

# *The Guardian: The climate crisis explained in 10 charts*

*From the rise and rise of carbon dioxide in the atmosphere to possible solutions*

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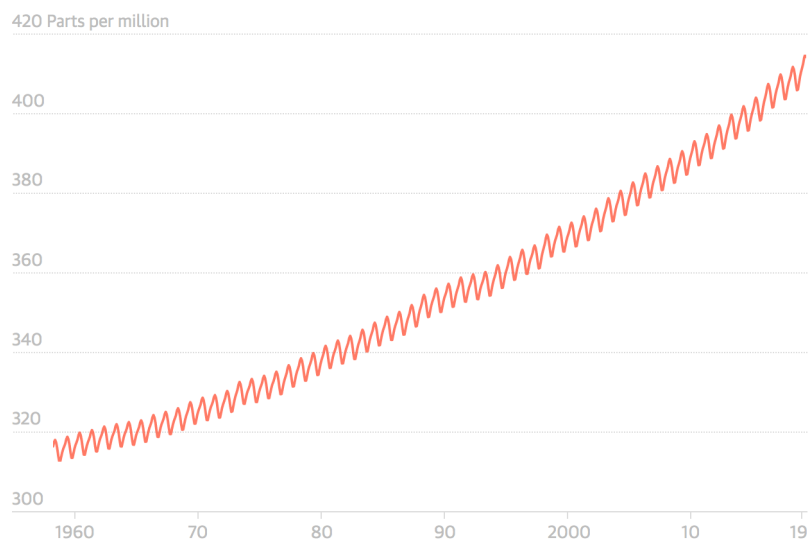


*Billions of tonnes of carbon dioxide are sent into the atmosphere every year from coal, oil and gas burning.  
Photograph: Oliver Berg/AFP/Getty Images*

## The problem – rising carbon dioxide in the atmosphere

The level of CO<sub>2</sub> has been rising since the industrial revolution and is now at its highest for about 4 million years. The rate of the rise is even more striking – the fastest for 66m years – with scientists saying we are in “uncharted territory”.

### Atmospheric CO<sub>2</sub>

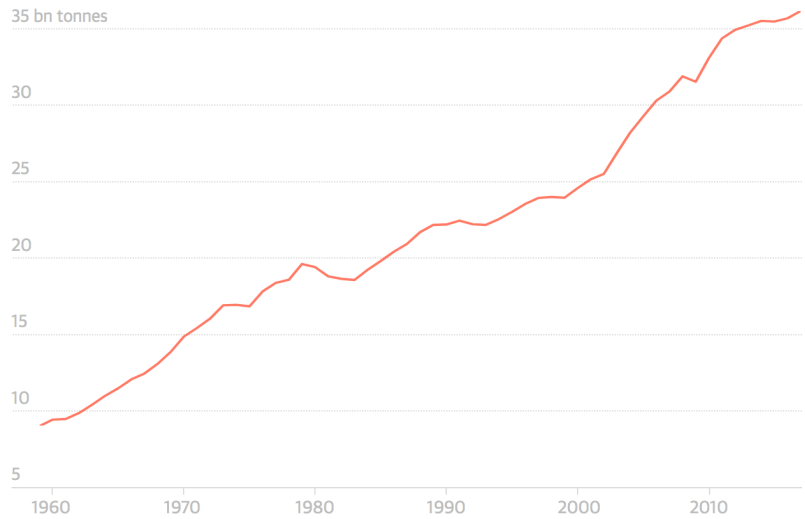


Guardian graphic | Source: RF Keeling et al, Scripps Institution of Oceanography

## The causes – fossil fuel burning

Billions of tonnes of CO<sub>2</sub> are sent into the atmosphere every year from coal, oil and gas burning. There is no sign of these emissions starting to fall rapidly, as is needed.

### CO<sub>2</sub> emissions from fossil fuel burning



Guardian graphic | Source: Global Carbon Project

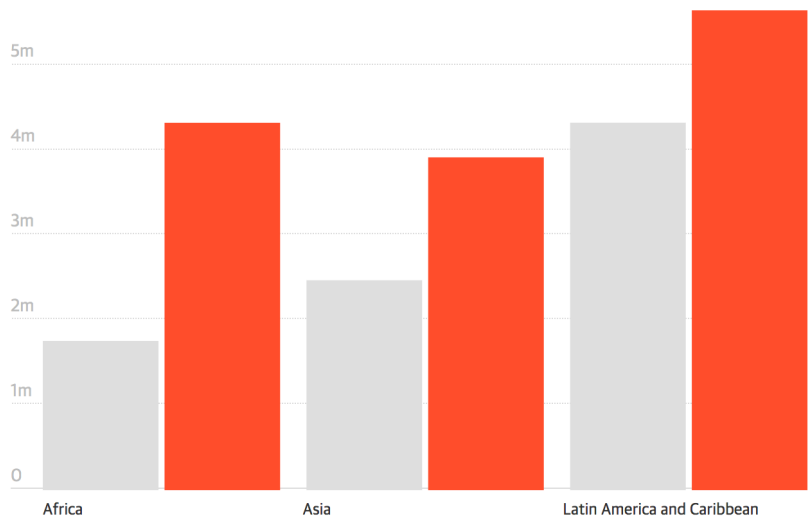
## The causes – forest destruction

The felling of forests for timber, cattle, soy and palm oil is a big contributor to carbon emissions. It is also a major cause of the annihilation of wildlife on Earth.

### Tropical forest destruction before and after international declaration in 2014 to tackle deforestation

Average annual loss in million hectares before and after the New York declaration on forests

■ Before NYDF (2001-13) ■ After NYDF (2014-18)



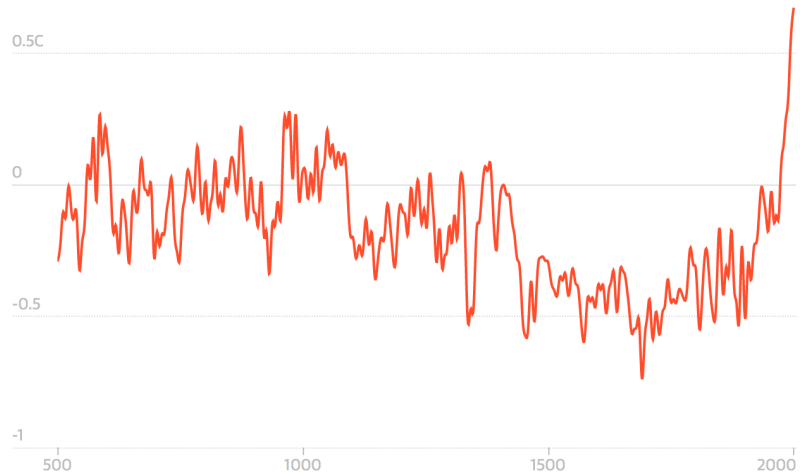
Guardian graphic | Source: World Resources Institute / Global Forest Watch

## The consequences — global temperature rise

The planet's average temperature started to climb steadily two centuries ago, but has rocketed since the second world war as consumption and population has risen. Global heating means there is more energy in the atmosphere, making extreme weather events more frequent and more intense.

### Global average temperature

Celsius, compared to 1961-1990 average

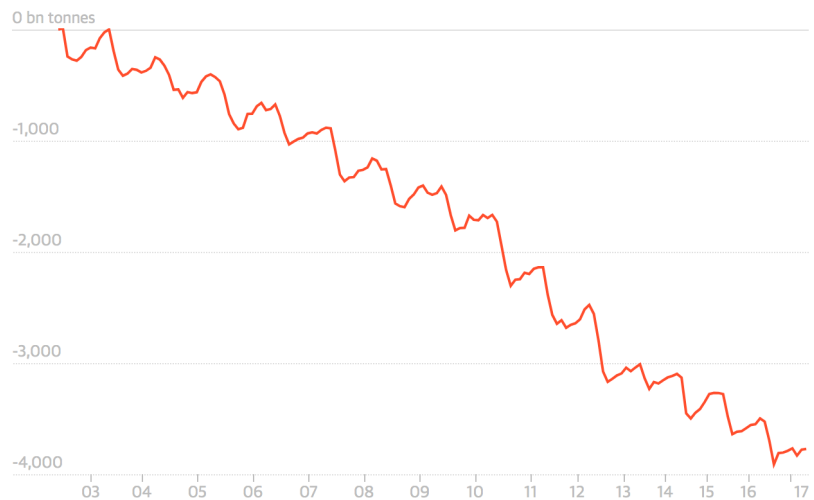


Guardian graphic | Source: M.E. Mann et al, PNAS, 2008

## The consequences — ice melting in Greenland

Greenland has lost almost 4 trillion tonnes of ice since 2002. Mountain ranges from the Himalayas to the Andes to the Alps are also losing ice rapidly as glaciers shrink. A third of the Himalayan and Hindu Kush ice is already doomed.

### Greenland ice loss

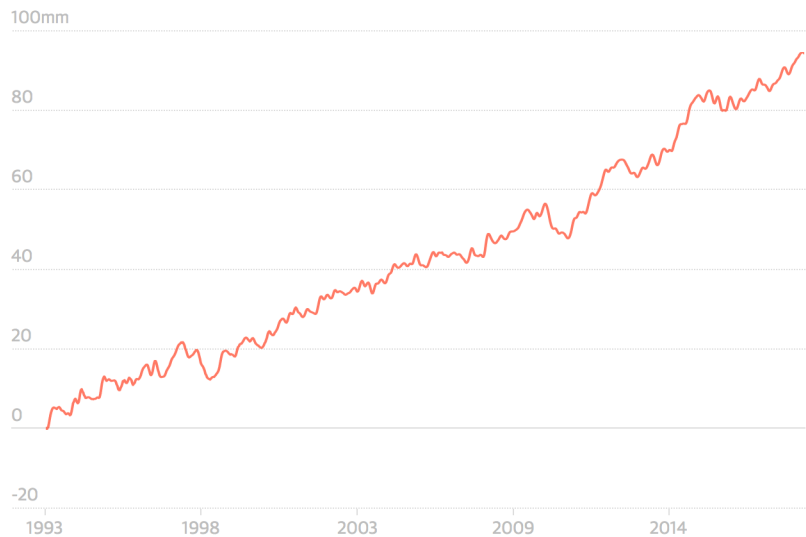


Guardian graphic | Source: Wiese et al, NASA JPL GRACE

## The consequences – rising sea levels

Sea levels are inexorably rising as ice on land melts and hotter oceans expand. Sea levels are slow to respond to global heating, so even if the temperature rise is restricted to 2C, one in five people in the world will eventually see their cities submerged, from New York to London to Shanghai.

### Sea level rise

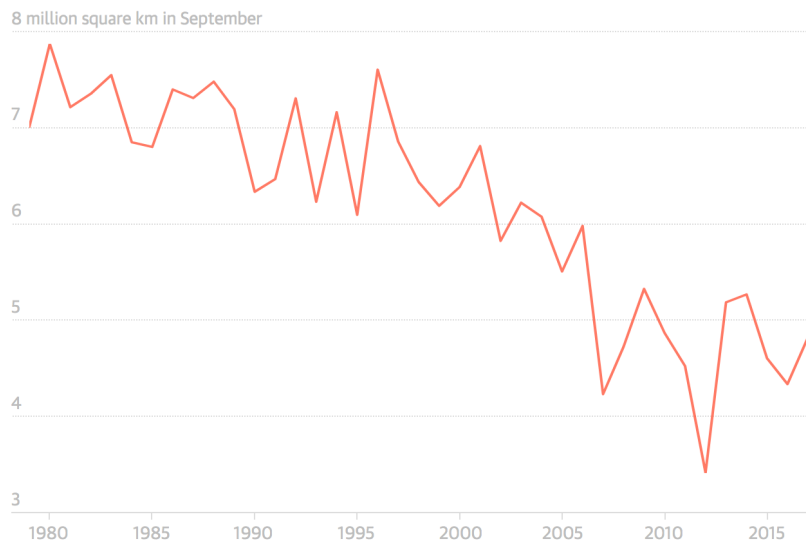


Guardian graphic | Source: NASA Goddard Space Flight Center

## The consequences – shrinking Arctic sea ice

As heating melts the sea ice, the darker water revealed absorbs more of the sun's heat, causing more heating – one example of the vicious circles in the climate system. Scientists think the changes in the Arctic may be responsible for worsened heatwaves and floods in Eurasia and North America.

### Arctic sea ice



Guardian graphic | Source: NSIDC/NASA

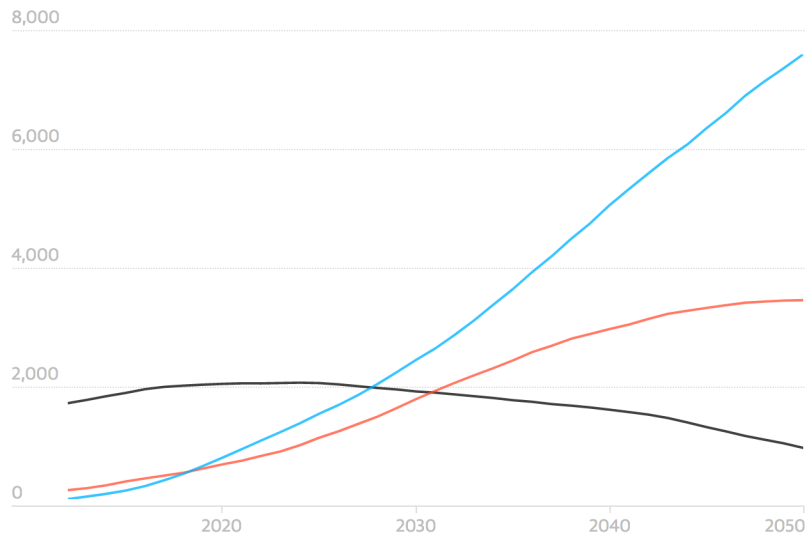
## The upside (I) – wind and solar energy is soaring

Huge cost drops have seen renewable energy become the cheapest energy in many places and the rollout is projected to continue. Analysts also expect coal use to fall. But much government action is still required to reach the scale needed, and solve difficult problems such as aviation and farming.

### Wind and solar versus coal power

Cumulative installed capacity (GW)

■ Coal ■ Wind ■ Solar



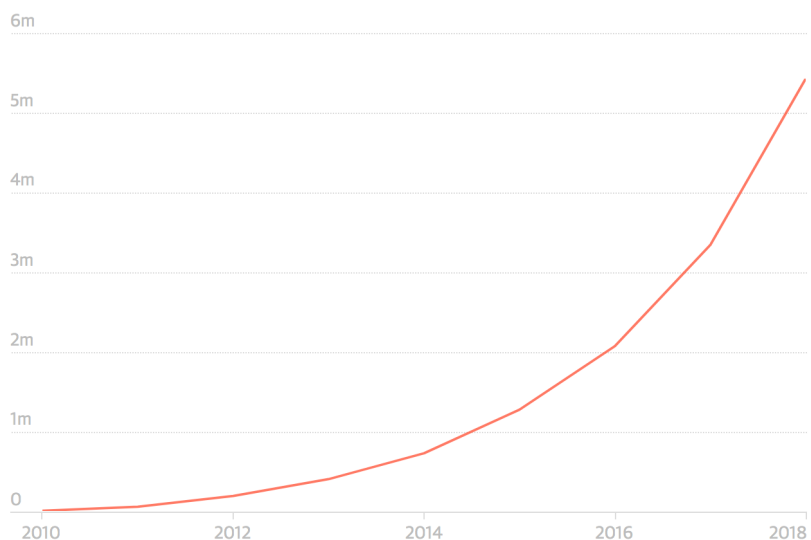
Guardian graphic | Source: BloombergNEF

## The upside (II) – electric vehicles

The global fleet of electric cars and vans is still small compared with those running on fossil fuels. But sales are growing very fast. Electric cars are cheaper to run, suggesting they will become mainstream.

### Electric vehicles

Cumulative sales of battery and plug-in hybrid cars, vans, light trucks



Guardian graphic | Source: EV-volumes.com

This article was amended on 20 September 2019 to correct an error in the figure given for the rate of Greenland's ice loss. The correct amount is 4 trillion tonnes of ice lost since 2002.

*Published online with links at:*

<https://www.theguardian.com/environment/2019/sep/20/the-climate-crisis-explained-in-10-charts>