米国 原子力エネルギー協会（NEI）における根拠に基づく情報の提供（事例）

【情報提供の分野】

◆ **Why Nuclear Energy**

- Why Nuclear Energy
- Clean Air Energy
- Value of Electricity Diversity
- Reliable & Affordable Energy
- Economic Growth & Job Creation

◆ **Issues & Policy**

- Delivering the Nuclear Promise
- Congressional Resource Guide
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- New Nuclear Energy Facilities
- Second License Renewal for Nuclear Plants
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◆ **News & Media** （内訳省略）

事例①

①「Clean Air Energy」をクリックするとP2の情報が表示される

②P2中の「Climate Change」をクリックするとP3及びP4の情報が表示される

※P4中の「Resources」に列挙されている出典では、他機関へのリンクが貼ってあり、根拠情報まで辿れる

事例②

①「FAQ About Nuclear Energy」をクリックするとP5～10の情報が表示される

② P8中の「Economic Benefit」の“an analysis”をクリックすると根拠情報「White Paper（P11～15）」のダウンロードページが表示される

③ 根拠情報「White Paper(P11～15)」

※米国 原子力エネルギー境界（NEI）のウェブサイト（http://www.nei.org/）を基に内閣府作成

事例①

オプション ▼

Clean Air Energy

Concern about clean air is a main reason that 63 reactors are under construction around the world—including four in the United States.

Clean Air Benefits

Nuclear energy is by far the largest source of electricity that doesn't emit any air pollution—and the only one that can produce large amounts of electricity around the clock. Nuclear energy has a major role in protecting America's air quality. Learn more>>

Climate Change

「Climate Change」をクリックするとP3及び4の情報が表示される

While some predict meaningful climate change policy may take several years to finalize, nuclear energy, which provides almost two-thirds of America's clean-air electricity, must continue to be part of the energy mix to solve our clean air challenges. Learn more>>

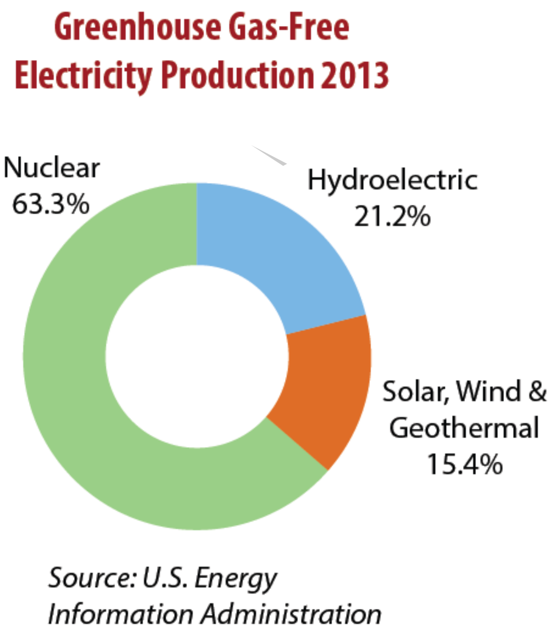
Life-Cycle Emissions

All energy sources produce greenhouse gases in the life cycle of a facility—from construction to operation. However, several independent studies show that nuclear energy's "life-cycle" emissions of carbon dioxide are comparable to renewable energy sources such as solar, wind and hydro power. Learn more>>

Climate Change

To move toward a clean-energy, low-carbon economy, nuclear energy must continue to be a part of the energy mix.

Nuclear energy facilities produce no air pollution that could threaten our atmosphere by causing ground-level ozone formation, smog and acid rain. The principal greenhouse gas emitted by human activities is carbon dioxide, and about 40 percent of our CO_2 emissions come from burning fossil fuels to generate electricity. More nuclear energy means less air pollution.



There is widespread agreement that nuclear energy is part of the climate change solution. Mainstream analyses conducted by independent organizations have shown that reducing carbon emissions will require a diverse energy portfolio and that nuclear energy is the only low-carbon option to help meet forecasted global electricity demand.

Resources

U.S. Environmental Protection Agency, "EPA Analysis of the American Power Act of 2010 (Kerry/Lieberman), June 2010. The core policy scenario for reducing greenhouse gas emissions would require more than doubling total nuclear capacity by 2050. If all existing U.S. operating reactors retire at 60 years, the United States will need to build another 253 gigawatts of nuclear capacity (about 181 new reactors).

U.S. Environmental Protection Agency, "EPA Analysis of the American Clean Energy and Security Act of 2009 (H.R. 2454, Waxman/Markey)," June 2009. The core policy scenario for reducing greenhouse gas emissions projects that the United States will increase nuclear power generation by 150% (about 180 new nuclear reactors) by 2050.

Joint Statement of the Academies of Science for the G8+5 Countries, "Climate Change Adaptation and the Transition to a Low Carbon Economy," 2008. The statement recommends accelerating the transition to a "low carbon economy," producing more energy from such low-carbon sources as nuclear power.

Electric Power Research Institute, "Prism/MERGE Analyses: 2009 Update." The technical potential exists for the electric sector to achieve a 41 percent reduction in carbon dioxide emissions from 2005 levels by 2030 using a full portfolio of technologies that includes 45 new nuclear reactors.

Energy Information Administration, "Energy Market and Economic Impacts of H.R. 2454, the American Clean Energy and Security Act of 2009," August 2009. The basic scenario projects that the United States would need 96 gigawatts of new nuclear capacity (almost 70 reactors) by 2030.

OECD/International Energy Agency, "World Energy Outlook 2009," 2009. Stabilizing atmospheric concentrations of carbon dioxide at 450 parts per million would require nearly doubling nuclear capacity by 2030.

Business Roundtable, "The Balancing Act: Climate Change, Energy Security and the U.S. Economy," 2009. "As the only existing, proven and scalable low-carbon baseload generation technology, nuclear power will be critical to managing the impending turnover in baseload capacity in a sustainable manner."

World Business Council for Sustainable Development, "Towards a Low-Carbon Economy," 2009. "Existing technologies such as … nuclear have to be extensively deployed across countries to implement concrete mitigation actions."

※Resourcesに他機関のリンクを貼ってある。
青字の箇所をクリックすれば根拠情報まで辿れる。

事例②

FAQ About Nuclear Energy

+ The Basics

What is nuclear energy?

Nuclear power plants split uranium atoms inside a reactor in a process called fission. At a nuclear energy facility, the heat from fission is used to produce steam, which spins a turbine to generate electricity.

How does nuclear energy compare to other power sources?

A single uranium fuel pellet the size of a pencil eraser contains the same amount of energy as 17,000 cubic feet of natural gas, 1,780 pounds of coal or 149 gallons of oil.

Does nuclear energy produce greenhouse gases?

There are no emissions of carbon dioxide, nitrogen oxides and sulfur dioxide during the production of electricity at nuclear energy facilities. Nuclear energy is the only clean-air source of energy that produces electricity 24 hours a day, every day.

Is nuclear energy considered a renewable energy source?

A renewable energy source uses an essentially limitless supply of fuel, whether wind, the sun or water. Nuclear energy is often called a sustainable energy source, because there is enough uranium in the world to fuel reactors for 100 years or more.

Do nuclear energy facilities require large areas of land?

Compared to other non-emitting sources, nuclear energy facilities are relatively compact. The amount of electricity produced by a multi-reactor nuclear power plant would require about 45 square miles of photovoltaic panels or about 260 square miles of wind turbines.

Do Americans support using nuclear energy?

A March 2015 national poll of 1,000 adults by Bisconti Research Inc. found that solid majorities have favorable opinions about nuclear energy and building new nuclear power plants. Sixty-nine percent of Americans favor the use of nuclear energy—up from 65 percent in 2012.

Sixty-two percent of respondents agree that the industry should build more nuclear power plants in the future and almost 80 percent of respondents agree that nuclear power is an important part of our energy future.

+ Radiation

The radiation one associates with a nuclear energy facility are particles, such as alpha rays and gamma rays, emitted by an atomic nucleus as a result of the fission process.

Do nuclear power plants release radioactive material?

Yes, but in extremely small levels that are regulated by the federal government. Nuclear power plants produce radioactive gases and liquid wastes during normal operation. A plant has tanks designed to store gas and liquid radioactive materials that are generated during normal operation. The radioactive material is held for a period of time to allow for the radioactivity level to decrease before being treated and/or released in a planned, monitored way. This keeps the amount of radioactive material in releases low and well within federal limits.

Radiation releases that are not made in accordance with procedures, or are above regulatory limits, are reported to the Nuclear Regulatory Commission and to the state where the facility is operating.

How is radiation measured around nuclear energy facilities?

During normal operations, very little radiation is released. Multiple independent studies have found have no health effects on the neighboring population. Radiation monitors surrounding the plant site provide real-time data on radiation levels. Additionally, radioactive materials that could cause radiation exposure near nuclear energy facilities are monitored by sampling air, food and water supplies.

Nuclear energy facilities are non-polluting and use multiple, redundant layers of safety to contain radiation within the reactor. There has never been an event in the United States that resulted in harm from radiation exposure. Radiation from the Fukushima Daiichi plant in Japan did not cause any immediate health effects, according to a United Nations panel of scientific experts. It is unlikely to be able to attribute any health effects in the future among the general public, the panel found.

+ Safety

Are nuclear energy facilities safe?

Yes. The industry's first commitment is to operate nuclear energy facilities safely. After more than a half-century of commercial nuclear energy production in the United States—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 cause no harm to people in neighboring communities.

Are facilities as safe for workers as for the public?

Yes. According to the U.S. Bureau of Labor Statistics, there is a smaller chance that a worker at a nuclear plant would be injured than employees at a fast food restaurant or a grocery store. As part of the industry's commitment to a safe workplace, employees are continuously monitored for radiation exposure, for which strict limits are enforced by the independent Nuclear Regulatory Commission.

Could an accident like the one at Chernobyl happen at a U.S. plant?

No. It is physically impossible for a U.S. commercial nuclear energy facility to run out of control and explode like the Chernobyl RBMK reactor design did. During power operations, when the temperature within the reactor reaches a predetermined level, the fission process is naturally suppressed so the

What about the Three Mile Island accident?

More than a dozen health studies and continuous environmental monitoring have found no effect on public health or the environment near the Three Mile Island nuclear energy facility in Pennsylvania.

Companies that operate nuclear energy facilities have developed proven emergency response plans to protect the public in the event of an emergency. These plans often are used to evacuate citizens during natural disasters such as hurricanes and other storms.

Risks from nuclear energy are considerably smaller than many everyday activities, such as driving a car.

+ New Nuclear Facilities

How many new reactors are being built?

Construction is under way on two reactors in Georgia, two in South Carolina and one in Tennessee and another 67 new reactors are being built in 15 countries. Some of these countries, such as the United Arab Emirates, are building their first reactors. Others, such as China and India, already have made a significant commitment to nuclear energy.

Why should new plants be built in the United States?

The U.S. Department of Energy projects that demand for electricity in the United States will rise 22 percent by 2040. That means our nation will need hundreds of new power plants to provide electricity for our homes and continued economic growth. Maintaining nuclear energy's current 20 percent share of electricity production will require building one reactor every year starting in 2016, or 20 to 25 new reactors by 2040, according to DOE forecasts.

Fourteen companies and consortia are studying, licensing or building 26 reactors in the United States. The U.S. Nuclear Regulatory Commission is reviewing six combined license applications from five companies and consortia for ten nuclear power plants.

Will there be the kinds of delays and cost overruns that affected some earlier projects?

The Nuclear Regulatory Commission process for licensing new reactors is more efficient and the industry is taking advantage of modular construction techniques to make schedules more attractive.

Construction of next-generation nuclear power plants will differ from the previous process, in which companies built plants as the designs and regulations were evolving. Facilities under construction have all design-related safety issues resolved before construction begins, avoiding delays.

The entire process, from starting the license application to the NRC to completing the new power plant, takes about nine years, four of them for construction.

+ New Reactor Cost

How much do nuclear energy facilities cost?

Nuclear power plants are capital-intensive projects, with construction costs estimated at $6 billion to $8 billion for a large reactor. Once built, operating costs for electricity are low.

How are utilities managing cost recovery for the construction of new reactors?

By paying the cost of building a new reactor as it is incurred, electric companies can benefit their customers by reduced financing costs. This is called Construction Work in Progress (CWIP). While there may be a small charge added to the monthly utility bill, it facilitates paying off finance charges immediately rather than over the entire life of the plant. This avoids "interest-on-interest" charges and prevents a much larger one-time increase in electric rates when the reactor becomes operational.

Improved cash flow to the electric company leads to a stronger financial rating, which in turn results in lower interest costs for the nuclear energy project and all other investments the utility makes over the long term.

How much is added to the monthly electricity bill? The amount differs depending on the nature of the project and what is allowed by the state government and regulator. For example, Florida Power & Light said that the cost recovery charge for its projects was about $1.65 per month to a typical customer. The fee financed $130 million for upgrades to the St. Lucie and Turkey Point nuclear power plants.

What are loan guarantees for nuclear energy facilities?

The Energy Policy Act of 2005 created a program to provide federally backed loan guarantees for building new nuclear energy facilities; however the Department of Energy has not completed its review of any applications to use this financing tool. Loan guarantees provide government backing to ensure construction loans will be repaid in the rare event of default. The guarantee results in lower interest rates for an energy company building a reactor, which passes on the savings to its customers. They are neither grants nor subsidies. Unlike loan guarantees for other sources of energy, nuclear energy facilities must pay the government a fee for granting the guarantee.

+ Economic Benefits

「an analysis」をクリックすると
「White Papers」のダウンロード
ページにとび、根拠情報にたどり着く。

How do nuclear energy plants benefit the economy?

Every dollar spent by the typical nuclear power plant results in the creation of $1.04 in the local community, $1.18 in the state economy, and $1.87 in the U.S. economy, according to an analysis of 23 nuclear plants representing 41 reactors.

Companies operating a typical nuclear plant pay about $16 million in state and local taxes annually. These tax dollars benefit schools, roads and other state and local infrastructure. Each company typically pays federal taxes of $67 million annually.

In addition, nuclear energy facilities typically employ up to 3,500 people during construction and 400 to 700 people during operation, at salaries 36 percent higher than average in the local area. It produces approximately $470 million annually in sales of goods and services in the local community.

The construction of new reactors depends on a robust supply chain to support manufacturing. Nuclear plants are comprised of hundreds of components and subcomponents, whose construction requires a deep and diverse supplier base. More than 22,500 companies provide $14.2 billion in components and services to the U.S. nuclear energy industry each year.

How do suppliers thrive when only 5 nuclear facilities are under construction?

Nuclear energy facilities update their equipment over time and also need replacement parts, providing a steady stream of orders through the supply chain. Beyond this ongoing activity, the U.S. nuclear energy industry competes in international markets. The more successful this effort, the more manufacturers contribute to domestic job creation and economic development.

Nuclear energy facilities employ workers across myriad disciplines. Highly trained and licensed employees operate reactors and are supported by engineers of various types, health physicists, instrumentation and control workers and other professionals, as well as skilled craftspeople such as welders and mechanics.

How do nuclear energy facilities contribute to their communities?

Nuclear power plants often are located in rural communities that benefit considerably from a large industrial complex. Companies that operate nuclear energy facilities are involved in the life of nearby towns and communities, offering college scholarships for related professions, participating in charities and sponsoring other activities. Energy education centers at many facilities teach schoolchildren about nuclear energy as well as about other forms of electricity generation. Because the plants operate over several decades, their presence encourages continuity in their communities by offering employment over more than one generation of families and workers.

Nuclear energy facilities enhance the habitat around the plant, too. Many take an active role in preserving the local flora and fauna, often earning commendations from their communities and from environmental and conservation groups.

For example, the St. Lucie facility in Florida has devoted considerable resources to tracking and preserving the health of sea turtles attracted to breeding areas near the plant. At the Peach Bottom facility in Pennsylvania, Exelon Corp. developed a biodiversity team to mold its riverside site into an even more hospitable residence for its furred and feathered co-inhabitants, including bats, white-tailed deer, turkeys, foxes, bald eagles and osprey.

+ Safely Managing Used Nuclear Fuel

What is used nuclear fuel?

Used uranium fuel assemblies from commercial reactors still have 90 percent of the original potential energy, but are stored at nuclear energy facilities where they are used.

How is used nuclear fuel stored?

Most plants store used fuel in steel-lined, concrete vaults filled with water, which acts as a natural barrier for radiation from the used fuel. The water also keeps the fuel cool while it becomes less radioactive. The water itself does not leave the used fuel pool, rather is constantly circulated to maintain a suitable temperature.

After at least five years of storage in the used fuel pool, the rods can be moved into large, heavily shielded concrete and steel storage containers, whose designs must be approved by the Nuclear Regulatory Commission. There it awaits removal by the U.S. Department of Energy to a disposal facility.

Is the used fuel stored at nuclear energy facilities safe?

Used fuel storage at nuclear plant sites is safe and secure. However, centralized temporary storage at volunteer locations would enable the movement of used fuel from both decommissioned and operating plants before a repository begins operating. This would fulfill the government’s legal responsibility to take possession of used nuclear fuel.

What is low-level radioactive waste?

Low-level radioactive waste is a byproduct of the beneficial uses of radioactive materials, including

It is solid material that can be safely transported under strict regulations established by the U.S. Department of Transportation and the Nuclear Regulatory Commission. Low-level radioactive waste usually consists of items such as gloves and other protective clothing, glass and plastic laboratory supplies, machine parts and tools, and disposable medical items that have come in contact with radioactive materials.

+ After Fukushima

How did the 2011 nuclear accident in Japan affect the nuclear energy industry?

In the United States, the nuclear energy industry and the independent Nuclear Regulatory Commission immediately took steps to make facilities even safer than before the accident. Most other countries took a similar approach to the United States and kept their facilities operating. Germany and Switzerland are phasing out their nuclear energy facilities. Japan shut down its plants, but has restarted one and may restart others after they make safety upgrades.

What did the U.S. nuclear energy industry do in the aftermath of the Fukushima accident?

The industry quickly implemented a safety enhancement strategy to ensure that plants have the additional equipment needed to respond to extreme natural events such as the tsunami in Japan. The industry initiative will provide additional sources of water and electric power to keep the reactor and used fuel pool cool if electricity from the grid is unavailable, as it was in Japan. Additional generators, batteries, water pumps and other emergency equipment have been purchased at each site. In addition, regional response centers in Tennessee and Arizona will maintain more emergency equipment that can be dispatched quickly to any facility that needs it.

These enhancements follow additional safety measures that were implemented following the 2001 terrorist attacks. Safety enhancements made over more than 40 years, including new processes and procedures based on lessons learned from the accidents at Three Mile Island in 1979 and in Japan in 2011, have resulted in sustained high levels of safety.

The industry is implementing additional safety measures required by the Nuclear Regulatory Commission through 2016.

white paper

Nuclear Costs in Context

Prepared by the
Nuclear Energy Institute

April 2016

NUCLEAR ENERGY INSTITUTE

The Nuclear Energy Institute is the nuclear energy industry's policy organization.

This white paper and additional information about nuclear energy are available at *nei.org*.

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Total Generating Costs

In 2015, the average total generating cost for nuclear energy was $35.50 per megawatt-hour. Total generating costs include capital, fuel and operating costs – all the costs necessary to produce electricity from a nuclear power plant. Cost information for the U.S. nuclear fleet is collected by the Electric Utility Cost Group with prior years converted to 2015 dollars for more accurate historical comparisons.

2015 Cost Summary ($/MWh)

Category	Number of Plants / Sites	Fuel	Capital	Operating	Total Operating (Fuel + Operating)	Total Generating (Fuel + Capital + Operating)
All U.S.	58*	6.91	7.97	20.62	27.53	35.50
Plant Size						
Single-Unit	23	7.10	10.26	27.15	34.25	44.52
Multi-Unit	35	6.85	7.31	18.74	25.60	32.90
Operator						
Single	12	7.49	9.30	22.05	29.54	38.84
Fleet	46	6.74	7.58	20.21	26.95	34.53

** Costs exclude shutdown plants. Also excludes Fort Calhoun, Fitzpatrick, and Pilgrim because no data was provided for 2015.*
Source: Electric Utility Cost Group (EUCG)

Three-quarters of nuclear power in the U.S. comes from plants with multiple reactors. The ability to spread costs over a greater amount of electricity production means that the generating cost at multi-unit sites is generally lower than at single-unit plants. In 2015, the total generating cost at multi-unit plants was $32.90 per megawatt-hour compared to $44.52 for single-unit plants.

U.S. Nuclear Plant Costs (2015 $):

Year	Fuel	Capital	Operating	Total
2002	5.73	3.92	18.61	28.27
2003	5.60	4.94	18.87	29.40
2004	5.29	5.66	18.56	29.50
2005	5.02	5.81	18.97	29.80
2006	5.05	5.56	19.23	29.85
2007	5.13	6.12	19.09	30.35
2008	5.36	6.77	19.53	31.66
2009	5.94	8.92	20.52	35.38
2010	6.77	9.17	20.66	36.59
2011	7.10	10.07	21.91	39.08
2012	7.47	10.77	21.50	39.75
2013	7.74	8.21	20.95	36.91
2014	7.22	8.19	20.95	36.35
2015	6.91	7.97	20.62	35.50
2002-2015 Increase	21%	103%	11%	26%
2010-2015 Increase	2%	-13%	0%	-3%

The 2015 generating costs were 2.4 percent lower than in 2014 and almost 11 percent below the 2012 costs. Prior to the 2012 peak, nuclear generating costs had increased steadily over the previous decade. Between 2002 and 2015, fuel costs increased 21 percent, capital expenditures by 103 percent, operating costs by 11 percent (in 2015 dollars per megawatt-hour). Total generating costs are up 26 percent in the last 13 years.

Capital

Industrywide capital spending increased from $4.4 billion a year in 2006 (2015 dollars), peaked at $8.7 billion in 2012, and dropped to $6.25 billion in 2015.

Capital investment took a step change up in about 2003, leveled off for several years, then took another step change in 2009 and has declined over the last two years. These inflections are the result of a few major items: a series of vessel head replacements, steam generator replacements and other upgrades as companies prepared their plants for operation after the initial 40-year license, and power uprates to increase output from existing plants. As a result of these investments, 81 of the 99 operating reactors have received twenty-year license renewals and 92 of the operating reactors have been approved for uprates that have added over 7,000 megawatts of capacity.

Capital spending on uprates and items necessary for operation beyond 40 years should moderate as most plants complete these efforts. Capital investments in uprates peaked at $2.5 billion in 2012 but declined to $315 million in 2014. This decline has been offset in other areas where spending has increased. Capital spending to meet regulatory requirements was around $1 billion in 2007 and 2008 before jumping to $1.8 billion in 2010 and holding near that level until reaching a peak of almost $2 billion in 2014. This increase began with significant investments post-9/11 to enhance security, followed by expenditures for post-Fukushima items, which totaled $1 billion in 2014. As the industry completes Fukushima-related safety upgrades, regulatory capex should also moderate, and revert toward 2007-2008 levels. A further breakdown of capital costs for 2015 will be available at a later date.

Operations

Operations costs increased over the last twelve years from $18.59 per megawatt-hour in 2002 to $20.92 per megawatt-hour in 2014. Operations costs have declined 4 percent from the peak in 2011.

This increase in operations costs was not driven by any single category. Operations costs in the 2002-2008 periods are similar to where money was being spent in the 2009-2014 period. However, operations costs have remained flat compared to the past decade. Between 2006 and 2010, operations costs increased 16 percent while, over the past five years, the increase was only 1 percent. A further breakdown of operations costs for 2015 will be available at a later date.

Fuel

Fuel costs represent 15-20 percent of the total generating cost. Fuel costs experienced a relatively rapid increase from 2009 to 2013. This was largely the result of an escalation in uranium prices that peaked in 2008. Since uranium is purchased far in advance of refueling and resides in the reactor for four to six years, the effect of this commodity price spike persists for a long time after the price increase actually occurred.

Economic Pressures Facing Nuclear Plants

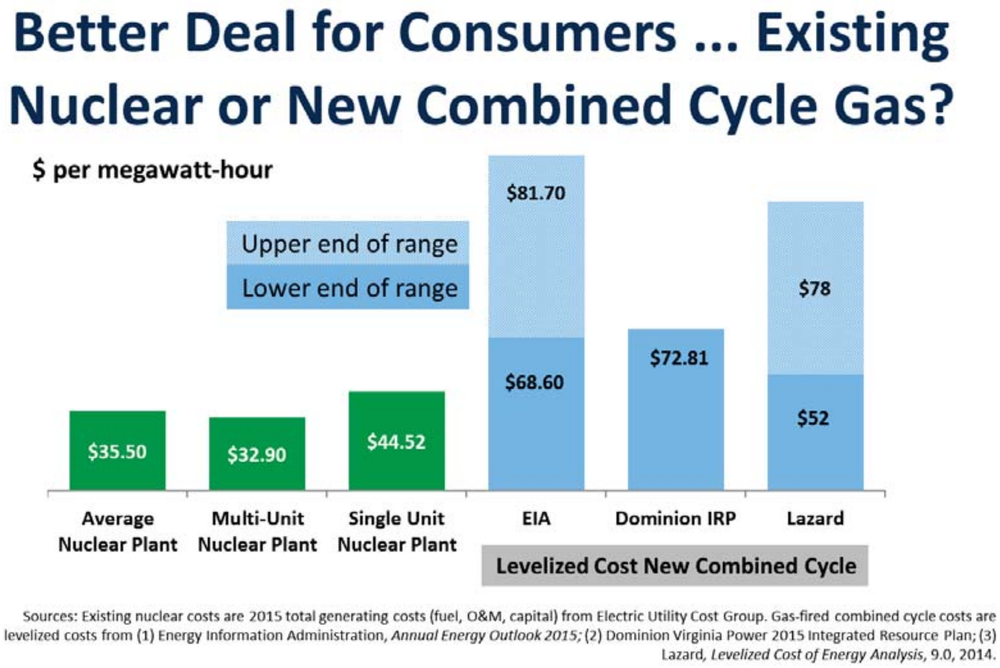
Since 2013, five nuclear reactors (Crystal River 3 in Florida, San Onofre 2 and 3 in California, Kewaunee in Wisconsin, and Vermont Yankee) have shut down permanently. Entergy announced in October 2015 that it would close its Pilgrim plant in Massachusetts by June 2019, and possibly sooner. And in February 2016, Entergy announced that it would shut down its FitzPatrick nuclear plant in upstate New York in early 2017.

Crystal River and San Onofre shut down due to failed steam generator replacements – unique situations that are unlikely to be repeated. Since the Surry nuclear power plant in Virginia replaced its steam generators in the early 1980s, approximately 110 reactors around the world have replaced their steam generators (including 57 reactors in the United States), in what has become a routine practice.

Kewaunee, Vermont Yankee, Pilgrim and FitzPatrick – all in competitive markets – fell victim to a combination of market-related factors (and, in some cases, a combination of several factors), including:

- Sustained low natural gas prices, which are suppressing prices in wholesale power markets, and will continue to do so.
- Relatively low growth (in some markets, no growth) in electricity demand due partly to subpar economic performance since the 2008 recession, partly to greater efficiency.
- Federal and state mandates for renewable generation, which suppress prices, particularly during off-peak hours (when wind generation is highest and the electricity is needed the least). For example, the federal production tax credit allows wind producers to bid negative prices, which places baseload plants at a disadvantage. Some nuclear plants in Illinois see negative prices as much as 10-11 percent of the off-peak hours and 5-6 percent of all hours.
- Transmission constraints, which require a power plant to pay a congestion charge or penalty to move its power on to the grid. Certain nuclear plants at particularly congested points on the grid pay a penalty of $6-9 per megawatt-hour to move their power out.
- Market designs that do not compensate the baseload nuclear plants for the value they provide to the grid, and market policies and practices – e.g., reliance on out-of-market revenues – that tend to suppress prices.

The Kewaunee, Vermont Yankee, Pilgrim and FitzPatrick nuclear plants are the only casualties to date, but there are other nuclear stations at risk.



Economic Impact of Nuclear Plant Closures

Kewaunee and Vermont Yankee were both highly reliable plants with high capacity factors and relatively low generating costs. Allowing these facilities to close will have long-term economic consequences: replacement generating capacity, when needed, will produce more costly electricity, fewer jobs that will pay less, and more pollution.

In 2015, on average, U.S. nuclear power plants produced electricity for almost $36 per megawatt-hour. The smaller single-unit plants like Kewaunee and Vermont Yankee were a little more costly – about $44 per megawatt-hour. The larger, multi-unit sites were less costly – in the $33 per megawatt-hour range. The electricity these plants produces will likely be replaced with either combined cycle gas-fired capacity at a levelized cost of over $70 per megawatt-hour (see graph, “Better Deal for Consumers ... Existing Nuclear or New Combined Cycle Gas?”).

■