

Nuclear energy social benefits and costs

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Its impacts on the environment are almost non-existent if well managed: It occupies only small surfaces of land and consumes small amounts of fuel; its waste is small, confined, and isolated from the environment. There is no industry in the world that can present the same excellent record of safety performance as the nuclear industry.

Introduction to Nuclear Energy for Civilian Purposes

Most early atomic research focused on developing an effective weapon for use in World War II. After the war, the United States government encouraged the development of nuclear energy for peaceful civilian purposes while continuing to develop, test, and deploy new nuclear weapons. The Experimental Breeder Reactor I at a site in Idaho generated the first electricity from nuclear energy on December 20, 1951. As of 2008, 13% of the world's electricity comes from nuclear energy. Fewer than 400 nuclear power reactors were operating as of May 2012 (Japan's 54 reactors were gradually taken offline after the March 2011 meltdowns at Fukushima Daiichi).

There were also 60 nuclear reactors under construction. In the United States alone, there are 103 nuclear power reactors, which provide about 19% of the nation's electricity. A new nuclear power plant has not been ordered in the U.S. since 1973.

How It Works – The Scientific Process Behind Nuclear Energy

Nuclear energy relies on the fact that some elements can be split (in a process called fission) and will release part of their energy as heat. Because

it fissions easily, Uranium-235 (U-235) is one of the elements most commonly used to produce nuclear energy. It is generally used in a mixture with Uranium-238, and produces Plutonium-239 (Pu-239) as waste in the process. A nuclear power plant generates electricity like any other steam-electric power plant. Water is heated, and steam from the boiling water turns turbines and generates electricity. The main difference in the various types of steam-electric plants is the heat source.

Coal, oil, or gas is burned in other power plants to heat the water. Heat from a chain reaction of fissioning Uranium-235 boils the water in a nuclear power plant. Some have compared this process to using a canon to kill a fly. On March 11, 2011, a strong earthquake hit off the coast of Japan. The resulting tsunami caused meltdowns at multiple reactors at the Fukushima Daiichi nuclear power plant. For more information on the accident at Fukushima, click here. On April 26, 1986, the No. 4 reactor at the Chernobyl power plant (in the former U. S. S. R. , present-day Ukraine) exploded, causing the worst nuclear accident ever.

Social Costs

External Costs

The waste material generated by nuclear energy from nuclear fleets to nuclear plants is radio-active, and for this waste to naturally decompose it takes from hundred thousand to millions of years, if it is not fully decomposed it still poses a threat. The waste material created by nuclear energy if it isn't disposed well, and terrorists can have access to it the result would be disastrous, as it can be used for nuclear weapons. If there is any nuclear accident the reaction would spread to a large area and apart from

destroying people's lives it would also cause other people and different organisms to be radio-actively exposed creating long-term health problems. Nuclear accidents tend to destroy the natural ecosystem, by polluting water-bodies and animals. Nuclear accidents can cause climate change: extreme heat waves or droughts.

Private Costs

Allocating the resources (land) for building the nuclear energy power plant is very difficult, as finding a fairly sparsely populated region close to a water-body isn't available readily. The investment needed for to build a nuclear energy power plant, and the capital for its safety measures all costs a lot of money (in billions). If a nuclear power station wants to shut down, the process of nuclear decommissioning (process of entrusting the land for other uses) is also very expensive. The process of getting rid of the nuclear waste is very costly, as the investors need to hire highly skilled people to enclose this waste into tin boxes for it to degrade, and the capital (equipment) and transportation facility for this process is very expensive. Nuclear accidents can three times more than the operating revenue of that nuclear power plant.

Social Benefits

External Benefits

Nuclear energy has very high chances for development, as some can produce less nuclear waste, others have chances of efficiently reproduce the waste, and nuclear power plants can run on other types of radio-active materials, or with little waste products producing huge amount of electricity. Nuclear energy running on different types of radio-active material is

predicted to fulfil the increasing demand for electricity for more than 3000 years. Nuclear energy is the one of the energy type which does not release any greenhouse gases into the atmosphere, but only releases water-vapour as a by-product, but yet still has the capacity to produce a lot of energy.

The waste product generated from fossil fuel is far greater than nuclear energy, the burning of coal not only produces greenhouse gases but also fairly radio-active materials which are leashed into the environment, but in nuclear energy the radio-active waste is shielded from the environment and is far less compared to that of burning fossil fuels. Nuclear energy plants have the ability to produce large amounts of electricity which would not only be cheap but would have a high voltage; this would help a country's industrial (secondary) sector.

Private Benefits

The amount spent on buying fuel (uranium rods, etc.) is very less. For investors according to their scale of preference to develop a power station, a nuclear energy plant would be high on the scale.

Because the chances of there being a nuclear accident is very low, as there is no power industry in the world that can present the same excellent records of safety measurements than the nuclear energy industry. Despite the Chernobyl disaster which was because of the USSR developing very fast and lack of the type of technology available today, and the Fukushima nuclear disaster being an act of God, which the world wasn't prepared for but now is.