Climate Change: Past, Present and Future

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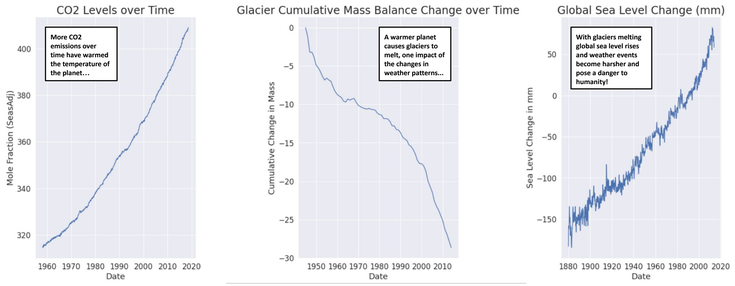
OVERVIEW

Climate change refers to the long-term warming of the planet and the changes in weather patterns that are associated with it. The main cause of climate change is the burning of fossil fuels - such as coal, oil and natural gas, which release greenhouse gases (CO2, Methane, Nitrous Dioxide, etc.) into the atmosphere. These gases become trapped in the atmosphere and cause Earth's temperature to rise. This results in changes to the climate that have negative effects on the planet and humanity. A serious impact of a changing climate is more frequent and severe weather events which can cause significant damage to the environment and populations around the world.

This project is aimed at gauging the impacts of countries that have contributed to the trends of climate change, identifying what countries have been vulnerable to severe weather events in recent time, and recognizing the actions being taken by countries to address climate change (through cleaner energy adoption).

Global Metrics of Climate Change



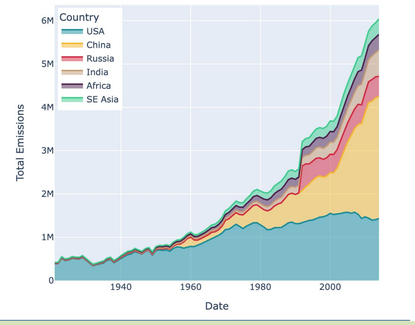
These metrics are important to our project because they are the clear indications of the rapid warming of the climate and the catalyst for shifting weather patterns that will be further investigated in the following sections.

With this in mind we will select countries of interest to provide a more focused understanding of the impacts of climate change, but at the same time provide a generalized interpretation of data trends.

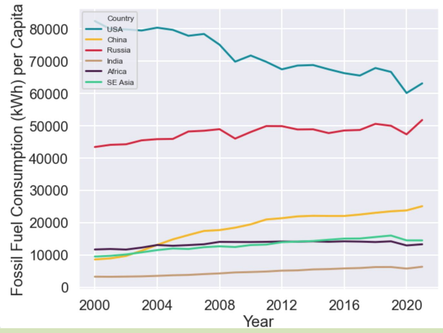
PAST: WHO HAS CONTRIBUTED TO CLIMATE CHANGE?

Industrialized countries have traditionally been the largest emitters of greenhouse gases because they have relied heavily on fossil fuels for energy. In recent years, **China** has surpassed the **United States** as the world's largest emitter of greenhouse gases. Other large emitters include **India** and **Russia**. **African** and **South-East Asian** countries have emitted less overall.

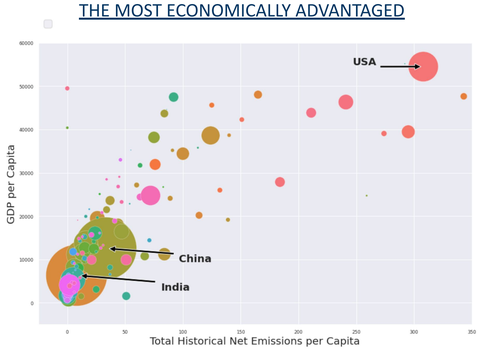
USA IS THE BIGGEST HISTORIC CONTRIBUTOR TO GREENHOUSE GAS EMISSIONS



USA HAS GREATEST FOSSIL FUEL CONSUMPTION PER CAPITA

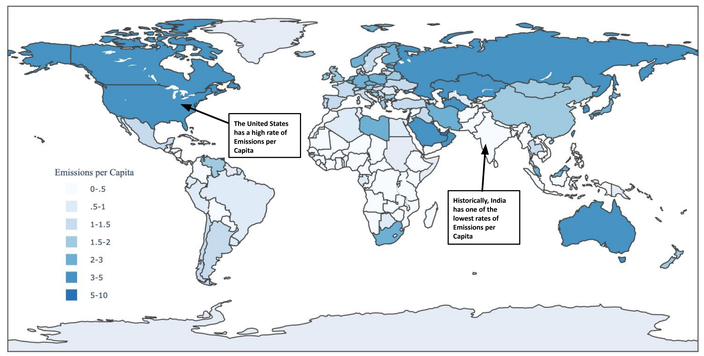


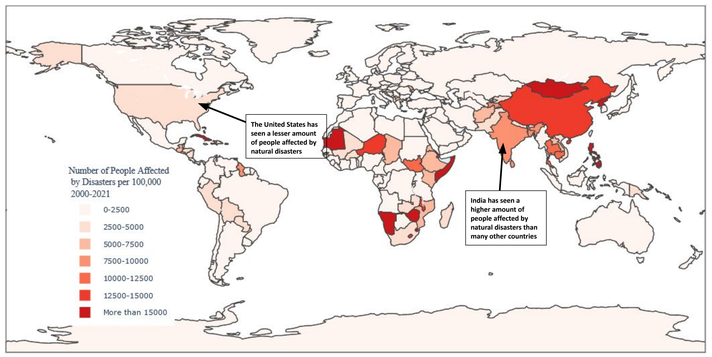
BIGGEST EMITTER COUNTRIES TEND TO BE THE MOST ECONOMICALLY ADVANTAGED



PRESENT: WHO IS SUFFERING AND WHO CONTINUES TO POLLUTE?

No country is immune to the impacts of climate change, however some countries are more vulnerable to the impacts of climate change than others. For example, small island nations and coastal regions are particularly at risk from rising sea levels and more frequent storms. These vulnerable countries tend to also be countries with low levels of emissions.

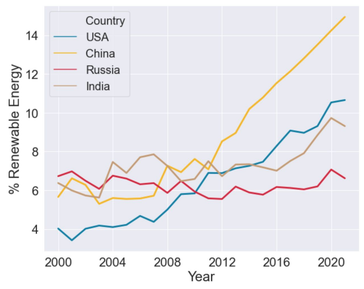




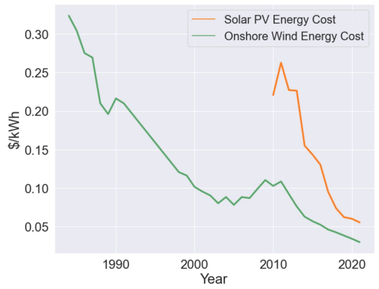
FUTURE: WHO IS INVESTING IN CLEAN ENERGY?

One approach that countries have taken to address climate change is to adopt technology that produces cleaner forms of energy. Renewable sources of energy, such as wind and solar power, do not produce the harmful emissions that contribute to climate change. Emissions from certain sectors are hard to shift to low emitting sources, such as transport.

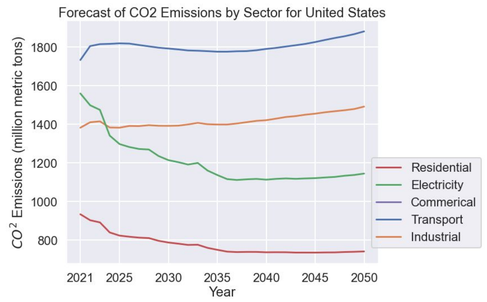
CHINA IS LEADING IN RENEWABLE ENERGY ADOPTION



COSTS OF RENEWABLE FORMS OF ENERGY HAS FALLEN DRAMATICALLY IN THE US



TRANSPORTATION IS FORECASTED TO REMAIN THE HIGHEST EMITTING SECTOR IN THE UNITED STATES, INDUSTRIAL SECTOR TO SURPASS ELECTRICITY BY 2023



CONCLUSION

The world, especially the US, needs to adopt renewable energy resources to a much greater degree. The disproportionately high emission rates and high levels of wealth of western nations makes it only fair they should become leaders in combating climate change. With the rapidly decreasing prices of renewables, this is economically feasible. Conditioned on the intensity of policy action, the world may see different climate outcomes:

Warming Target:	GHG down by 2030:	Net zero by:	Disruption to human and animal life:
1.5°C	45%	2050	Severe
2°C	25%	2070	Very Severe

source: https://yaleclimateconnections.org/2021/08/1-5-or-2-degrees-celsius-of-additional-global-warming-does-it-make-a-difference/

Data Sources:

Global Climate Change Datasets: Datahub.io - https://datahub.io/collections/climate-change
Energy Dataset: Our World in Data - https://ourworldindata.org/energy
Natural Disasters Dataset: Our World in Data - https://ourworldindata.org/natural-disasters
United States Forecasted Emissions Dataset: U.S. Energy Information Administration - https://www.eia.gov/energyexplained/energy-and-the-environment/outlook-for-future-emissions.php

"There's one issue that will define the contours of this century more dramatically than any other, and that is the urgent threat of a changing climate."

-Barack Obama