



# Greenhouse Gas Emissions

Key findings for the Pacific from the United Nations

**Intergovernmental Panel on Climate Change's (IPCC)**

Sixth Assessment Report (AR6) on Mitigation\* of Climate Change

\*actions that reduce the rate of climate change



Emissions from energy and industry rose by

**6%** in 2021 to the record level of **36.3 billion tonnes**

Average emissions from **2010-2019** were higher than any previous decade

Largest growth in emissions has been



carbon dioxide and



methane

Wealthiest

**10%** of households globally create up to

**45%** of consumer greenhouse gas emissions

Small Island Developing States contribute

**0.5%**

**Global greenhouse gas emissions need to peak before 2025 to keep long-term warming below 1.5°C**



The projected emissions from existing and planned power-sector fossil fuel facilities alone would take us

**above a 1.5°C warming pathway**

To limit warming to

**1.5°C**

CO<sub>2</sub> emissions need to be reduced by around

**48%** in 2030 and reach

**net zero** in the early 2050s



Economic benefits outweigh costs of impacts and emission-reduction



Afforestation and reforestation are already widely practiced CO<sub>2</sub> removal methods



Providing universal access to electricity across the Pacific would only marginally affect global GHG emissions

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**Global greenhouse gas emissions have continued to rise over the past decade, despite a temporary drop in emissions due to the COVID-19 pandemic. Global national commitments to reducing emissions need to be strengthened if we are to achieve the temperature goals of the Paris Agreement.**

## WHAT IS HAPPENING

**Global greenhouse gas (GHG) emissions from energy and industry rose by 6% in 2021 to their highest level ever at 36.3 billion tonnes.**<sup>1</sup> Average emissions from 2010 – 2019 were higher than any previous decade, however, the emissions growth rate for this period has slowed compared to 2000 - 2009. At first, COVID-19 disruptions caused a slight drop in global emissions in the first part of 2020, however, they returned to their pre-COVID levels by late 2020.<sup>2</sup> Despite improvements in energy efficiency and carbon intensity, emissions have increased across all major sectors and from all GHGs.<sup>3</sup> The largest growth in emissions has been in carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>).<sup>4</sup>

**Globally, contributions to emissions continue to vary across regions and populations, with the wealthiest 10% of households creating 34-45% of global household GHG emissions.**<sup>5</sup> Small Island Developing States (SIDS) contributed only 0.50% of global GHG emissions in 2019, including from land-use and forestry sources.<sup>6</sup> Equity is an important aspect of mitigation policies. Limited economic, social and institutional resources often result in high vulnerability and low adaptive capacity, especially in developing countries.<sup>7</sup>

**Direct transport sector emissions accounted for 23% of global energy-related CO<sub>2</sub> emissions in 2019.** 70% of direct transport emissions came from road transport, while 11% came from shipping and 12% from aviation. Growing demand for freight and passenger services are driving continued emissions in these sectors.<sup>8</sup> Industries requiring shipping across large geographic distances are largely responsible for the growth of emissions from freight transport.<sup>9</sup>

## WHAT COULD HAPPEN FURTHER

**Unless the nations of the world increase their commitments to making rapid and substantial emission reductions, it is *likely*<sup>10</sup> that global warming will exceed 1.5°C.**<sup>11</sup> SIDS have advocated for warming staying below 1.5°C in light of their significant vulnerability to impacts at warming beyond this level.<sup>12</sup> Pathways limiting warming to below 2°C involve rapid and substantial reductions in fossil fuel consumption and a near elimination of the unabated use of coal (i.e. without effective carbon capture and storage).<sup>13</sup> Global policies for reducing emissions will need to be strengthened if we are to avoid warming of 2.2 – 3.5°C by 2100.<sup>14</sup> To limit warming to 1.5°C with no or limited overshoot, global GHG emissions need to peak before 2025. CO<sub>2</sub> emissions will need to be reduced by 48% in 2030 compared to 2019 levels and reach net zero in the early 2050s. To keep warming below 2°C, GHG emissions still need to peak before 2025, and be reduced by 21% compared to 2019 levels by 2030, with net zero CO<sub>2</sub> emissions reached in the early 2070s.<sup>15</sup>

1 IEA 2022, 'Global Energy Review: CO<sub>2</sub> Emissions in 2021', <https://www.iea.org/reports/global-energy-review-co2-emissions-in-2021-2>

2 Summary for Policymakers (SPM) B.1.4

3 SPM.B.2

4 SPMB.1.2; SPM.1

5 SPM.B.3.4

6 SPM Footnote 15

7 Chapter 15.6.7; Chapter 4.5

8 Executive Summary

9 10.1.2

10 likely means a 66–100% chance of happening. All reported warming levels are relative to the period 1850–1900.

11 This refers to 1.5°C with no or limited overshoot. Overshoot is where the global temperature temporarily exceeds 1.5°C, before coming back down below 1.5°C.; SPM.B.6

12 SPREP 2016, <https://www.sprep.org/news/15-stay-alive-be-supported-ipcc-report>

13 Chapter 3, Executive Summary

14 SPM.C.1

15 SPM.C.1.1

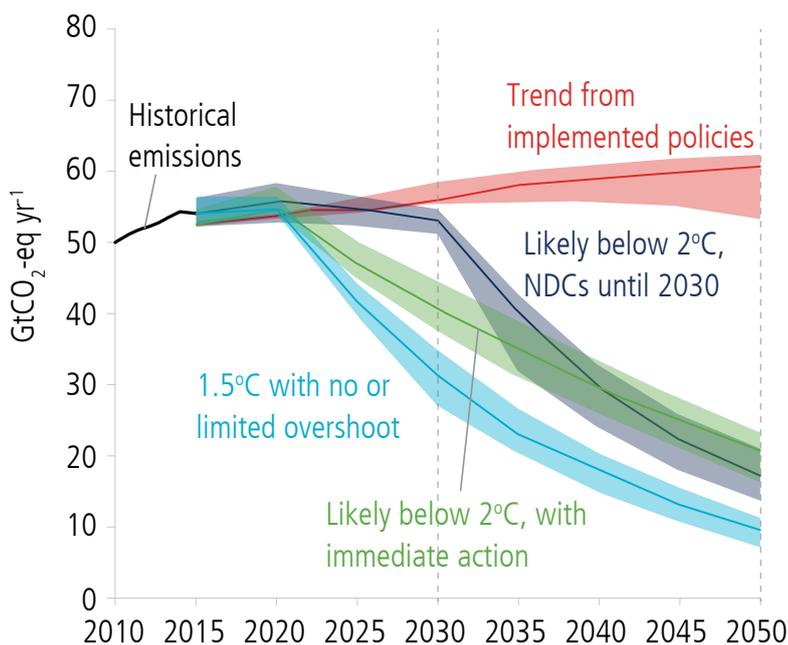
The projected emissions from power-sector fossil fuel projects alone (both existing and planned) would take us above a 1.5°C warming pathway.<sup>17</sup> Aligning the power sector with a 1.5°C warming pathway would require a combination of decommissioning, retrofitting, and cancelling new fossil fuel energy installations.<sup>18</sup>

There is significant potential to reduce global GHG emissions to at least half of 2019 levels by 2030.<sup>19</sup> This would require a wide range of mitigation options as well as drawing down existing carbon from the atmosphere.<sup>20</sup> Afforestation and reforestation are already widely practiced CO<sub>2</sub> removal methods.<sup>21</sup>

Providing universal access to electricity across the Pacific can be achieved without significant global emissions growth.<sup>22</sup> The additional energy demand needed to support decent living standards for all is estimated to be well below current average energy consumption.<sup>23</sup> This energy would likely come from zero or low-carbon sources such as renewables to keep with a 1.5°C warming pathway.<sup>24</sup>

The global economic benefits associated with likely limiting warming to below 2°C outweigh mitigation costs over the 21st century.<sup>16</sup>

Global greenhouse gas emissions over 2015 – 2050 under four pathways, showing the need for immediate action to keep warming below 2°C.<sup>25</sup>



- Trend from implemented policies:** Pathways following policies implemented until the end of 2020 and extended beyond 2030. In this pathway GHG emissions continue to rise leading to global warming of 3.2°C [2.2°C–3.5°C] by 2100.<sup>26</sup>
- Likely below 2°C, NDCs until 2030:** Pathways with emissions until 2030 following NDCs announced prior to COP26, followed by accelerated reductions *likely* to limit warming to below 2°C or to return warming to below 1.5°C with 50% or greater probability.
- Likely below 2°C with immediate action:** Pathways *likely* to limit warming to below 2°C with immediate action after 2020.
- 1.5°C with no or limited overshoot:** Pathways limiting warming to 1.5°C with no or limited overshoot. All these pathways assume immediate action after 2020.

16 SPM.C.12.3  
17 SPM.B.7.1  
18 SPM.B.7.2

19 Chapter 12, Executive Summary  
20 SPM.C.11

21 Chapter 12.3.3  
22 SPM.B.3.3  
23 Chapter 2.4.3

24 SPM.C.3  
25 Adapted from Figure SPM.4

26 SPM.C.1.3