Met Office

Limiting global warming to 1.5°C: Where are we now?

The Paris Climate Agreement aims to limit warming to well below 2°C above pre-industrial levels and make efforts to limit it further to 1.5°C. Are we on track?

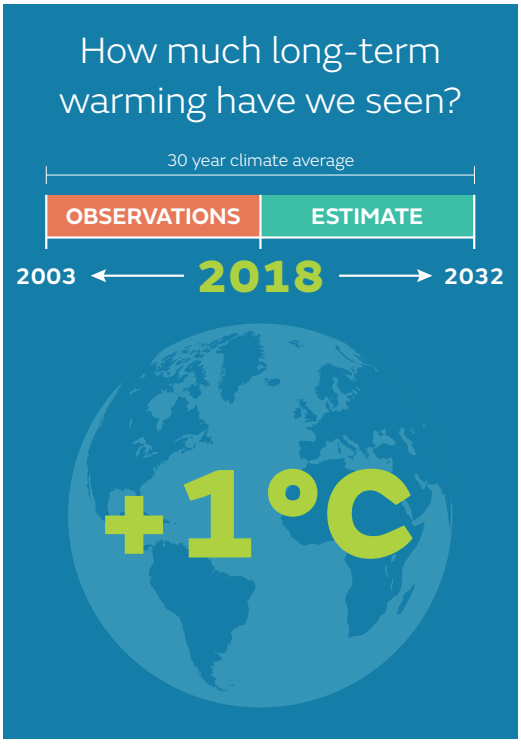
Summary

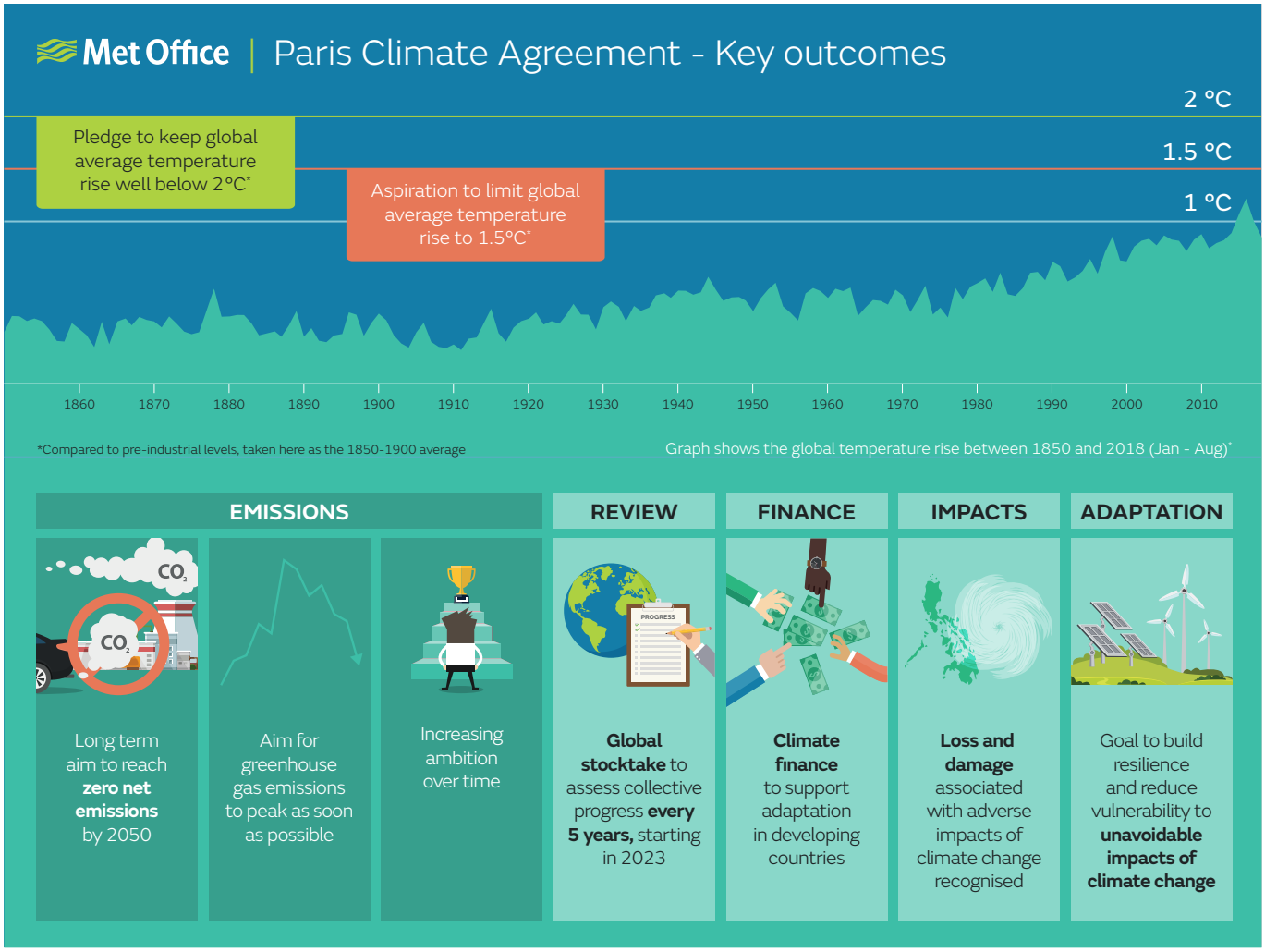
- Our global climate is about 1°C warmer than pre-industrial levels.
- Met Office research suggests almost all of that warming is due to human activity.
- There is an 11% chance we could see a single year at 1.5°C or higher by 2021.
- This does not mean we are committed long-term to a 1.5°C world – but rapid cuts in global greenhouse gas emissions are needed to avoid this.

Global annual average temperature reached more than 1°C above pre-industrial levels* for the first time in 2015. This year is currently tracking at about 0.9°C (January-August average). This illustrates how temperatures can fluctuate slightly from year to year due to natural variations in our climate, despite the clear long-term warming trend. For this reason, looking at temperatures in one particular year is not a perfect indicator of how our climate has changed.

The Paris Agreement pledged to keep "global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C". It is therefore important to assess the long-term change in our climate so we can track where we are relative to the Paris goals.

One way to do this is to take the observed warming trend over the last 15 years as a reasonable gauge of the trend we might expect over the next 15 years. This enables us to construct a basic estimate of a 30-year climate average centred around 2018 to average centred giving a basic indication of where we are now. This method suggests a current global average of about 1°C above pre-industrial temperatures. It's worth noting that changes in greenhouse gas emissions over the next 15-years are unlikely to have a big effect on such short-term warming trends, but natural variations (such as El Niño or a big volcanic eruption) could push warming slightly up or down.



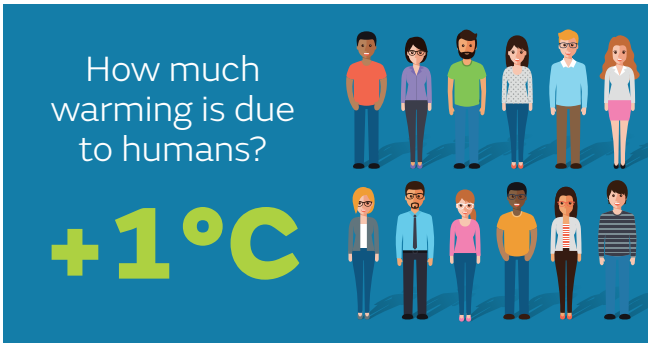


How much of the 1°C rise is due to human activities?

The latest report from the IPCC, published in 2013, concluded that "it is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century".

The Met Office Hadley Centre has updated these estimates of the human contribution to warming up to 2017, showing that the warming attributable to human factors is likely to be around 1°C. Warming from human greenhouse gas emissions is actually higher than this, at likely more than 1.2°C, but about 0.3°C of this is offset by human aerosol emissions (i.e. air pollution – which acts to cool the climate) and, to a much lesser extent, natural factors.

This reinforces the understanding that our total influence on the climate, and our progress against the Paris goals, stands at about 1°C above pre-industrial levels.



How close are we to 1.5°C?

The goals of the Paris Agreement refer to the average global temperature over a long period i.e. 30 years. Therefore, if the global temperature exceeds 1.5° C for a month or even a year, this will not break the conditions of the agreement. However, early temporary excursions above 1.5°C would provide a warning that one of the Paris Agreement thresholds is being approached.