

Humanity has long looked up to the stars. These luminous lights are featured in the cultural memory of nearly all human civilizations. For millennia, the light produced by stars were a mystery to humanity. What were these dazzling dots in the distance? Were they the remnants of some mythological adventures? This ancient puzzle was solved by Hans Bethe in the 1930's when he uncovered the process of nuclear fusion and applied it to the stars. Our life-giving sun contains an abundance of hydrogen which combines with itself to produce helium, alongside an immense amount of energy and other subatomic particles. The (light) energy manufactured through nuclear fusion is then sent out into the universe, where a tiny fraction has allowed for life to form on Earth. If such a small proportion of energy has the power to create life on Earth, what could humans do with this power? The efficient and painless process of nuclear fusion could greatly expand humanity's potential.

Due to difficulties in recreating nuclear fusion on Earth, modern science currently utilizes nuclear fission in most areas. During nuclear fission, a large nucleus is split into smaller nuclei, energy, and radioactive byproducts. This process powers most of our nuclear bombs, weapons capable of untold devastation. Nuclear bombs have only been used two times in war, with disastrous consequences. Alone, one nuclear bomb at Hiroshima wiped out at least 70,000 people. Yet, far more dangerous, are the fusion-powered hydrogen bombs. This technology has the power to destroy cities, along with millions, even billions, of people. It has the potential to set off an existential catastrophe from which homo sapiens may not recover.

About a tenth of our energy capabilities currently come from nuclear power plants where electricity is harnessed from nuclear fission reactions. While this is a relatively clean and efficient energy source, the deadly radioactive byproducts and potential for another disaster similar to Chernobyl has made the use of this energy very controversial. In contrast, if we could

use nuclear fusion to power these plants, we would not only be able to harness much more energy at a cheaper rate, but the highly dangerous radioactive byproducts that nuclear fission creates would not be produced. Additionally, increasing reliance on this form of energy could lessen the grip that fossil fuels have on modern civilization. Reducing emissions and potentially decreasing the rate of climate change could greatly reduce an existential risk thereby increasing humanity's chances of survival.

One day, scientists will inevitably discover a way in which nuclear fusion can be used on Earth as a source of energy. Whether this is at very high temperatures or through the usage of cold fusion remains to be determined. Of course, it cannot be emphasized enough that for this type of research to be performed, there must be a tremendous amount of oversight. As a government executive regulating this technology, there must be rigorous boundaries on what this energy can fuel. Specifically, banning the usage of nuclear weapons. Nuclear energy should not be used to harm anyone or anything. Needless to say, regulation will not be as easy as telling people not to do something nor can it be determined on a country to country basis. There would need to be global agreement on how to use the energy created from fusion. International oversight would mean an impartial organization or committee formed to ensure that countries stick to the regulations and codes for the proper use of this technology. There have been several historical instances in which treaties have not been honored. Governments have a tendency to lie. As such, this organization would need to have some power to potentially punish those that break the rules. Punishments could include economic and monetary sanctions, a task force to take control of the contraband, or trade repercussions. Naturally, all this would require funding as well as international accord on the necessity of such a group. Gaining such a consensus would

likely be difficult but with the help of public opinion, an agreement on how to approach the situation could be and must be formed.

Today, several countries possess (and are capable of creating) nuclear bombs. We have already seen the devastating consequences of these weapons and have theorized additional perilous consequences that could emerge from a nuclear war, such as nuclear winter. Despite being aware of the dangers of nuclear violence, human ingenuity is unparalleled, especially in discovering how to harm others for personal or national gain regardless of the fallout. As such, a global coalition would need to be tasked with ensuring that no other weapons are made with this technology as well as with decommissioning the nuclear weapons that already exist. This could mean putting restrictions on some of the scientific theories or research behind the channeling of nuclear technology. Blocking off informatory access from the public for some time may help limit damage. Without common knowledge of how to trigger nuclear fusion, the damage done by the public would dramatically decrease. Furthermore, nuclear weapons require specific equipment and knowledge of processes that citizens currently do not have access to. Without access to instruments or information, the risk of violence lessens. Even more importantly, agreements within the nuclear research community could set some boundaries and guidelines on what to do with discoveries and how to commence researching in a secure way. Much like geneticists did in 1975 as the field of genetic engineering began to grow, nuclear researchers should come to a consensus over a standard set of principles meant to protect humans from the possible consequences of their research. These could include staying away from violent uses of the technology, setting up an ethics committee, or standardizing safety protocols for securing research. Any experimentation done into nuclear energy would need to be done slowly so as to ensure a safe process that would protect humanity from itself.

Now, why, if this energy is so dangerous, should we even develop it at all? The inherent efficiency of nuclear energy could be used to further humans in unimaginable ways. This energy could be used to power electricity on Earth, and even to push humans to the stars. Instead of inefficient fuel or solar panels with a required amount of surface area, nuclear energy can, theoretically, be done in any sort of environment. It could be used to push humans past our current boundaries and out into the universe where future generations can spread our values and technology. In fact, rather than find a star to create settlements around, fusion could be used to potentially make a new star. After all, stars are powered through nuclear fusion. There are innumerable ways that this technology could be used to push humanity to its full potential. Yet, humans will never reach that point if there is no clear oversight and limitations to the usage of nuclear fusion. In order to spread past Earth and fulfill our potential, humans need to exist. Nuclear energy is an existential risk. It has the power to wipe out humanity. However, if the proper protocols and communication are used, there is no reason that nuclear energy could not be used to power the future of humanity.