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**Application of Slovic's Risk Perception Research to  
Next Generation Advance Reactors**

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**University of Missouri-Rolla**

**Nuclear Engineering**

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## **Abstract**

Over the past few years the United States has seen a dramatic increase in energy demand and consumption. With this increase there is a great need for a cheap, clean, energy source. In order to meet future energy needs the United States will have to build Generation (III+) and Generation (IV) power reactors, which have increased capabilities and passive safety features. One major challenge for this new exciting technology is public acceptance. In the past, the nuclear industry has had grim luck with public perception of any nuclear technology. However, there is hope for a solution to this problem; a problem that stems only from the lack of knowledge about nuclear energy. The American public knows a great deal about the risks involved with nuclear technology, but very little about the benefits it also brings. If most people were aware of all the diverse benefits associated with nuclear energy then the nuclear industry would gain public acceptance on a large scale. To achieve this, the nuclear industry and all stakeholders must familiarize the public through some massive means, inserting a constructive image into the nation's mind. People will then realize nuclear energy as a part of their everyday lives, and will open the country to new sustainable social, economic, and environmental possibilities.

## **Introduction**

The nuclear industry plays an important role in the everyday lives of all Americans, even though most are completely unaware of it. There are so many examples of the important products and services provided by nuclear technology that improve both present and future generations. For instance, about twenty percent of the nation's power comes from nuclear power plants, and without it, the already struggling energy situation would be a disaster. Deaths and serious injuries are prevented every day thanks to gamma-radiography, which finds cracks and defects in the materials used in common structures and machines, such as commercial aircrafts. Dangerous criminals are caught based on neutron activation, which allows police to detect weapons, drugs, and explosives. Even nuclear technology is behind the customary smoke detector, which saves lives all over the world. Finally, the medical uses seem to be endless, from simple x-rays to PET Scans; people everywhere are enjoying the benefits of this modern technology.

Imagine what the nuclear industry would be like if the majority of U.S. citizens were aware of all the aforementioned benefits. Unfortunately, very few Americans have any idea about all of the positive impacts nuclear technologies have on themselves and their loved ones; and if they did, it is certain that the average perception associated with the word *nuclear* would be much brighter.

The largest problem the nuclear industry faces is negative public perception. Paul Slovic is a psychologist who has done extensive research on risk perception of the nuclear industry. His work has helped explain some of the industry's public perception setbacks. Perception is a key issue because in a democracy the people control policy,

whether directly or indirectly. It has been seen that without supporting government policy, nuclear progress is almost impossible. It has also been seen that the converse is true in countries such as France and Japan. If public perception is positive then government support will materialize and progress will prevail.

### **Risk, Media and Stigma and Paul Slovic**

The main source of research in this paper is the book Risk, Media and Stigma: Understanding Public Challenges to Modern Science and Technology edited by James Flynn, Paul Slovic, and Howard Kunreuther. This book is particularly relevant to the nuclear industry and explores its case in depth. Before going into detail about Slovic's works it is necessary to first define the terms *risk* and *stigma*.

Risk is nothing but a probability, a probability of something bad or dangerous happening. Very often a person's perception of a risk is quite far off from the true statistical risk value. Several explanations of this will be examined later.

According to Erving Goffman, the word *stigma* was created by the ancient Greeks, referring to signs imposed on one's body to show something bad, immoral, or strange about the bearing person.<sup>1</sup>

For the current situation, the term *technological stigma* is used. It is very similar to the stigma used by the Greeks, except that technological stigma is placed on a certain technology or industry, and so is viewed as being spoiled or hazardous by a substantial number of people. Also, the process of a something receiving stigma is called *stigmatization*.

## **Risk Perception**

Risk-perception is often stemmed from stigma – if a stigma is placed on a technology then it will be perceived as in one way or another as risky. There are six characteristics of this which have been classified through empirical research (Jones et al., 1984, p. 24).<sup>2</sup>

1. *Concealability*. Is the condition hidden or obvious? To what extent is its visibility?
2. *Course*. What pattern of change over time is usually shown by the condition? What is its ultimate outcome?
3. *Disruptiveness*. Does it block or hamper interaction and communication?
4. *Aesthetic qualities*. To what extent does the mark make the possessor repellent, ugly, or upsetting?
5. *Origin*. Under what circumstances did the condition originate? Was anyone responsible for it and what was he or she trying to do?
6. *Peril*. What kind of danger is posed by the mark and how imminent and serious is it?

These six characteristics of stigma induce risk-perception; sadly the nuclear industry has had a serious history with all of the characteristics because of accidents like Three Mile Island, Chernobyl, and the Fermi I Breeder Reactor. More recently, issues like nuclear waste storage, transportation, and proliferation have further complicated the evolution of risk-perception. It is easy to conclude that as a result of these incidences and policy issues the nuclear industry is perceived with high risk. Surprising to some, the difference between the perceived risk and the actual risk is very large. Statistically, the risk associated with the nuclear industry compared with other industries is exceedingly low, as opposed to what the average person believes.

## **Media**

Media plays an important role in public perception of all technology and industry. The media is the means through which most people gather facts about technology,

especially if they have no *human* resources about that technology. It has been experimentally proven by psychologists John Farquhar and Nathan Maccoby (1977; Maccoby & Alexander, 1980; Maccoby, 1980) that face-to-face communication is far more effective than media.<sup>3</sup> However, in the case of the nuclear industry, very few direct human sources of information are available due to the relatively small number of experts in the field. This means that almost all of the information accumulated by the public is obtained through the media. Because so few human resources are available, the media has a tremendous responsibility to report accurately on the subject of nuclear technology.

The media is a money making business like any other. It will grab viewers in any way it can, even if that means reporting on nuclear related topics in a dramatic way. The media has perhaps inadvertently caused a stigma to be placed on the nuclear industry by way of its vivid reporting.

As mentioned before, accidents like those at Chernobyl and Three Mile Island have been devastating to the industry, greatly as a result of the style of the reporting. The coverage of the Three Mile Island accident was particularly intense and frightening. Words used to describe the accident included “horror,” “catastrophe,” and “the first step of a nuclear nightmare.”<sup>4</sup> These reports caused the first major downturn in America for the industry.

Since the Three Mile Island accident almost all reporting on nuclear related topics have been of the same nature. More recently Yucca Mountain has received a fair amount of media attention. Similar types of words have been used to describe it such as “radioactive grave,” “dump or a tomb or a shaft full of gunk,” “atomic garbage”, and “big

R.I.P.”<sup>5</sup> Because of these kinds of expressions used by the media, the public has an overall fear and disgust for nuclear energy.

Another current topic in media focus is that of nuclear weapons of mass destruction. This media subject has been ongoing since nuclear weapons were created or obtained by other countries around the world, especially Russia. After 9-11 the threat of these weapons falling into the hands of terrorists became very real. In the following months the United States even attacked Iraq based on the possibility that they might have nuclear weapons. Nuclear weapons in the media are here to stay simply because they are so important and are received with so much dread.

Another interesting story that seems to frequently show up in the news is the report about a catastrophic nuclear accident that has not happened but could happen soon. It is a very strange story because most news is about something that did happen or it is at least about an event that is probable to happen. The chances of this kind of nuclear accident to happen in the U.S. are slim to none. But this type of story is really scary to the public because it is easy for people to imagine this scenario and all the awful images that go along with it.

It seems still that any media publicity of the word nuclear is always grim and frightening. With all the wonderful means of technology today, the mass media extends far beyond the news; sources such as internet sites, movies, television shows, books, and radio are all contained in the long spectrum of media. Again, through all of those sources the nuclear industry is often made to look sensationally terrifying and ugly. One perfect example is the hit movie The China Syndrome, which came out in 1979, just 12 days before the Three Mile Island accident. It was made with specific anti-nuclear intentions,



and the timing could not have been worse. The title comes from the scenario of a core meltdown that melts right through the world all the way to china. Furthermore, about 25 years later, today, if a curious individual decides to use an internet search engine to look up the word “nuclear,” he or she is shown several negative sites or images, most of which are about nuclear arms or are very scientifically incorrect, but sound really eloquent. On a positive note, more pro-nuclear websites are showing up, which are quite informative and accurate.

### **Public Perception**

Public perception of nuclear technology has evolved greatly over the decades. The Department of Energy’s “Nuclear Age Timeline” gives a detailed description of nuclear technology’s history.<sup>6</sup> In the 1930’s and 1940’s the first nuclear activities began to take place. The United States was entering and fighting World War Two at the time, and people viewed nuclear energy as a technology that could help win the war; that was about all that was on most people’s minds in that period in history. When President Truman decided to drop the bombs on Japan, it was then the public first realized the power and terror of nuclear radiation, even though it was not fully understood. Right as World War Two ended, the Cold War began with the Soviet Union weapons race. Then the 1950’s was the decade of the famous “Atoms for Peace” speech given by Eisenhower, promoting the peaceful applications of nuclear energy for power generation. According to the U.S. Department of Energy Office of Environmental Management’s Nuclear Age Timeline, ‘He (Eisenhower) pledged the United States’ determination “to help solve the fearful atomic dilemma--to devote its entire heart and mind to find the way by which the miraculous inventiveness of man shall not be dedicated to his death, but consecrated to

his life.”<sup>7</sup> In 1957 the first major nuclear power plant began operations in Shippingport, Pennsylvania, literally kicking-off the Atom’s for peace movement. The 1950’s was a very promising time for nuclear energy. In the 1960’s Americans were encouraged to build fall-out shelters in case of a nuclear attack, and the threat of nuclear radiation became very real. Also, the Non-proliferation Treaty and the Limited Test Ban Treaty was being signed by the United States and other nations. Even still, a massive amount of commercial nuclear power reactors were built in those years. The most notable events in the 70’s were, of course, the Three Mile Island accident and Carter’s banning of nuclear fuel reprocessing. As mentioned before, Three Mile Island was the point at which public confidence in nuclear technology took a turn for the worse. The Anti-nuclear mind-set became prominent across the nation, and since then no new nuclear power plants have been built. The eighties were equally dim with the accident at Chernobyl, which caused extreme fear and discomfort with nuclear power. People continued to perceive nuclear energy with dread on through the 90’s.

In 2005 it is difficult to gauge the level of public acceptance of nuclear energy. Based on the history, one would conclude that the perception is still rather negative, and the industry is still stigmatized. Clearly, public perception is too low for the nuclear industry to make any bold moves.

Several attempts have been made to measure the amount of public acceptance of nuclear energy through different national surveys. Each study has a slightly different finding. According to a 2005 study conducted by Bisconti Research Inc., 67% of Americans favor nuclear energy.<sup>8</sup> However, according to the Gallup Poll, only 44% of Americans approve of “expanding the use of nuclear energy,” while 51% disapprove.<sup>9</sup>

Even though that poll was conducted in 2001, the overall public opinion is certainly not going to jump from 44% approval to 67% approval in only four years. The Associated Press also conducted a poll in 2001 and found that 50% of Americans support the use of nuclear power to generate electricity, with 30% opposing the use of nuclear power.<sup>10</sup> If one conclusion can be drawn from all the surveys conducted; it is that between about 45% and 65% of Americans approve of nuclear power. This neighborhood of approval is not high enough for the nuclear industry to make any major expansions in the current political environment.

With the generation (III+) and generation (IV) initiative in mind, the American public will not lend enough support to the building of a new nuclear reactor. Many of the people who do accept nuclear power do not want it in their own back yard because they are uneasy about nuclear reactors. Massachusetts Institute of Technology has done extensive research on public attitudes toward nuclear power and has found discouraging results. The Future of Nuclear Power: An Interdisciplinary MIT Study reports that “.....the U.S. public is unlikely to support nuclear power expansion without substantial improvements in costs and technology. Second, the carbon-free character of nuclear power, the major motivation for our study, does not appear to motivate the U.S. general public to prefer the expansion of the nuclear option.”<sup>11</sup> People do not seem to realize that carbon-free nuclear power will help with the fight against global warming. This is an example of Americans not being at all conscious of the benefits of the technology, but instead they seem to be focused on the risks. A shift in focus would lead to a shift in confidence.

## Industry Stigma

The nuclear industry is a perfect example of a stigmatized industry. It is easy to see how the industry became stigmatized just by looking back on the history, which is only about a century old. Any new technology is going to be initially feared if it is unfamiliar and not understood, as nuclear technology certainly is. Going back to the definition of stigma, it is a term having to do with signs, meaning that stigma is all about imagery. It is simple to prove that the nuclear industry is stigmatized by researching the imagery associated with the industry. Paul Slovic researched this subject thoroughly and reported his findings in Risk, Media, and Stigma. He looked specifically into the nuclear images linked with the potential Yucca Mountain nuclear waste repository in Nevada. Slovic found a round about way to obtain images associated with the nuclear industry by surveying individuals about their personal images of Nevada. The survey was taken by Phoenix, Arizona residents in 1988. Nevada was chosen for this survey because it has a lot of nuclear images associated with it and it is the home of Yucca Mountain and the weapons test site. Slovic constructed the following table to illustrate the types of nuclear images people had.

### Images Associated with an “Underground Nuclear Waste Storage Facility”<sup>12</sup>

| Category          | Frequency | Images included in category  |
|-------------------|-----------|--|
| 1. Dangerous      | 179       | Dangerous, danger, hazardous, toxic, unsafe, harmful, disaster                                 |
| 2. Death/sickness | 107       | Death, dying, sickness, cancer   |
| 3. Negative       | 99        | Negative, wrong, bad, unpleasant, terrible, gross, undesirable, awful, dislike, ugly, horrible |
| 4. Pollution      | 97        | Pollution, contamination, leakage, spills, Love Canal  |
| 5. War            | 62        | Warm, bombs, nuclear war, holocaust  |
| 6. Radiation      | 59        | Radiation, nuclear, radioactive glowing  |
| 7. Scary          | 55        | Scary, Frightening, concern, worried, fear, horror   |

|                          |    |  |
|--------------------------|----|--|
| 8. Somewhere else        | 49 | Wouldn't want to live near one, not where I live, far away as possible |
| 9. Unnecessary           | 44 | Unnecessary, bad idea, waste of land                                   |
| 10. Problems             | 39 | Problems, trouble  |
| 11. Desert               | 37 | Desert, barren, desolate   |
| 12. Non-Nevada locations | 35 | Utah, Arizona, Denver  |
| 13. Nevada/Las Vegas     | 34 | Nevada (25), Las Vegas (9)   |
| 14. Storage location     | 32 | Caverns, underground salt mine   |
| 15. Government/industry  | 23 | Government, politics, big business                                     |

Many of the images the Phoenix residents had corresponding with nuclear waste storage are the same images shared by most Americans when thinking about any nuclear technology that they are not familiar with. These images are the ones that define nuclear stigma.

The nuclear industry is not the only industry that has been stigmatized. Technological stigma is a growing concern in today's business world and is a problem that many companies have faced. Usually stigmatization occurs when a scary or dramatic event happens with a particular product or industry, and most of the time the event is very improbable. For example, in 1982 fewer than ten people were killed from cyanide poisoned Tylenol®. These poisonings led to around 125,000 printed news stories and cost the company millions of dollars.<sup>13</sup> People were very afraid to buy the brand for a long time after that even though it was extremely unlikely that an individual would buy a tainted bottle. Tylenol® made an incredible comeback and is still a very popular product today, proving that it is possible for an industry overcome a massive stigmatization. Other stigmatized industries or industries that have been stigmatized in the past include: fertilizer companies, pesticide companies, beef, eggs, video game makers, chemical manufacturers, cigarette companies, and the oil industry. Each of these industries have experienced stigma in a different way; arguably, some were deserved and some were not.

An interesting scenario should also be considered, that is when an industry should be stigmatized but is not. It can be a fairly dangerous situation if the risks are severe enough. Risk, Media, and Stigma examines the case of automobile airbags. Statistically, airbags are actually really dangerous, especially for smaller people like the elderly, women and children. By 1999 over 100 deaths of drivers and small children, and thousands of injuries had been caused by airbags.<sup>14</sup> Although airbags could be made a lot safer, there is no public outcry or demand for it. Airbags have been known to inflate at crash impact speeds as low as 8 miles per hour and on average airbags are designed to detonate at impact speeds between 13 and 18 miles per hour, and when the average airbag detonates, it does so with a force of 2000 pounds and a rate of 200 miles per hour.<sup>15</sup>

One would wonder why airbags are not seriously stigmatized. Slovic found three possible answers to this question. The first explanation for this absence of stigma is public ignorance. If the public is unaware of the risky facts, then clearly they cannot be outraged over them. Various surveys have been conducted to find out whether people know about the risks associated with airbags and the results show that people are relatively ignorant of these risks.<sup>16</sup> Secondly, personal optimism was proposed to explain the lack of airbag stigma. Personal optimism is when people think “it won’t happen to me.” Also, most Americans believe that they are great drivers for some reason. Even if this justification is correct, society should be infuriated by the amount of children’s lives airbags have claimed. However, a more logical and complicated explanation is provided. It is that most people trust that the benefits outweigh the risks. In Risk, Media, and Stigma it is noted that “Howard Margolis of the University of Chicago has argued that the public reaction to many technological dangers can be best understood as following a

danger-opportunity calculus. If a technology's danger is 'on-screen' but its benefits are 'off-screen,' there will be public demands for a 'better safe than sorry' approach to government policy. This is in fact the public response to nuclear power and agricultural pesticides, technologies that have imaginable dangers yet benefits that are difficult for ordinary people to fathom. If a technology's benefits and dangers are both 'on-screen,' then Margolis' prediction is that people will approach the issue with an attitude of 'fungibility' (Margolis, 1996). This attitude is far more tolerant of danger than the 'better safe than sorry' attitude."<sup>17</sup> In the case of airbags, the benefits are definitely "on-screen," and that could mean that the industry will never be sufficiently stigmatized.

As stated by Margolis, the nuclear industry's benefits are "off-screen" and unknown by the common person. Nuclear technology could really profit from Margolis' analysis, in knowing that if more people were aware of the benefits and the risks then they would be willing to accept the industry's risk-benefit balance. The nuclear industry needs to find an efficient way of getting the advantages of the technology "on-screen." American Nuclear Society has made some great progress in this area, but the facts just need to be presented to an even larger audience. With this strategy in mind, next generation advanced reactors along with the nuclear industry as a whole have some encouraging possibilities.

### **Reversing Negative Public Perception Today**

Currently, the nuclear industry is taking a few steps to improve public relations. For example, almost all the nuclear power plants across the nation have a nice visitor's center and offer free tours and information about the technology. This is a great way to increase public support especially on a local level, which is very important. The

American Nuclear Society (ANS) has also made tremendous efforts to educate the public on nuclear topics with the official American Nuclear Society website and a new website called "About Nuclear." ANS has also set out to educate the public through the "grass roots method," which is quite effective because it involves the human factor. The hope of this method is that it will take the domino effect; that is that one person will become educated and then educate his or her friends and family and the process will continue. ANS and other organizations also offer resources to teachers of all age levels. One of the most important audiences to reach is the children because they will be the next generation of law makers. The Department of Energy and some of the national laboratories also partake in similar forms of public outreach offering educational programs, extracurricular activities, and tours. All of these methods used have been very vastly effective in helping individuals make informed decisions and opinions about nuclear energy.

#### **A Possible Ad-campaign for the Nuclear Industry**

The nuclear industry has a great deal of potential to introduce an ad-campaign to inform the public of all the benefits offered by its technology. Doing this would improve public acceptance substantially. It is shameful that an industry does so much for a society which is completely unaware of it. Even though the nuclear industry is very broad, it can still launch an ad-campaign as many other generic or broad industries have. Milk, beef, cotton, and eggs are all generic products that have had impressive advertising accomplishments. Generic stigmatized industries have also introduced successful ad-campaigns, such as the "Plastics make it Possible" promotion. The plastic industry presented those commercials because plastics were beginning to become stigmatized due to their petroleum derivatives. Most people seemed to then realize how important



plastics are to society, and all the negative plastic publicity began to dwindle. Something of a similar nature could take place for the nuclear industry, even with its rocky past.

Instead of “Plastics make it Possible,” the nuclear industry might introduce an advertising phrase like “Nuclear Technology: Saving Lives, Enriching Life” because nuclear technology is responsible for making life safer and better with its various applications to materials, agriculture, cleanliness of instruments and food, power, public safety, military, and medicine. Plus, there is no doubt that many more applications will be invented in the future, especially since the technology is less than a century old. If America understood these things, then there would certainly be an abundance of enthusiastic support behind the industry.

The introduction of a nuclear ad-campaign is tempting to criticize, particularly when recalling the American Nuclear Energy Council’s (ANEC) 1991 advertising campaign for the Yucca Mountain repository site in Nevada. The advertising goal was to help the public understand that the transportation of high-level nuclear waste was safe. The methods used by the campaign designers looked good on paper, but backfired swiftly. One television commercial showed a truck with a waste container being smashed into by a large train. The spokesman proclaims that the container is fully intact after parts and machinery fly everywhere during the collision. Department of Energy scientists appeared in other ads, assuring the public that high-level nuclear waste cannot explode and that living near a nuclear power plant does not cause cancer. Another commercial showed that nuclear waste is solid, not liquid or gaseous as usually expected.<sup>18</sup>

Despite the valiant effort of ANEC, the campaign failed miserably. A later survey concluded that people responded to the ads with feelings of disbelief and insult. Many people disagreed with the ads or were indifferent, but some were also positive. Less than 15% of respondents felt more supportive after the ads, 32% felt less supportive, and 52% said that their opinion was unchanged.<sup>19</sup> To make matters worse, the campaign became an issue of media criticism and satire. The American Nuclear Energy Council went about their attempts all wrong. They simply defended the case for nuclear waste transportation, thereby emphasizing the perceived risks. Defending a product will never make people realize its advantages.

The Nuclear Energy Institute (NEI) has also recently run into some problems with its ads. The NEI was reported to the Better Business Bureau for claiming that nuclear power is environmentally clean.<sup>20</sup> This problem has received ample media coverage about the industry's alleged "greenwashing" citizens into supporting nuclear power by making them believe that it produces no waste. This has offended the public and added to the distrust of nuclear business. Dishonest claims or even claims that are generally accepted as false do not make for acceptable advertising, especially for the nuclear industry. Advertisements for nuclear technology must be designed very carefully with human psychology in mind.

A psychological aspect that makes people uneasy about nuclear energy is the fact that they are not familiar with it. Most people have received little or no education on atomic energy. An ad-campaign showing how nuclear technology is an everyday part of life would familiarize the public enough that they would feel more comfortable with it. An example of how this works is given by Psychiatrist Dr. Robert DuPont, who said, "It's

like when I have a fearful flyer. Get him on an airplane. I want him to meet the pilot. I want him to tell the flight attendants that he's a fearful flyer. What they do is they humanize that scary environment. I don't want him in 17A, cowering like this. I want him talking to people. Well, that's exactly what you would do with nuclear power. You'd want him to talk to the engineers. You want to talk to the laborers in there. You want to talk to everybody in there, so they know they're just neighbors doing their work. And that's very reassuring to see that."<sup>21</sup> According to DuPont, familiarity reduces fear. A reduction of fear is exactly what the industry needs.

Imagery and visualization also play a key role in how people perceive a technology. If people could associate positive images with the nuclear industry they would be more likely to support it. Presently, the images associated with the nuclear industry include *mushroom clouds, death, sickness, radiation, glowing, cancer*, and so on. The table on page 11 shows some of the current nuclear imagery of Yucca Mountain, which applies to all the nuclear industry. People have these images because they appear on the television, in newspapers and articles, and even in history books. These are not images that are going to cause any public support. Adding nuclear associated images such as *life, wellness, safety, future generations, environmentally friendly, health, prosperity, and beauty* to the public's mind would also make people more likely to support the technology. Pictures truly are worth a thousand words. Advertisements about nuclear technology with these images presented clearly and sensibly will cause people to be less one-sided when thinking about nuclear energy because there will be new positive images along with the former negative images.

If the nuclear industry did decide to launch an ad-campaign, it would have to make sure it did so truthfully, politically correctly, and non-defensively. It would have to be able to make the public feel comfortable with nuclear energy, and do so using constructive imagery. Advertising just may be the answer to the nuclear public acceptance problem if done correctly.

## **Conclusion**

Today, more than ever, it is important to reawaken the nuclear industry with the generation (IV) reactor initiative in order to meet the world's energy needs. The nuclear industry has experienced major difficulties and low points with the media and public opinion, but is still slowly recovering. America is ready for an attitude change because there has not been an accident for more than two decades and public confidence seems to be on the rise. All the industry needs to use is a little psychology to minimize the people's fear and maximize the people's knowledge of common beneficial nuclear technology. After more than fifty years of nuclear technology, there are finally helpful applications with which all people can relate and can appreciate. The idea of public acceptance of next generation advanced reactors should not be an *if* or a *when*, but instead a *how*. Gaining public support and consequently political support is not impossible; it just must be done in the right way. It is time for the nuclear industry to take action to enhance life for the present and for the future.

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