Why we should not be afraid of nuclear energy

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In the class, we've discussed many things including GM food, globalization and world trade, economics and urbanization, India society etc. Among those things, there are two topics that made me thought again and again which are: the nuclear power stations and the damage human create towards the environment.

Start with the first topic. We say that humanity if cancer, a disease of the planet because we damage the environment, making the other life unable to survive and "killing the Earth". To answer the question of whether if the humanity is a disease of the planet of Earth, we would have to look at another question, which: what is the purpose of life? Of course, this is a question that many great philosophers have tried to answer, but I'm not trying to solve the micro part of this question that associate with an individual person. I'm asking what the purpose of life in is general. Which, why is life formed? Does it have a purpose to do anything, for example, a large-scale computer to compute an answer

to explain everything like what's written in the novel The *Hitchhiker's Guide to the Galaxy*? Or is it just what it is, no reason, no purpose, completely irrational representation, a systematic error or the universe itself? Hegel said, "What is real is reasonable, what is reasonable is real". This question cannot be answered simply by digging into philosophical imagination or religious debate, because it is more than a philosophical question but a scientific question. Which for a scientific question the basic requirement is to have science, and that will also require intelligence. Thus all life is approaching the goal of adapting intelligence, and the kind who was a little faster than the others called themselves "human". Thus any life who adapted intelligence can be called "human" regardless if they came from apes or dinosaurs, it is only a symbol that this intelligent kind gave to itself. Then, of the nature of life, they will form a society. The kind of life that adapted intelligence will collect together and form - not simply a society - they call it civilization. Since all life is trying to become what we called "human" regardless of monkey-human or cat-human. Thus, either humanity is not a disease of Earth, or all forms of life are cancers of Earth and no lives were ever supposed to form in all universe.

However, this is based on the idea that believes the world-nature has a purpose, a well of making things good and right. This idea sounds very traditional philosophy thinking like Kant's, Hegel's, but it is not very scientific. Infect, a scientific way of thinking should explain how the world works in a purely mechanical way. For example, why is the apple fallen from the tree, why does the sun rise and set every day. Not by assuming that there is a purpose- a spiritual power makes it happen, but merely a law of physics. The law of physics decided that the apple will fall from the tree, and so it happened. Now if there is no purpose in life, would humanity be a cancer of Earth?

By the common ancestor shares in between humans, chimps, and gorillas(https://news.nationalgeographic.com/news/2012/03/120306-gorilla-genome-apes-humans-evolution-science/), this may proof part of the Theory of Evolution by Charles Robert Darwin that all life forms are evolving. Some chose to evolve their physical strength like the predators, tigers, lions. Some chose to evolve their brain, like humanity. Does this mean that human and the other kind are on the different branch of evolution ever since the beginning? That they gene might or might not form any kind of intelligence? Which means human and its

civilization is a huge cancer of Earth and it's ecosystem?

To answer this question, first of all, the metaphor "human as a cancer of Earth" this line itself is a false proposition. Even "damaging the Earth" is a false proposition. We've already explained in the previous part that under a scientific discussion "there is no assumption of a supreme well" which includes if Earth and what we call "the ecosystem". Thus, Earth has no thought(well) and does not care what human is doing on it.

Earth does need us to save. Earth does not care. This is a "young" planet made by rocks flowing in a "young" solar system. Even if the majority of life on Earth extinct, this planet will regenerate a new group of life in a relatively short amount of time. Which has happened many times already? We've never tried to save the other life, we've only trying to save ourselves. Mankind needs to save itself because mankind is a part of the ecosystem.

This is why we are saying that the development needs to be sustainable. However, the operation of civilization requires energy. Mechanical energy, electricity, etc. The most common techniques of

generating energy that humanity has discovered are firepower (coal, oil. etc), water power, tidal power, wind power, solar power, geothermal power and nuclear power. The question is, which one of them is the most sustainable method to generate energy?

Start with the fossil energy. Based on the concept above, the oil is not the blood of Earth what so ever, simply pulling these things out from the ground does not damage Earth and the ecosystem. There is no other life but human needs to burn these corps to generate energy. After million years after humanity is long gone, our body will form the new "fuel" for the next intelligent kind to use——if there will be one. However, burning oil and the coal does create carbon monoxide, carbon dioxide and the other toxic gas which causes global warming, ozone layer hole, rising of the sea level and other things that do harm the ecosystem, plus the air pollution such that the combustion dust might be breath into human lung to form cancer.

The water damp causes large scale of eco-crises especially to the downstream area and causes involuntary immigration especially for

the high damps. In additional is the demo collapse, billions of tons of water dropping from a height over 200 hundred meters (the highest damp is Nurek Dam in Tajikistan with 304 meters) will create massive energy which is nothing less than a nuclear bomb.

The other sources of power are generally limited due to the time period of the day (tidal power), the weather state (wind power), too costly (solar power) or due to the geographical limitations (geothermal power). These sources of power stations can only be an auxiliary power station and not the main one to generate the power with.

What about the nuclear station?

It does not limit its outcome because of time, it does not limit its outcome because of weather, it does not limit its outcome because of geography. Generally, nuclear stations do not limit to any circumstance. It does not produce combustion waste in the air like the fire stations, it also does not create large geographic change to the local environment like the damp stations. Under the proper operations,

the nuclear station seemed to be the eco-friendliest method to work with. However, if the nuclear elements will be mixed into air, water, soil. For example, the Chernobyl disaster, the Fukushima Daiichi nuclear disaster and Three-Miles Island Nuclear Station accident. Apparently, this is a very insecure way of generating the energy——but is that so?

Chernobyl was built in the 1970s and Reaktor Bolshoy Moshchnosti Kanalniy technology that the Soviet Union used was created in the 50s. As an early model of nuclear station, many things in there were not applied to the safety code we have today. For example, the nuclear reactor was not placed in a containment building which causes the leak of the reactor(http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/appendices/rbmk-reactors.aspx).

besides, Chernobyl was built mainly operate manually, but the Soviet Union prohibited people to discuss the design of the nuclear station both privately and publicly even includes the designer of the station. Which, the workers in the nuclear station did not know the structure of the nuclear station, but only know how to operate it while it maintains

normal functioning.

The same thing happened in Fukushima. The station started operating in the early 70s of the last century which frankly the same time as Chernobyl. Back in 1976 it already had a fire disaster happened in the station. In 1978 it had its first criticality accident (but was only known until 2007) which shows that there were risks in the design of the station. We like to say that the Japanese people are the most careful, attentive in the world that their workers are like machines and never make mistake, but it neglects a fact which is once these machines are programmed they do not fix their code at all. Even though they might be noticed that there are parts in the code that went wrong until it created a disaster that no one can cover. Like an arrow, once fired, it is impossible to change the direction. World War Ⅱ can be a perfect example of how this kind of spirits of machine creates massive chaos, and this also explained (partly) on how the manual mis-operations were formed in Fukushima. From this perspective, both Fukushima and Chernobyl disaster were nearly "destined to happen" because of their lack of risk prevention, workers' misoperation, and outdated technology.

The technology and the architectural material that used back then gave us lessons on building safer nuclear stations and management of the stations. However, can we risk the possibility that people will still be exposed to the nuclear radiation?

Now that we say Nuclear radiation causes cancer and death of people. However when we look at the country that had it's civilian expose to nuclear radiation the most, Japan (two nuclear bombs, one nuclear power station explosion plus US's), has the highest **healthy life expectancy** overall: 72.6 for men and 76.9 for women (http://apps.who.int/gho/data/node.main.HALE?lang=en) and the highest life expectancy: 83.84 by average (https://data.worldbank.org/indicator/SP.DYN.LE00.IN). Although Dr. Vombatkere has mentioned few times in the class that "data can be manipulated by people to make it fit their own benefit", but what else can we trust if even data cannot be trusted? Clearly not history, it is even easier to be manipulated, but, what else? My idea is that there is no point to get sucked in the loop of a conspiracy theory, it does not benefit anyone at all. We use multiple sources to compare and exam

it's reliability, repeatability, validity so we can approach the actual data that really fit the reality, and then I chose to trust whatever represent in front of me even if it might be far away from my hypothesis, my common sense even my believe.

Speaking of data, I went to do a little calculation on how nuclear radiation effect on human health. Based on (https://surveillance.cancer.gov/statistics/types/lifetime_risk.html) the probability of growing cancer is on average 41.53%, the probability of dying because of cancer is on average 19.78%. This data number is based on the statistics of United States but consider the health care and the environmental quality we can take it as the nearest data of "natural growth of human without pollution". Which means no matter how healthy we live, how organic the food we eat how clean the water we drink, there is still about 20% of probability that we might die because of cancer. Based on an older statistic the article on nucsafe.com represent "the current risk of dying from all types of cancer in the United States is approximately 25 percent – while a person who receives a whole-body radiation dose of 25,000 mRem over his or her lifetime has a risk of dying from cancer of 26 percent –

a one percent increase."—based on the statistic (http://www.nucsafe.com/cms/Radiation+Risks/41.html).

How does this number affect us? Ministry of Education, Culture, Sports, Science and Technology (Japan) gave a data in March 2011 shows that the prefecture that receives the highest radiation rate near Fukushima is Ibaraki prefecture with a rate of 0.169 microsieverts per hour. Regard to the fact that this data is given 7 years ago, the radiation rate in Ibaraki should be less now because the nuclear dust is carried by air, water and distribute to the other places—but still highly remain in Ibaraki. 1rem = 10000 mSv, 25000mRem = 250000mSv. If we do the math, (250000mSv)/(0.169 mSv/h)/(24h/d)/(365d/year) = 168 years. The article on The Lancet claims that for every 5 micrograms of fine particles per cubic meter of air, the risk of lung cancer increases by 18%, for every increase of 10 micrograms per cubic metre in PM10 pollution the risk increased by 22%.(https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(13)70279-1/abstract). Meanwhile when I write this paper the rate of pm2.5 in Beijing is average 104 μg/m3 and 174 μg/m3 in Mumbai. In comparison, I would rather live in Ibaraki rather than Beijing or

Mumbai.

The other example like Three-Miles Island Nuclear Station. Infect, after the situation, "The health effects of the 1979 Three Mile Island nuclear accident are widely, but not universally, agreed to be very low"(https://en.wikipedia.org/wiki/Three_Mile_Island_accident_health_effects). In 2005 the research published by IAEA and WHO also shows that there are 4000 people would die because of cancer caused by radiation, out of the 600,000 people who exposed to the radiation of Chernobyl (https://www.iaea.org/newscenter/focus/chernobyl).

As a comparison, the number of people died of the lung cancer because of breathing in the combustion dust of firepower station and the miners died under the coal mine every year are far larger in number than the number of people suffered because of nuclear energy, regardless that many miners also breath in coal dust under the mine which also gives them lung cancers as well. It is killing people with a certain amount where nuclear power is only a little possibility, especially with the advanced technology today. As the government, the primary consideration should the least harmful decision.

Infect, the panic of the public towards the nuclear station is not that people will die, but that they believe they will die because of an invisible, unexplainable reason, also the possibility of deformity of children. Because whatever the radiation is doing to their gene, it is "invisible". So they made "documentary" footage to scare people and using their sympathy by showing them the image of disabled boys and girls, but not helping the public to understand anything about the nuclear power with rational thinking. Brainwashing people by using their emotions and to turn them irrational, that it is more unethical than building nuclear power stations and generate electricity for the usage of people who protest against nuclear stations.

We should never be afraid, but we should beware. No further than that.

Moreover, does it matter? Here we human is just a passenger on Earth if death is not something makes people terrified. This leads back to the philosophical question at the very beginning of this paper: Is there a meaning of life? If we do not seek for this truth, then we will start to

question the truth of the reality. If the reality of life is being questioned, is the pain that we receive real? If it is not real, does it matter?

Now, I wish to have some sushi to celebrate the end of my summer study. Based on the Native-American's religion, I should be grateful for the spirit of fish sacrificed it's own body to become my food, that I did not kill it, but it gave it's life and energy to me—which I am, grateful, indeed.