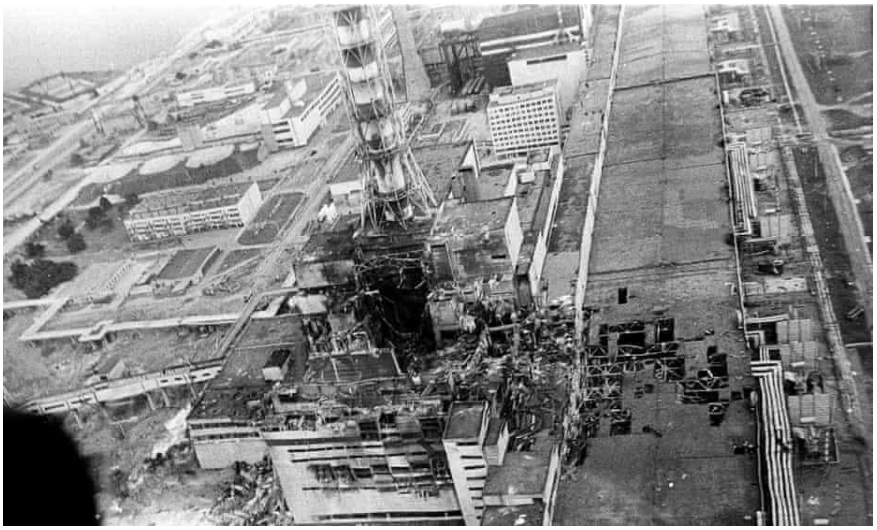

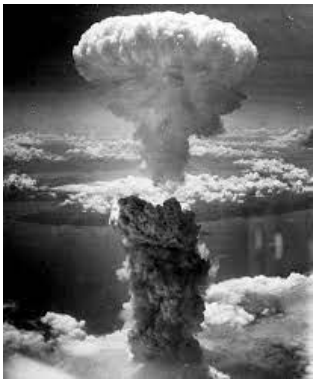


BBC NEWS

Is A Picture Worth A Thousand Words?

Hiroshima. Nagasaki. Chernobyl. Fukushima. Three Mile Island. These massive catastrophes are what tend to come to people's minds when they think of nuclear power. Since these incidents, however, nuclear power has come a long way. Unfortunately, this progress is not as flashy as the negative effects of nuclear energy are. The QR codes displayed are probably much less interesting to most people than the disaster photos and the emotions they evoke. How do we examine the relative value of the images and the scholarship on the benefits of nuclear power? How do we reconcile nuclear power in our worldview when it has both a history of disaster and potential for massive human progress?

Granted, nuclear power is dangerous and risky. However, the benefits of nuclear power are much less flashy and dramatic, so they are often overlooked. As a result, the world may be losing a potential source of energy merely because the risks are so well-advertised and the benefits are not. Nuclear energy is a source of power that is cleaner and more reliable than many other alternatives, and the risks and detriments of nuclear power are often overrepresented.

Nuclear energy is cleaner, meaning it's better for the environment, than fossil fuel sources, and it is also much more sustainable and reliable than alternative sources of energy. It is one of the lowest-carbon-emitting energy sources with one of the smallest carbon footprints as a result. When emitted into the atmosphere, carbon dioxide traps heat, upsets the greenhouse effect, and increases global warming.[1] So, energy sources with low carbon footprints are necessary for combatting the climate crisis. Nuclear releases about as many greenhouse gasses as solar does (about 4-5% as much as natural gas), and it releases less radiation than any other

[1] Richard Wolfson, *Energy, Environment, and Climate*, 3rd ed. (New York: W.W. Norton & Company, 2018).

major energy source.[2] This may seem counter-intuitive, but coal is actually the global major source of radioactive release. Therefore, nuclear is the largest source of clean power in the United States, generating almost 800 billion kilowatt hours of electricity a year.[3] Additionally, the steam from a nuclear power plant is just water, so there's no additional air pollution like with fossil fuel sources. Nuclear energy is integral to reducing our greenhouse gas emissions, because it is much cleaner than our fossil fuel sources, which we use predominantly.

When compared to non-fossil fuel sources of energy, nuclear still comes out on top. Wind, solar, and hydroelectric power are all unreliable to a certain extent because they depend on unpredictable factors. Not all days are sunny or windy, and water doesn't always run through dam turbines. Nuclear power plants, by contrast, run 24/7 and refuel every couple years, meaning it's the most reliable energy source on the energy grid.[4] In recent years, nuclear power plants in the United States have had an average capacity factor of over 92%, meaning they operated at full capacity for the vast majority of the year. Hydroelectric in the US, to compare, had a capacity factor of 38.2%, wind turbines 34.5%, and solar electricity 25.1%.[5] Even plants that use coal or natural gas have a lower capacity factor than nuclear due to fuel prices and fluctuations in demand. So, compared with both classic fossil fuel sources of energy as well as cleaner alternatives, nuclear energy is the clear winner. Beyond its efficiency and capabilities, though, there are clear doubts regarding nuclear that are generally misplaced.

As previously mentioned, many people have a very dangerous conception of nuclear power. This is very fair. Many deaths and crises have resulted from nuclear power, and that loss and tragedy cannot be overstated. However, nuclear accidents in particular are not more dangerous than accidents that occur at other plants, and nuclear weaponization has already become more integral to international politics than we care to admit. Studies have shown that the worst possible accident at a nuclear power plant is actually far less dangerous than we have been led to believe, especially in comparison with other energy sources. For example, almost 4,000 people died and thousands more were infected with disease when there was a massive gas leak from a pesticide plant in Bhopal, India. Similarly, in Henan Province, China, nearly 30,000 people drowned after a hydroelectric dam failed during a typhoon. These are merely 2 examples

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[2] "Why Nuclear Power must be Part of the Energy Solution," last modified July 19, accessed Mar 1, 2022
[3] "Nuclear Power in the USA." *World Nuclear Association* (February, 2022).
[4] "Advantages and Challenges of Nuclear Energy," last modified March 29, accessed Mar 1, 2022
[5] Ibid footnote 1,"Why Nuclear Power must be Part of the Energy Solution,"

of disasters that can occur from non-nuclear factories. To compare these to the most well-known nuclear disaster, the active chairman of the United Nations Scientific Committee on the Effects of Atomic Radiation during the Chernobyl disaster stated that "[The death rate from Chernobyl] is lower than the average fatalities from [accidents involving] a majority of other energy sources. For example, the Chernobyl rate is nine times lower than the death rate from liquefied gas… and 47 times lower than from hydroelectric stations."[6] So, all plants, factories, and therefore power sources have massive risks, but nuclear is the only source with its dangers so well-advertised. Therefore, the perception that nuclear is much more dangerous than fossil-fuel or alternative energy is misguided and false.

Potential nuclear weaponization is another argument against the use of nuclear power; however, I think this is also somewhat misguided. The most powerful countries in the world already have nuclear weapons, and they are playing a bigger and bigger role in international politics. Take a very current event, for example: the Russian invasion of Ukraine. Ukraine gave up its nuclear weapons following the collapse of the Soviet Union, and Russia would surely not be taking such liberties if they had not. Personally, I think total nuclear disarmament would be the best way forward, but this is simply not realistic anymore. The world has come to a place where nuclear weaponry is exceedingly important for self-defense in addition to first-strike capabilities. They are not just offensive weapons anymore. Therefore, the threat of nuclear weaponization will play a large role in future conflicts, meaning that nuclear power of all kinds is necessary for countries who want to not only use reliable and clean energy, but also protect themselves.

Additionally, many people balk at the high operating costs for nuclear power plants. Because there must be strict regulations regarding maintenance, training, inspections, and staffing, nuclear power plants are naturally expensive to run. However, in the United States, the Department of Energy has developed a program called the Light Water Reactor Sustainability program, which is attempting to modernize plants to reduce costs and improve performance. This will make the energy source far more cost-effective. They are also trying to develop new accident tolerant fuels, which will allow for better response times and less waste production. The DOE expects that this new fuel type could be used across the world by 2025.[7] Therefore, the high

[6] "Chernobyl: The Fear of the Unknown," last modified Warsaw, Poland
[7] Ibid footnote 2, "Advantages and Challenges of Nuclear Energy,"

operating costs of nuclear power plants can be managed, and the world is making steady progress on achieving this goal. Furthermore, the benefits of nuclear energy seem to outweigh the costs in most cases, especially for wealthier countries and especially as greenhouse gasses continue to threaten our planet.

In conclusion, nuclear energy is a very reliable, clean source of energy that has fewer detriments than most people expect. Energy is an indispensable part of our lives, so why are most of us either uninformed or misinformed about where we get it? The path forward for nuclear starts with dispelling the many misperceptions that people have regarding this energy source and replacing them with the realities: that nuclear provides a bright future for our energy grid, and therefore, the environment and humankind as a whole.