Act (APA) and language within individual statutes provide the minimum procedural rights and that courts cannot impose further requirements on federal agencies. *Id.* at 549.

<sup>222</sup> *Entergy Nuclear Vermont Yankee, LLC v. Shumlin*, 1:11-CV-99 JGM, 2012 WL 162400 (D. Vt. Jan. 19, 2012).

<sup>223</sup> *Id.*



Certificate of Public Good (CPG).<sup>224</sup> In order to operate any energy facility in Vermont, the facility must possess a CPG, which is issued by the State of Vermont Public Service Board<sup>225</sup>, a quasi-judicial body.<sup>226</sup> In 2002, Entergy Nuclear Operations, Inc. (Entergy) bought Vermont Yankee for \$180 million.<sup>227</sup> The previous NRC license, which expired in March 2012, was transferred from the previous owners to Entergy. Furthermore, the Public Service Board endorsed the sale, noting that the sale benefited rate payers, and subsequently called for a CPG, expiring in March 2012, to be issued to Entergy.<sup>228</sup>

In 2006, the State of Vermont enacted Act 160, which required approval by the Vermont General Assembly before the Public Service Board may issue a renewed Certificate of Public Good.<sup>229</sup> This law effectively put the decision of whether or not to relicense Vermont Yankee in the hands of the Vermont legislature. In 2010, the Vermont Senate voted twenty-six votes to four votes in favor of shutting the plant down.<sup>230</sup> However, on March 21, 2011, the NRC issued Vermont Yankee a renewal of its license, certifying its operation from March 22, 2012 through March 21, 2032.<sup>231</sup> In April 2011, Entergy sued the State of Vermont arguing that several state laws<sup>232</sup> enacted by Vermont were preempted by the Atomic Energy Act because those acts dealt primarily with nuclear safety, over which the NRC has sole jurisdiction.<sup>233</sup>

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<sup>224</sup> *Id.*

<sup>225</sup> Vt. Stat. Ann. tit. 30, § 248 (West 2002), invalidated by *Entergy Nuclear Vermont Yankee, LLC v. Shumlin*, 1:11-CV-99 JGM, 2012 WL 162400 (D. Vt. Jan. 19, 2012).

<sup>226</sup> *Shumlin*, F. Supp.2d at \*4. Decision made by the Public Service Board can be appealed to the Vermont Supreme Court.

<sup>227</sup> *Id.*

<sup>228</sup> *Id.*

<sup>229</sup> *Id.* (citing Vt. Stat. Ann. tit. 30, § 248 (West 2002) *Entergy Nuclear Vermont Yankee, LLC v. Shumlin*, 1:11-CV-99 JGM, 2012 WL 162400 (D. Vt. Jan. 19, 2012)).

<sup>230</sup> *Id.*

<sup>231</sup> *Id.*

<sup>232</sup> Vermont Acts 74, 160, and 189. Vt. Acts & Resolves Nos. 74, 160, and 248.

<sup>233</sup> Entergy alleged that the Atomic Energy Act preempted Act 74, Act 160, and Act 189. Entergy also put forth two additional arguments: that the jurisdiction of the Federal Energy Regulatory Commission preempts the PSB, and that



In January 2012, a federal court struck down Act 160, noting that these acts “are held to be preempted by the Atomic Energy Act.”<sup>234</sup> March 21, 2012, which was the date that the Certificate of Public Good was set to expire, has come and gone, and Vermont Yankee continues to operate. However, the issue is far from over. The State of Vermont has appealed the federal court’s decision and the Public Service Board, which has the authority to issue or reject a Certificate of Public Good, has not made a decision on whether it will issue such a Certificate.<sup>235</sup> The outcome of the United States Court of Appeal for the Second Circuit or the Public Service Board could have the potential to close the plant down; however, any such decision would likely be appealed by Entergy. Regardless of the action of the Second Circuit or the Public Service Board, this case may be headed to the United States Supreme Court should the Court choose to take this case.

The story of the relicensing of Vermont Yankee crystalizes the lack of influence the public has on the relicensing process. The public has voiced its discontent with Vermont Yankee with public demonstrations that started in the 1970s and have continued to the present day.<sup>236</sup> Despite an overwhelming vote—twenty six votes to a mere four votes—from the Vermont Senate calling for the closure of Vermont Yankee, it now appears, barring action from the courts or the Public Service Board, that the nuclear power plant will continue to operate for at least another twenty years. Even Vermont’s representatives in the United States Senate as well as Vermont’s representative in the House of Representatives have publicly objected to the

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threats to the continued operation of Vermont Yankee unconstitutionally burdens interstate commerce in violation of the Commerce Clause of the United State Constitution and 42 U.S.C § 1983. Complaint at 11–12, *Entergy Nuclear Vermont Yankee, LLC v. Shumlin*, 1:11-CV-99 JGM, 2012 WL 162400 (D. Vt. Jan. 19, 2012) (No. 11-cv-99).

<sup>234</sup> *Entergy Nuclear Vermont Yankee, LLC v. Shumlin*, 1:11-CV-99 JGM, 2012 WL 162400 (D. Vt. Jan. 19, 2012)

<sup>235</sup> *State’s attorney appeal Vermont Yankee nuclear plant ruling*, REUTERS, Feb. 18, 2012, <http://www.reuters.com/article/2012/02/18/us-utilities-entergy-vermontyankee-idUSTRE81H0N520120218>

<sup>236</sup> *Wilson Ring, 130 arrested in Vermont Yankee protest*, Bloomberg Businessweek, Mar. 22, 2012, <http://www.businessweek.com/ap/2012-03/D9TLUAG01.htm>.



relicensing.<sup>237</sup> Despite all these measures taken by members of the public, state lawmakers and United States Senators, some of the most powerful people in the country, Vermont Yankee continues to operate.

This case not only affects the lives of many Vermonters, as well as citizens of the states of New Hampshire in Massachusetts, both of which are located within miles of the nuclear power plant, the *Entergy Nuclear Vermont Yankee, LLC v. Shumlin* case has the potential to affect numerous other power plants across the country that will soon be up for relicensing. The lack of real participation that citizens have in the United States as to the licensing and relicensing of plants, both in the official hearing process as well as the less official political process, provides a detrimental example for China as it is developing its own nuclear regulatory framework.

### C. Comparison of the Effectiveness of Public Participation

Although the nuclear industry and regulatory frameworks differ considerably in China and the United States, the public in both countries face considerable challenges in attempting to participate in the licensing or relicensing of nuclear power plants. First, participating in the official public process—whether it is the hearing process established by the NRC or the environmental impact assessment process in China—has proven to be difficult for the public in either country. Second, the public in both countries has had much more success contesting the operation of nuclear power plants in settings other than official proceedings. Although citizens in both countries have had their share of success, the ultimate decision regarding the operation of nuclear power plants in both countries is left to the relevant government agency.

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<sup>237</sup> Osha Gray Davidson, *NRC: Vermont Yankee Nuclear Power Plant ‘Good to Go’ for 20 More Years*, FORBES, Mar. 22, 2012, [http://www.forbes.com/sites/oshadavidson/2011/03/22/nrc-vermont-yankee-nuclear-power-plant-good-to-go-for-20-more-years/?utm\\_source=allactivity&utm\\_medium=rss&utm\\_campaign=20110322](http://www.forbes.com/sites/oshadavidson/2011/03/22/nrc-vermont-yankee-nuclear-power-plant-good-to-go-for-20-more-years/?utm_source=allactivity&utm_medium=rss&utm_campaign=20110322) (quoting Bernie Sanders, *Delegation Statement on NRC and Vermont Yankee*, Mar. 21, 2011, <http://www.sanders.senate.gov/newsroom/news/?id=8D1A7C17-D53D-46EF-9682-EA450683BDFB>).

In both China and the United States, the public faces a considerable number of obstacles to simply having their case heard during the licensing or relicensing process. While great strides have been made in China in recent years to open important decision to the public, the Chinese public is still limited in the ways in which they can participate.<sup>238</sup> Aside from the relatively few projects available for public review, the time and duration of the comment period and the way in which the public is defined are two key factors that prevent meaningful input from the public in a number of cases.<sup>239</sup> Furthermore, the EIA process is rife with additional problems such as limited access to information, limited impacts in decision making, and restricted access to the courts to seek redress.<sup>240</sup> When information is provided to the public, it can often be false as was the case in the Pengze case study.<sup>241</sup> To determine if information is accurate, the public must possess resources to conduct their own studies. Even if they do have the money to complete these studies, the public would still have only a few days to complete what could be a complicated study in order to satisfy the duration requirements of public participation. Given these obstacles, it is perhaps not surprising that examples of public participation in the licensing process of nuclear power plants do not exist.

The American public faces its own share of obstacles, many of which are similar to the challenges the Chinese public face. The first hurdle the public must face during licensing or relicensing hearings is obtaining intervenor status.<sup>242</sup> Petitioners must fulfill a number of criteria in a relatively short amount of time.<sup>243</sup> Furthermore, in order to make a meaningful effort to

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<sup>238</sup> Zhao, *Rhetoric or Reality*, *supra* note 8 at 107.

<sup>239</sup> *Id.*

<sup>240</sup> *Id.*

<sup>241</sup> MSN NEWS, *supra* note 165.

<sup>242</sup> 10 C.F.R. §2.309 (2008).

<sup>243</sup> Webster & LeMense, *supra* note 193, at 381.



contest issues set forth in the application, interveners must use experts as part of the hearing process.<sup>244</sup> Thus, not only must the interveners find experts in a relatively short amount of time, but they must find a way to pay for the experts' key services.<sup>245</sup> Furthermore, the issues that interveners can bring up during the hearings have been severely limited by the recent retooling of the NRC regulations regarding licensing.<sup>246</sup> Based on these limitations, the public has not had much of a voice in the relicensing of the nuclear power plants in the United States.<sup>247</sup> It was not until 2007 that the first public hearing was held regarding a relicensing application.<sup>248</sup> By the time of that hearing, the NRC had renewed the licenses of forty-four of the 104 nuclear power reactors across the United States.<sup>249</sup>

Based on the lack of success the public has had in the official licensing or relicensing of nuclear power plants, the public has sought other means to contest the operation of nuclear power plants. Both the Chinese and American public have used the media, governmental officials, and other grass-roots methods to voice their disapproval of nuclear power plants. The example of the Shoreham Nuclear Power Plant in New York illustrates how the combination of media coverage and the intervention of public officials can play a large role in voicing the will of the public. The Chinese have had a similar experience thus far in Pengze where, after a media blitz and assistance from local politicians, the matter of whether the plant will operate will now be decided by the national economic and planning department.

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<sup>244</sup> *Id.*

<sup>245</sup> *Id.*

<sup>246</sup> Anthony Z. Roisman, et. al., *supra* note 183, at 336.

<sup>247</sup> Webster & LeMense, *supra* note 193, at 382.

<sup>248</sup> *Id.*

<sup>249</sup> *Id.*



While media and political backing provide the public with an enhanced opportunity to have their voice heard, these factors have not guaranteed the public's success. The example at Vermont Yankee Power Plant in the United States and the undecided fate of Pengze demonstrate that, ultimately, the decision of whether or not to issue a license, or a renewed license, lies squarely on the shoulders of the government.

#### IV. PROPOSED SUGGESTION OF ENHANCED PUBLIC PARTICIPATION

As demonstrated by the licensing/relicensing process in the United States and the EIA process in China, the current state of public participation for matters involving nuclear power plants is inadequate in both China and the United States. By looking at the ways in which the public has participated in licensing/relicensing processes in both countries, the Chinese public may implement certain strategies that would enable them to engage in the licensing/relicensing processes. This Part first proposes a number of steps the public can take under the existing framework to have a say in decisions made regarding the operation of nuclear power plants. Then, this part explores how China could modify their regulations involving public participation at the licensing stage of nuclear power plant development to better include the public in major decisions.

##### A. What the Public Can Do Now

Although the public faces an uphill battle when attempting to participate in the nuclear licensing process through the EIR procedures, there are certain measures the public can take to increase their involvement in the licensing of nuclear power plants. A significant first step would be for opposition groups around the country to nationalize. At the moment, China does not have



a unified anti-nuclear organization.<sup>250</sup> Instead, there are groups of individuals spread throughout the country that are waging similar battles. A unified opposition group would significantly support the efforts of localized opposition groups that, at least initially, may suffer from a lack of information, funds, or technical know-how. Second, somewhat relatedly, the nuclear opposition groups should take better advantage of the national and international NGOs around the country in an effort to obtain technical and financial support for their campaigns. A nationalized opposition network would be ideally positioned to work with NGOs.

Those wishing to participate in the EIR process at specific proposed power plant sites can take a number of steps to increase their chances of having their voice heard in the licensing process. First, the involvement of local politicians appears to be critical to the success of public. In both the United States and China, the ultimate decision regarding whether to proceed with the construction of a nuclear power plant lies with national agencies. By engaging and gaining the support of local officials, the public acquires a valuable ally as local governments can wield more power and can be better acquainted with the national agencies' policies. Likewise, involving the media throughout the process, as the retirees did at Pengze, provides additional leverage to the public.

#### B. What Chinese Regulators Should Do Now

While there are certain actions that the public can take to increase their involvement in the EIA process, the current framework of public participation in China can still inhibit the public from participating in decisions regarding the licensing of nuclear power plants. Unfortunately, the public participation process during licensing and relicensing in the United States is flawed

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<sup>250</sup> Wen Bo, *China's Emerging Anti-Nuclear Movement*, NUCLEAR MONITOR, 3 (Nov. 29, 2007), <http://www.nirs.org/mononline/nm663.pdf>.



and therefore does not provide a usable model for China to emulate. The following describes a number of steps that could enable the Chinese public to have a greater voice in participating in EIA process during licensing decisions.

Currently, the Chinese public can only effectively participate in the licensing process after a draft EIA document has been submitted.<sup>251</sup> At that time, the economic incentives driving the project could easily overwhelm any concerns identified by the public.<sup>252</sup> Moreover, once the draft EIA document has been filed, the Chinese public must file its response within thirty days of the EIA becoming public.<sup>253</sup> By providing an earlier opportunity to respond, the public would not only have more time to identify and formulate their objections, but they could possibly have more of an opportunity to work with the applicant to find suitable alternatives to save time and money. For example, if actionable problems are identified at a later stage of the project, the applicant will have already put time and resources into evaluating their first proposal. Earlier identification of problems will thus benefit all sides.

Second, intervening groups in both the United States and China have suffered from a lack of resources and time throughout the public participation process. This lack of resources is compounded by the incredible complexity of a nuclear power plant.<sup>254</sup> In order to adequately participate in the licensing process, most citizen groups will need help from experts, and this assistance will not likely come easy or cheap. Furthermore, lawyers may become necessary to ensure that the public is complying with the cumbersome public participation requirements.

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<sup>251</sup> Jesse L. Moorman & Zhang Ge, *Promoting and Strengthening Public Participation in China's Environmental Impact Assessment Process: Comparing China's Eia Law and U.S. Napa*, 8 VT. J. ENVTL. L. 281, 309 (2007)

<sup>252</sup> *Id.*

<sup>253</sup> *Id.*

<sup>254</sup> Christian Parenti wrote that the process of generating energy at nuclear power plants “is to coal power, or a windmill, as a Formula One race-car is to the mechanics of a bicycle.” CONTESTING THE FUTURE OF NUCLEAR POWER, *supra* note 28, at 42 (quoting Christian Parenti, *Nuclear Power Is Risky and Expensive*, in ALTERNATIVE ENERGY 50–55 (Peggy Becker ed., 2010)).



Because the process will in likelihood become expensive, the government should provide funding for interveners.<sup>255</sup> Such funding mechanism may be modeled after several “public intervener programs” that were used in the United States for a time in the 1970s and 1980s or the mechanisms found in the more restrictive Equal Access to Justice Act, which was enacted in 1980.<sup>256</sup> In any event, any financial assistance given to citizens would likely further the participation of public in licensing process. Alternatively, the government could provide intervener groups with technical assistance in lieu of or in addition to financial assistance as the involvement of nuclear engineers would be critical to any meaningful public participation in the licensing of nuclear power plants.

Additionally, great strides should be taken in the type and amount of information that is provided to the public during the EIA process. Access to accurate and complete information should be the starting point for public participation at any level. Under the current framework, both the applicants and the government are not required to provide the full and accurate record during the EIA process.<sup>257</sup> The example at Pengze Nuclear Power Plant, where the applicants appear to have falsified key information relating to the local population and earthquake risk, illustrates why accurate and complete information is tantamount to the public participation process. Perhaps the threat of criminal penalties or other punitive measures for misinformation would reduce the prevalence of missing or inaccurate information. Only with a full and reliable record can citizens have meaningful input during the public participation stage of any project.

## V. CONCLUSION

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<sup>255</sup> William S. Jordan, III, *A Plea for Reason and Responsibility in Nuclear Energy Policy Nuclear Power Transformation*, 56 U. CIN. L. REV. 971, 981 (1988)

<sup>256</sup> *Intervenor Funding As the Key to Effective Citizen Participation in Environmental Decision-Making: Putting the People Back into the Picture*, 19 ARIZ. J. INT'L & COMP. L. 643, 656 (2002)

<sup>257</sup> Zhao, *Rhetoric or Reality*, *supra* note 8 at 111.



Because of its rapid pace of growth and resulting increased demand for energy, China is seeking to expand its supply of nearly every type of energy. As a consequence of these efforts, China has begun an unprecedented effort of designing and constructing nuclear power plants across the country. To keep up with the construction of these plants, China has been attempting to provide adequate regulatory oversight of this development; however, due to the lack of regulation and staff as well as the secretive and economically-focused motivation of regulators, safety issues at these nuclear power plants may be overlooked. The role of the public has the potential to fill this regulatory vacuum. However, the existing state of public participation hinders the ability of the public to protect themselves from the potentially catastrophic consequences of nuclear power. Many of these problems may be endemic of public participation generally throughout China. Nevertheless, by taking certain steps such as nationalizing a nuclear opposition group, engaging the media, and gaining the support of local politicians, the public may increase their chances of having their concerns heard. Furthermore, Chinese regulators also have the ability to expand the public's role in the licensing process by giving the public more flexibility in the EIA process, providing intervener funding to citizen groups, and punishing those who provide false or incomplete information in public disclosures. While these steps may seem overly optimistic given China's history of excluding the public in major decisions, the tragedy at Fukushima Daiichi in Japan has revealed what really is at stake for the entire country.