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Forum: SF2: Sustainable Development

Issue: Resolving the issue of carbon emissions from the combustion of coal, natural gases, oil and other fuels, including waste and non-renewable municipal waste with a special emphasis on China.

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Introduction

Carbon emissions are causing great danger to humanity as they pollute the air greatly and increase climate change. The majority of carbon emissions are from the combustion of coal, natural gas, crude oil, and other fuels including waste and non-renewable municipal waste. As carbon emission is caused mainly by the combustion of fossil fuels, carbon emissions per country differ, as the requirement of fossil fuel combustion differs according to the country's energy demand and reliance on fossil fuels. The people's Republic of China, the most populous country on Earth, has the highest amount of carbon emissions. (1)("Chart Of The Day: These Countries Create Most Of The World'S CO2 Emissions")

Definition of Key Terms

CAT(Climate Action Tracker): The Climate Action Tracker (CAT) is an independent scientific analysis that measures government climate action against the globally agreed aim of holding warming well below 2°C, and pursuing efforts to limit warming to 1.5°C, which are set in the Paris Agreement.[6] ("Climate Action Tracker / Climate Analytics")

Fossil fuel: Fossil fuel, any of a class of hydrocarbon-containing materials of biological origin occurring within Earth's crust that can be used as a source of energy. All fossil fuels can be burned in air or with oxygen derived from air to provide heat. This heat may be used to produce steam to drive generators that can supply electricity. Fossil fuels are not infinite. One of the main by-products of fossil fuel combustion is carbon dioxide (CO₂). The ever-increasing use of fossil fuels in industry, transportation, and construction has added large amounts of CO₂ to Earth's atmosphere. Fossil fuels include coal, petroleum, natural gas, oil shales, bitumens, tar sands, and heavy oils.[8] ("Fossil Fuel | Meaning, Types, & Uses")

Renewable Energy: Renewable energy, also called as alternative energy, is energy from a source that is not depleted when used, such as wind or solar power. Other examples are rivers (hydroelectric power), hot springs (geothermal energy), tides (tidal power), and biomass (biofuels). [9]

Waste-to-energy: Waste-to-energy (WtE) or energy-from-waste (EfW) is the process of generating energy in the form of electricity and/or heat from the primary treatment of waste or the processing of waste into a fuel source.[10]("Waste-To-Energy")

Background Information

Carbon emissions caused by the combustion of fossil fuels like coal, natural gases, oil, and other fuels like waste and non-renewable municipal waste are causing great danger to humanity as it causes illnesses, because of the pollution created in the air, and climate change. The top 15 highest carbon dioxide emitting countries own 72.2% of the carbon dioxide, which is the primary form of the carbon emission created by the combustion of fossil fuels, emission in the world, including China. The



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People's Republic of China emits the highest amount of carbon dioxide, emitting 27.2% of the world's carbon dioxide. The rest of the world emit 27.7% of the world's carbon dioxide which greatly shows the importance of PRC's carbon emission figures. In 2017, global carbon dioxide emissions were 36.15 billion tonnes and China emitted 9.84 billion tonnes of carbon dioxide.

The People's Republic of China is the most populous country on Earth. Even though population and carbon emission are not directly proportional it is one of the most prominent factors. As a result, most populous three countries rank in the first three spots of the list for carbon dioxide emissions in the order of the People's Republic of China, the United States of America and the Republic of India. As it is seen in the order, even though India's population is larger than the United States it ranks lower than the United States, carbon emissions do not rely only on the population. Industrialization and fossil fuels cause the greatest amount of carbon emissions and the United States is much more urbanized and industrialized than India.

According to CAT China has shown some progress regarding the Paris Agreement yet it is not enough. They are getting close to their target, yet according to CAT those actions are not enough and other countries also need to take more ambitious actions to have an impact on the Earth's future. China's carbon dioxide emissions are still rising. The growth in carbon dioxide emissions last year was 2.3% and it is expected to rise until 2030, even though some studies estimate that the peak will be seen in 2020. The Chinese government has heavily subsidized the manufacture of electric cars and has sought to reduce the number of gasoline-powered cars on the road; in 2018, Chinese consumers bought 1.1 million electric vehicles—more than the rest of the world combined. Although China is the largest consumer of coal and financing many coal-fired power plants around the world, China is the largest manufacturer of solar technology. Air pollution caused by carbon emissions is causing the death of 750000 people in China, annually, according to the World Bank. Also according to CAT, countries like Russia, the United States of America, Ukraine and Turkey are far behind where they should be in order to limit the

Waste-to-Energy in China:

The People's Republic of China has the largest waste-to-energy capacity in the world, with more than 300 plants in operation. China's waste-to-energy capacity has increased by 26% percent annually, whereas the average increase is just 4% for OECD countries. In April 2019, after China unveiled its plans to build the world's largest waste-to-energy plant to the outskirts of Shenzhen, local environment activists protested and started lawsuits against the project due to concerns that the ash, leachate, and airborne pollutants from the projected Shenzhen Waste-to-Energy Plant will make their way into the nearby reservoir and the air, polluting both the air and water of Shenzhen. The projected plant also houses 40000 square meters of solar panels on its roof while processing up to 5000 tonnes of waste daily. With 20 million people, Shenzhen produces 15000 tonnes of waste daily and this number is expected to increase by 7% each year. China generates more waste than any other country just like they do in carbon emissions. So they need alternatives to landfills in order to manage all the waste that is produced as landfills take up lots of land and degrade the soil by polluting it. The combustion of waste also causes carbon dioxide emission, yet the officials claim it will be half of the landfill sites, where the waste ends up normally. In the past few years, protests against planned incinerators have taken place in Hubei, Hunan, Guangdong, Shandong, Hainan, Jiangxi, and Zhejiang provinces. Some have turned violent, showing the significant public distrust about these facilities but the protests were not enough to stop the development of these plants. [4]("As China Pushes Waste-To-Energy Incinerators, Protests Are Mounting")[5] ("One Of China's Biggest Megacities Is Building A Giant Waste-To-Energy Plant")

Coal in China:

The People's Republic of China is both the largest producer and consumer of coal in the world. They are also the country with the third most coal imports. In order to reduce carbon dioxide emissions,



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China reduced its coal consumption from 80% in 2010 to 60% in 2017. Domestic coal production also decreased with a year on year decline of 9% in 2016. However, imports of coal increased to compensate for the decrease in domestic coal production. China imports most of its coal from Australia, which is the largest exporter of coal in the world. From 1990 to 2018, China increased its coal consumption from 0.99 billion tons to 4.64 billion tons, when China has seen significant economic growth through industries like manufacturing which are energy-intensive. Since 2011, China has consumed more coal than the rest of the world combined. Also, China is financing coal-fired power plants all around the globe and is set to build new coal-fired power plants in order to boost its slowing economy despite its carbon emissions.[7]

In 2004 China emitted 4707 million metric tons of carbon dioxide because of fossil fuels and 3809 million metric tonnes were caused by coal.

Timeline of Major Events

1992	The United Nations Framework Convention on Climate Change was formed during the United Nations Conference on Environment and Development (UNCED) to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system".
1994	UNFCCC became effective after a sufficient number of Member States have ratified it.
1997	It is an international treaty that extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that commits state parties to reduce greenhouse gas emissions based on "the scientific consensus that global warming is occurring and it is extremely likely that human-made CO ₂ emissions have predominantly caused it."
2005	The Kyoto Protocol entered into force on 16 February 2005
2011	Durban Platform for Enhanced Action was accepted in the UN Climate Change Conference in Durban (COP17) to "develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties" which became the Paris Agreement in 2015.
2012	The Doha Amendment for the Kyoto Protocol was accepted for the second commitment period of the Kyoto Protocol which also founded the Paris Agreement in 2015. It is also known as the Kyoto Protocol Extension until 2020.
2013	After the record-high air pollution in 2012 and 2013, the Chinese government released the State Council's September 2013 Action Plan for the Prevention and Control of Air Pollution which aimed to reduce coal's share in China's energy sources to 65% by 2017.
2015	Paris Agreement was accepted during the United Nations Climate Change Conference in Paris (COP21) which aims to limit climate change to less than two degrees Celsius and pursue efforts to limit the rise to 1.5 degrees Celsius.



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2016	The Paris Agreement entered into force on 4 November 2016.
2017	China's coal share has become 60%, which is even less than the State Council's September 2013 Action Plan for the Prevention and Control of Air Pollution had aimed.
2019	China has faced protests against waste-to-energy plants but it is still planning and building them alongside new coal-fired power plants.
2020	Today, in 2020 the measures taken on a global scale and in China are still insufficient to resolve the issue of carbon emissions from the combustion of coal, natural gases, oil and other fuels, including waste and non-renewable municipal waste.

Previous Attempts to Solve the Issue

United Nations Framework Convention on Climate Change: (United Nations Conference on Environment and Development (UNCED), 1992)

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty that was accepted in the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro. It became effective on 21 March 1994, after a sufficient number of countries had signed it. The UNFCCC aims to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". The UNFCCC has 197 members according to the data from December 2015. [3]("United Nations Framework Convention On Climate Change")

Durban Platform for Enhanced Action (The UN Climate Change Conference in Durban(COP17), 2011)

In 2011, parties of the UNFCCC in the annual Conference of the Parties 17 adopted the "Durban Platform for Enhanced Action". In a part of the Durban Platform, parties have agreed to "develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties".

Paris Agreement (United Nations Climate Change Conference in Paris(COP21), 2015)

Taking its foundation from the Durban Platform for Enhanced Action and the Doha Amendment for the Kyoto Protocol, the Paris Agreement aims to limit climate change to less than two degrees Celsius, and pursue efforts to limit the rise to 1.5 degrees Celsius. The Paris Agreement entered into force on 4 November 2016.

The Kyoto Protocol (COP3, Kyoto, 1997)



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It is an international treaty that extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that commits state parties to reduce greenhouse gas emissions based on “the scientific consensus that global warming is occurring and it is extremely likely that human-made CO₂ emissions have predominantly caused it.” The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005.[11]("Kyoto Protocol")

Major Countries and Organizations Involved

Kingdom of Morocco:

Regarding the Paris Agreement, Morocco is the globally leading country with a massive plan to reduce its carbon dioxide emissions in order to limit climate change to 1.5 degrees C. With its “National Energy Strategy” Morocco calls to generate 42 percent of its electricity from renewables by 2020, and 52 percent by 2030. The Noor Ouarzazate complex, located in Morocco, is the largest concentrated solar farm in the world.[2]

Republic of Costa Rica:

Costa Rica aims to produce all of its electricity by renewable sources by 2021. In 2018 it generated 98 percent of its electricity from renewable sources, mostly hydropower. As two-thirds of its greenhouse gas emissions are from transportation, the government launched the National Plan for Electric Transportation. The plan calls for at least five percent of the bus fleet to be replaced by electric buses every two years, and for at least 10 percent of new taxi concessions to be given to electric vehicles. Also, Costa Rica had a moratorium on oil since 2002, and in February 2019 they extended the moratorium on oil extraction and exploitation from 2021 until the end of 2050.

European Union:

The European Union is an adopter of climate targets. They had set goals as early as 2009 in order to reduce greenhouse gas emissions by 20 percent by 2020. After the Paris Agreement, they increased their target to a 40 percent reduction by 2030. These targets differ per country within the European Union yet, the average decrease target is 40 percent. CAT calculates that meeting this and other targets contained in the European Commission’s “Clean Energy for all Europeans” package would result in a reduction in emissions of 48 percent by 2030, which is above the official aim. If the EU reaches its aim but the US and China do not take these strict measures the global result regarding the Paris Agreement will be in the range of a 2 degrees C-compatible reduction.

Possible Solutions

As combustion of coal, natural gases, oil and other fuels, including waste and non-renewable municipal waste are all done in order to produce energy, alternatives to these resources, which are renewable sources, should be used in order to resolve the issue of carbon emissions from these resources. In the world, there is great potential for renewable energy like rivers (hydroelectric power), hot springs (geothermal energy), tides (tidal power), and biomass (biofuels), sun (solar power), wind (wind energy) which should be utilized. China has most of its renewable energy sources in the form of hydropower, wind, biomass and solar power. Even though hydropower is a renewable energy form, the extensive usage of dams may create the degradation of that water source. China is also utilizing hydropower a lot among other means of renewable sources. After extensive comprehension of the location and effects, the usage of waste-to-energy plants are also a good option as they help to manage waste.



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Useful Links For Further Research

<https://www.nationalgeographic.com/environment/2019/09/climate-change-report-card-co2-emissions>

<https://e360.yale.edu/features/as-china-pushes-waste-to-energy-incinerators-protests-are-mounting>

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