Final Project Tableau Presentation Script

Story Overview: (1 min 20-30 sec)

Hello, my name is Matthew, and my Tableau project topic is on a global warming and climate change crisis. You may already know or have an idea as to what global warming and climate change may be since scientists have been hounding at us on the imminent dangers on the world if we do not take immediate actions, but just in case, “according to NASA, global warming is the long-term heating of Earth’s climate system observed since the pre-industrial period due to human activities, primarily fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth’s atmosphere”. But how is this different from climate change? Climate change, according to NASA, refers to “a long-term change in the average weather patterns that have come to define Earth’s local, regional, and global climates”. Ultimately, global warming and climate change can be used interchangeably, just that climate change is also used to describe both human and natural warming effects.

The three focus topic questions are one, how has the increase of CO2 emissions affected the temperature in the countries around the world, two, how has global warming and climate change affected the glaciers and the ocean levels, and three, what impact has global warming and climate change had on the economy, renewable energy, and public belief? The first analysis we will look at is CO2 Emission Levels.

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Analysis 1: CO2 Emission Levels (1 min 20-30 sec)

         We have already seen these three graphs from our tableau assignment from class, but to quickly recap, the left graph displays the total CO2 emissions in a bar graph, with the North American region totaling at least 266 million kilotons of CO2, then East Asia & Pacific region with the second highest total at 238 million kilotons, and Europe & Central Asia region right behind at third highest totaling 226 million kilotons. The middle graph displays a time series of the CO2 per capita, with the United States holding the top spot with the most from the 1960s all the way to 2009, before being overtaken by Saudi Arabia. (Demonstrate) And the right graph shows a steady median increase through a gradual darker shade of blue by value in the CO2 per capita as the years go by. To summarize, the global total of CO2 emissions continues to increase as the years go by. An interesting thing I did with the year filter is that I have linked all three graphs to the same year filter. (Demonstrate) If we look at 2005 to 2015, we see the three graphs have changed, with East Asia & Pacific Region producing the most CO2 emissions now.

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Analysis 2: Global Surface Temperature (1 min 30 sec)

         With an increase in CO2 emissions in our atmosphere, the greenhouse effect traps more of the heat, thereby increasing the global surface temperature. As we look at the left graph from DataHub, we see an increase of about 3 degrees in Fahrenheit from 1960 to 2015. Although the temperature stops at 54.4 degrees Fahrenheit in 2015, with this forecast, we can predict that the average global surface temperature will only continue to increase unless we do something to lessen this. On the right graph, we see the global average temperature in degrees Celsius from September 1880 to September 2013, and it makes sense that the highest average temperature would be in countries like Brazil, most of Africa, India, and Indonesia because these countries are along the equator. If we move the left slider for date to the right, we can see that the colors of the countries start to become a darker shade of orange or red, showing an increase in average temperature (Example: United States). The United States had an average of 8.85 degrees Celsius, but now on October 19 1999, it is now 9.67 degrees Celsius.

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Analysis 3: Glacier Mass (20 sec)

         So, what happens now that the global surface temperature increases. Well, according to this graph from DataHub from 1940 to 2014, we see that total mean cumulative mass of glaciers has continued to decrease, especially more rapidly starting around the early 2000s.

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Analysis 4: Sea Levels (45 sec to 50 sec)

         Now that all that water from the glaciers have been melting into the oceans and seas, we can see, according to the CSIRO and NOAA data on the left graph from 1993 to 2013, that the sea levels have increased by 2.6 inches overall. The top right graph shows this 67-millimeter increase, and the bottom right graph shows a reconstruction of how much sea level we had, dating all the way back to 1880 from 2013, and we gained at least 8 inches from then. (Show lightbulb) I also added this little pop-up legend of acronyms for GMSL, CSIRO, and NOAA. (And GMSL stands for global mean sea level, CSIRO stands for the Commonwealth Scientific and Industrial Research Organisation, and NOAA stands for the National Oceanic and Atmospheric Administration)

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Analysis 5: Global Economic Losses from Weather Catastrophes 2007-2021 (1 min 15 sec)

         With warmer temperatures and more moisture in the air, this results in more weather activities, notably weather catastrophes. In 2010, the total economic loss was $310 billion due to this year being one of the most active seismic years in decades, with quakes at Haiti, Chile, Turkey, China, and Indonesia, the Russian heat wave, and Pakistani flooding. In 2017, the economic loss totaled a whopping $519 billion due to this year being one of the higher-than-average reported storms, with some of the strongest and costliest hurricanes like Hurricane Harvey, Irma, and Maria, costing $95 billion, $80.7 billion, and $69.7 billion respectively. Although this time series shows a slight increase in the global economic loss from weather catastrophe, further research is needed to investigate the significance of this phenomenon. For instance, we don’t know if every natural disaster and weather catastrophe has been recorded and if only a few major disasters have been the main cause of the economic losses.

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Analysis 6: Global Clean/Renewable Energy Investments (1 min 10-15 sec)

         The costly weather catastrophes worldwide only proved that there needs to be more focus on solutions to lessen CO2 emissions. From 2005 to 2021, many countries are coming together to increase renewable energy investments. On the left graph in 2019, China surprisingly leads in the total investments with $90.1 billion, the United States with $59 billion, and Europe just behind with a total of $58.4 billion. The top right graph shows a decrease in growth rate percentage of global clean energy investments from 2005 to around 2017 but begins to pick back up in 2019. The bottom right graph shows that the worldwide investment in clean energy hasn’t been increasing as much over the years from 2005, and the graph also is missing the data for slightly increased investments in years 2019 to 2021 like in the top right graph.

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Analysis 7: Global Renewable Energy Consumption 2000-2020 (35-40 sec)

         An increase in global interest and investment in renewable energy has also allowed for an increase in renewable energy consumption. Compared to in 2000 when the total renewable energy exajoule consumption was only 2.64, this total exajoule in 2020 jumped to about 32 EJ.  This 32 Exajoule, however, is still small compared to the rest of energy types as the world total energy consumption is 556.63 in 2020. Luckily, this renewable energy consumption will only continue to increase.

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Analysis 8: Public Belief (40-45 sec)

         With all these weather phenomena and catastrophes, what does the public think about it? Based on the 2020 data from Statista, Italy and the United Kingdom ranks the highest with 81% of the public believing there to be a global climate emergency. The United States only ranks 22nd in the world with 65% of the public believing there to be a climate emergency worldwide. And Moldova ranks 37th with only 50% or half the public believing in a climate crisis. The graph on the right shows this public belief in map form.

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Results/Main Findings (1 min 45-50 sec)

         So, in conclusion, Analysis 1 showed us that CO2 total emissions will continue to rise, with North America in the lead, followed by East Asia & Pacific, and then Europe & Central Asia. Analysis 2 displayed the projected increase of global average surface temperatures from 54.4 degrees Fahrenheit in 2015 due to the increased trapping of heat via greenhouse effect with more CO2 in the atmosphere. Analysis 3 showed that the overall mean mass of glaciers continues to decrease, especially more rapidly during the recent years as warmer temperatures are melting the ice. Analysis 4 demonstrated the increase in the global mean sea level by 2.6 inches from 1993 to 2013 now that more of the glaciers are melting into the oceans and seas. Analysis 5 displayed a slight increase in economic losses from increased weather catastrophes due to more moisture in the air, but more research is needed to prove this. Analysis 6 showed that the increase in global renewable energy has started to stagnate around 2017 but has been picking back up around 2019 and onwards. In analysis 7, although the total renewable energy in 2020 of 32 exajoules is comparably smaller than the total world energy consumption of 556.63 exajoules, it will continue to increase. Finally, Analysis 8 on the public belief in the climate emergency showed that the United States ranked 22nd with 65% believing in it, and that Italy and the United Kingdom lead with 81% of the public believing in the climate crisis.

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Recommendations and Next Steps (Research) (1 min 45-50 sec)

         Now that we understand or know how imminent the dangers of the climate crisis are, what can we do about it? The first thing we can do is to reduce our use of fossil fuels, thereby decarbonizing, to quickly reduce our CO2 and methane emissions. We can do this by increasing the switch to wind and solar energy alternatives now that these alternatives are becoming more economically viable. We can also plant more trees to restore forests and grasslands. Additionally, there is a machine called the carbon capture and storage, and this device captures the CO2 in the air already. However, it runs on fossil fuels, and we do not know enough of the effectiveness of this machine. Another alternative would be doing ocean fertilization, which creates plankton blooms to absorb CO2 in the air at oceans, but the long-term impacts have not been studied enough to know if this is a safe method. Another major thing we can do is to get every or as many more countries possible, working together to reduce greenhouse emissions. And a third major thing to do is increasing political support to encourage individuals to adopt low carbon-intensive lifestyles like going vegetarian, food-waste reduction, and renewable energy options.

         For this project, the logical next steps would be to find up-to-date data. This would also include finding out if all disasters were recorded for the global economic loss of each year, as well as more research needed in the correlation between increased economic loss and weather catastrophes. A final future step would be to include the global warming and climate change policies and their impact on the climate crisis.

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Closing Statement (15 sec)

         I would like to thank you for listening and close on reminding us all that there is no Planet B, so it is important that we take immediate action to solve this problem together.