

Reduce Greenhouse Gas Emission and Turn to Environmentalism from Anthropocentrism to Mitigate Global Warming

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ABSTRACT

International cooperation to reduce greenhouse gas emissions faces challenges such as population growth, increased energy demand and anthropocentrism. Population growth and economic expansion has led to the increase in energy demand and greenhouse gas emission, which pollutes the atmosphere and causes surface temperature rise. People should turn to low-carbon lifestyle and establish environmental ethics, which are rules to regulate people's behavior to conserve the environment.

Keywords: Fossil fuel, Greenhouse gas, Environmental ethics

INTRODUCTION

The global temperature has been rising since 1940s, and this trend of climate change is particularly evident since 1970s according to temperature records. One of the reasons for global warming is changes in total solar irradiance, but the changes in total solar irradiance is small and could be neglected [1]. The increasing carbon dioxide concentration in the air is the main factor that strengthened the greenhouse effect and leads to the global temperature rise. Human population has grown rapidly since the Industrial Revolution, leading to increased use of fossil fuels. This leads to the increase of greenhouse gas emission and the rise of carbon dioxide concentration in the air. So, to mitigate global warming, people should turn to environmentalism from anthropocentrism, including slowing down population growth, conserving the environment and reducing greenhouse gas emission.

Global temperature rise

A number of scientific evidences show that global average surface temperature is rising, and there are observed changes since 1950s [2]. The global average surface temperature was -0.17°C in 1880 and 0.85°C in 2018, an increase of 1.02°C [3]. Research shows that in the last 40 years of the 20th century, ice depth in all regions of the Arctic Ocean has decreased by approximately 40% [4]. Austrian glaciologists reported that almost all glaciers were shrinking since the 1940s, and the rate of shrinkage has increased since 2001 [5].

In the Arctic area, the ice coverage in September and March are of the minimum and maximum extent respectively each year. The annual minimum extent of Arctic sea ice has decreased in the past decades [6]. Sea ice cover in September 2012 was the lowest on record, 44% below the 1981-2010 average for that month [7]. The march 2015 sea ice extent reached the lowest extent on record-about 7% less than the 1981-2010 average, the September 2016 sea ice extent was 700,000 square miles less than the 1981-2010 average for that month [7].

In the Antarctic area, the annual minimum and maximum sea ice extent typically occur in February and September. Antarctic sea ice extent in September and February has increased over time [7]. The September 2014 maximum extent reached the highest level on record-about 7% larger than the 1981-2010 average, but in 2015 it was slightly below the 1981-2010 average. The February 2016 extent was about 9% below the 1981-2010 average [7]. The sea ice increases in the Antarctic were not as large as the sea ice

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decreases in the Arctic, and the increases of sea ice in the Antarctic were not widespread geographically. The Arctic sea ice loss exceeded the Antarctic sea ice increase. The average rate at which the Earth lost sea ice since 1979 has been 13,500 square miles per year [8].

The annual mean growth rate of global land-ocean temperature was 0.13 from 1880 to 1900, -0.046 from 1901 to 1950, 0.17878 from 1951 to 2000, and 0.0357 from 2000 to 2018 [3]. According to Lean [9] (2018), global mean surface temperatures increased at a rate of $0.09 \pm 0.01^\circ\text{C}$ per decade from 1900 to 1950, $0.1 \pm 0.01^\circ\text{C}$ per decade from 1950 to 2000, and $0.04 \pm 0.05^\circ\text{C}$ per decade at the beginning of the 21st century. The growth rate of global temperature was the highest from 1951 to 2000, and it declined from 2000 to 2018.

Although anthropogenic greenhouse gas emissions have caused climate change and environmental degradation, there are still difficulties for countries over the world to cooperate in reducing greenhouse gas emissions. China surpassed the United States in greenhouse gas (GHG) emission as the leading country in 2007 [10] and China has been the largest GHG emitter since then. However, China is a non-Annex I country, and China does not need to limit GHG emission under the Paris climate agreement. India is the world's third biggest GHG emitter, but India is reluctant to offer a plan to reduce its GHG emission. India's Environment Minister repeated that they would not adopt emission reduction targets because poverty eradication and economic development is a priority [11]. The Senate of the United States refused to ratify the climate change protocol because countries like India and China did not participate, and the United States withdrew from the Paris Climate Accord in 2017 [12].

THE INCREASING ENERGY DEMAND FOR FOSSIL FUEL

Greenhouse gas emission was 236 million metric tons in 1880, and it was 9855 million metric tons in 2014, an increase of 41.76 times [13]. Since 1751, approximately 337 billion metric tons of carbon have been released into the atmosphere because of the use of fossil fuels and cement production. Half of these emissions occurred after the middle of 1970s, and the contribution of emitters to global warming is proportional to their cumulative emissions [14].

The world's average energy intensity of GDP was 0.176 koe/\$2015P in 1990, 0.114 koe/\$2015P in 2018, a decrease of 1.5% during 2000 to 2018 [15]. World energy intensity of GDP decreases gradually with advances of science and technology, but world energy consumption increases with population growth and economic expansion. World total consumption in primary energy grew by 2.9% in 2018, the fastest since 2010 compared with its 10-year average of 1.5% per year [16]. First, energy consumption growth was driven by natural gas, which accounts for more than 40% of

the growth. Second, renewable energy grew rapidly, and renewable accounted for the second largest increment to energy growth. At the same time, carbon emissions rose at a higher rate in 2018 [16].

In 2018, the top three largest countries in primary energy consumption are China, the United States and India. China's primary energy consumption was 3273.465 Mtoe (million tons of oil equivalent), accounting for 23.61% of the world's total. The primary energy consumption of the United States was 2300.64 Mtoe, accounting for 16.59% of the world's total. India's primary energy consumption was 809.15 Mtoe, accounting for 5.84% of the world's total [16].

The world's energy demand continued to grow from 1990 to 2018, and the growing demand was largely covered by fossil fuels, namely petroleum, coal and natural gas. The world total energy consumption was 8763 Mtoe in 1990, and it was 14391 Mtoe in 2018, the mean annual growth rate was 2.29% from 1990 to 2018 [15]. Energy consumption grew in most Asian countries, such as India, Indonesia, Malaysia and South Korea. Japan's energy consumption began to grow since 2013, and it grew faster in 2018. Energy consumption remained stable in the European Union, but it decreased in Britain, and increased in Poland, Germany, Spain, Italy and Turkey.

Human population was 989.8 million in 1800, 1650 million in 1900, 6127 million in 2000 [17], 7.962 billion in 2017 [18]. Population growth in the 20th century is the largest in human history [19]. The growth rate of world population was 1.9% in 1962, and 2.1% in 1972, reaching its highest period in human history [17]. The growth rate has fallen since then, and it was 1.24% in 2017 [19]. It is the population growth that drives the rapid growth of fossil fuel consumption.

Human population growth leads to the rise in carbon dioxide concentration, which traps more solar energy and leads to temperature rise. Anthropogenic greenhouse forces are the main factor for the surface temperature rise according to changes in the earth's energy budget over the past four decades [20]. Human beings are changing the composition of the atmosphere and driving future climate change because of the use of fossil fuel [21].

TURN TO ENVIRONMENTALISM FROM ANTHROPOCENTRISM

Generally, traditional ethics are mainly anthropocentric or human-centered, and these ethics either assign human value only, or assign humans higher level of value than animals or plants. From the perspective of traditional ethics, human interests and well-being are higher than non-human creatures. For example, people often slaughter animals during festivals, and human festivals are often the days when animals and plants suffer disasters.

In early days of human society, humans rely on hunting,

fishing, picking or collecting for a living. And now, humans have advanced technology to cultivate plants and animals, and scientists have biotechnology to grow new species of animals and plants. However, many species of animals and plants have become extinct due to deforestation and urbanization. Human has come to a crossroads: conserving and protecting animals and plants, while also having a colorful and better future; gradually leading to the extinction of animals and plants, but also to the end of mankind. Anthropocentrism has caused environmental degradation, biological destruction, and it would ultimately destroy human well-being [22].

In 2019, there are 8,730 species of vertebrates that are listed to be threatened, including 1,220 species of mammals, 1,492 species of birds, 1,367 species of reptiles, 2,157 species of amphibians and 2,494 species of fish. There are 5,138 species of invertebrates, 14,360 species of plants, and 110 species of fungi and protists listed to be threatened [23]. Human beings have become the greatest danger to animals and plants [24], the rate of species extinction caused by human is 1,000-10,000 times that of the natural process [23].

Environmental ethics are the norm and morality that people follow to conserve and protect plants, animals and their environment [25]. Environmental ethics confirm that animals and plants have the same living right just like humans, and humans cannot casually kill them and encroach on their habitats. The core of environmental ethics is that all living things have the same right to life. Human survival and happiness are based on the survival of animals and plants. Humans should establish fair ethics and laws to ensure their survival and establish national parks and ecological reserves to ensure that their habitats are not encroached. Hunting or trapping animals should be abolished [26].

But there are difficulties for people to establish environmental ethics. First, many people do not accept animal rights and justice, let alone plant rights and justice. Some people take it for granted that animals and plants are created for human, everything on earth was put there by God for human consumption. Everything was assumed to be at the human disposal. Second, human population continues to grow, and the growing human population has been a huge burden on the environment. For example, in some developing countries such as India, their population continues to grow, but their education and living standards are low. And the third, there is still no consensus on the content of environmental ethics, and deforestation and urbanization continues in most developing countries.

CONCLUSION

The United States, China and India rely heavily on coal, oil, and natural gas to meet their energy needs, and this is also the case of energy structure in most developing countries. International cooperation to slow the trend of catastrophic climate change faces tremendous difficulties, and

governments of the world should work together to achieve climate goals through implementable agreements.

There is no supranational authority to implement climate arrangements, and developing countries are reluctant to cooperate effectively with developed countries, resulting in the inability to control greenhouse gas emissions [27]. Some commentators regard the Kyoto Protocol as a vicious plan to either retard the process of developed countries or transfer the global wealth toward the developing countries. However, research shows that technology innovation and the application of clean energy can reduce the cost of environmental policies, accelerate emission reduction and lead to positive spillover effects. The promotion of clean energy and technology innovation is driving countries and regions that have not joined the climate treaties voluntarily take measures to reduce greenhouse gas emission [28]. For example, falling costs and policy support for renewable energy have promoted the development of wind and solar power in developing countries.

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