# *DRAFT*
# Current Climate Warming Trend, Expected Impacts & Building Support for Large-Scale Action

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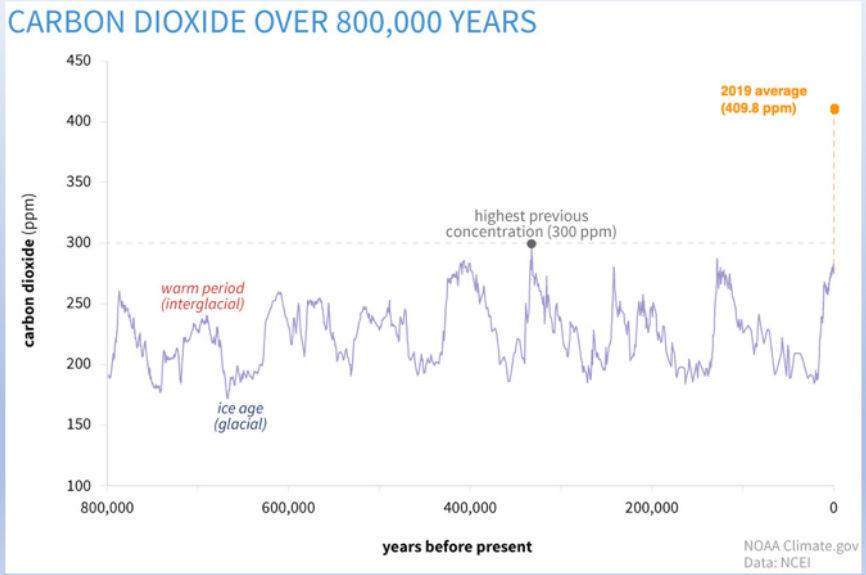
This presentation is about the current climate warming trend and expected impacts of this trend unless adequate large scale action is taken to mitigate this change. Since warming trends have been shown to correlate closely with atmospheric CO2 levels, we will start by showing some graphs that illustrate changing CO2 levels in the atmosphere over different time periods.

# Carbon Dioxide Levels Over last 800,000 yrs

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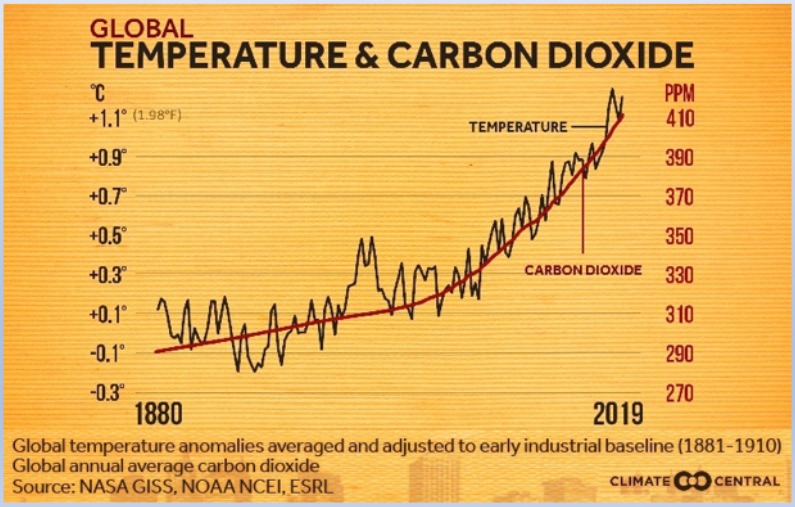
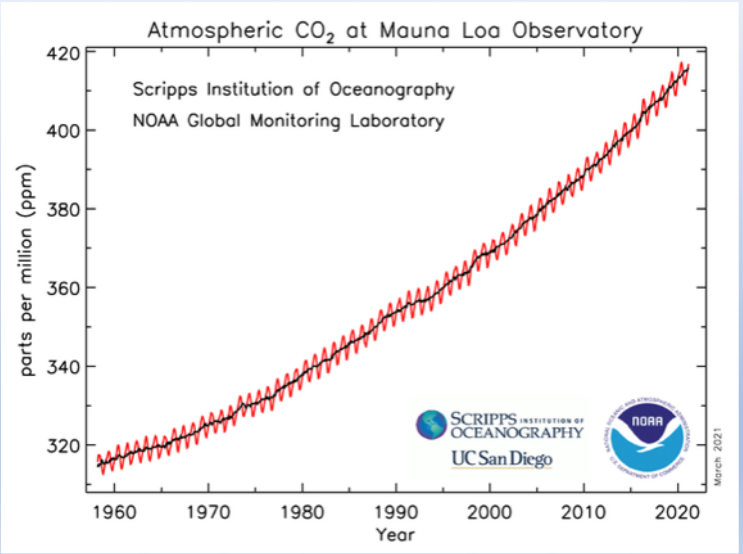
To provide you with an overview about the current warming trend compared to earlier warming trends that have occurred in last many hundreds of thousands of years, here is a graph showing atmospheric CO2 levels over the last 800,000 years and how it has risen recently to unprecedented levels compared to this earlier record. This graph is from an article published by Climate.gov entitled “How do we know the build-up of carbon dioxide in the atmosphere is caused by humans?” on November 5, 2020.

## Global Temperature and Carbon Dioxide Levels from 1880 to 2019




As shown in this graph, rising CO2 levels have been correlating relatively closely with rising global temperatures since 1880.

## Actual Atmospheric $CO_2$ levels Measured at the Mauna Loa Observatory in Hawaii 1958-2021




The **red** line and symbols represents the monthly mean values.

The **black** line and symbols represent the same, after correction for the average seasonal cycle.

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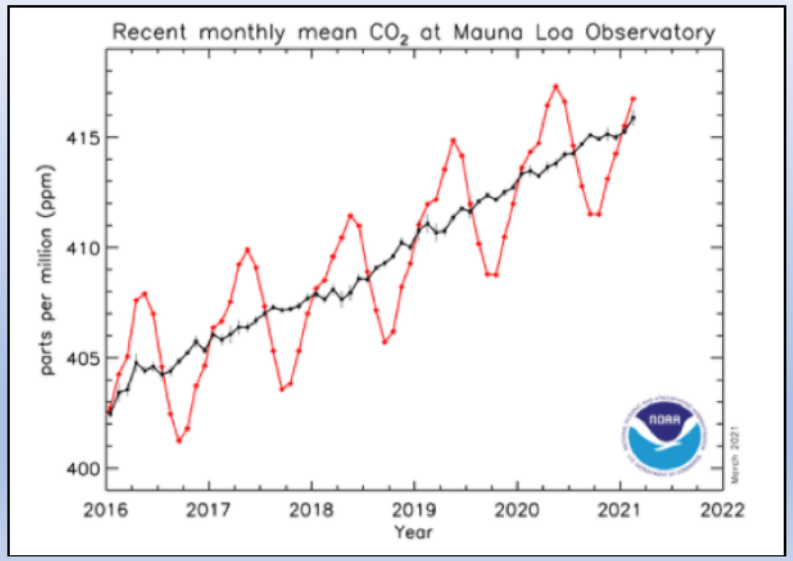
To provide you with view of atmospheric CO2 levels on a shorter time scale, shown in this graph are actual CO2 levels measured at the Mauna Loa Observatory in Hawaii between 1958 and 2021. The red lines and symbols represent the monthly mean values. The black lines and symbols represent the same, after correction for the average seasonal cycle.

## Actual $CO_2$ levels Measured at the Mauna Loa Observatory in Hawaii 2016-2021




The **red** line and symbols represents the monthly mean values.

The **black** line and symbols represent the same, after correction for the average seasonal cycle.

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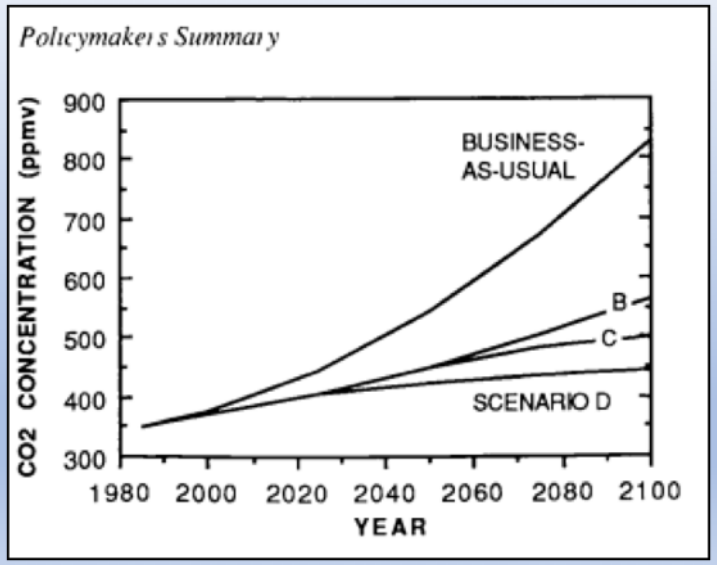
Here are the CO2 levels on an even shorter time scale. This graph illustrating CO2 levels is from the same observatory in Hawaii for the period from 2016 to 2021 The black line, which shows the average after correcting for the seasonal cycle, illustrates a fairly steady rise in CO2 levels over time. As well, it should be noted that, according to this graph, the reduced economic activity due to the covid crisis seems to have had a very limited effect on reducing the rate of increase in CO2 levels over the past year.

## IPCC Graph Showing Scenarios of Expected Rise in CO2 Levels from IPCC AR1 report published in 1990

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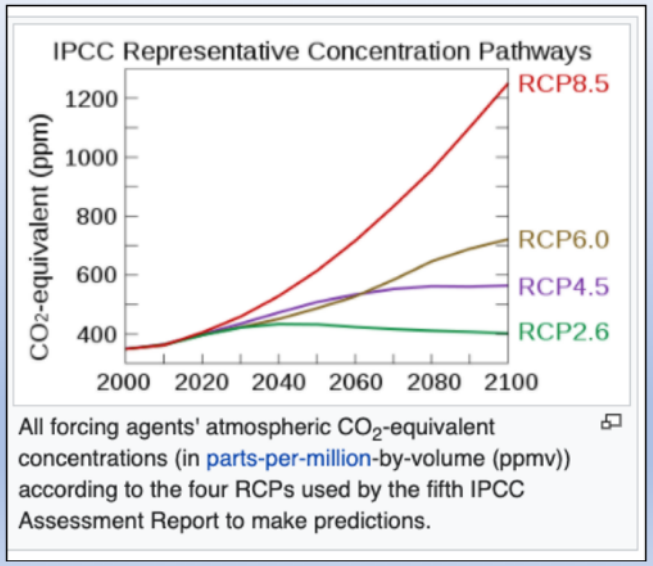
In 1990, the Intergovernmental Panel on Climate Change or IPCC published their first assessment report or AR. In this report, they published this graphic which shows a series of scenarios estimating the expected rise in CO2 levels. Now they call these scenarios Representative Concentration Pathways. As you can see, the business as usual line is much higher than the other scenarios.

## IPCC Representative Concentration Pathways graph from IPCC AR5 report published in 2014




All forcing agents' atmospheric $CO_2$-equivalent concentrations (in parts-per-million-by-volume (ppmv)) according to the four RCPs used by the fifth IPCC Assessment Report to make predictions.

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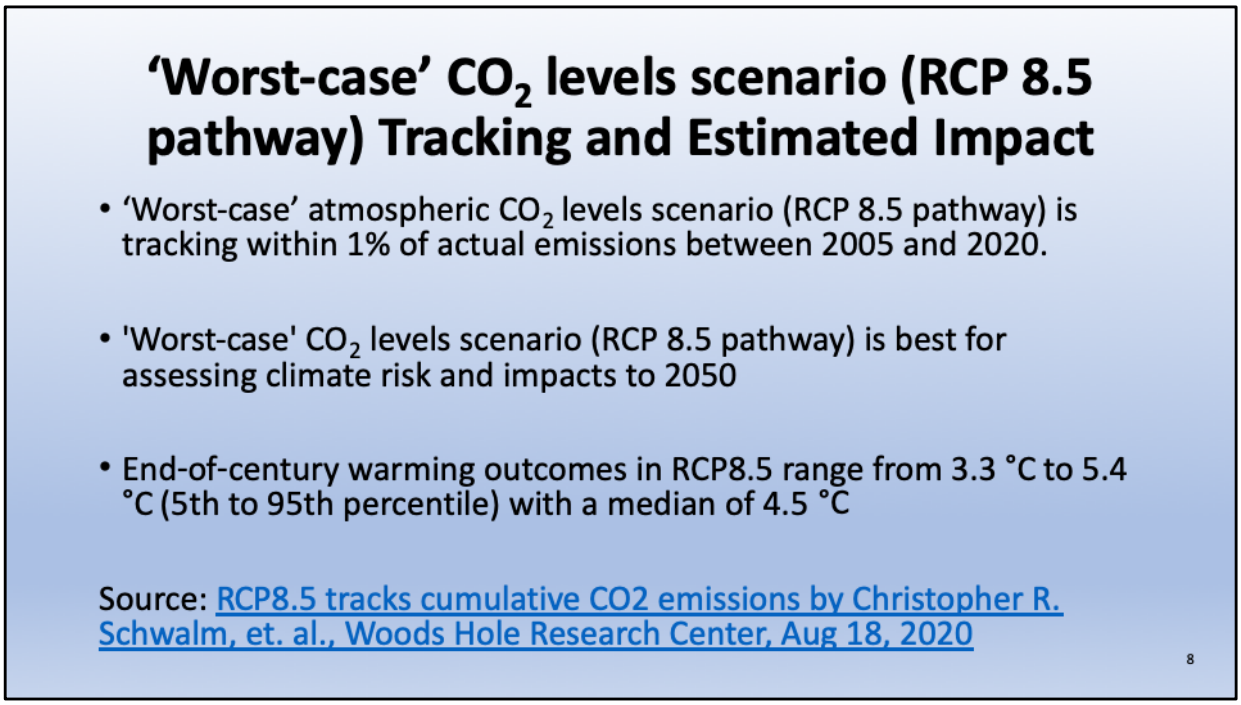
Shown here is a more recent graph by the IPCC, which shows a series of Representative Concentration Pathways or RCPs. This graph is based on the modeling completed for the IPCC AR5 report that was published in 2014. Please note that the RCP8.5 pathway is considered the worst-case scenario.




Unfortunately, the worst-case scenario or RCP 8.5 pathway is tracking within 1% of actual emissions between 2005 and 2020 according to a research paper by a team of researchers at the Woods Hole Research Center in Massachusetts. They also indicate that the RCP 8.5 pathway is best for assessing climate risk and impacts to 2050. If no substantial action is taken to reduce CO2 and other greenhouse gas emissions, it can be expected that we will remain on the RCP 8.5 pathway. If that does occur, end-of-century warming outcomes related to RCP8.5 pathway range from 3.3 °C to 5.4 °C, which relates to 5th to 95th percentile. The median of this range is 4.5 °C.

## Some Example Reasons Why The World is Tracking so Close to the RCP 8.5 Pathway

- Large scale implementation of new technologies requiring large amounts of power such as data centers and blockchain systems (such as bitcoin).
- Large scale deforestation in many areas of the world including the Amazon Forest (Amazon is on the brink of turning into a carbon source, study warns 2021).
- Increased forest fires in many areas including the arctic.
- Increased methane emissions from areas in the north that are no longer frozen.
- Trawling for sea food releasing massive amounts of methane emissions.
- Rapid population growth and increased energy usage by people in developing countries.
- Continued large scale manufacturing of products that generate substantial emissions when being produced, such as cement and steel.
- Construction of many new buildings that have a high carbon emissions rate when in use.

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Why is this happening? There are several likely reasons. Most of society appears to operating in business-as-usual mode. Even though renewable energy production is growing rapidly, total energy demand appears to be growing even faster. Growing populations engaging in a wide range of economic activities are creating substantial increases in energy demand.

As well, large forest fires and rapid deforestation are creating considerable carbon emissions. In addition, there are large new sources of carbon emission due to the warming of the polar regions. For example, when permafrost warms and thaws, it releases carbon dioxide and methane into the atmosphere.

## Next Slide: 2-min Video About What Happens If The World Warms Up By 4°C? by SkyNews

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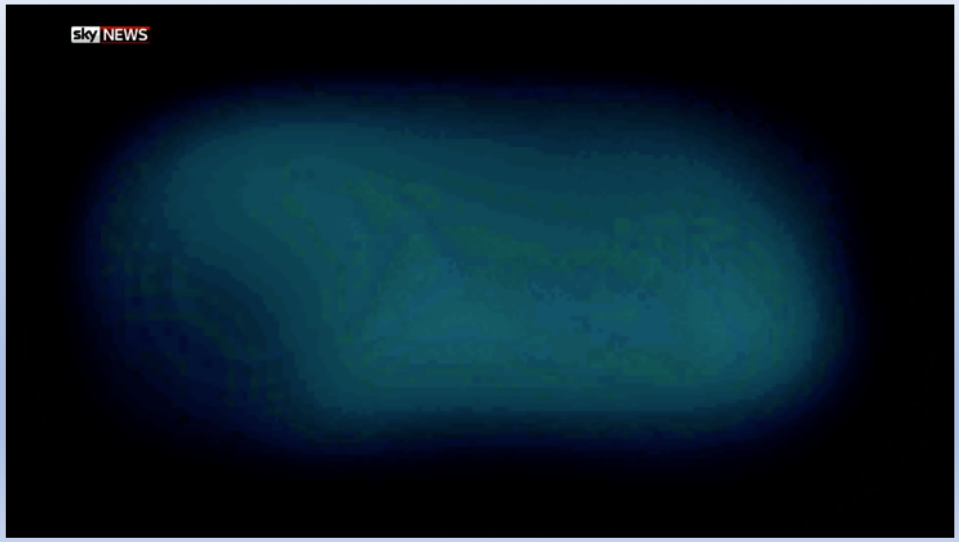
The expected impact on the world if it warms by 4.5 degrees C are very significant. To provide you with some idea of what kind of a world we can expect if the temperature rises by this this amount, shown here is a short 2 minute video published by SkyNews about the world if it warms up by 4°C.

# Climate Change: What Happens If The World Warms Up By 4°C? by SkyNews

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## Need and Way for Broad Support for Adequate Large Scale Action on Climate Change

- In order implement action on climate change on a sufficiently large-scale, broad-based support is needed.
- To build help broad-based support for this level of action, we need to "bridge the gap between believers and doubters".
- Conservative voters and leaders are often receptive to the views of military and intelligence experts.
- Military and intelligence experts who speak about the current and expected impacts of climate change on human security can help build broad support for large-scale climate action.

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In order implement action on climate change on a sufficiently large-scale, we expect broad-based support is needed. To help build this broad-based support, we need to "bridge the gap between believers and doubters" on the need for this level of action. We have observed that conservative voters and leaders are often receptive to the views of military and intelligence experts about human security. Therefore, when these experts who speak about the impacts of climate change on human security, we feel they can help build broad support for this needed level of climate action.

## Conclusions

- 'Worst-case' atmospheric $CO_2$ levels scenario (RCP 8.5 pathway) is tracking within 1% of actual emissions between 2005 and 2020.
- Unless substantial action to mitigate climate change is implemented, it appears that the RCP 8.5 pathway could become the likely pathway.
- The RCP 8.5 pathway will create catastrophic conditions on earth by 2100.
- In order implement action on climate change on a sufficiently large-scale, broad-based support is needed.
- Military and intelligence experts who speak about the current and expected impacts of climate change on human security can help build broad-based support for this level of action.

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In conclusion, the RCP 8.5 pathway or also known as the 'Worst-case' atmospheric CO2 levels scenario, is tracking within 1% of actual emissions between 2005 and 2020. Unless large-scale action to mitigate climate change is implemented, it appears that the RCP 8.5 pathway could become the likely pathway. The RCP 8.5 pathway will create catastrophic conditions on earth by 2100. In other words, the current path we are on is a pathway to disaster. To implement action on climate change on a sufficiently large-scale in democratic countries, broad-based support is needed. Fortunately, military and intelligence experts who speak about the current and expected impacts of climate change on human security can help build broad support for this level of action.

## Call To Action

- Create awareness that 'Worst-case' atmospheric $CO_2$ levels scenario (RCP 8.5 pathway) is tracking within 1% of measured $CO_2$ levels between 2005 and 2020.
- Learn about and promote large scale climate mobilization initiatives such as "Mobilizing Canada for the Climate Emergency" by Seth Klein.
- Help build broad-based support for adequate large-scale climate action by encouraging awareness of events that highlight impact of climate change on human security such as our online media advisory event on May 4th, 2021.

If you find situation concerning, we invite you take these actions:
- Create awareness that 'Worst-case' atmospheric CO2 levels scenario (RCP 8.5 pathway) is tracking within 1% of actual emissions between 2005 and 2020.
- Learn about large scale climate mobilization initiatives such as "Mobilizing Canada for the Climate Emergency" by Seth Klein. If you support one or more of the initiatives, create more awareness about them.
- Help build broad-based support for adequate large-scale climate action by encouraging awareness of events that highlight impact of climate change on human security such as our online media advisory event on May 4th, 2021.

Thank you for taking the time to view to this video and consider these important issues. If you are interested in more information, please visit ClimateSAN.org/cwt