



**WIRRAL
INTELLIGENCE
SERVICE**

Climate Change

**Wirral Intelligence
Service**

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Climate Change

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Introduction

What is Climate Change?

Climate change describes a change in the average conditions — such as temperature and rainfall — in a region over a long period of time and this is something that has been particularly more apparent in the past 20 years, with Earth's surface warming, so producing many of the warmest years on record.

[Committee on Climate Change](#) suggest that there is good scientific evidence to show the climate is changing because of emissions of greenhouse gases resulting from human activity. The bulk of emissions derive from our demand for energy. The largest contributor is carbon dioxide (CO₂), emitted when fossil fuels are burnt to meet those demands. There are also other emissions attached to industrial processes and agriculture.

The [Climate Change Act](#) (2008) made the UK the first country to establish a long-term legally binding framework to cut carbon emissions. It contains a target requiring emissions reductions by at least 100% by 2050. To limit the most damaging impacts of climate change, we need to reduce greenhouse gas emissions globally. A wider legal commitment – [The Paris Agreement](#) also exists, spanning the UK, the EU and globally, to address climate change.

But it will take more than just legislation to ensure we tackle the problem. Change will involve a combination of new technologies, processes and human behaviour. So, what needs to be done? There are significant benefits of the UK acting now to reduce its emissions:

- The world has committed to global action on climate change. By reducing its own emissions, the UK is supporting wider international efforts.
- In a future world where greenhouse gases are restricted, the cost of emitting those gases (i.e. carbon price) will be high. Early action to reduce emissions – here and elsewhere – can help reduce future costs.
- Investment in and development of low-carbon technologies will put the UK at the forefront of new and expanding global markets.

There will also be a need to adapt to climate change that cannot be avoided. The UK will need to prepare for more flooding, greater pressure on water resources, damage to natural habitats, and risks to human health from heat waves. At the same time, there could be opportunities, including reduced energy demand and fewer cold-related deaths due to milder winters.

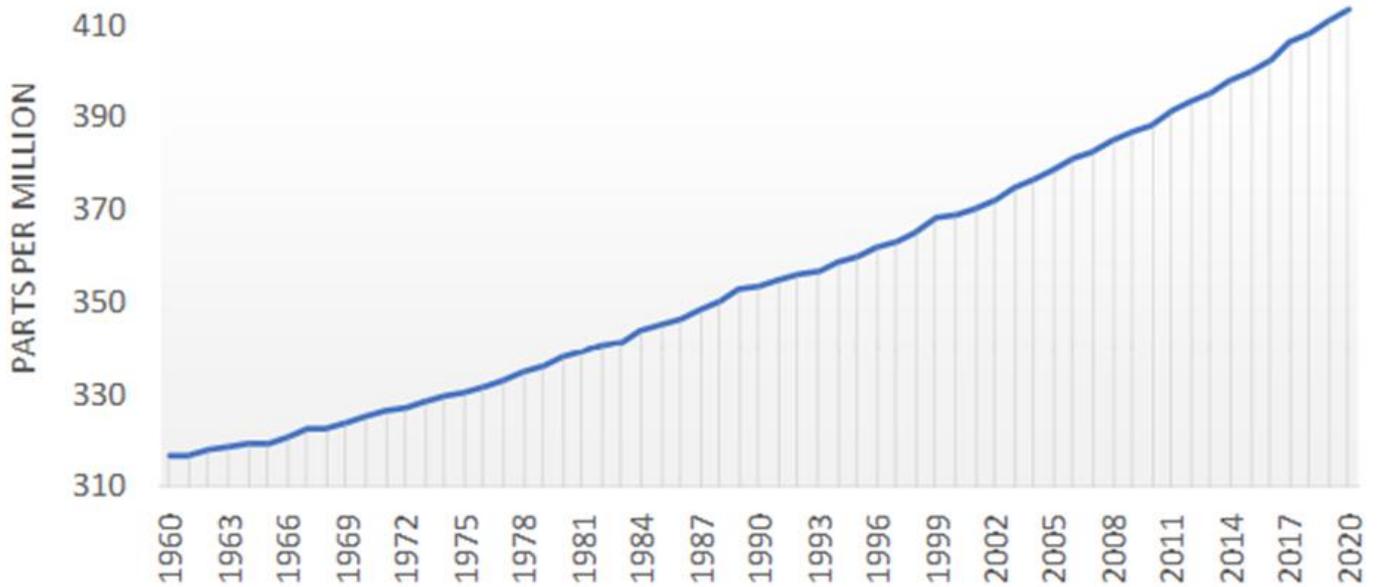
The Climate Crisis Explained in 10 Charts

The Problem

Rising Carbon Dioxide in the Atmosphere

The concentration of CO₂ in the Earth's atmosphere has increased by 48 percent since the beginning of the Industrial Age and 11 percent since year 2000. Once CO₂ is added to the atmosphere, it hangs around, for a *long* time: between 300 to 1,000 years¹.

Atmospheric CO₂



Source: RF Keeling et al, Scripps Institution of Oceanography²

The Causes

Fossil Fuel Burning

Billions of tonnes of CO₂ 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 needed³.

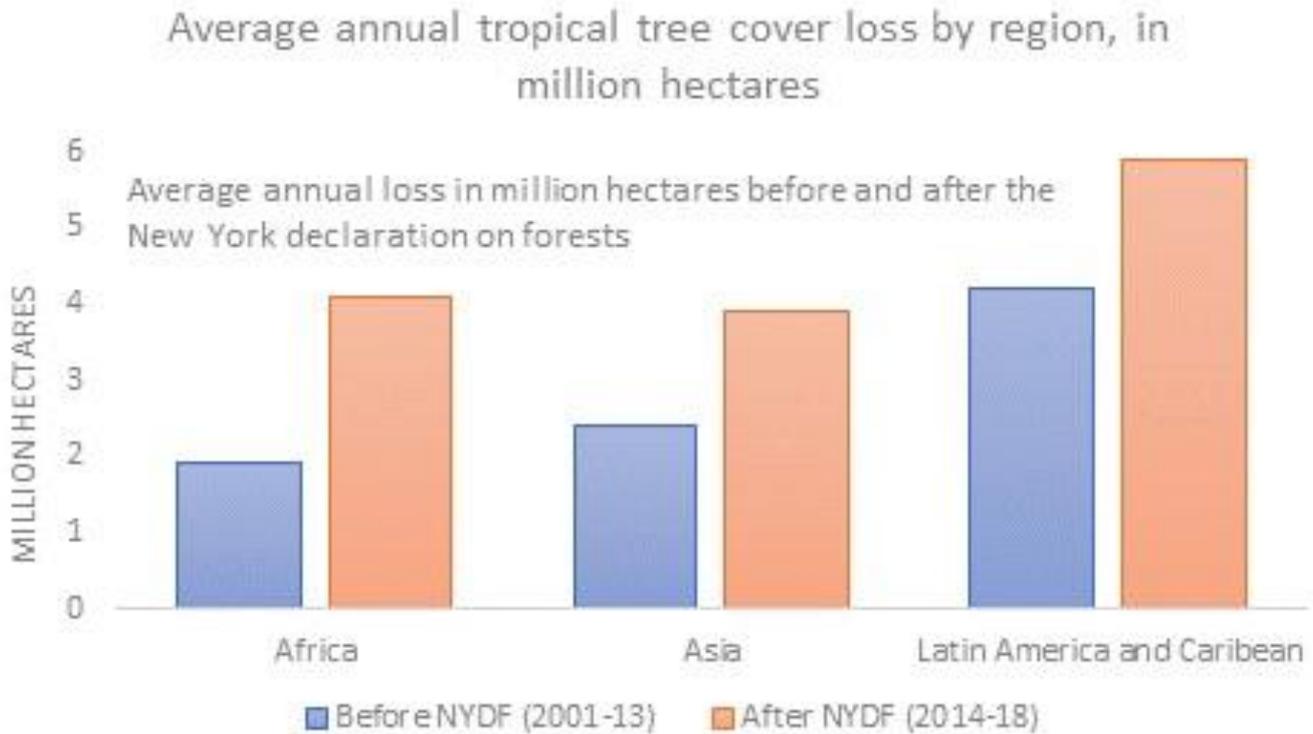
CO₂ emissions from fossil fuel burning



Source: Global Carbon Project (GCP) and Carbon Dioxide Information Analysis Center (CDIAC)³

Forest Destruction

The felling of forests for timber, cattle, soy and palm oil is a big contributor to carbon emissions. The 2014 New York Declaration on Forests' (NYDF) overarching goal aims to halve natural forest loss by 2020 and halt it by 2030. The world is not on track to meet this goal. Instead, the average annual global gross tree cover loss has been higher in the years following the adoption of the New York Declaration on Forests, increasing by 43 percent or 7.8 million hectares per year (Mha/yr) compared to a 2001-13 baseline⁴.



Source: World Resources Institute / Global Forest Watch⁵

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. Impacts include fires, droughts, floods, hurricanes and rising seas⁶.

Global average temperature land and ocean



Source : NASA's Goddard Institute for Space Studies⁶

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. According to research⁷ 36% of the Himalayan and Hindu Kush ice will melt even if we succeed in limiting global warming to 1.5C. If emissions are not cut, emissions are likely to rise to two-thirds.

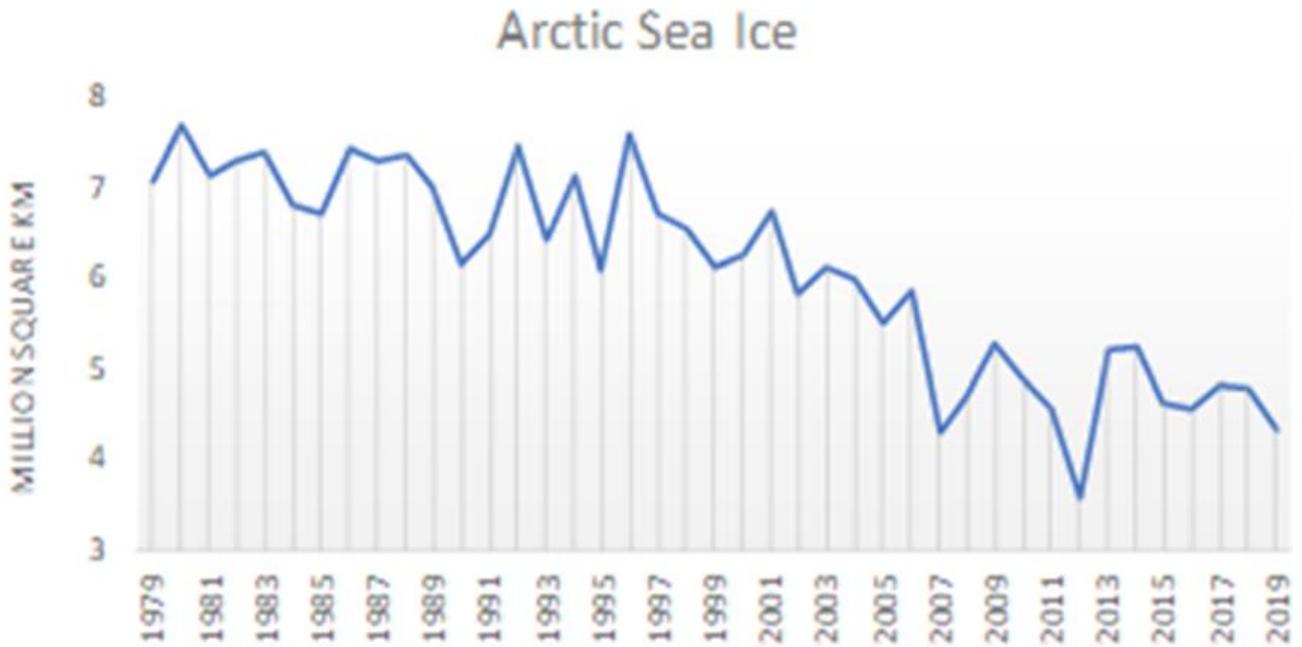
Greenland ice sheets



Source : Ice mass measurement by NASA's GRACE satellites; NASA⁸

Shrinking Arctic Sea Ice

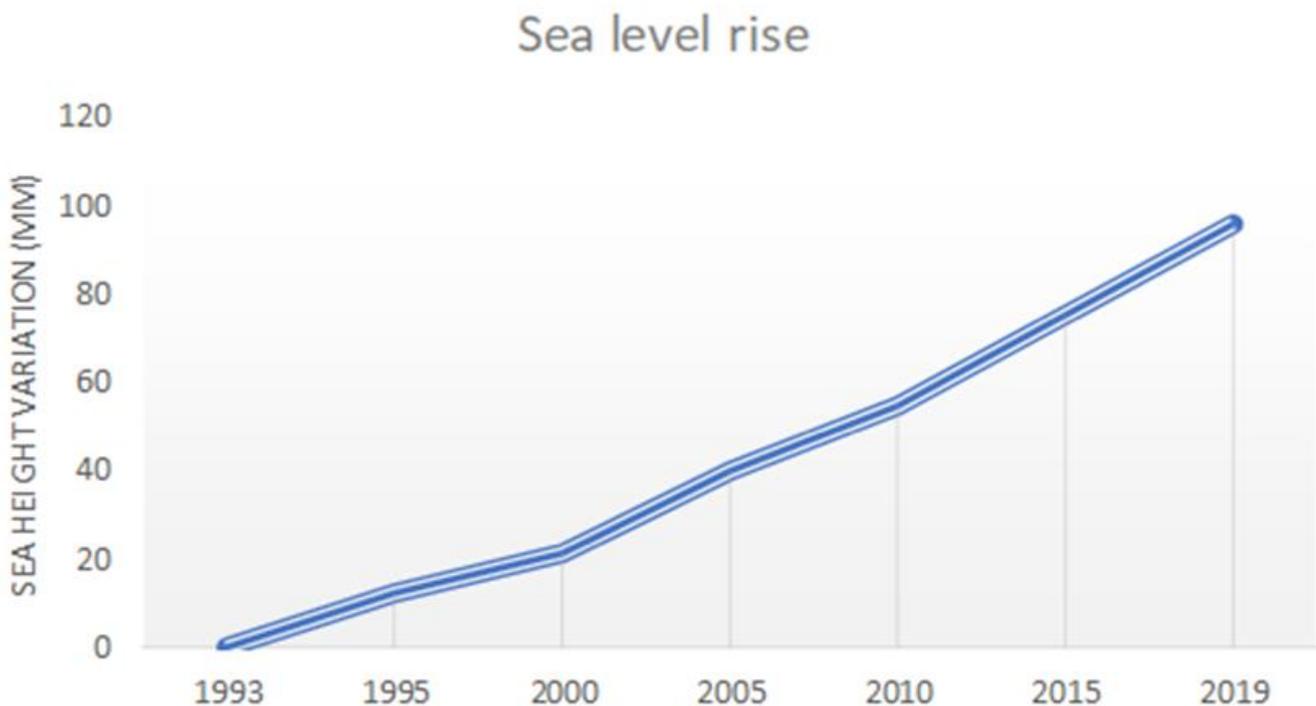
As heating melts the sea ice, the darker water revealed absorbs more of the sun's heat, causing more heating – one example of the vicious circles in the climate system⁹.



Source :Satellite observations; NSIDC/NASA⁹

Rising Sea Levels

Sea level rise is caused primarily by two factors related to global warming: the added water from melting ice sheets and glaciers and the expansion of seawater as it warms¹⁰.

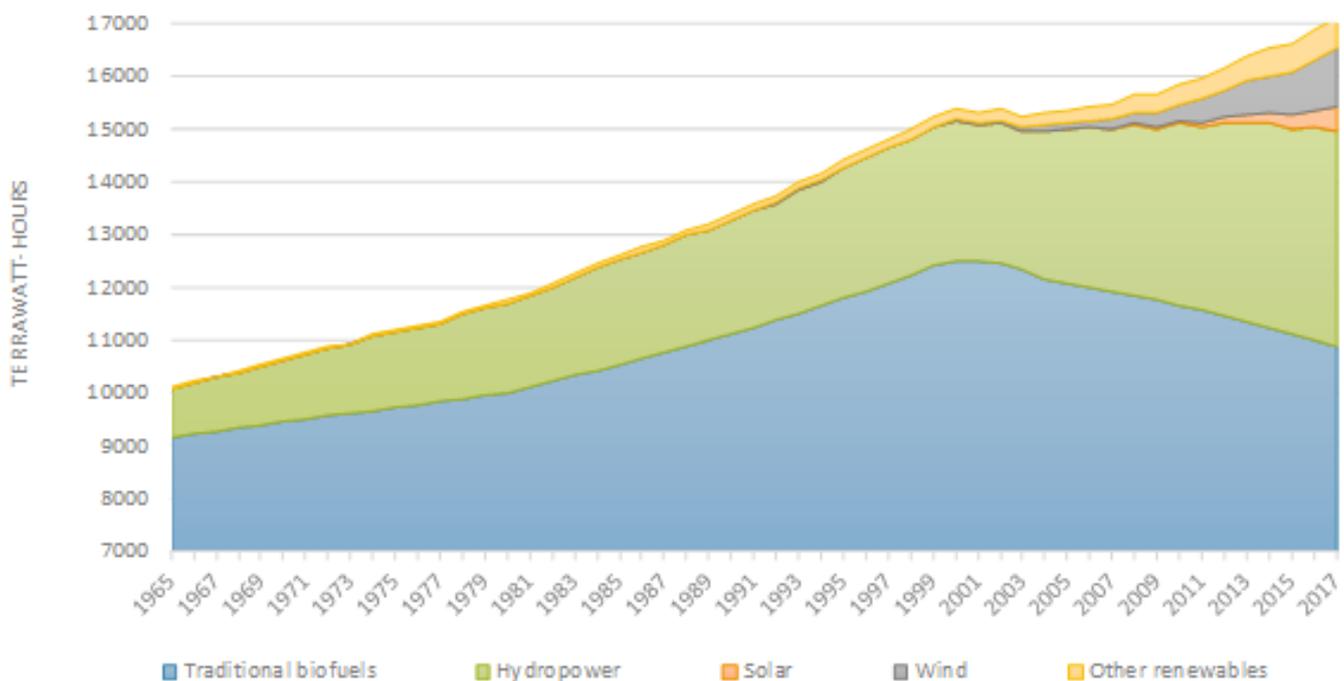


Source :Satellite sea level observations; NASA Goddard Space Flight Centre¹⁰

Renewable Energy Consumption

The International Energy Agency (IEA) found that solar, wind and hydropower projects are rolling out at their fastest rate in four years. Global supplies of renewable electricity are growing faster than expected and could expand by 50 percent in the next five years, powered by a resurgence in solar energy. Renewable energy sources make up 26 percent of the world's electricity today, but according to the International Energy Agency (IEA) its share is expected to reach 30% by 2024¹¹.

Global renewable energy consumption, World

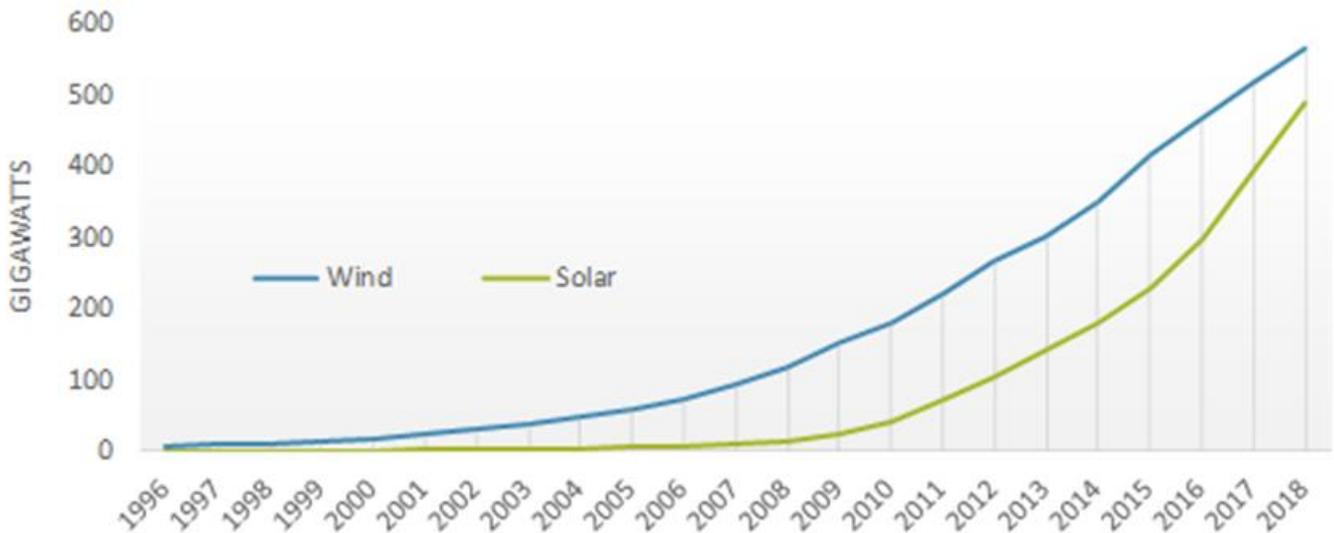


Source: Vaclav Smil (2017) & BP Statistical Review of Global Energy (2019)
Hannah Ritchie and Max Roser (2020) "Renewable Energy". Published online at OurWorldInData.org.
Retrieved from <https://ourworldindata.org/renewable-energy> (Online Resource)¹¹

Renewable Energy Consumption – Wind and Solar

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 more action is still required to reach the scale needed and solve difficult problems such as aviation and farming¹².

Installed wind and solar energy capacity, Global

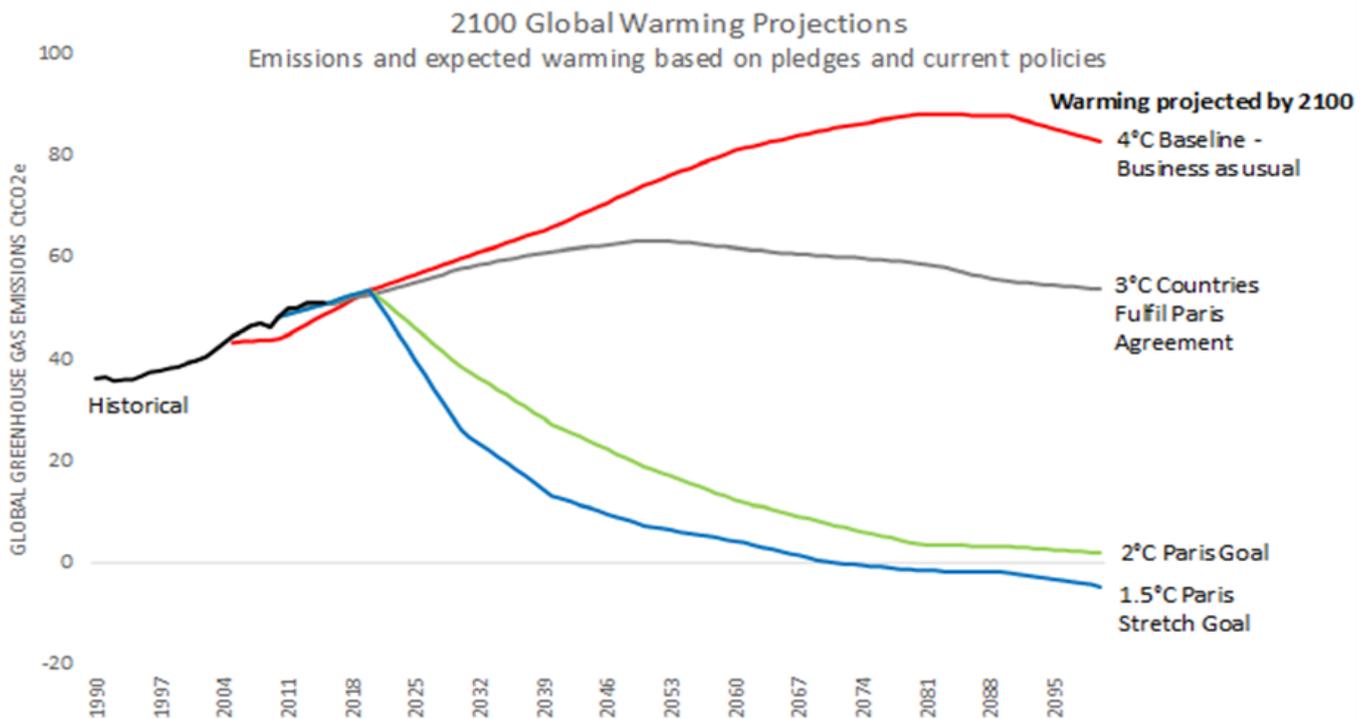


Source: BP Statistical Review of Global Energy (2019)
 Hannah Ritchie and Max Roser (2020) "Renewable Energy". Published online at OurWorldInData.org.
 Retrieved from 'https://ourworldindata.org/newable-energy' (Online Resource)¹²

Paris Agreement Climate Change Pledges and Current Policies

Under the framework of the UNFCCC (United Nations Framework Convention on Climate Change) many governments have put forward proposals about how much they intend to reduce their greenhouse-gas emissions in both the near and the long term.

In the absence of policies, global warming is expected to reach 4.1°C – 4.8°C above pre-industrial by the end of the century. Current policies presently in place around the world are projected to reduce baseline emissions and result in about 3.0°C warming above pre-industrial levels¹³.



Source: Climate Action Tracker¹³

Comparing Potential Climate Impacts at 1.5°C, 2°C, 3°C and 4°C

Comparing Potential Climate Impacts at 1.5°C, 2°C, 3°C and 4°C

	1.5°C Paris stretch goal	2.0°C Paris goal	3.0°C If countries fulfill their current Paris Pledges	4.0°C Where we are headed
Impacts on sea level rise	Rising sea levels displace 46 million people Sea level rise of 48cm	Fewer opportunities for infrastructure adaptation Sea level rise of 56cm	Near-complete melting of the Green ice sheet Sea level rise of 7+ meters	470-760 million people at risk Sea level rise of nearly 9 meters
Impacts on water	Water shortages in the Mediterranean, Australia, Brazil and Asia	8% of the global population faces severe water shortages	Almost half of Himalayan high mountain glaciers lost	More frequent and severe extreme droughts
Impacts on food	Wheat, rice, maize and soybean production suffers	Agricultural yields fall rapidly	Fish species go extinct locally	High levels of food insecurity, development path reversed
Impacts on flora and fauna	9 out of 10 coral reefs at risk from severe degradation	All coral reefs disappear	Marine ecosystems may collapse	Half of all plant and animal species face local extinction

Source: Climate Nexus¹⁴

Further Sources:

- [This is Wirral: Environment](#)

References:

¹ NASA Global Climate Change <https://climate.nasa.gov/news/2915/the-atmosphere-getting-a-handle-on-carbon-dioxide/>

² Scripps CO₂ Program <https://scrippsco2.ucsd.edu/>

³ CDIAC Carbon Dioxide Information Analysis Center <https://cdiac.ess-dive.lbl.gov/>

⁴ Forest declaration New York Declaration on Forests Progress Update <https://forestdeclaration.org/goals/goal-1>

⁵ Global Forest Watch <https://www.wri.org/our-work/project/global-forest-watch>

⁶ NASA Goddard Institute for Space Studies <https://data.giss.nasa.gov/>

⁷ The Hindu Kush Himalaya Assessment https://link.springer.com/chapter/10.1007/978-3-319-92288-1_7

⁸ NASA' GRACE satellites, NASA <https://climate.nasa.gov/vital-signs/ice-sheets/>

⁹ NSIDC/NASA <https://climate.nasa.gov/vital-signs/arctic-sea-ice/>

¹⁰ NASA <https://climate.nasa.gov/vital-signs/sea-level/>

¹¹ Our World in Data <https://ourworldindata.org/renewable-energy>

¹² Our World in Data <https://ourworldindata.org/renewable-energy#wind-energy>

¹³ Climate Action Tracker <https://climateactiontracker.org/global/temperatures/>

¹⁴ Climate Nexus <https://climatenexus.org/>

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