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# **Myths & Facts About Nuclear Energy**

Synopses of Common Myths About Nuclear Energy and Corresponding  
Facts That Refute Them

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## **Myths & Facts About Nuclear Energy**

### **New Plants**

#### **No new nuclear plants have been built in the past 30 years.**

**Fact:** While no new nuclear plants have been ordered since 1973, construction activity continued into the mid-1990s. Forty-five reactors were completed and put into service in the 1980s and five in the 1990s. The TVA Watts Bar 1 plant in Tennessee was placed on line in 1996, and the Watts Bar 2 plant is being completed and is expected to begin operation in 2012.

#### **New nuclear plants are too expensive to build.**

**Fact:** While nuclear plants are capital-intensive projects, with construction costs estimated at \$6 billion to \$10 billion for a large reactor, their production costs are the lowest among major electricity sources, with the exception of hydroelectric power plants. The production cost of nuclear energy, which includes fuel operating and maintenance expenses, averaged 2.03 cents per kilowatt-hour throughout the industry in 2009—compared to 5 cents per kilowatt-hour for natural gas. Nuclear power plants are considered 60-year investments; most other carbon-free energy technologies have a far shorter design life. Recent independent studies by the Massachusetts Institute of Technology, U.S. Energy Information Administration and National Research Council found that new nuclear plants are competitive in the current market and will be even more competitive if carbon controls are implemented. For more information, see NEI's white paper "[The Cost of New Generating Capacity in Perspective.](#)"

#### **New nuclear plants are more expensive to build than renewable energy supplies.**

**Fact:** To produce the same amount of electricity as a nuclear facility, wind and solar projects will cost more, take as long to build and occupy far more space. In 2008, T. Boone Pickens said his Mesa Wind Project in Texas would cost \$10 billion to build, take eight years to complete, occupy 312 square miles and require \$3 billion to \$6 billion in new infrastructure. The total cost for the project, which would generate as much electricity as one nuclear reactor, would be between \$13 billion and \$16 billion. He has since cancelled the project based in part on the cost and difficulty of building transmission lines. According to the U.S. Energy Information Administration, the [levelized costs](#) (dollars per megawatt-hour) for new generation that will come on line in 2016 are: solar PV 296.1, solar thermal 256.6, wind offshore 191.1, wind on land 149.3, coal with carbon capture storage (CCS) 129.2, hydro 119.9, [nuclear 119.0](#), geothermal 115.7, natural gas with CCS 113.3, coal conventional 100.4, natural gas conventional 83.1.

#### **Nuclear plants can't be built fast enough.**

**Fact:** In just 19 years, between 1970 and 1989, 105 nuclear energy plants were constructed and put into service in the United States. The current licensing and construction of new nuclear plants will take eight to 10 years, which is comparable to similar sized electricity sources. The timeline is expected to shorten to six years or less with licensing and construction experience. Building [new nuclear plants](#) will create thousands of non-exportable jobs, help revitalize the U.S. manufacturing sector, and positively affect the [U.S. economy](#) and the environment.

#### **New U.S. nuclear plants will suffer cost and schedule overruns.**

**Fact:** Several new dynamics support the expectation that new U.S. nuclear projects will be completed on time and on budget: the new combined construction and operating license [process](#), standardized plant designs, computer modeling, computer-aided modular construction, integrated engineering and construction schedules, and major changes to financing requirements.

**Note:** With few exceptions new nuclear plants are being completed on time and on budget overseas. Additionally, the Tennessee Valley Authority in 2007 completed a five-year, \$1.8 billion refurbishment of the Browns Ferry Unit 1 reactor in northern Alabama on schedule and within budget. For more information, see the Nuclear Energy Insight article [“TVA Restarts Browns Ferry Reactor.”](#)

**Most Americans do not support using nuclear energy.**

**Fact:** Recent national polls show a growing majority of Americans support the use of nuclear energy. According to a [2010 Gallup poll](#), support for use of nuclear energy reached a new high of 62 percent. In addition, 28 percent of Americans now say they “strongly favor” nuclear power, also the highest Gallup has measured since the question was first asked in 1994. A [2010 poll](#) performed by Bisconti Research Inc./Gfk Roper found a strong majority (70 percent) says the United States should “definitely build more” nuclear energy facilities, and the [Pew Research Center](#) found that 56 percent of Americans favor incentives for increased development of nuclear power. Bisconti Research also identified a “perception gap” in which public support for nuclear energy is underestimated. For example, a [2010 survey](#) showed that while 74 percent of Americans favor the use of nuclear energy, only 42 percent think the American public generally supports building more nuclear plants, and 44 percent think that the public opposes construction of more plants.

## Energy Supply

**Uranium supplies are running out.**

**Fact:** Readily available uranium resources (5.5 million metric tons) will last at least 100 years at today’s consumption rate, according to the World Nuclear Association and the Nuclear Energy Agency of the Organization for Economic Cooperation and Development. An estimated additional 10.5 million metric tons that remain untapped will expand the available supply to at least 200 years at today’s consumption rate. The agency also determined that further exploration and improvements in extraction technology are likely to at least double this estimate over time. These estimates do not take into account the effect that increased recycling of used nuclear fuel would have on global supplies. The Massachusetts Institute of Technology (MIT) recently confirmed that uranium supplies will not limit the expansion of nuclear energy in the U.S. in its 2010 study [“The Future of the Nuclear Fuel Cycle.”](#) For more information, see NEI’s policy brief [“Uranium Fuel Supply Adequate to Meet Present and Future Nuclear Energy Demand.”](#)

**Nuclear energy is not needed to achieve the nation’s energy and environmental goals.**

**Fact:** Analyses of climate change issued by independent organizations including the National Academies of Science, Electric Power Research Institute, U.S. Environmental Protection Agency and the U.S. Energy Information Administration show that reducing carbon emissions requires a portfolio of clean energy technologies, including nuclear energy. All agree that a major expansion of nuclear generating capacity over the next few decades is essential for success. For more information, see NEI’s web page on [Nuclear Energy and Climate Change](#).

**Renewables and efficiency can meet all the nation’s energy needs.**

**Fact:** Increased efficiency and the expansion of renewable energy supplies are important, but wind and solar technologies are intermittent by nature and cannot generate continuous electricity supply. Baseload electricity makes up more than 60 percent of the electricity used in the United States. Even with record growth in recent years, renewable energy technologies constitute 3 percent of U.S. electricity production. Nuclear power plants provide [20 percent](#) of the nation’s electricity, despite constituting only 11 percent of installed electric generating capacity. Currently, nuclear energy, coal

and natural gas power plants produce 88 percent of the nation's electricity. Nuclear energy is the only low-carbon source of baseload electricity that can be expanded on a large scale to replace carbon-emitting coal and natural gas baseload power plants.

**Baseload electricity is not needed to meet our energy needs.**

**Fact:** Baseload electricity is critical to the U.S. economy and American's quality of life. About 60 percent of the electricity used in the United States is baseload electricity. Baseload electricity is the continuous "round-the-clock" electricity needed to run our homes, schools, hospitals, businesses, transportation infrastructure, telecommunications, military and other operations vital to the safety and security of our nation and citizens. Nuclear energy, coal and natural gas power plants produce most of the nation's baseload electricity. Intermittent electricity sources such as wind and solar are incapable of generating baseload electricity.

## **Financial**

**The bulk of government energy subsidies have gone to nuclear energy.**

**Fact:** Nuclear energy has received one of the smallest amounts of federal subsidies over time, and over the past decade, the industry has received less federal support than renewables and coal. A recent [study](#) analyzed all federal energy expenditures from 1959 to 2006 and found that of the \$725 billion that was distributed, 73 percent went to oil, natural gas and coal; 18 percent to hydro and renewable; and nine percent to nuclear. The Energy Policy Act of 2005 authorized \$18.5 billion in loan guarantees each for nuclear and renewable energy projects, the American Recovery and Reinvestment Act of 2009 authorized an additional \$60 billion in loan guarantee authority and tax credits for renewable and alternative energy supplies with none for nuclear energy.

**Nuclear loan guarantees are government handouts.**

**Fact:** A loan guarantee provides government backing for a loan that allows companies to access capital at lower interest rates. This reduces the overall project cost, which means lower electricity prices for consumers. All guaranteed loans must be paid back in full, and project sponsors must pay a fee to the government to participate in the loan guarantee program. There is no cost to taxpayers unless there is a default, which is unlikely because of the stringent financial requirements of the nuclear loan guarantee program. For more information, see [Loan Guarantee Fast Facts](#).

**The expected default rate on nuclear loans is 50 percent or higher.**

**Fact:** The claim of a 50 percent default rate comes from a 2003 Congressional Budget Office (CBO) analysis of a proposed loan program that was not enacted and was much different than the loan guarantee program put in place under the Energy Policy Act of 2005. The CBO recently refuted critics' use of the 50 percent default characterization, saying it was not applicable to the nuclear loan guarantee program under the Energy Policy Act of 2005. For more information, visit [NEI Nuclear Notes](#).

**A mature industry should not require loan guarantees.**

**Fact:** Because of the structure of the U.S. electric energy industry, most of the more than one-thousand electric companies are relatively small. Exelon, the nation's largest electric company, has a market value of approximately \$30 billion. This pales in comparison to oil companies such as Exxon Mobil and Chevron, which have market values of \$314 billion and \$161 billion, respectively. Because of electric companies' small size and the capital investment needed for new nuclear plants, loan guarantees are a prudent low-cost means to help achieve the nation's energy and environmental goals.

**Note:** Loan guarantees also are being made available to other low-carbon technologies that have received federal support as far back as the 1970s, so they also are “mature.” The notable difference between nuclear energy and those technologies is that the federal investment in nuclear energy has proven worthwhile: Despite constituting only 11 percent of installed electric generating capacity, nuclear energy provides more than 70 percent of the nation’s carbon-free electricity production at among the lowest electric production costs.

**Nuclear loan guarantees take money away from other energy supplies.**

**Fact:** Seventy-six and a half billion dollars in direct subsidies, tax credits and loan guarantees was made available by the federal government for renewable energy technologies and other alternative energy supplies. This compares to \$18.5 billion in loan guarantees available for new nuclear energy facilities. Only a fraction of the funding available for renewable energy has been utilized to date.

**Note:** The federal government successfully manages a loan guarantee portfolio of \$1.2 trillion consisting of 70 loan guarantee programs to ensure investment in critical infrastructure. The federal loan guarantees enable investment in critical national needs, including shipbuilding, transportation infrastructure, exports of U.S. goods and services, affordable housing, and many other purposes.

## Safety

**Nuclear energy isn’t safe.**

**Fact:** After more than a half-century of commercial nuclear energy production in the United States, including more than 3,500 reactor years of operation, there have been no radiation-related health effects linked to their operation. Studies by the National Cancer Institute, The United Nations Scientific Committee of the Effects of Atomic Radiation, the National Research Council’s BEIR VII study group and the National Council on Radiation Protection and Measurements all show that U.S. nuclear power plants effectively protect the public’s health and safety. Nuclear plants also are safe for workers. According to the U.S. Bureau of Labor Statistics, it is safer to work at a nuclear plant than at a fast food restaurant or a grocery store or in real estate. For more information, see the NEI fact sheet [“Radiation Safety at Nuclear Power Plants: Studies Look at Public, Workers.”](#)

**Chernobyl could happen in the United States.**

**Fact:** By design, it is physically impossible for any U.S. commercial nuclear energy plant to run out of control and explode like the [Chernobyl RBMK](#) reactor design did. Unlike the [Chernobyl](#) reactor, all U.S. reactors are designed to be self-limiting. During power operations, when the temperature within the reactor reaches a predetermined level, the fission process is naturally suppressed so the power level cannot spike under any circumstances. The Chernobyl RBMK reactor is banned in the United States.

**A nuclear power plant can explode.**

**Fact:** It is physically impossible for a U.S. commercial reactor to explode like a nuclear weapon. The concentration of uranium-235 within the reactor fuel is far too low to be explosive and all U.S. commercial reactors are self-limiting. During power operations, when the temperature within the reactor reaches a predetermined level, the fission process is naturally suppressed so the power level cannot spike under any circumstances. No one can intentionally or unintentionally alter a commercial nuclear reactor, its controls or its fuel to make it explode like a nuclear bomb.

**The threat of a nuclear meltdown is high.**

**Fact:** The probability of fuel melting, or core damage, in a U.S. commercial nuclear reactor is very low. Because of the lessons learned and additional precautions taken after the accident at the Three

Mile Island nuclear plant 31 years ago, risk assessments performed for the U.S. Nuclear Regulatory Commission determined that an accident that could cause core damage in the current U.S. fleet of 104 reactors could occur approximately once in 1,000 years. The risk of core damage for an individual plant is approximately once in 100,000 years. For a [new reactor](#), the risk of core damage is less likely—once in a million years—because of enhanced safety features. Core damage does not mean radioactivity would be released from a plant, nor does it mean that anyone would be harmed. Every nuclear plant has an extremely strong containment building that encloses the reactor and multiple safety features designed to mitigate the consequences of a core damage event. Half of the fuel in the [Three Mile Island](#) reactor melted and the rest was severely damaged but no one in or outside the plant was harmed. The potential for a nuclear plant to have a core damage accident resulting in significant release of radiation is low—once in 10,000 years for the operating plant fleet.

**Note:** To protect the health and safety of the public, every U.S. nuclear plant is required to have [emergency plans, procedures and notification systems](#) at the ready should a core damage event occur. Every plant is required to regularly perform emergency drills graded by the U.S. Nuclear Regulatory Commission and each must maintain high levels of performance and emergency preparedness to continue operations.

### **Nuclear power plants are likely targets for terrorism.**

**Fact:** With protective measures similar to high-security military installations, U.S. nuclear plants are among the most highly protected facilities in the nation's industrial infrastructure. It is because of their fortifications and multiple layers of security that nuclear plants present a strong deterrent to potential threats.

### **A nuclear power plant cannot withstand a terrorist attack.**

**Fact:** With protective measures similar to high-security military installations, U.S. nuclear plants are among the most [highly protected facilities](#) in the nation's industrial infrastructure. Nuclear power plants are protected 24/7 by professional security personnel armed with automatic weapons prepared to repel ground and airborne terrorist attacks. It is because of their fortifications and multiple layers of security that nuclear plants are far less likely to be targets of terrorism than the thousands of far more vulnerable potential targets across the nation. Anti-terrorism measures are regularly tested and closely coordinated with local, state and federal authorities.

### **A nuclear power plant cannot withstand the impact of a jetliner.**

**Fact:** Following the terrorist attacks of Sept. 11, 2001, sophisticated computer modeling by some of the world's leading structural engineers showed that [facilities](#) at nuclear power plants that contain radioactive material can withstand a [jetliner impact](#) without releasing radiation. Likewise, all new nuclear power plants are required to withstand the direct impact of a fully fueled commercial jetliner.

### **Nuclear plants are vulnerable to cyberattacks.**

**Fact:** There has never been a successful [cyberattack](#) at any U.S. nuclear plant. Unlike industries for which two-way data flow is critical (e.g. banking), nuclear power plants do not require incoming data flow. None of a plant's safety and control systems are connected to the Internet. Any additional computers utilized in a nuclear plants are strictly controlled with their content, use and possession monitored by security personnel. And nuclear plants are protected from grid instability and are able to safely shut down in a variety of ways without computer controls under any condition including a total loss of offsite power.

### **Nuclear energy leads to the proliferation of nuclear weapons.**

**Fact:** The technology to make highly concentrated uranium and plutonium for nuclear weapons is completely independent of nuclear power plant technology. It is impossible to make a nuclear

weapon with the low-enriched uranium contained in commercial nuclear reactor fuel. If every commercial nuclear energy plant and all the supporting technology around the world were dismantled and none were ever built again, the proliferation of nuclear weapons would still be a threat.

**Note:** Nuclear energy plants reduce the threat of nuclear weapons by using warhead material as fuel and rendering it useless for weaponry. To date, the U.S.-Russia Megatons to Megawatts program has consumed 400 metric tons, the equivalent of 16,000 nuclear warheads. Strict protocols administered by the International Atomic Energy Agency (IAEA) are used to control fuel enrichment, fabrication and reprocessing facilities. The international community, through the United Nations Security Council, can take action against nations that are not complying with safeguards commitments to the IAEA.

### **Terrorists can use commercial reactor fuel to make nuclear weapons.**

**Fact:** It is impossible to make a nuclear weapon with the low-enriched uranium contained in commercial nuclear reactor fuel. Only through extremely complex and expensive reprocessing could the plutonium in used nuclear fuel be isolated for use in a nuclear weapon. This requires a very large industrial complex that would take years and hundreds of millions of dollars to construct—far beyond the capability of any terrorist organization.

### **Reprocessing used nuclear fuel will lead to proliferation of nuclear weapons.**

**Fact:** Reprocessing of used nuclear fuel can be designed to prevent the isolation of plutonium therefore posing no threat of [proliferation](#). It is impossible to make a nuclear weapon with the low-enriched uranium contained in commercial nuclear reactor fuel.

### **Transporting radioactive materials exposes the public to unacceptable risk.**

**Fact:** Since the 1960s, there have been more than 3,000 [shipments](#) of used nuclear fuel and high-level radioactive waste on U.S. roads, highways and railways totaling more than 1.7 million miles. There have been nine accidents, four on highways and five on railways. Because the shipping containers are so strong, there were no injuries, leaks, exposures or environmental damage. The typical high-integrity fuel shipping container can withstand a direct hit by a high-speed locomotive, an 80-mile-an-hour crash into an immovable concrete barrier, immersion in a 1,475-degree Fahrenheit fire, a direct hit by a projectile 30 times more powerful than an anti-tank weapon, immersion in 600 feet of water and more.

### **The Nuclear Regulatory Commission is too “cozy” with the nuclear industry.**

**Fact:** The commercial nuclear industry is arguably the most strictly regulated industry in the nation. The Nuclear Regulatory Commission is an independent, safety-focused, transparent regulatory agency that inspects and monitors all U.S. nuclear power plants. The NRC’s five commissioners are appointed by the president of the United States and confirmed by the U.S. Senate. The majority of the agency’s funding is drawn from nuclear energy industry user fees as mandated and administered by Congress. The NRC can impose warnings, fines and special inspections; order plants to shutdown; and modify, suspend or revoke a plant’s operating license. Each year, the NRC utilizes an average of 3,800 person-hours of inspection effort for each reactor, including at least two full-time resident inspectors with unlimited access to their assigned facility. Specialist teams also conduct inspections throughout the year. If a plant’s performance declines, additional inspections are utilized. All NRC inspection reports, hearing information, performance ratings, enforcement orders and license information for every nuclear facility are posted on its website and open to the public. The NRC has strict [rules](#) to prevent conflicts of interest between its personnel and members of the nuclear industry and can impose corrective and/or punitive actions if they occur.

### **Nuclear plant license renewal is a “rubber stamp” by the NRC.**

**Fact:** The Nuclear Regulatory Commission’s [license renewal process](#) takes an average of two years to complete and costs the owners of the facility between \$10 million and \$20 million. The application for license renewal (ranging from several thousand to tens of thousands of pages of required information for one reactor) involves at least 60,000 person-hours of preparation by the company that owns the facility. The public is encouraged to participate in the process through public meetings and public comment periods on rules, renewal guidance and other documents. In addition, parties and members of the public have an opportunity to request a formal adjudicatory hearing if they believe they would be adversely affected by the renewal. The NRC must determine that a plant can continue to operate safely throughout the extended period of operation to issue the license renewal. A license renewal does not guarantee that a nuclear plant can operate for the extended 20-year period. The plant must continue to meet regulatory safety standards, or the NRC can order it to shut down and can modify or revoke the unit’s license.

**Note:** The original 40-year term for nuclear power plant licenses was not based on an expected operating life span, but was selected by Congress for the Atomic Energy Act of 1954 because this was the typical amortization period for an electric power plant at that time.

## **Radiation**

### **There is no such thing as a safe dose of radiation.**

**Fact:** If this claim were true, it would be dangerous to breathe air or eat food. Every human being is continuously exposed to different forms of radiation every moment of their life. [Studies](#) by the United Nations Scientific Committee on the Effects of Atomic Radiation, the National Research Council’s BEIR VII study group and the National Council on Radiation Protection and Measurements all show that the risk associated with low-dose radiation from natural and man-made sources, including nuclear power plants, is extremely small. [Radiation](#) is strictly controlled and monitored at all nuclear power plants to minimize plant emissions and worker exposure. Less than one-tenth of a percent of all radiation exposure is from nuclear facilities as confirmed by widespread monitoring programs that ensure the safety of plant workers and neighbors. In fact, the use of radiation in medicine, electricity generation, and many other common applications has improved, extended and saved the lives of millions of Americans. For more information about radiation, visit [www.radiationanswers.org](http://www.radiationanswers.org).

### **Nuclear plants emit dangerous amounts of radiation.**

**Fact:** Nuclear power plants have controlled and monitored emissions of radiation, but the amount is extremely small and poses no threat to the public or the environment. The Nuclear Regulatory Commission reports that people living close to a nuclear power plant receive, at most, an additional one millirem of radiation exposure a year. To put this in perspective, one millirem is one thousandth of the radiation exposure from a single whole-body [CAT scan](#). The average American is exposed to 620 millirem of radiation every year. Three hundred millirem of this comes from natural sources, such as cosmic rays, uranium in the Earth’s crust and radon gas in the atmosphere. Most of the rest comes from medical procedures such as CAT scans and consumer products. The radiation exposure from living near a nuclear power plant is insignificant and is no threat to the health of the public. After more than 3,500 reactor years of operation, there is no scientific or medical evidence that shows anyone has been harmed by the radiation from any of the nation’s commercial nuclear energy facilities, including the accident at Three Mile Island 31 years ago.

### **The radiation from nuclear plants causes cancer and other harmful effects.**

**Fact:** After more than a half-century of radiological monitoring and medical research, there is no evidence linking U.S. nuclear energy plants to negative effects on the health of the public or workers. Claims that radioactivity from nuclear plants has caused negative health effects have been [refuted](#) by the United Nations Scientific Committee of the Effects of Atomic Radiation, National Research Council's BEIR VII study group, National Cancer Institute, American Cancer Society, the American Academy of Pediatrics, numerous state departments of health and other independent studies.

### **The accident at Three Mile Island in 1979 caused health effects.**

**Fact:** After 31 years, there is no evidence that the nation's worst nuclear power plant accident harmed a single person or had any negative effect on the environment. More than a dozen health studies and continuous environmental monitoring have found no effect on the health of the people or the environment around the [Three Mile Island](#) nuclear plant in Pennsylvania.

### **Radioactive waste from nuclear plants is the most toxic waste known to man.**

**Fact:** Radioactive materials from nuclear plants, including used nuclear fuel, are highly regulated, strictly controlled and monitored and can be safely stored indefinitely. No member of the public has ever been harmed by the handling, transportation, storage or disposal of any of the radioactive material from the nation's nuclear power plants.

**Note:** At the same concentration, industrial waste products such as hydrogen cyanide and arsenic are more toxic to humans than any of the materials used or produced at a nuclear plant.

## **Used Fuel**

### **Used nuclear fuel is "waste."**

**Fact:** Used fuel assemblies from U.S. commercial nuclear reactors are energy-rich resources that contain 95 percent of their original potential energy. By [recycling](#) the used fuel to make new fuel (as done in a number of countries), the remaining energy can be put to use. According to the World Nuclear Association, if the used nuclear fuel currently in storage were recycled using existing technologies, it could power the entire U.S. fleet of 104 nuclear power plants for more than 30 years with no new uranium required.

### **Industry hasn't determined what to do with the used fuel.**

**Fact:** By law, the federal government is responsible for the long-term disposition of used nuclear fuel from the nation's commercial nuclear power plants. In early 2010, Secretary of Energy Steven Chu established a special [commission](#) and tasked it with developing policy recommendations by the end of 2012 for the long-term disposition of used fuel. Although used fuel is safely and securely stored at plant sites in concrete and steel containers and can remain there for many decades, the nuclear industry agrees that a comprehensive [long-term plan](#) is needed and looks forward to the recommendations of the [commission](#). There are several technically and scientifically proven options for safely and securely managing used nuclear fuel. In its 2010 study "[The Future of the Nuclear Fuel Cycle](#)," the Massachusetts Institute of Technology (MIT) offers an independent academic assessment of used fuel management options in the U.S.

**Note:** In September 2010, the Nuclear Regulatory Commission issued final revisions to its "[Waste Confidence](#)" rule. The rule expresses confidence that used nuclear fuel can be safely stored for at least 60 years beyond the licensed life of any U.S. reactor, without significant environmental impacts, and that sufficient repository capacity will be available when necessary.

### **The Yucca Mountain repository is a “dump.”**

**Fact:** The proposed [Yucca Mountain](#) repository is highly engineered and strictly controlled to protect public health and safety for many thousands of years. By federal law, the repository is the United States’ designated geological disposal facility for used nuclear fuel and high-level radioactive waste products. Unlike poorly designed and unsecure waste dumps, all radioactive materials stored at Yucca Mountain repository would be secured in extremely strong shielded containers and placed into designated storage locations in tunnels beneath 1,000 feet of dry rock and well above the water table. Continuously monitored and guarded, the used nuclear fuel would be accessible and retrievable for possible future recycling.

## **Environment**

### **Nuclear power plants consume large quantities of fresh water.**

**Fact:** According to the U.S. Geologic Survey (USGS), the nation’s 104 nuclear power plants “consume” a far smaller amount of fresh water than they withdraw before returning water to the environment. While it is true that nuclear power plants collectively withdraw billions of gallons of water each day for their cooling systems, 98 percent of the water is returned to its natural source. Only two percent is not returned. In fact, USGS surveys found that heat-driven power plants (coal, natural gas and nuclear) that produce 88 percent of the nation’s electricity consume just 3.3 percent of the total water used annually in the United States. The remaining consumption is via mining (0.8 percent), commercial (1.3 percent), livestock (3.2 percent), industry (3.4 percent), residential (6.7 percent) and crop irrigation (81.3 percent). Scientific [studies](#) find that water withdrawals by nuclear plant cooling systems have a negligible impact on aquatic life populations because of protective measures at the water intakes that minimize risk to fish and other organisms.

### **Plant cooling systems greatly harm aquatic environments and fish populations.**

**Fact:** Scientific studies have found that the nation’s nuclear plants have a negligible impact on the health of local fish populations and aquatic environments. Any fish mortality associated with nuclear plant cooling systems is an exceptionally small percentage of the overall fish population and is readily replenished through natural reproduction. In some instances fish populations near nuclear plants have increased. Anti-nuclear activists claim that one billion fish, fish larvae and eggs are destroyed each year by the once-through cooling system at one nuclear facility. They do not mention this number is only a tiny fraction of the total population or that fish population remains healthy around the facility that has operated for several decades. Their claims also do not acknowledge the adverse effects of pollution, sediment buildup, commercial and recreational fishing and questionable water resource management. For further information, visit NEI’s [Water Use and Environmental Stewardship](#) web page.

### **Nuclear energy is “dirty.”**

**Fact:** Nuclear energy is one of the cleanest energy sources in America. In 2009, the nation’s 104 nuclear plants produced 70 percent of the low-carbon electricity generated in the United States. This avoided the [emission](#) of 644 million tons of CO<sub>2</sub>, the equivalent of taking 125 million cars off the road. A University of Wisconsin [study](#) found that nuclear energy’s [life-cycle emissions](#) (including construction and all aspects of plant operation) are less than hydro, solar and biomass and on par with wind and geothermal, all of which are considered “clean” energy supplies.