**Indian Point Energy Center**

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| **Indian Point Energy Center** |
| Entergy's Indian Point Energy Center (IPEC) seen from across the [Hudson River](http://en.wikipedia.org/wiki/Hudson_River). |
| Location of Indian Point Energy Center |
| **Country** | United States |
| **Location** | [Buchanan, New York](http://en.wikipedia.org/wiki/Buchanan%2C_New_York) |
| **Coordinates** | [41°16′11″N 73°57′8″W﻿ / ﻿41.26972°N 73.95222°W﻿ / 41.26972; -73.95222](http://toolserver.org/~geohack/geohack.php?pagename=Indian_Point_Energy_Center&params=41_16_11_N_73_57_8_W_type:landmark_region:US-NY)[Coordinates](http://en.wikipedia.org/wiki/Geographic_coordinate_system): [41°16′11″N 73°57′8″W﻿ / ﻿41.26972°N 73.95222°W﻿ / 41.26972; -73.95222](http://toolserver.org/~geohack/geohack.php?pagename=Indian_Point_Energy_Center&params=41_16_11_N_73_57_8_W_type:landmark_region:US-NY) |
| **Status** | Operational |
| **Commission date** | Unit 2: August 1, 1974Unit 3: August 30, 1976 |
| **License expiration** | Unit 2: September 28, 2013Unit 3: December 12, 2015 |
| **Operator(s)** | [Entergy](http://en.wikipedia.org/wiki/Entergy) |
| **Architect(s)** | [United Engineers and Constructors](http://en.wikipedia.org/wiki/United_Engineers_and_Constructors) |
| **Constructor(s)** | [United Engineers and Constructors](http://en.wikipedia.org/wiki/United_Engineers_and_Constructors) |
|  |
| **Reactor information** |
| **Reactor type(s)** | [PWR](http://en.wikipedia.org/wiki/Pressurized_water_reactor) |
| **Reactor supplier(s)** | [Westinghouse](http://en.wikipedia.org/wiki/Westinghouse_Electric_Corporation_%281886%29) |
|  |
| **Power generation information** |
| **Installed capacity** | Unit 2: 1,020 MWUnit 3: 1,025 |
| **Annual generation** | Unit 2: 8,842 GWhUnit 3: 7,797 |
| **Website**<http://www.safesecurevital.org/> |

**Indian Point Energy Center** (**IPEC**) is a three-unit [nuclear power plant](http://en.wikipedia.org/wiki/Nuclear_power_plant) station located in [Buchanan, New York](http://en.wikipedia.org/wiki/Buchanan%2C_New_York) just south of [Peekskill](http://en.wikipedia.org/wiki/Peekskill). It sits on the east bank of the [Hudson River](http://en.wikipedia.org/wiki/Hudson_River), 38 miles north of [New York City](http://en.wikipedia.org/wiki/New_York_City). The plant generates over 2,000 megawatts of electrical power, comprising as much as 30 percent of the electricity used in New York City and Westchester County.

The plant is owned and operated by Entergy Nuclear Northeast, a subsidiary of [Entergy Corporation](http://en.wikipedia.org/wiki/Entergy_Corporation), and includes two operating [Westinghouse](http://en.wikipedia.org/wiki/Westinghouse_Electric_Company) [pressurized water reactors](http://en.wikipedia.org/wiki/Pressurized_water_reactor) – designated Indian Point 2 and Indian Point 3 – which Entergy bought from [Consolidated Edison](http://en.wikipedia.org/wiki/Consolidated_Edison) and the [New York Power Authority](http://en.wikipedia.org/wiki/New_York_Power_Authority) respectively. The facility also contains the permanently shut down Indian Point Unit 1 reactor. Total employment at the site is 1,100.

**Unit 1**

Indian Point 1, built by [Consolidated Edison](http://en.wikipedia.org/wiki/Consolidated_Edison), was the first of three reactors at this location. It was a 275-megawatt [pressurized water reactor](http://en.wikipedia.org/wiki/Pressurized_water_reactor) and was issued an operating license on March 26, 1962 and started operations on September 16, 1962. The first core at the Indian Point power station used a [thorium](http://en.wikipedia.org/wiki/Thorium)-based fuel, but it did not live up to expectations. The plant was operated with [uranium oxide](http://en.wikipedia.org/wiki/Uranium_oxide) fuel for the remainder of its operations.

The Unit 1 reactor was shut down on October 31, 1974 because the emergency core cooling system did not meet regulatory requirements. All spent fuel was removed from the reactor vessel by January 1976. The licensee, Entergy, plans to decommission Unit 1 with Unit 2.

**Units 2 and 3**

The two additional reactors, Indian Point 2 and 3, were built in 1974 and 1976 respectively. Together they generate up to 30% of the electricity used in New York City, depending on a variety of conditions. Unit 2 generates up to 1,025 MW while Unit 3 generates up to 1,040 MW. The reactors at Indian Point are protected by containment domes made of steel-reinforced concrete that is four- to six-feet thick.

**Nuclear Capacity in New York State**

Located in New York State, Indian Point Units 2 and 3 are two of six operating nuclear energy sources in the state. New York is one of the five largest states in terms of nuclear capacity and generation, accounting for approximately 5% of the national totals. Nuclear power is less than 13% of New York’s electric capacity, but it produces nearly 30% of the State’s electricity. Although many States with similarly sized nuclear industries are net electricity exporters, New York has historically been an electricity importer due to its high consumption.

**Spent fuel**

Indian Point stores used fuel rods in two [spent fuel pools](http://en.wikipedia.org/wiki/Spent_fuel_pool) at the facility. According to the New York State Department of Environmental Conservation, the Indian Point spent fuel pools, which contain more nuclear material than the reactors, "have no containment structure". While the spent fuel pools at Indian Point are not stored under a containment dome like the reactor, they are contained within a 40-foot-deep pool and submerged under 27 feet of water. The spent fuel pools at Indian Point are made of concrete walls that are four to six feet wide with a half-inch thick stainless steel inner liner. According to [Jonathan Alter](http://en.wikipedia.org/wiki/Jonathan_Alter), the pools are located in bedrock, not above-ground as at many other plants including the Japanese ones.

Indian Point began "[dry casking](http://en.wikipedia.org/wiki/Dry_cask_storage)" spent fuel rods in 2008, a "safer alternative", according to the Nuclear Regulatory Commission. Some rods have already been moved to casks from the spent fuel pools, which will be kept "nearly full of spent fuel, leaving enough space to allow emptying the reactor completely should that become necessary." Dry cask storage systems are designed to resist floods, tornadoes, projectiles, temperature extremes, and other unusual scenarios. NRC requires the spent fuel to be cooled in the spent fuel pool for at least five years before being transferred to dry casks.

**Incidents**

On October 17, 1980, 100,000 gallons of Hudson River water leaked into the Indian Point 2 containment building from the fan cooling unit, undetected by a safety device designed to detect hot water. The flooding, covering the first 9 feet of the reactor vessel, was discovered when technicians entered the building. Two pumps which should have removed the water were found to be inoperative. NRC proposed a $210,000 fine for the incident.

In 2005, Entergy workers while digging discovered a small leak in a spent fuel pool. Water containing tritium and strontium 90 was leaking through a crack in the pool building "and then finding its way into the nearby Hudson River." Workers were able to keep the fuel rods "safely covered" despite the leak. On March 22, 2006 the [*New York Times*](http://en.wikipedia.org/wiki/New_York_Times) also reported finding radioactive [nickel-63](http://en.wikipedia.org/wiki/Nickel-63) and strontium in groundwater on site.

On April 23, 2007, the [Nuclear Regulatory Commission](http://en.wikipedia.org/wiki/Nuclear_Regulatory_Commission) fined the owner of the Indian Point nuclear plant $130,000 for failing to meet a deadline for a new emergency siren plan. The 150 sirens at the plant are meant to alert residents within 10 miles to a plant emergency.

On January 7, 2010, NRC inspectors reported that an estimated 600,000 gallons of mildly radioactive steam was intentionally vented to the atmosphere after an automatic shutdown of Unit 2. After the vent, one of the vent valves stayed unintended slightly open for two days. It seems that there was a minor steam generator tube leak from the primary circuit. The levels of tritium in the steam were below those allowable by NRC safety standards.

On November 7, 2010, an explosion occurred in the main transformer for Indian Point 2.

**Safety**

On March 10, 2009 the Indian Point Power Plant was awarded the fifth consecutive top safety rating for annual operations by the Federal regulators. According to the Hudson County *Journal News*, the plant had shown substantial improvement in its "safety culture" in the previous two years.

**Terrorism**

Indian Point is protected by federal, state, and local law enforcement agencies, including a [National Guard](http://en.wikipedia.org/wiki/National_Guard_of_the_United_States) base within a mile of the facility, as well as by private off-site security forces.

During the [September 11 attacks](http://en.wikipedia.org/wiki/September_11_attacks), [American Airlines Flight 11](http://en.wikipedia.org/wiki/American_Airlines_Flight_11) flew near the Indian Point Energy Center en route to the [World Trade Center](http://en.wikipedia.org/wiki/World_Trade_Center). [Mohamed Atta](http://en.wikipedia.org/wiki/Mohamed_Atta), one of the 9/11 hijackers/plotters, had considered nuclear facilities for targeting in a terrorist attack. Entergy says it is prepared for a terrorist attack, and asserts that a large airliner crash into the [containment building](http://en.wikipedia.org/wiki/Containment_building) would not cause reactor damage. Following 9/11 the NRC required operators of nuclear facilities in the U.S. to examine the effects of terrorist events and provide planned responses. In September 2006, the Indian Point Security Department successfully completed mock assault exercises required by the Nuclear Regulatory Commission. However, according to [Riverkeeper](http://en.wikipedia.org/wiki/Riverkeeper), an [environmental](http://en.wikipedia.org/wiki/Environmentalism) group, these NRC exercises are inadequate, because they do not envision a large enough group of attackers.

The New York State Department of Environmental Conservation states that the spent fuel pools at Indian Point are "exposed and unsecured" and therefore "vulnerable to attack" According to the *New York Times*, fuel stored in dry casks is "less vulnerable to terrorist attack than fuel in the storage pools".

**Safety Procedures**

A 2003 report commissioned by then Governor [George Pataki](http://en.wikipedia.org/wiki/George_Pataki) concluded that the "current radiological response system and capabilities are not adequate to...protect the people from an unacceptable dose of radiation in the event of a release from Indian Point.”

**Evacuation**

The [Nuclear Regulatory Commission](http://en.wikipedia.org/wiki/Nuclear_Regulatory_Commission) defines two emergency planning zones around nuclear power plants: a plume exposure pathway zone with a radius of 10 miles (16 km), concerned primarily with exposure to, and inhalation of, airborne radioactive contamination, and an ingestion pathway zone of about 50 miles (80 km), concerned primarily with ingestion of food and liquid contaminated by radioactivity.

The 2010 U.S. population within 10 miles (16 km) of Indian Point was 272,539, an increase of 17.6 percent in a decade, according to an analysis of U.S. Census data for msnbc.com. The 2010 U.S. population within 50 miles (80 km) was 17,220,895, an increase of 5.1 percent since 2000. Cities within 50 miles include New York (41 miles to city center); Newark, N.J., (39 miles); Stamford, Conn., (24 miles); Bridgeport, Conn., (40 miles).

In the wake of the [2011 Japanese nuclear accidents](http://en.wikipedia.org/wiki/2011_Japanese_nuclear_accidents), columnist Peter Applebome noted in *The New York Times* that a fifty mile radius from Indian Point (the area which the State Department suggested Americans avoid in Japan) "includes almost all of New York City except for Staten Island; almost all of Nassau County and much of Suffolk; all of Bergen County, N.J.; all of Fairfield, Conn.". He quotes Purdue University professor Daniel Aldrich: "“Many scholars have already argued that any evacuation plans shouldn’t be called plans, but rather ‘fantasy documents".

The current 10-Mile Plume Exposure Pathway Emergency Planning Zone (EPZ) is one of two EPZs intended to facilitate a preplanned strategy for protective actions during an emergency and comply with NRC regulations. “The exact size and shape of each EPZ is a result of detailed planning which includes consideration of the specific conditions at each site, unique geographical features of the area, and demographic information. This preplanned strategy for an EPZ provides a substantial basis to support activity beyond the planning zone in the extremely unlikely event it would be needed.”

In an interview, Entergy executives said they doubt that the evacuation zone would be expanded to reach as far as New York City.

**Earthquake risk**

In 2008 researchers from [Columbia University](http://en.wikipedia.org/wiki/Columbia_University)'s [Lamont-Doherty Earth Observatory](http://en.wikipedia.org/wiki/Lamont-Doherty_Earth_Observatory) have located a previously unknown active seismic zone running from [Stamford, Connecticut](http://en.wikipedia.org/wiki/Stamford%2C_Connecticut), to the [Hudson Valley](http://en.wikipedia.org/wiki/Hudson_Valley) town of Peekskill, New York - the intersection of the Stamford-Peekskill line with the well-known [Ramapo Fault](http://en.wikipedia.org/wiki/Ramapo_Fault) - which passes less than a mile north of the Indian Point nuclear power plant. Indian Point was built to withstand an earthquake of 6.1 on the Richter scale, according to a company spokesman. Entergy executives have also noted "that Indian Point had been designed to withstand an earthquake much stronger than any on record in the region, though not one as powerful as the quake that rocked Japan".

In the opinion of some seismologists, the Ramapo fault is unlikely to exhibit significant activity, , or is "dead".

The Nuclear Regulatory Commission's estimate of the risk each year of an earthquake intense enough to cause core damage to the reactor at Indian Point was Reactor 2: 1 in 30,303; Reactor 3: 1 in 10,000, according to an NRC study published in August 2010. [Msnbc.com](http://en.wikipedia.org/wiki/Msnbc.com) reported based on the NRC data that "Indian Point nuclear reactor No. 3 has the highest risk of earthquake damage in the country, according to new NRC risk estimates provided to msnbc.com." According to the report, the reason is that plants in known earthquake zones like California were designed to be more quake-resistant than those in less affected areas like New York. The NRC did not dispute the numbers but responded in a release that "The NRC results to date should not be interpreted as definitive estimates of seismic risk," because the NRC does not rank plants by seismic risk.

**Recertification or closure**

On May 2, 2007, the NRC announced that the "License Renewal Application for Indian Point Nuclear Plant is available for Public Inspection". This initiated Entergy's effort to extend the operating licenses of each unit by 20 years. The original federal licenses for the two reactors expire in 2013 and 2015.

On September 23, 2007, Friends United for Sustainable Energy (FUSE) filed legal papers with the NRC opposing the relicensing of the Indian Point 2 reactor. The group contends that the NRC improperly held Indian Point to less stringent design requirements. The NRC responds that the newer requirements were put in place after the plant was complete.

On December 1, 2007, [Westchester County](http://en.wikipedia.org/wiki/Westchester_County) Executive [Andrew J. Spano](http://en.wikipedia.org/wiki/Andrew_J._Spano), [New York Attorney General](http://en.wikipedia.org/wiki/New_York_Attorney_General) [Andrew Cuomo](http://en.wikipedia.org/wiki/Andrew_Cuomo), and [New York Governor](http://en.wikipedia.org/wiki/New_York_Governor) [Elliot Spitzer](http://en.wikipedia.org/wiki/Elliot_Spitzer) called a press conference with the participation of environmental advocacy groups [Clearwater](http://en.wikipedia.org/wiki/Clearwater) and Riverkeeper to announce their united opposition to the re-licensing of the Indian Point nuclear power plants. The [New York State Department of Environmental Conservation](http://en.wikipedia.org/wiki/New_York_State_Department_of_Environmental_Conservation) and the Office of the Attorney General requested a hearing as part of the process put forth by the Nuclear Regulatory Commission. In September 2007 [*The New York Times*](http://en.wikipedia.org/wiki/The_New_York_Times) reported on the rigorous legal opposition [Entergy](http://en.wikipedia.org/wiki/Entergy) faces in its request for a 20-year licensing extension for Indian Point Nuclear reactor 2.

A water quality certificate is a prerequisite for a 20-year renewal by the NRC.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia%3ACitation_needed)] On 3 April 2010 the Department of Environmental Conservation ruled that Indian Point violates the federal [Clean Water Act](http://en.wikipedia.org/wiki/Clean_Water_Act), because "the power plant’s water-intake system kills nearly a billion aquatic organisms a year, including the short nose sturgeon, an endangered species." The state is demanding Entergy construct new closed-cycle cooling towers, at a cost of over $1B, a decision that will effectively close the plant for nearly a year. Regulators denied Entergy's request to install [fish screens](http://en.wikipedia.org/wiki/Fish_screen) that they said would improve fish mortality more than new cooling towers.

Advocates of recertifying Indian Point include New York City mayor [Michael Bloomberg](http://en.wikipedia.org/wiki/Michael_Bloomberg), who says that "Indian Point is critical to the city's economic viability". According to New York Independent System Operator spokesman Ken Klapp: "Without Indian Point, system voltages would also degrade, limiting the ability to transfer power from upstate New York resources through the Hudson Valley to New York City."

As governor, Andrew Cuomo continues to call for closure of Indian Point. In late June 2011, a Cuomo advisor in a meeting with Entergy executives informed them for the first time directly of the Governor's intention to close the plant, while the legislature approved a bill to streamline the process of siting replacement plants.

Nuclear energy industry figures and analysts responded to Cuomo's initiative by questioning whether replacement electrical plants could be certified and built rapidly enough to replace Indian Point, given New York state's "cumbersome regulation process", and also noted that replacement power from out of state sources will be hard to obtain because "New York has weak ties to generation capacity in other states." They said that possible consequences of closure will be a sharp increase in the cost of electricity for downstate users and even "rotating black-outs".

Several members of the House of Representatives representing districts near the plant have also opposed recertification, including Democrats [Nita Lowey](http://en.wikipedia.org/wiki/Nita_Lowey), [Maurice Hinchey](http://en.wikipedia.org/wiki/Maurice_Hinchey), and [Eliot Engel](http://en.wikipedia.org/wiki/Eliot_Engel) and then Republican member [Sue Kelly](http://en.wikipedia.org/wiki/Sue_Kelly).

**Economic Impact**

An April 2004 report by the Nuclear Energy Institute found that “the total economic impact of the Indian Point plant on Westchester, Orange, Rockland, Putnam and Duchess counties for 2002 was $763.3 million. Indian Point’s total impact on New York State’s economy for the same period was $811.7 million and $1.5 billion for the U.S. economy.

“The economic activity generated by Indian Point create(d) another 1,200 jobs in the five-county region. Given the combination of employees at the plant and secondary jobs created by Indian Point’s economic activity, the plant is responsible for 2,500 jobs in Westchester, Orange, Rockland, Putnam and Duchess counties.”

**See also**

* [American Nuclear Society](http://en.wikipedia.org/wiki/American_Nuclear_Society)
* [Anti-nuclear movement in the United States](http://en.wikipedia.org/wiki/Anti-nuclear_movement_in_the_United_States)
* [Brittle Power](http://en.wikipedia.org/wiki/Brittle_Power)
* [Consolidated Edison](http://en.wikipedia.org/wiki/Consolidated_Edison)
* [Entergy Corporation](http://en.wikipedia.org/wiki/Entergy_Corporation)
* [Environmentalist movement](http://en.wikipedia.org/wiki/Environmentalist_movement) [Nuclear accidents in the United States](http://en.wikipedia.org/wiki/Nuclear_accidents_in_the_United_States)
* [Nuclear and radiation accidents](http://en.wikipedia.org/wiki/Nuclear_and_radiation_accidents)
* [Nuclear Energy Institute](http://en.wikipedia.org/wiki/Nuclear_Energy_Institute)
* [Nuclear Information and Resource Service](http://en.wikipedia.org/wiki/Nuclear_Information_and_Resource_Service)
* [Nuclear safety in the U.S.‎](http://en.wikipedia.org/wiki/Nuclear_safety_in_the_U.S.)
* [Union of Concerned Scientists](http://en.wikipedia.org/wiki/Union_of_Concerned_Scientists)