

Combating Global Warming

Why Is It So Hard?

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July 31, 2021

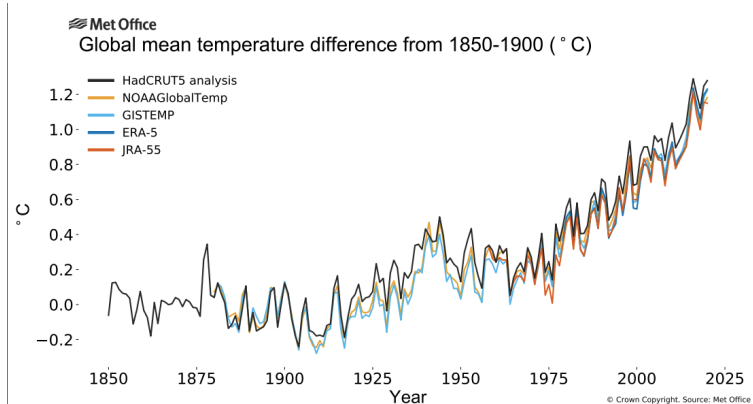
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Scientific consensus on climate change

- Earth's climate has warmed significantly since the late 1800s
- Global warming is caused by human activities
- Emission of greenhouse gas will increase the severity of global warming
- It is possible to slow the pace of global warming

Earth's climate has warmed significantly



Global warming is caused by human activities

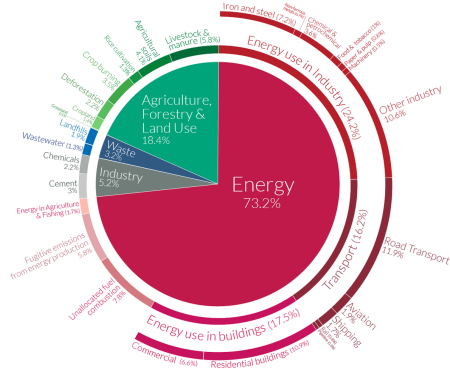
- Human activities result in emission of greenhouse gases
- Emission of greenhouse gases enhances greenhouse effect
- Enhanced greenhouse effect lead to global warming

Sources of greenhouse gases

Global greenhouse gas emissions by sector

Our World
in Data

This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO₂eq.



OurWorldinData.org – Research and data to make progress against the world's largest problems.

Source: Climate Watch, the World Resources Institute (2020).

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Human enhanced greenhouse effect

- 1 Solar radiation reaches the Earth's atmosphere - some of this is reflected back into space
- 2 The rest of the sun's energy is absorbed by the land and the oceans, heating the Earth
- 3 Heat radiates from Earth towards space
- 4 Some of this heat is trapped by greenhouse gases in the atmosphere, keeping the Earth warm enough to sustain life
- 5 Human activities such as burning fossil fuels, agriculture and land clearing are increasing the amount of greenhouse gases released into the atmosphere.
- 6 This is trapping extra heat, and causing the Earth's temperature to rise

It is possible to slow the pace of global warming

- Average temperatures rise 1.2 °C resulted in distinction of numerous plants and animals
- A global average increase in temperature of 2°C would contribute to sea level rise that could devastate various Island nations
- A 3 °C rise would lead to death of tens of millions of people
- A 5 °C rise would threaten the ongoing existence of human being civilization
- Possible to slow the pace by reduce 50% emission of greenhouse gases

Politics of climate change

- Climate change denial vs Scientific consensus
- Developed vs Developing
- Individual interests vs Public good
- Immediate costs vs Long term benefits

Climate Change Denial

Arguments and positions:

- CO₂ is only a trace gas in the atmosphere (roughly 0.04%), it can only have a minor effect on the climate
- Global temperatures are actually decreasing (global cooling)
- Global warming are not caused by human activities, but by natural variability such as sunspots and cosmic rays
- Global warming is harmless even beneficial
- conspiracy theory: climatologists are acting on their own financial interests by causing undue alarm

Developed vs Developing

Accumulative co2 emission by countries

Self interest vs public goods

- Public good: non-rivalrous and non-excludable
- Self interest: benefit without contribution

Immediate costs vs Long term benefits

- Immediate costs: 7.6% reduction per year
- Long term benefits: rise below 1.5°C by year 2100

Combating Climate Change Technically

- Mitigation: actions to reduce greenhouse gas emission
- Adaptation: actions to defend against the negative results of global warming
- Climate engineering: direct human intervention in the climate, aimed at reducing average global temperature

Combating Climate Change Politically

- International
- National
- Individual

End

Are we doomed or blessed?