

## Global Warming Is Real - Highlights of the Data

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Mankind has had an enormous impact on the planet. We dominate the planet from the North Pole to the South Pole. In this poster I highlight some of the important data and other factors effecting our environment and tie them together to show how human activities have brought this about. At the very foundation of global warming is the Greenhouse Effect. The Greenhouse Effect is a natural phenomena caused by the presence of the Greenhouse Gases such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) whose molecular structure allows them to trap energy from the sun in the form of heat energy here on the planet. The levels of the greenhouse gases have been increasing for the last 240 years. This being the case, global temperatures must also be increasing. Since 1880 global mean surface temperature has increased by 0.85°C (1.53°F). Data from the Law Dome ice core in Antarctica gives further support to temperature increases (not shown) and increases in the levels of atmospheric greenhouse gases. Both started an upward trend after 1750 with the advent of the Industrial Revolution. Since about 1978 satellites have been orbiting the Earth. There are satellites looking out measuring the amount of energy incoming and others looking in measuring how much energy is leaving. The results indicate that the Earth is keeping in more energy than is escaping into space. Climate researchers have been looking for the components of the Earth's atmosphere that are responsible. The big culprits are the three greenhouse gases, CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. The current energy imbalance is about 2.3 W/m<sup>2</sup>. Who is responsible? I show how human CO<sub>2</sub> emission from the burning of fossil fuels has increased over the past 150 years. In 2010 we emitted about 37 billion tons and by 2030 it is projected we will be emitting 45 billion tons of CO<sub>2</sub>. These are massive amounts. To illustrate this point I compare 40 billion tons/year to the weight of the human race. 40 billion tons is a shocking 114 times larger than the total weight of the human race living on the planet today. We can see from the Maun Loa Observatory data that atmospheric levels of CO<sub>2</sub> are showing a steady increase. This data correlates very well with the amounts of fossil fuels we are using. Who is responsible? It sure looks like we are! What is driving our increasing usage of fossil fuels? I looked at the growth of the human population. It is clearly increasing at a rapid pace. In addition there is a growing desire for a higher standard of living in many regions of the planet. The current data show that the net increasing in the human population is about 75 million additional people each year. This means more fossil fuels will be used and as a result larger emissions of CO<sub>2</sub> into the climate system. Are there other possible causes of Global Warming? The three most commonly mentioned are the Sun, Orbital Forcing and Volcanoes. I show data to demonstrated that they or not major factors. That leaves the human race. What will be the outcome of our massive use of fossil fuels? I show data from the IPCC's RCP 2.6 and 8.5 scenarios. We are currently on the path of RCP 8.5 which as been dubbed the "business as usual" scenario. If the IPCC's projection for global temperatures for 2100 are on target the future might not turn out well for the human race.

<b>Summary: RCP 8.5</b>		<b>Reference Point in 1750 is 56.84°F</b>		
<b>Projected Atmospheric CO<sub>2</sub></b>		<b>Global Mean Surface Temperature °C Temp Anomalies &amp; (mean in actual °F)</b>		
2050	2100	2050	2100	2300
540 ppm	935 ppm	<b>2.0°C (60.44°F)</b>	<b>3.7°C (63.5°F)</b>	<b>≥ 8.0°C (71.24°F)</b>
		<b>Warming Zone</b>	<b>Danger Zone</b>	<b>Danger!</b>

**Figure 1.** Warming projected from the IPCC's RCP 8.5 Scenario.