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Understanding the Historical Origins of Public Distrust Surrounding Nuclear Energy

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Abstract

Nuclear energy can be perceived as dangerous by the general public due to morbid associations including death, illness, and warfare. Even with the environmental benefits and practicality of nuclear energy, some members of the general public oppose it due to fears of nuclear disasters, radioactive waste, and the potential for weapons proliferation. Historical events related to these concerns create a destructive image of nuclear energy. Such examples are the spread of radioactive aerosols from explosions after the Chernobyl disaster, the prevalence of radioactive contamination in the Yucca Mountain Nuclear Waste Facility, and the secretive construction of atomic weapons. In the eyes of the public, these events paint nuclear energy as unreliable, unhealthy, and unethical. Methods to alleviate these concerns, such as improved safety protocol, fuel cycle changes, and nonproliferation policies, do not deter negative perceptions of nuclear energy. The general public's perception of the dangers of nuclear energy was heightened by governmental neglect, causing the public to lack trust in agencies devising scientific and policy solutions. This paper will analyze the origins, representations, and potential solutions to each concern, through public opinion surveys, scientific studies, and policy developments.

Introduction

Nuclear power is an efficient and practical source of energy when implemented correctly. Because nuclear power is cheaper and not as regionally restricted as renewable energy such as wind or solar power, it is becoming increasingly widespread (Pilibaityte, 2010). 410 reactors are in operation globally, the majority of them in North America, Western Europe, and East Asia (IAEA PRIS). Though commonplace, nuclear energy has a negative and controversial connotation, associated with its history. (Temper et al., 2020).

The origins of the modern nuclear reactor date to the Manhattan Project in 1942, as seen in Figure 1. Scientists constructing the first atomic bomb learned how to use uranium and plutonium to create nuclear fission.

This process was used to make a small nuclear reactor in the same year, yet nuclear fission was primarily associated with the atomic bomb. Recognizing nuclear energy's potential and association with war, American President Dwight Eisenhower launched the Atoms for Peace campaign, promoting nuclear fission for civilian power generation, rather than weapons manufacturing (Gu, 2018). By the 1960s the US, UK, Soviet Union, and France created civilian nuclear programs. Even with these programs, nuclear power's military associations remained. Nuclear energy's expansion halted in the 1970s and 80s, due to both its increasing cost and the Three Mile Island accident in 1979. Power plant production drastically plummeted after the Chernobyl disaster in 1986 (Char & Csik, 1987). In the 2000s, nuclear power had a small resurgence, which was stopped by the Fukushima disaster in 2011. The environmentalism movement began in the 1960s, with its anti-nuclear wing widening after Three Mile Island and the United States Department of Energy's handling of the Yucca Mountain waste depository in Nevada in 1987. Coverage of accidents and waste facilities drew attention to the health and environmental issues that stem from radiation. As a result, environmentalist movements advocated against nuclear while supporting renewable energy (Chater, 2005).

Nuclear reactors generate electricity by releasing energy through nuclear fission reactions. This type of reaction occurs when a neutron hits the nucleus of an atom, splitting it into two pieces. Neutrons that are affected by the split immediately make contact with other atoms, releasing thermal energy. This energy is used to create steam, which generates electricity through powering a turbine. Fission reactions use uranium ore as fuel, either converted into uranium-235 or plutonium-239 through radioactive decay (De Scantis et al., 2016).

Investors mostly hold concerns over high power plant and energy production costs. This suggests that with reduced public fear, nuclear energy still may not become the main global energy source, due to economic barriers (Davis, 2012). With increased public acceptance, nuclear energy may become more commonplace, though not dominant. Non-experts may oppose nuclear power because of its troubled history, creating concerns of nuclear disasters, the effects of waste, and the potential for weapons proliferation. Nuclear power is dangerous, mostly when it is poorly regulated, because the dangers associated with public concerns are exacerbated by shortcomings from nuclear energy organizations and the government. As a result, the public's perceived danger of nuclear energy is heightened by a lack of trust between organizations administering nuclear power and the general public (Pilibaityte, 2010), (Temper et al., 2020).This paper explores each concern's history by analyzing public opinion surveys and academic studies, to determine how trust in governments and other organizations influence public perception.

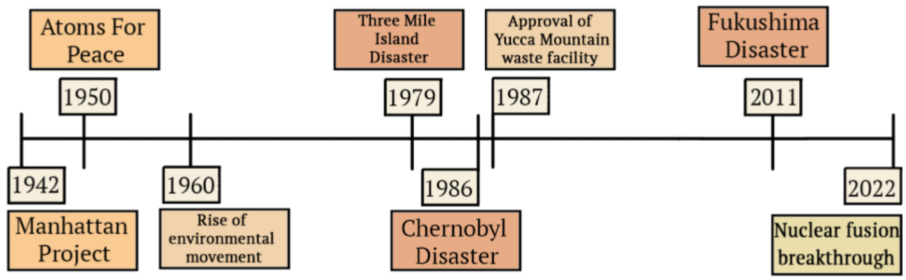

FIGURE 1. *Timeline of Major Events in the Development of Nuclear Energy*

Nuclear disasters

The origin of some worries about nuclear energy stems from three major nuclear power plant accidents. Each accident was partially caused due to mismanagement and poor planning from governmental and nuclear regulatory organizations. The partial reactor meltdown at Three Mile Island stemmed from the US Nuclear Regulatory Commission's confusing safety protocol (Okrent & Moeller, 1981). The Chernobyl disaster resulted from both human error and poor manufacturing of the reactor, as it lacked proper safety technology. (International Nuclear Safety Advisory Group, 1992).

A blatant example of mismanagement from nuclear agencies would be the Fukushima disaster. Media investigations found that the power plant explosion was caused by poor safety practices from nuclear power agencies. Tokyo Electric Power Company (TEPCO) kept the plant running, even after finding a crack in a reactor core (Ramana, 2012). As seen in Figure 2, neglecting this issue caused emergency energy generators to fail, causing a reactor to overheat. This failure allowed flammable hydrogen to build up, culminating in an explosion that exposed radioactive waste to open air. After the first explosion, three more reactors similarly failed (Acton and Hibbs, 2012, Funabashi and Kitazawa, 2011). Workers who misjudged how to manage the disaster were not trained to deal with safety crises–a responsibility that falls on TEPCO and their flawed operating protocol (Funabashi & Kitazawa, 2012). Furthermore, Japan’s nuclear regulator, the Nuclear and Industrial Safety Agency (NISA) overestimated the plant’s capability to withstand seismic hazards. Figure 2 shows that the NISA and TEPCO used a 5.7-meter tsunami height in their calculations in disaster-related simulations, while the tsunami that hit the plant was about 14 meters high. As the NISA was dependent on government agencies promoting nuclear energy, it had little independence to conduct safety inspections (Acton and Hibbs, 2012). The possibility of a nuclear disaster occuring is low without mismanagement issues from nuclear regulatory organizations. Thus, nuclear energy is not inherently disaster-prone with careful planning and safety protocol.

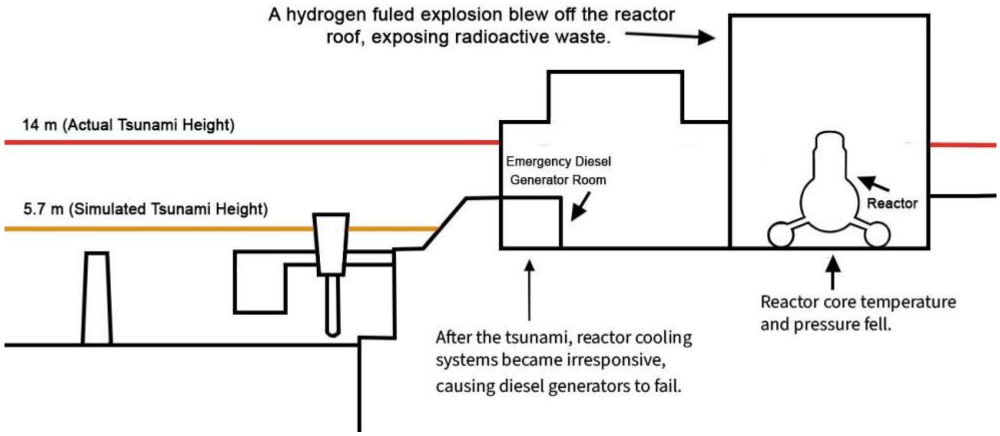

FIGURE 2. *Technical Malfunctions in the Fukushima Nuclear Disaster*

However, while disasters are uncommon, the few that have happened had severe impacts, in terms of spreading ionizing radiation. The aftermath of both the Chernobyl and Fukushima disasters saw an increase in thyroid cancer in radiation-affected areas, through the contamination of food and water sources. (United Nations Scientific Committee on the Effects of Atomic Radiation, 2011), (World Health Organization, 2013). One aspect of the concern over nuclear disasters is that their effects aren't localized, as seen with the spread of cesium in Figure 3. Disaster aftermath, such as radioactive aerosols can spread to people otherwise not impacted by nuclear energy. Radioactive aerosols travel through fires, spreading quickly and farther out after an explosion in a nuclear reactor. After Chernobyl, radioactive cesium-137 aerosols, particles with heavy long-term radiological effects, spread from Ukraine to Ireland (Evangeliou et al., 2016). Figure 3 reveals that cesium-137 remained in the same areas, even 12 years after the disaster. These aerosols are responsible for contaminating the water and food supply of disaster-affected areas. For example, an increase in child cancer rates in the former Soviet Union was linked to milk contamination by aerosols from Chernobyl (United Nations Scientific Committee on the Effects of Atomic Radiation, 2011). In Germany, cesium-137 particles in wild boar muscle were 10 times greater than the European Union limit of 600 Bq/kg (Fairlie and Sumner, 2006). No matter a country's distance from the disaster's origin, radioactivity from Chernobyl is positively associated with cancer-related hospitalizations (Marino & Nunziata, 2018). The after effects of nuclear disasters remain dangerous, even though they are unlikely to happen.

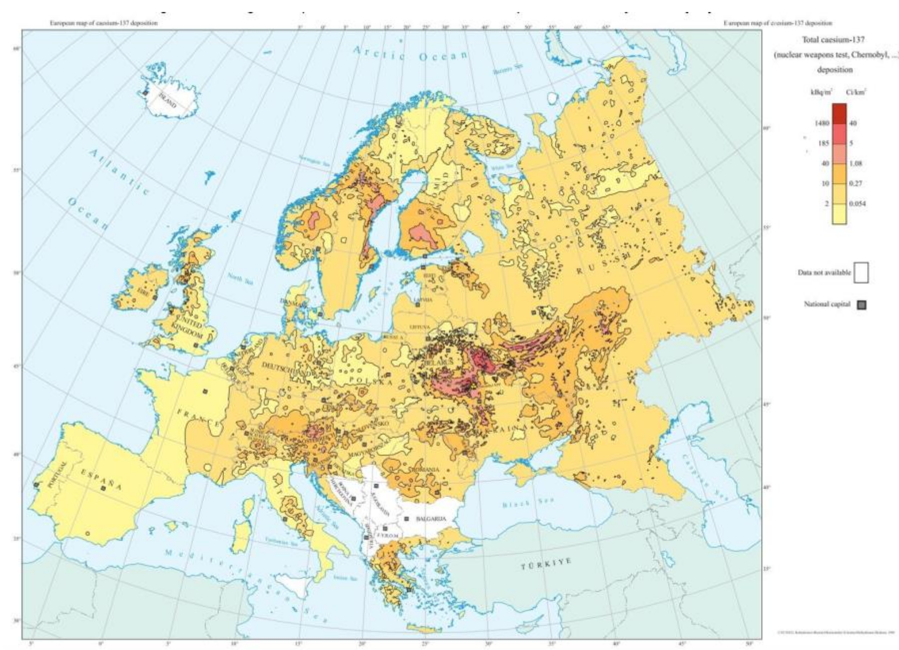

FIGURE 3. *Surface Deposition of cesium-137 in Europe Released after the Chernobyl Nuclear Disaster* Note: by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), 1998.

The dangers of nuclear disasters started to become associated with nuclear energy as a whole. As of 2016, 30 years after the Chernobyl disaster, and five years after the Fukushima disaster, 71% of survey respondents in Serbia were afraid of disasters, and 31% believed one would happen (Cvetkovic et al., 2021). While the last nuclear disaster was over 10 years ago, fear still lingers, especially in affected regions or countries that are new to the industry. After the Fukushima disaster, the global public acceptance of nuclear power dropped from 52.7% to 45.4%. Countries in Eastern Europe had low rates of support for nuclear before Fukushima, possibly due to the Chernobyl disaster, which happened 25 years prior, while East Asian countries had relatively high support for nuclear energy pre-Fukushima. Additionally, countries that had prior experience with nuclear power plants had a sharper decrease in public acceptance (Kim et al., 2013).

Some worries about nuclear disasters stem from a lack of trust in nuclear power companies and governments to operate power plants safely, along with the link between disasters and radioactive waste. Members of the public may worry that governments and companies cannot manage issues with radioactive waste or power plants themselves. For example, survey respondents in the United Kingdom state that for issues relating to nuclear, they lack trust in the government and energy industry, and instead trust scientists involved with environmental organizations (Bickerstaff et al., 2008). This phenomenon is not isolated, as government policy and rhetoric relating to nuclear power does not often line up with that of citizens. In Belarus, citizens have reported that their government undermined the severity of Chernobyl to draw support to their nuclear program. As of 2012, 49% of Belorussians were against nuclear power, with many of them citing the health risks of nuclear disasters as reasons for their viewpoints. Some Belorussians see their government's positivity surrounding nuclear power as dismissive of their experiences (Novikau, 2017). Similarly, in France, public support for nuclear has been on a downward trend since 1975, taking a hard hit after Chernobyl. Increasingly low support has been exemplified in large swaths of protests against France's nuclear policy in response to Three Mile Island and Chernobyl. Yet the French government continued to progress with pro-nuclear policies. Furthermore, the issue of nuclear power itself has been politicized, only to be dismissed in the French lawmaking process (Brounard & Guinaudeau, 2015). Both the Belorussian and French government are somewhat dismissive of concerns their citizens have related to nuclear disasters.

Experts in the nuclear industry are devising safer, less disaster-prone methods of producing nuclear energy. These methods range from establishing simple and redundant power plant safety protocols and creating technological devices that aim to prevent disasters from occurring (Cavazos, n.d.). One such example is the principle of active versus passive safety. Active safety devices require human operation, making them more prone to mismanagement, while passive devices use gravity and natural convection to regulate a power plant, instead of operator intervention. This ensures less room for human error. (Goldberg & Rosner, 2011). A simpler safety measure would be to fireproof energy generators within a plant, including backup generators in case of a disaster. (Acton and Hibbs, 2012). These technological innovations have worked to create a perception of safety. As of May 2023, only 20% of respondents to a global survey disagreed with the statement: "nuclear energy felt dangerous at first, but has been engineered to be extremely safe" (Clearpath et al., 2023).

Academics have also made policy suggestions for tackling the long-term aftermath of a nuclear disaster. Suggestions include limiting the import of contaminated food from regions heavily affected by a disaster and urging healthcare policies to ensure effective screening with a focus on regions heavily affected by radioactive fallout. (Marino & Nunziata, 2018). Scientists published studies on filtration systems for large cesium particles, used in preventing water contamination. A study on cesium particle emissions after Fukushima revealed that most particles were large and insoluble, implying that they are not as likely to cause contamination, especially when filtered (Adachi et al., 2013).

Increasing transparency among nuclear regulatory organizations is seen as one of the best methods of improving trust with the public, yet organizations have different definitions of what transparency looks like. Cross-collaboration between stakeholders in the nuclear safety process could solve this issue, through public meetings or informational committees between regulators and civilians on safety issues. Governments could also create specific procedures for monitoring transparency of nuclear safety authorities. To organize these meetings, organizations and civilians must trust each other enough to listen to differing points of view. Due to the prominent legacy of mishandling nuclear disasters, the possibility of open meetings occurring is low, unless organizations create smaller initiatives, such as information campaigns to start the trust building process (Perėko et al., 2020). Thus, cooperation between the public and the government will be a lengthy process. It is still possible for organizations in the nuclear energy field to rebuild trust with the public while avoiding belittling people who hold concerns about nuclear disasters.

Nuclear Waste:

Radioactive waste is sorted by the World Nuclear Association into four different categories: very low level, low level, intermediate level, and high level. (World Nuclear Association, 2022). On average, radioactive waste takes at least one million years to stabilize or to stop emitting radiation. The most common method of storing waste is through geological disposal facilities. As Shown in Figure 4, waste is typically stored about 1,000 feet below ground level within a series of barriers, posing a minimal risk to humans and the environment, depending on the type of rock the waste is stored in and the location's geological stability. Liquid waste stored underground still emits radioactive aerosols, which can contaminate food supplies if waste is stored haphazardly (Corkhill & Hyatt, 2018). Many of the dangers of nuclear waste occur from weak and poorly structured storage facilities.

The most difficult type of high-level waste to manage is Spent Nuclear Fuel (SNF), or radioactive waste left over from the fission process. It corrodes when exposed to oxygen, making storage difficult, and the waste itself is very hazardous to living organisms (Corkhill & Hyatt, 2018). SNF includes depleted uranium and plutonium waste, most of which can be recycled.

Most plants use an open fuel cycle, where SNF cannot be reused. Others use a closed fuel cycle, where uranium or plutonium are reprocessed into the power generation cycle, as shown in the spent fuel reprocessing step in Figure 4. While effective in waste reduction, the complexity of a closed fuel increases the exposure risk and the amount of low-level waste. (Rodriguez-Penaloga & Moratilla Soria, 2017).

Furthermore, while ingesting radioactive chemicals such as depleted uranium is harmful, ingestion is not the easiest way for uranium to enter the human body. On average, only 0.1-6% of ingested uranium enters a human's bloodstream through the mouth, stomach, or intestines, suggesting that aerosols from uranium waste do not have a high cancer risk (National Library of Medicine, n.d.). The buildup of nuclear waste can pose dangers for the environment, though is unlikely to have life-threatening effects on humans.

Concerns about the environmental and health effects of radiation from nuclear waste existed before the first nuclear disaster and became common after Three Mile Island. They further spread after the Chernobyl and Fukushima disasters. One year after the Fukushima disaster, 60% of UK citizens believed that climate change was less risky to society than nuclear waste. (Bickerstaff et al., 2008). Even as of 2023, 56% of survey respondents globally believed that nuclear waste will never be safe enough. Many members of the public believe that the potential benefits of nuclear power as a renewable energy source do not outweigh the negative impacts of nuclear waste. (Clearpath et al., 2023.)

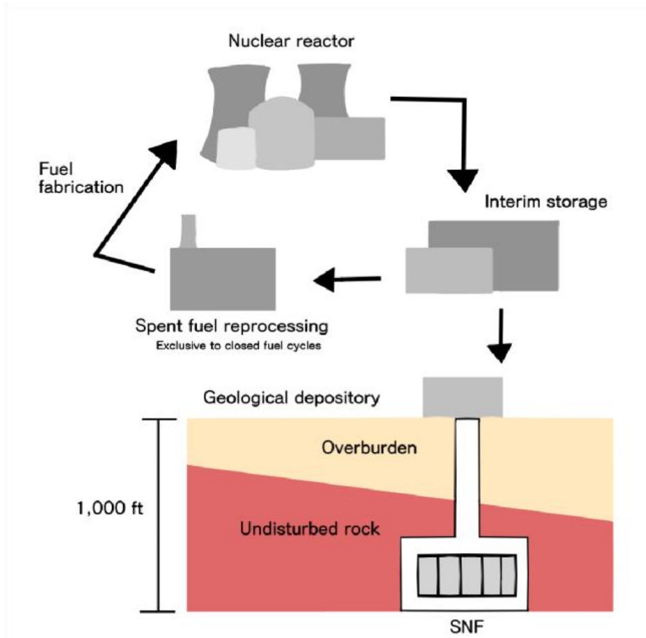

FIGURE 4. *Cycles of Nuclear Waste Deposition and Reprocessing*

The fear of nuclear waste itself originated as a regional phenomenon, with lower public acceptance of nuclear power more present in places that were directly impacted by nuclear disasters. For example, after Three Mile Island, support for nuclear energy experienced a significant decrease in the US, compared to the globe. This decrease may have occurred because disaster-affected places have a high rate of human and environmental damage due to leftover waste. (Kim et al., 2013). Radiation from leftover waste also created regional stigma, as people living in radiation-affected areas feared for their health. As residents of Fukushima prefecture fled the disaster, some of them reported being turned away from hotels or having their children called “vermin”. Along with people, goods from areas associated with ionizing radiation are stigmatized. For example, fish caught near the Kalpakkam nuclear facility in India are rarely bought by locals. (Ramana, 2012).

A prominent case of stigma relating to nuclear waste and radiation is the waste repository site at Yucca Mountain, Nevada. In 1987, the United States government selected Yucca Mountain in Nevada, as the only site in the country to be used for waste storage. Nevada residents and environmental activists protested, citing various health consequences of radiation and a continuation of neglecting Nevada's indigenous population. Protestors also called on Nevada's history as a site for atomic weapons testing, crafting a narrative of governmental neglect (Houston, 2013). According to a study conducted shortly after the Yucca Mountain waste facility was built, only 32% of Americans agreed that the Department of Energy could be trusted with disclosure of any problems with the program. When asked what they associate with an underground waste depository, respondents most commonly selected the words "dangerous/toxic" (17%) and "death/sickness" (8%) (Slovic et al., 1991). Similar findings continued, as 35% of UK residents 20 years later believe that the government isn't competent or reliable in managing nuclear waste (Bickerstaff et al., 2008). Negative associations with nuclear waste cause members of the public to associate nuclear power, despite being emissionless, with fossil fuels. This association stems from the belief that nuclear power is more risky than other forms of renewable energy. 39% of respondents to a 2006 survey believed that nuclear waste contributes to climate change (Devine-Wright). While all methods of nuclear waste storage are risky, their health effects are somewhat overblown by those opposed to nuclear power.

Fossil fuel technologies such as fracking and coal power plants pose greater health risks than nuclear power. Fracking generates groundwater pollution and seismic disturbances (Lin, 2014). Air pollution from coal power plants has led to premature deaths, along with increased rates of respiratory and cardiovascular diseases within one to two years of exposure. The health risks radioactive aerosols from nuclear power plants pose are severe, but pale in comparison to the day-to-day effects of coal power plant emissions.

Yet to the credit of anti-nuclear activists, federal agencies have understated the environmental and health risks of nuclear waste in choosing locations for nuclear power plants and waste depository sites. Ideal sites for nuclear power plants tend to be environmentally degraded, previously polluted, or close to places with radioactive risks. Communities selected for nuclear facilities tend to lack political, social, and economic strength to oppose federal decisions (Sovacool & Valentine, 2012). In Yucca Mountain, Nevada residents felt they were targeted since the Department of Energy did not seek to build waste depositories in other states. The French government dealt with a similar issue when finding a resting place for their nuclear waste, selecting disposal sites without consulting local communities, leading to public outrage. (Beaver, 2010).

Community involvement could begin with the site selection process. Instead of only having elected representatives and technical experts tasked with determining waste repository sites, the general public could receive platforms to directly ask critical questions to these people, before considering potential sites. These platforms could be used at a frequent rate throughout the process of finalizing a site, requiring representatives to consent with locals before making a commitment.(Krütli et al, 2010). These initiatives pose a challenge if the public does not trust government representatives to accurately respond to and act on civilian questions. Based on past instances of neglect in nuclear waste storage selection, this and other methods of connecting the public and government may take significant time to succeed.

Proliferation of Nuclear Weapons

As a result of the connection of nuclear power to the development of the atomic bomb, civilian nuclear power plants have long had an association with nuclear war and weapons proliferation. When asked to describe the image that comes to mind when hearing “nuclear”, 68% of participants in an American research survey used the words “bomb", “cloud”, and “destruction”– words directly relating to atomic bombs, not nuclear energy. The same study also suggests a psychological link between nuclear power and nuclear weapons due to the Cold War arms race (Baron & Herzog, 2020). While no country has currently used civilian nuclear power facilities for proliferation, countries have used imported nuclear reactors to make weapons. In 1974, India used a Canadian nuclear reactor to create a nuclear bomb, leading to stricter regulations on nuclear technology exports. Additionally, countries that refused to sign the 1978 Nuclear Nonproliferation Treaty (NPT) and did not allow inspections from the International Atomic Energy Agency (IAEA) were banned from accepting exported fuel from countries involved with the treaty. Nuclear weapons proliferation is possible, though unlikely in countries with well-developed nuclear energy programs with strong oversight from the IAEA (Gilinsky, n.d.).

However, some countries that have signed the NPT have come close to violating proliferation and nuclear safety policies for military purposes. During the start of the Russia-Ukraine war, Russian forces invaded the Chernobyl nuclear power plant, violating nuclear and environmental safety procedures, while posing health risks (Sawano et al). Ukranians living nearby feared that the Russians did not understand how dangerous their operation was (Hayda, 2022). A year later, Russia took over the Zaporizhzhia nuclear power plant, further violating IAEA safety standards (EEAS, 2022). Iran, another country that signed the NPT, maintained hidden nuclear programs in 2002 and 2009 without knowledge of the IAEA. Due to the country’s secrecy surrounding its uranium enrichment programs, many analysts believe Iran is stockpiling nuclear weapons (al-Harby, 2022). In February of 2023, the United Nations and IAEA found 83.7% enriched uranium stored in an abandoned Iranian civilian nuclear power plant. This finding, while drawing suspicion, does not provide certain evidence of weapons proliferation, nor does it suggest that proliferation cannot be prevented (IAEA Board of Governors, 2023).

The NPT has succeeded in lowering the spread of nuclear weapons and separating military and civilian nuclear technology (Fuhrmann and Lupu, 2016). But even though the risk of weapons proliferation through civilian nuclear power plants is low, it is not impossible. One argument suggests that as nuclear power becomes widespread, discouraging proliferation efforts will not succeed (Elhefnawy, 2008). Other arguments specifically point to the stability of countries with a civilian nuclear power program, suggesting that unstable countries have higher proliferation risks. This includes countries with high corruption levels and terrorist activity, along with a large military presence in civilian power plant management. (Miller & Sagan, 2009), (Voss, 2013). While public concerns about weapons proliferation are logical, they overlook that the risk extends beyond countries they consider threatening. Instead, proliferation risks exist in all countries with the problems listed above.

Most original concerns surrounding nuclear weapons proliferation among Americans only applied overseas. Under the Atoms for Peace program in 1950, the US declassified its plutonium fuel technology and exported about 30 tons of highly enriched uranium, leading to concerns about the spread of nuclear weapons through technology from reactors (Gilinsky, n.d.). A series of research surveys 30 years later found that concerns over nuclear proliferation only applied to reactor sales abroad. A plurality of 42-45% of respondents believed that the US should not sell nuclear power plants. Approval of selling US reactors differed based on country: 58% approved of sales to Australia, while only 7% approved of sales to Iran (Rankin et al., 1981). While the fears of nuclear disasters and radioactive waste stem from distrust of domestic organizations, the fear of weapons proliferation stems from distrust of foreign organizations.

In contrast, Japan managed to sever the link between nuclear power and nuclear weapons. Drawing on the United States' Atoms for Peace program, the Japanese government launched a series of advertisements, even showing atomic bomb survivors voicing support for nuclear power. Japanese nuclear power supporters differentiated between "atomic energy" and "nuclear weapons", further separating the two technologies (Baron et al., 2020). These initiatives proved to be successful, as Japanese support for civilian nuclear energy programs has gone up. Similar to Americans, Japanese people also fear hostile countries using nuclear technology to make weapons (Huges, 2007). The most probable way weapons proliferation could occur would be through using waste from operating civilian nuclear power plants. Technology used to limit the presence of nuclear waste, such as closed fuel cycles, can alleviate this potential problem. A process called pyro-processing, which mixes uranium and plutonium waste, can further prevent weapons manufacturing, as most nuclear weapons require pure enriched uranium and plutonium. (Woo et al). Additionally, policy approaches can combat cover-ups of weapons programs. Some have suggested that the IAEA should be given more authority to track illegal activity in civilian power plants. However, because countries have varying definitions of what nuclear weapons proliferation entails, the IAEA cannot track proliferation risks without establishing a universal standard (Voss, 2013).

Although the risk of weapons proliferation through civilian nuclear power plants is small, the possibility is exacerbated by unstable countries and countries with little separation between military and civilian agencies. As governments from countries that have these characteristics, such as Iran and Russia, toe the line of nuclear proliferation, the public is reluctant to believe that non-proliferation initiatives will work. It is possible for the IAEA to establish country-specific policies to prevent potential for weapons manufacturing, which would be particularly effective in cases where general IAEA protocol was broken (IAEA Board of Governors, 2023). Furthermore, encouraging cultural knowledge on countries prone to proliferation could increase potential for understanding (Voss, 2013). Thus distrust of international nuclear power programs persists, as some countries are reluctant to collaborate on nuclear weapons prevention, and individuals are less likely to collaborate with these countries.

Conclusion

The benefits of nuclear energy are well established, as it is more sustainable than fossil fuels, and more widely adaptable than renewable energy technology such as wind or solar. Yet due to the controversial history behind nuclear power, members of the public hold concerns about nuclear energy. These concerns manifest in fears surrounding nuclear disasters, health effects of nuclear waste, and the potential for the proliferation of nuclear weapons. While these concerns are proven to be dangerous, their danger is exacerbated by a lack of interest with companies and governments involved with the nuclear industry. Scientific advancements such as improved safety technology, closed fuel cycles, and different fuel processing methods can work to limit concerns.

However, the most impactful changes will come from greater collaboration between governments and civilians or international organizations. For nuclear disasters, ensuring transparency between nuclear regulatory agencies and civilians is crucial. Through establishing public meetings and procedures for monitoring transparency, regulatory organizations could work directly with civilians to establish a system with clear safety protocol. With nuclear waste, governmental agencies could consult communities living near potential depository sites, creating platforms where they can ask questions to keep elected officials and technical experts aware of their needs. Governments should listen to civilian critiques of waste repository locations. If possible, an IAEA standard definition of nuclear weapons proliferation may alleviate concerns about weapons manufacturing in civilian power plants. This could be combined with country specific policies and methods for cultural understanding between individuals and foreign governments. Implementing these initiatives will be a lengthy process, as members of the public may not trust governmental representatives enough to collaborate with them, without examples of this type of collaborating succeeding. Policies that ensure collaboration through consulting local communities about their fears could eventually enable governments to build a legacy of trust associated with nuclear energy.

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