

Dr. Pep Canadell
Executive Director
Global Carbon Project (GCP)
A global research project of **Future Earth**
Email: pep.canadell@csiro.au
Phone: 61-408020952
Climate Science Centre
CSIRO, Canberra, Australia

28 February 2022

Submission to UNFCCC First Global Stocktake

The Global Carbon Project

The GCP is an international research project within the Future Earth research initiative on global sustainability, and a research partner of the World Climate Research Programme. <https://www.globalcarbonproject.org/>

The GCP has developed a global research network with over 150 research institutions contributing to the development of global and regional budgets of the main greenhouse gases, including all emissions by sources and removals by sinks.

Global Greenhouse Gas Budgets

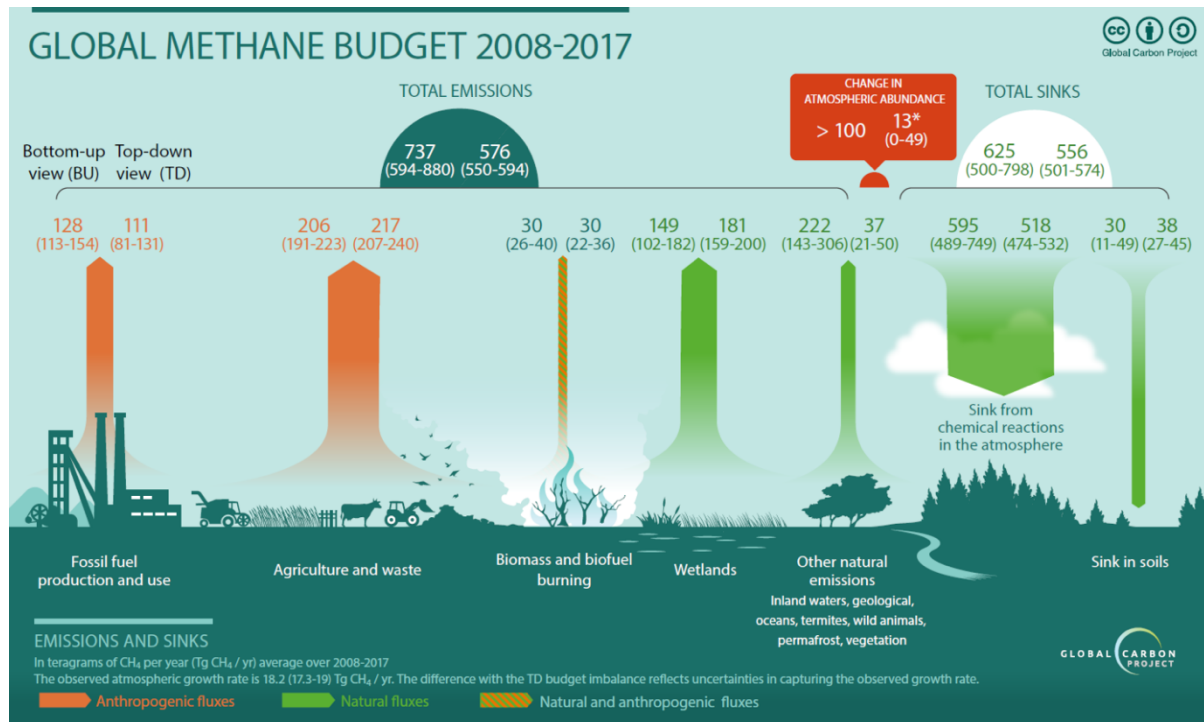
We provide annual/biannual updates of the global budgets of the main greenhouse gases: carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). These budgets are consistent, and in fact, are the same as the ones in the IPCC AR6 WGI, which were provided by the GCP. Here, the GCP will continue to update and improve these budgets on a regular basis and bridge the gap to next IPCC update in 6-7 years.

GHG budgets are built with many independent sources of data and multiple model ensembles to provide the most robust assessment of the magnitude of GHG sources and sinks, and their associated uncertainties. Over time, the budgets track changes of anthropogenic GHG sources and sinks, and how natural fluxes are being affected by climate and land-use change (feedbacks).

Based on the IPCC AR6 methodology, we also update the remaining carbon budget to 1.5°C and 2°C at various probability levels. Global GHG are regionalized to provide meaningful policy support.

This submission pertains to the global methane (CH₄) and nitrous oxide (N₂O) budgets. The Global Carbon Budget and carbon emissions data have been submitted in a separate submission by Prof. Pierre Friedlingstein, University of Exeter on behalf of the Global Carbon Project.

Global Methane Budget

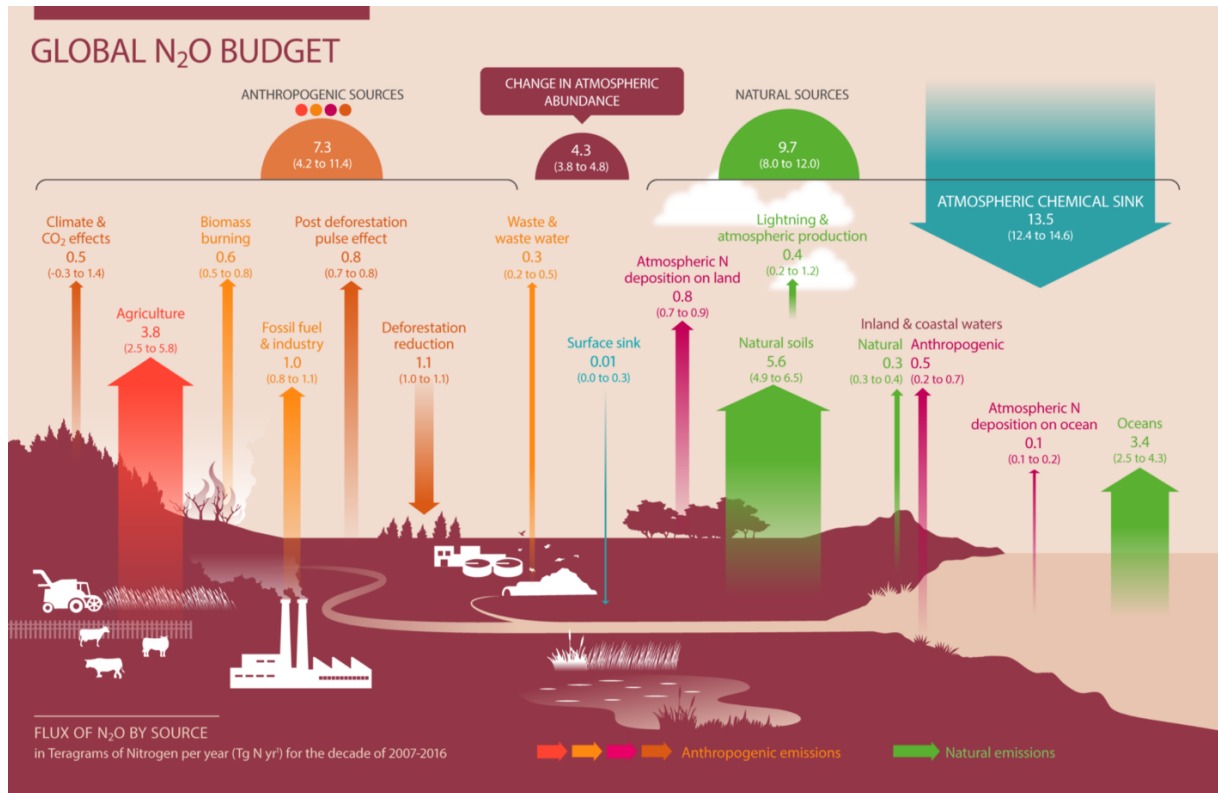


Data: <https://doi.org/10.18160/GCP-CH4-2019>

Peer-review paper of latest budget:
<https://essd.copernicus.org/articles/12/1561/2020/>

More information:
<https://www.globalcarbonproject.org/methanebudget/index.htm>

Nitrous Oxide Budget



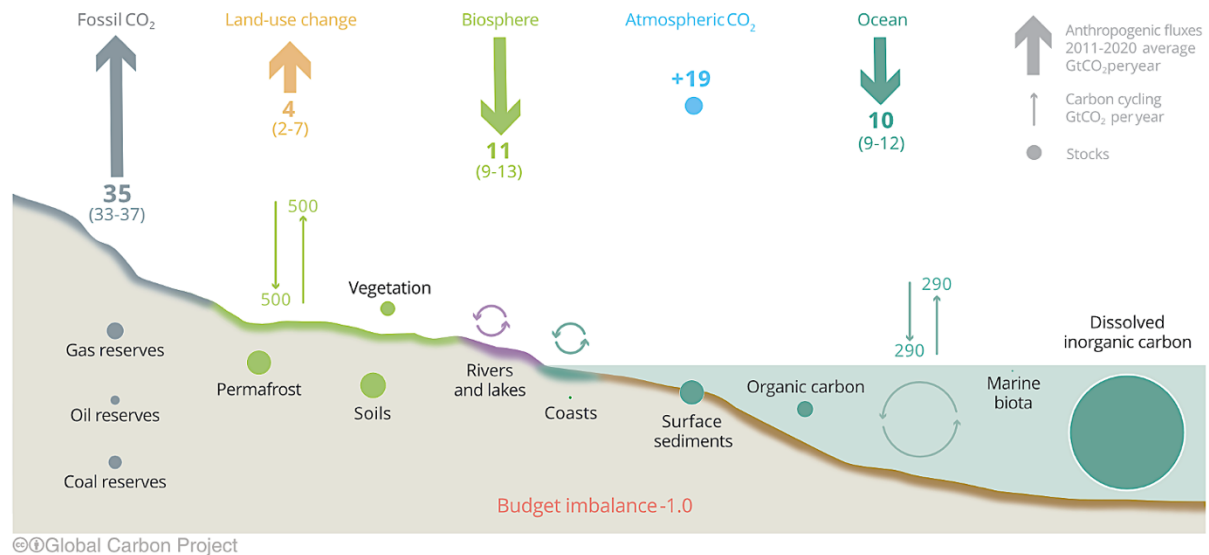
Data: <https://auburn.app.box.com/s/7fxesyrfzpj2k8h9cnu3vxbb014xj3sq>

Peer-review paper of latest budget:
<https://www.nature.com/articles/s41586-020-2780-0>

More information:
<https://www.globalcarbonproject.org/nitrousoxidebudget/>

Global Carbon (CO₂) Budget

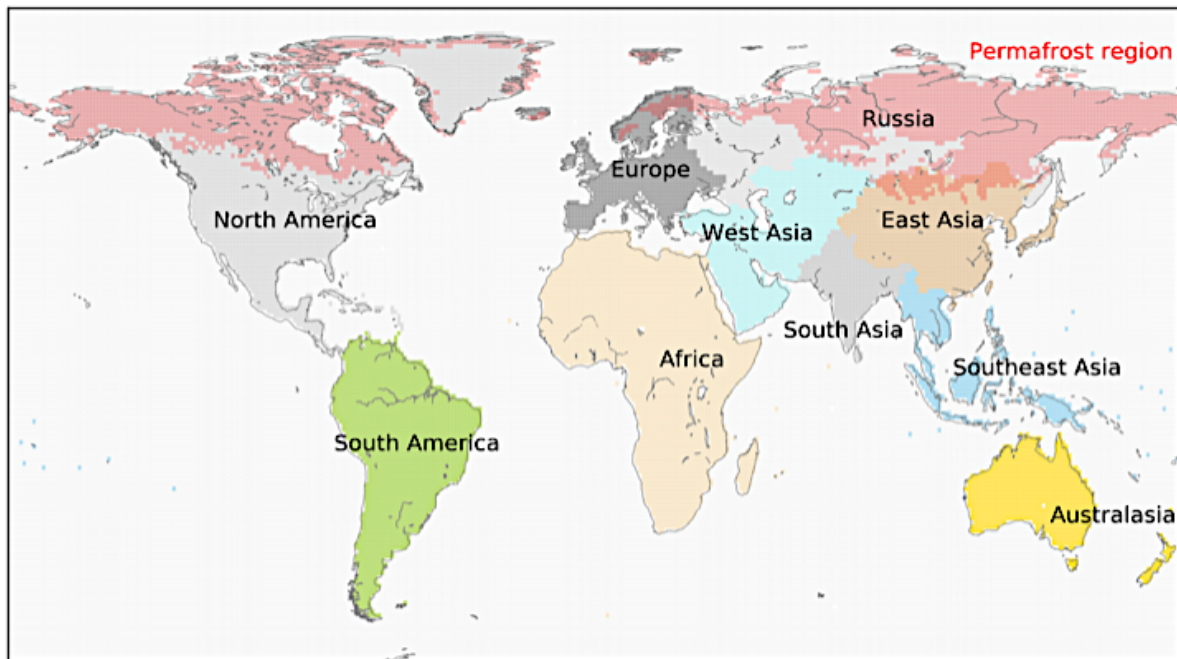
The Global Carbon Budget and emissions data have been submitted as a separate submission by Prof. Pierre Fridlingstein, University of Exeter.



More information on the Global Carbon Budget:

<https://www.globalcarbonproject.org/carbonbudget>

Regionalization of the Global GHG Budgets

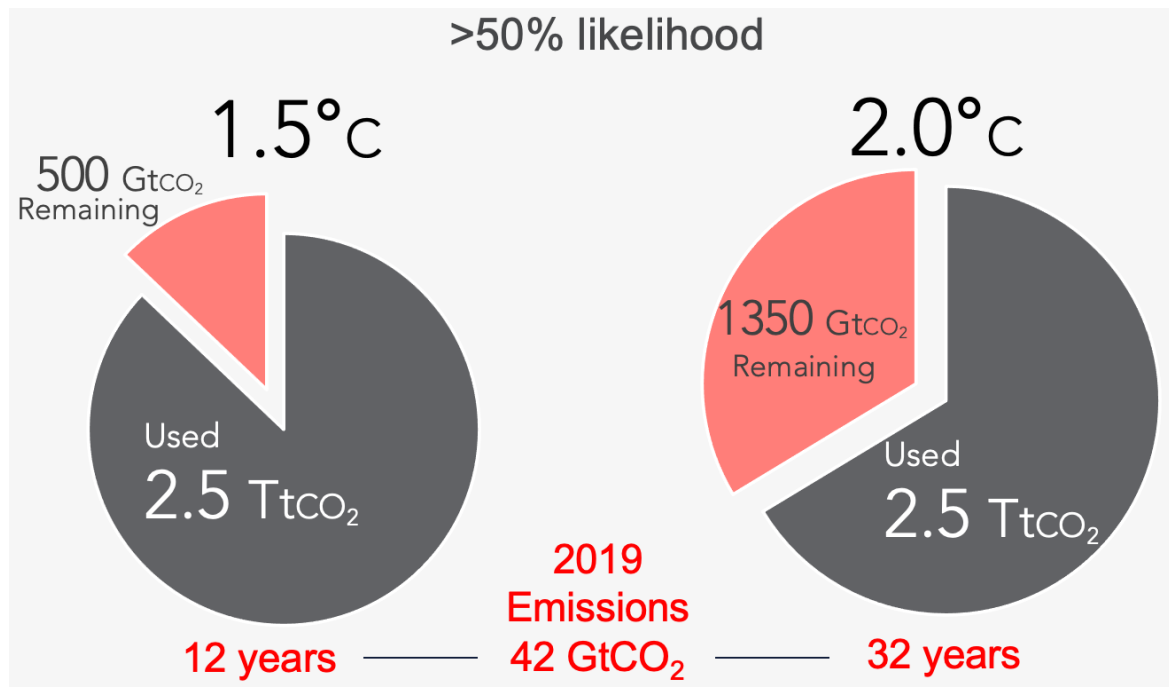


The GCP will have completed a spatial decomposition of the global budgets into 10 terrestrial regions (and five oceans) by the end of 2022 with the goal to provide data more valuable to regions and countries. The work is done under the project REgional Carbon Cycle Assessment and Processes2 (RECCAP2).

More information on RECCAP2:

<https://www.globalcarbonproject.org/reccap/>

Remaining Carbon Budget



Based on the IPCC AR6 WGI methodology, the GCP updates annually the remaining carbon budget to different temperature targets and probabilities.

Relevance to the Global Stocktake

The information in this submission relates to Decision 19/CMA.1 paragraph 36a and 36b. The information also addresses the following guiding questions set by SBSTA.

1. What are the past and present trends of greenhouse gas (GHG) emissions by sources and removals by sinks -and their underlying drivers- and mitigation efforts undertaken by Parties -and their impacts on emissions and removals including based on the information referred to in Article 13, paragraph 7(a), and Article 4, paragraphs 7, 15 and 19, of the Paris Agreement (para 36(a))?
2. What are the projected global GHG emissions and when will Parties reach global peaking of GHG emissions and achieve a balance between anthropogenic emissions by sources and removals by sinks of GHG in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty (Article 4.1 and para 36(b))?
3. What are the trends of the concentration of GHGs in the atmosphere and global average temperature and what global emission pathways are consistent with the goals set out in Articles 2 para 1(a) and Article 4.1?