BUSINESS INTELLIGENCE

MSIS 670

GLOBAL WARMING

Group 6

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INTRODUCTION

The Earth is warming up, and humans are at least partially to blame. The gradual increase in the planet's surface temperature is known as global warming. Although this warming trend has been around for a while, the burning of fossil fuels has greatly accelerated its pace over the past century. The amount of fossil fuels burned has increased along with the size of the human population. Burning fossil fuels such as coal, oil, and natural gas results in the "greenhouse effect," which affects the atmosphere of Earth.

These greenhouse gases are carbon dioxide, chlorofluorocarbons, water vapor, methane, and nitrous oxide. Our ecology and wildlife are being destroyed by the over usage of fossil fuels. Due to the significant pollution this activity produces and the resulting ozone layer damage, it also poses a serious threat to human life.

DATASET

Why this Dataset?

This dataset will help researchers and environment experts to predict global warming. So that countries should set a goal to decrease the emission of harmful gases.

This dataset provides a detailed list of all countries in the world with the details pertaining to CO2 emission and Green House Gas emission, Land Temperatures recorded in major countries and production of energy from different sources. The Greenhouse Gas data contains data like carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs) etc. EIA dataset contains consumption of coal, petroleum, natural gas etc. to produce electricity.

The dataset will help us to identify the major factors of global warming along with which country contributes to global warming the most and its effect on the environment. This helps us to analyze and come up with a solution to decrease global warming.

Source:

Kaggle, EPA(Environmental Protection Agency), Data.world, EIA(Energy Information Administration)

https://www.kaggle.com/datasets/unitednations/international-greenhouse-gas-emissions?ref=hackernoon.com

https://www.kaggle.com/datasets/moazzimalibhatti/co2-emission-by-countries-year-wise-17502022?resource=download

https://www.kaggle.com/datasets/berkeleyearth/climate-change-earth-surface-temperature-data?ref=hackernoon.com

https://www.epa.gov/ghgreporting/data-sets

https://www.eia.gov/electricity/data/browser/

Strength:

In this dataset, we were able to get information about the surface temperature change and their contribution to global warming on almost every country, helping us come up with a geographic visualization.

Limitation:

It was a little challenging to analyze the dataset, since we could not find enough data on the past century for some strategic questions

Dataset Cleaning:

Since some of the date columns were mismatched, it was difficult to create visualization in tableau, so we had to filter and transpose some columns to get a better understanding.

KEY AUDIENCE:

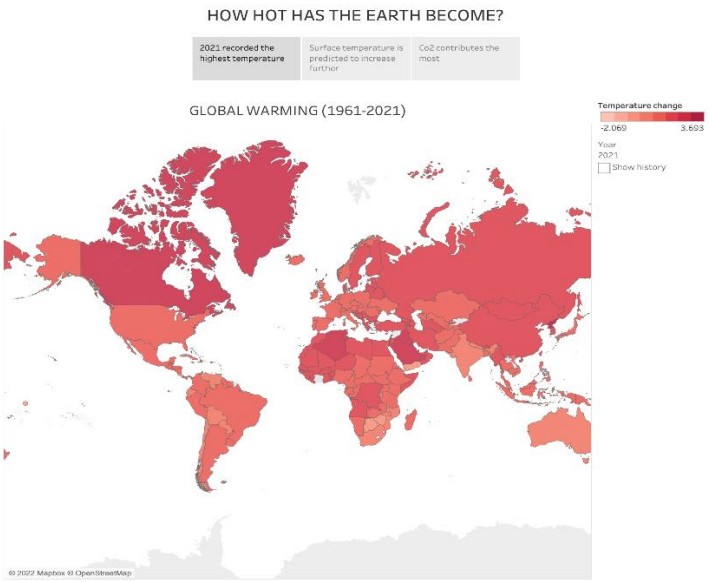
Our target audience for the analysis of global warming are the Public.

STRATEGIC-LEVEL QUESTIONS:

1. Why is the earth getting hotter?
2. Which industry adds to global warming the most?
3. What can be done to reduce global warming?

Question 1: Why is the earth getting hotter?

Extra greenhouse gases in our atmosphere are the main reason that Earth is getting warmer. Greenhouse gases, such as carbon dioxide (CO_2) and methane, trap the Sun's heat in Earth's atmosphere. The burning of fossil fuels like coal and oil increase the amount of CO_2 in our air. This happens because the burning process combines carbon with oxygen in the air to make CO_2. It's important that we monitor CO_2 levels, because too much CO_2 can cause too much warming on Earth. Several NASA missions have instruments that study CO_2 in the atmosphere.



a) What are the major factors that contribute to global warming?

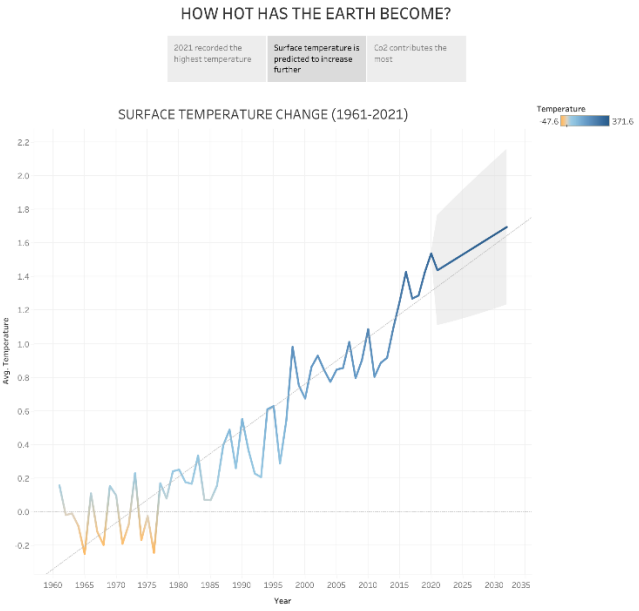
The greenhouse effect is essential to life on Earth, but human-made emissions in the atmosphere are trapping and slowing heat loss to space.

Five key greenhouse gases are CO2, nitrous oxide, methane, chlorofluorocarbons, and water vapor.

While the Sun has played a role in past climate changes, the evidence shows the current warming cannot be explained by the Sun.

Carbon dioxide: A very important component of the atmosphere, carbon dioxide (CO2) is released through natural processes (like volcanic eruptions) and through human activities, like burning fossil fuels and deforestation. Human activities have increased the amount of CO2 in the atmosphere by 50% since the Industrial Revolution began (1750). This sharp rise in CO2 is the most important climate change driver over the last century

b) What will happen if global warming is left unchecked?



Hotter temperatures

As greenhouse gas concentrations rise, so does the global surface temperature. The last decade, 2011-2020, is the warmest on record. Since the 1980s, each decade has been warmer than the previous one. Nearly all land areas are seeing more hot days and heat

waves. Higher temperatures increase heat-related illnesses and make working outdoors more difficult.

More severe storms

Destructive storms have become more intense and more frequent in many regions. As temperatures rise, more moisture evaporates, which exacerbates extreme rainfall and flooding, causing more destructive storms. The frequency and extent of tropical storms is also affected by the warming ocean. Cyclones, hurricanes, and typhoons feed on warm waters at the ocean surface. Such storms often destroy homes and communities, causing deaths and huge economic losses.

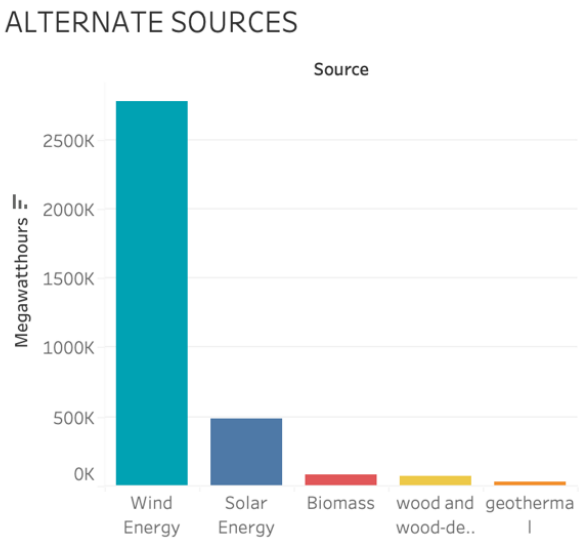
Increased drought

Climate change is changing water availability, making it scarcer in more regions. Global warming exacerbates water shortages in already water-stressed regions and is leading to an increased risk of agricultural droughts affecting crops, and ecological droughts increasing the vulnerability of ecosystems. Droughts can also stir destructive sand and dust storms that can move billions of tons of sand across continents.

A warming, rising ocean

The ocean soaks up most of the heat from global warming. The rate at which the ocean is warming strongly increased over the past two decades, across all depths of the ocean. As the ocean warms, its volume increases since water expands as it gets warmer. Melting ice sheets also cause sea levels to rise, threatening coastal and island communities.

c) How can we manage the existing impacts and come up with ways to reduce global warming in the near future?



There is no one-size-fits-all approach to stopping or slowing global warming, and each individual, business, municipal, state, tribal, and federal entity must weigh their options in light of their own unique set of circumstances. Experts say it is likely many strategies working together will be needed.

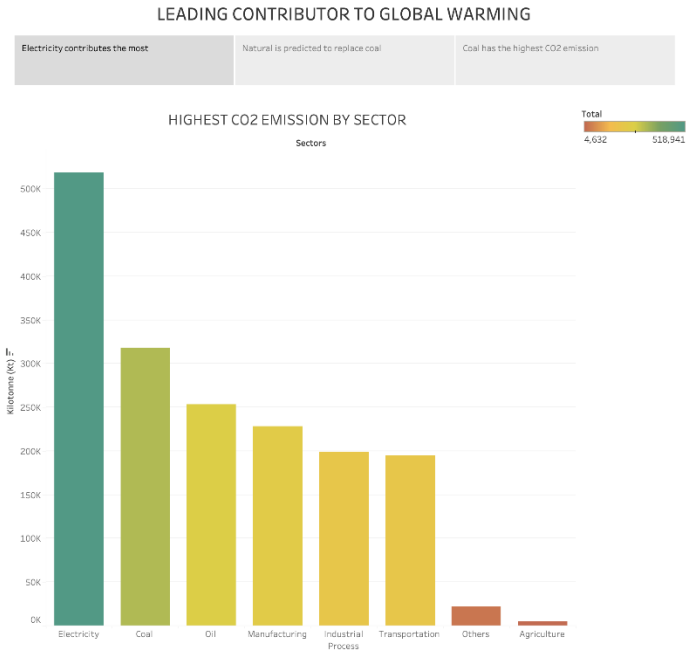
Generally speaking, here are some examples of mitigation strategies we can use to slow or stop the human-caused global warming:

- Where possible, we can switch to renewable sources of energy (such as solar and wind energy) to power our homes and buildings, thus emitting far less heat-trapping gases into the atmosphere.
- Where feasible, we can drive electric vehicles instead of those that burn fossil fuels; or we can use mass transit instead of driving our own cars.
- Where affordable, we can conserve energy by better insulating our homes and buildings, and by replacing old, failing appliances with more energy-efficient models.

Question 2) Which industry adds to global warming the most?

- Greenhouse gases trap heat and make the planet warmer. Human activities are responsible for almost all of the increase in greenhouse gases in the atmosphere over the last 150 years.[1] The largest source of greenhouse gas emissions from human activities in the United States is from burning fossil fuels for electricity.

a) Who is the leading contributor to greenhouse gas emission?



Generating power:

Generating electricity and heat by burning fossil fuels causes a large chunk of global emissions. Most electricity is still generated by burning coal, oil, or gas, which produces carbon dioxide and nitrous oxide – powerful greenhouse gases that blanket the Earth and trap the sun's heat.

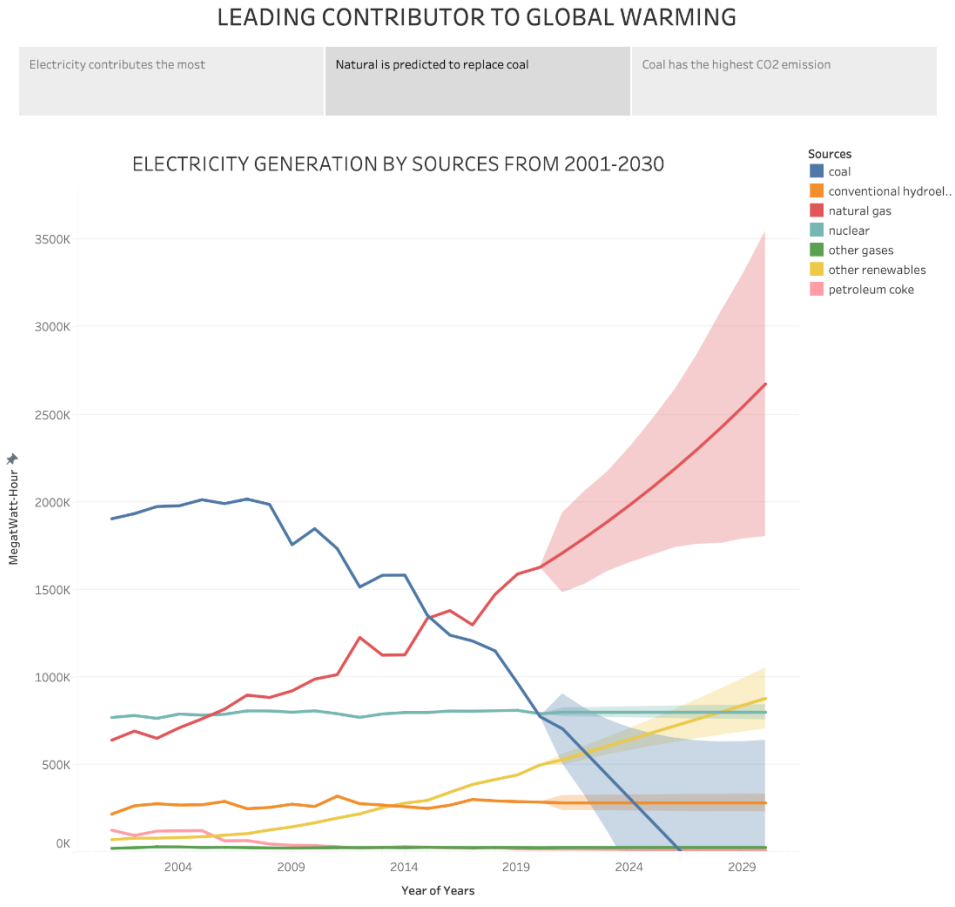
Using transportation

Most cars, trucks, ships, and planes run on fossil fuels. That makes transportation a major contributor of greenhouse gases, especially carbon-dioxide emissions. Road vehicles account for the largest part, due to the combustion of petroleum-based products, like gasoline, in internal combustion engines.

Manufacturing goods

Manufacturing and industry produce emissions, mostly from burning fossil fuels to produce energy for making things like cement, iron, steel, electronics, plastics, clothes, and other goods. Mining and other industrial processes also release gases, as does the construction industry. Machines used in the manufacturing process often run on coal, oil, or gas; and some materials, like plastics, are made from chemicals sourced from fossil fuels.

b) If left unchecked, how much more fossil fuel will be consumed in the next 10 years in order to produce electricity?



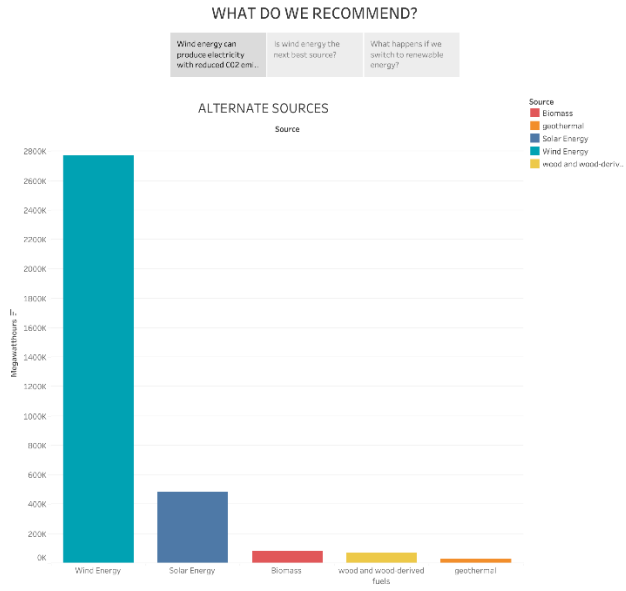
c) How can we reduce greenhouse gas emission from the leading contributor?

Question 3) What can be done to reduce global warming?

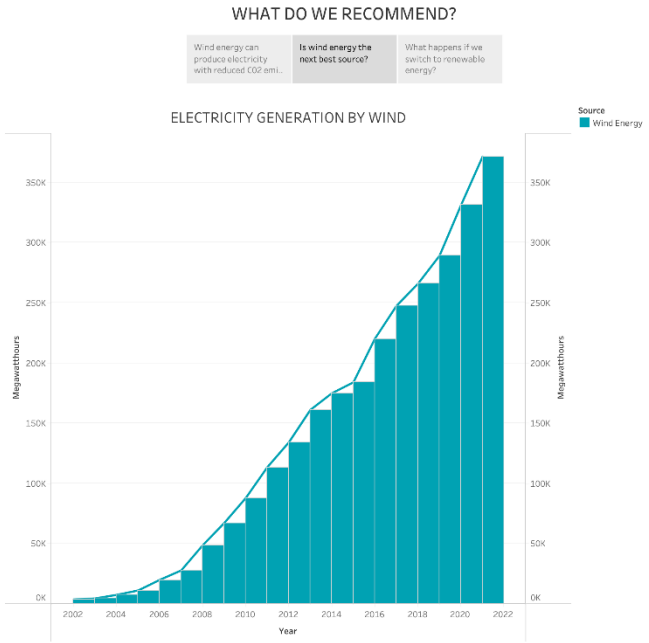
a) What are the alternate ways to produce clean and sustainable energy?

The most popular renewable energy sources currently are:

- Solar energy
- Wind energy
- Hydro energy
- Tidal energy
- Geothermal energy
- Biomass energy



b) If we do come up with ways to produce clean and sustainable energy, what will be its impact on global warming?



Human activity is overloading our atmosphere with carbon dioxide and other global warming emissions. These gases act like a blanket, trapping heat. The result is a web of significant and harmful impacts, from stronger, more frequent storms, to drought, sea level rise, and extinction.

In the United States, about 29 percent of global warming emissions come from our electricity sector. Most of those emissions come from fossil fuels like coal and natural gas .

Increasing the supply of renewable energy would allow us to replace carbon-intensive energy sources and significantly reduce US global warming emissions.

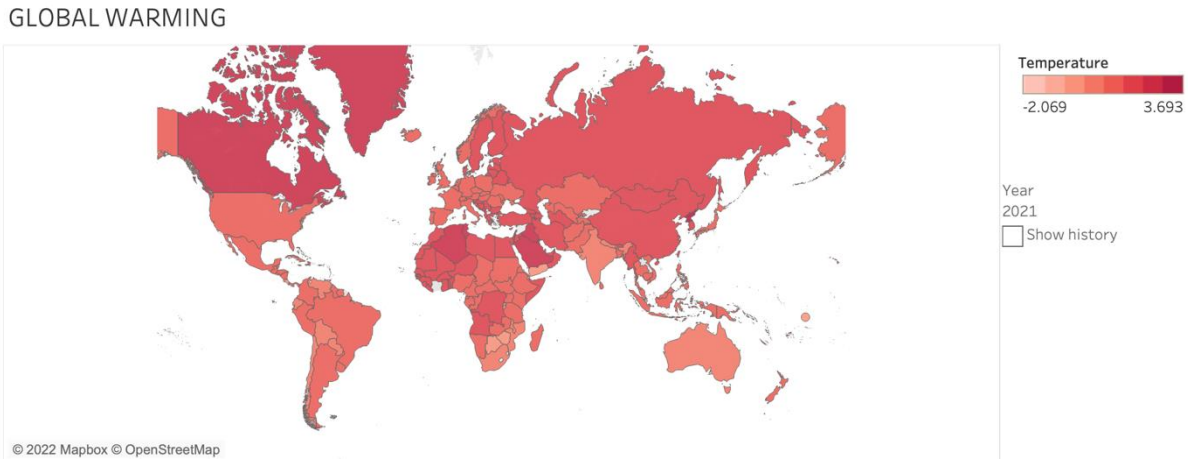
For example, a 2009 UCS analysis found that a 25 percent by 2025 national renewable electricity standard would lower power plant CO2 emissions 277 million metric tons annually by 2025—the equivalent of the annual output from 70 typical (600 MW) new coal plants.

In addition, a ground-breaking study by the US Department of Energy's National Renewable Energy Laboratory (NREL) explored the feasibility of generating 80 percent of the country's electricity from renewable sources by 2050. They found that renewable energy could help reduce the electricity sector's emissions by approximately 81%.

Increasing the supply of renewable energy would allow us to replace carbon-intensive energy sources and significantly reduce US global warming emissions.

C) Why should we switch to this alternate fuel?

Fossil fuels – coal, oil and gas – are by far the largest contributor to global climate change, accounting for over 75 per cent of global greenhouse gas emissions and nearly 90 per cent of all carbon dioxide emissions. As greenhouse gas emissions blanket the Earth, they trap the sun's heat. This leads to global warming and climate change. The world is now warming faster than at any point in recorded history. Warmer temperatures over time are changing weather patterns and disrupting the usual balance of nature. This poses many risks to human beings and all other forms of life on Earth.



CONCLUSION:

Climate change is an issue for humans right now, and people are the ones who are fueling these conflicts. Although it is impossible to completely stop global warming, people may still take steps to lessen and slow it down. Therefore, switching to alternate renewable sources like wind and solar energy can help reduce the impact of global warming on the planet.