

Our Path to Climate Change
How Did We Get Here
1 April 2026

Observation

The world has reached the warmest land temperatures seen in the last 120,000 years. The rate of warming exceeds anything seen in the last 20 million years, since the Miocene era. Sea surface temperatures in March 2026 were the highest ever measured. The World Meteorological Organization confirmed that 2015 to 2025 were the hottest 11 years ever measured. However, much of this heat is unknown to land living creatures as less than 10% of this heat is stored on land.

The remainder is absorbed by the oceans, which contain the greatest heat content ever documented. The Ocean warming rate has more than doubled over the past two decades, outpacing the last four decades. By many measures we are experiencing the warmest Earth temperatures seen in the last 10,000 years and warming up quickly. How did we get to this critical state? It has been humankind's work over the last two centuries, but most of this work has been accomplished in the last 50 or so years. The credit goes to humanities achievement of putting greenhouse gases into the atmosphere and disruption of the ecosphere.

A brief look at a few of the methods and means which brought us to this point in history.....

Coal

Coal and mining coal have a long history. Coal has been extracted from the earth for many centuries but its impact and uses are mainly focused since the start of the industrial revolution. This is where the use of coal transformed England into an industrial powerhouse. The mining of coal essentially begat the railroads as 'railcars' were utilized to move the coal from the mine. As recently as 2022 Coal accounted for 27% of global primary energy use and 35% of global electricity generation. Unfortunately, coal is very abundant on Earth and easily extracted, which is one of the reasons it has been used as a primary industrial source of power for 250 years.

Archeological evidence from China indicates surface mining of coal and household usage dating to 3490 BCE. The earliest reference to the use of coal in for manufacture or metalworking is found in the writings of the Greek discoverers dating from approximately 300 BCE.

Most coal deposits are known to have formed during the Devonian period more than 400 million years ago. Most anthracite and bituminous coals are dated after that time frame.

Coal is relatively easy to extract and commonly occurs throughout the world. Major deposits exist in China, Australia, India, United States, Germany, and Kazakhstan, but it is found in significant quantities in many other countries.

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By some measures more than 200 billion tons of extracted coal have been converted to 490 billion tons of heat trapping gases; carbon dioxide (CO₂), and lesser tonnages of methane and nitrous oxide. A way to visualize this is that this amount of coal could fill 8 billion CN ore cars or refill the Edmund Fitzgerald 600,000 times.

Oil and Natural Gas

Petroleum was used more than 2000 years ago in China. One of the earliest Chinese writings cites the use of oil. Oil was first discovered and used in China in the first century BC. The Han Dynasty is the date of creation for the Bronze Oil Lamp on display in the Luoyang Museum Henan, China.

Most oil was formed during the 180 million year Mesozoic era, about 250 million years ago.

Although oil and natural gas from naturally occurring deposits was utilized worldwide for two millennia, modern oil extraction as we are familiar came to be in the 19th century in both the United States and in the then Russian republic of Azerbaijan. The two discoveries that were in a sense the start of the modern era of oil extraction were in North America: Oil Springs, Ontario, in 1858, and the 69-foot oil well drilled in 1859, near Titusville, Pennsylvania.

The Oil Industry has become a major economic force in the world. The Petroleum Industry today is a 3.5 trillion dollar industry. Since 1950 the world has consumed about 1200 billion barrels of oil. Oil consumption has increased dramatically since that time.

That 1300 billion barrels can be expressed another way in tones of CO₂ production; 750 billion tons of CO₂.in addition to tonnages of other gases such as methane and nitrous oxide.

LULUC

Another front on the attack on the environment is Land Use and Land Use Change (LULUC). That is an International Panel on Climate Change (IPCC) word for agriculture and forest harvesting and degradation and land use other than natural. Land area exclusive of oceans, cover about 29% of the Earth's surface.

The greatest visual and physical impact that humanity has left on the planet is the transformation of the land into farmland. Farmland in reality is an inadequate word to use for this transformation. In addition, there has been urbanization (cities, infrastructures, conversion of existing natural habitat) timber harvesting, and mining.

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Today about 10% of the land is covered by glaciers, and a further 14% by deserts and other barren land. The rest is what academics call 'habitable land.' About 4% of the land surface is used for urban infrastructure, buildings, asphalt, concrete, roads, and associated facilities.

Of the remaining ~70%, about 44%, is used for agriculture. This comprises in total, an area of 48 million square kilometers (km²). Which is about six times the size of the contiguous United States. Livestock grazing utilizes about 50%, animal feed another 30%. Nonfood crops (ethanol etc.) cover 4% and the remainder 16% is direct human consumption. The numbers describe land use worldwide. The direct use of farmland in the United States for direct human food consumption is much lower (~10%) because of the tremendous land use for ethanol corn.

Discussion

This stored energy from the sun, contained in the fossil fuels has been consumed by humanity at an alarming rate. Coal for instance at its present rate of usage known deposits would be totally consumed in approximately 100 years. A material which required approximately 60 million years to accrete.

A similar story exists for Oil and Natural Gas. 160 million years in creation and storage. Known reserves would last about 50 years. It appears in about 300 years of human usage (1/200,000th the time of accumulation) we will have consumed solar energy that required between 60 to 160 million years to create in the form of coal, oil and gas. Basically, releasing all the carbon stored in those 60 million plus years.

It has not helped that we have reduced the carbon sink via our land use and well as releasing additional greenhouse gases into the atmosphere with our LULUC processes. It should not be a surprise to anyone that humanity alone has created this problem. Welcome to the Anthropocene.