

NET ZERO : what, why, and how?

Colloque International “Neutralité carbone : comment fait-on pour y parvenir ?”

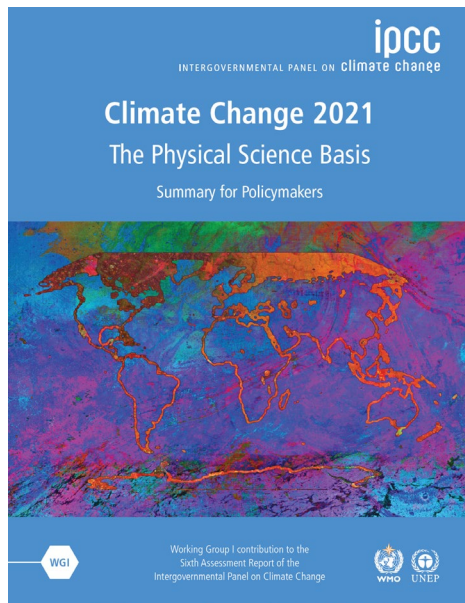
Forum International de la Météo et du Climat – 17 mai 2022

Joeri Rogelj

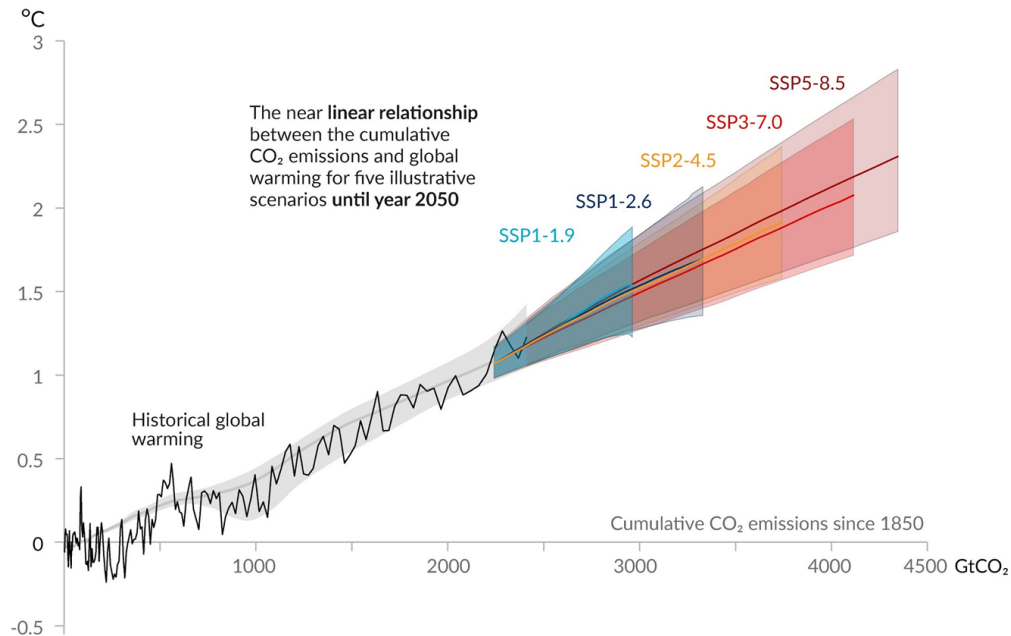
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EVERY TONNE OF CO₂ EMISSIONS ADDS TO GLOBAL WARMING



Global surface temperature increase since 1850-1900 (°C) as a function of cumulative CO₂ emissions (GtCO₂)



We understand better than ever what needs to be done to limit warming to the goals of the Paris Agreement

Global Warming Between 1850–1900 and 2010–2019 (°C)		Historical Cumulative CO ₂ Emissions from 1850 to 2019 (GtCO ₂)					
1.07 (0.8–1.3; likely range)		2390 (± 240; likely range)					
Approximate global warming relative to 1850–1900 until temperature limit (°C) ^a	Additional global warming relative to 2010–2019 until temperature limit (°C)	Estimated remaining carbon budgets from the beginning of 2020 (GtCO ₂)					Variations in reductions in non-CO ₂ emissions ^c
		<i>Likelihood of limiting global warming to temperature limit^b</i>					
		17%	33%	50%	67%	83%	
1.5	0.43	900	650	500	400	300	Higher or lower reductions in accompanying non-CO ₂ emissions can increase or decrease the values on the left by 220 GtCO ₂ or more
1.7	0.63	1450	1050	850	700	550	
2.0	0.93	2300	1700	1350	1150	900	

NET ZERO FUNDAMENTALS:

terms are confusing – be clear what you're talking about

~~Carbon neutrality vs Climate neutrality~~

- Concept emerged in scientific literature
- Net zero **CO₂** emissions (but not always)
- Requirement to stop warming

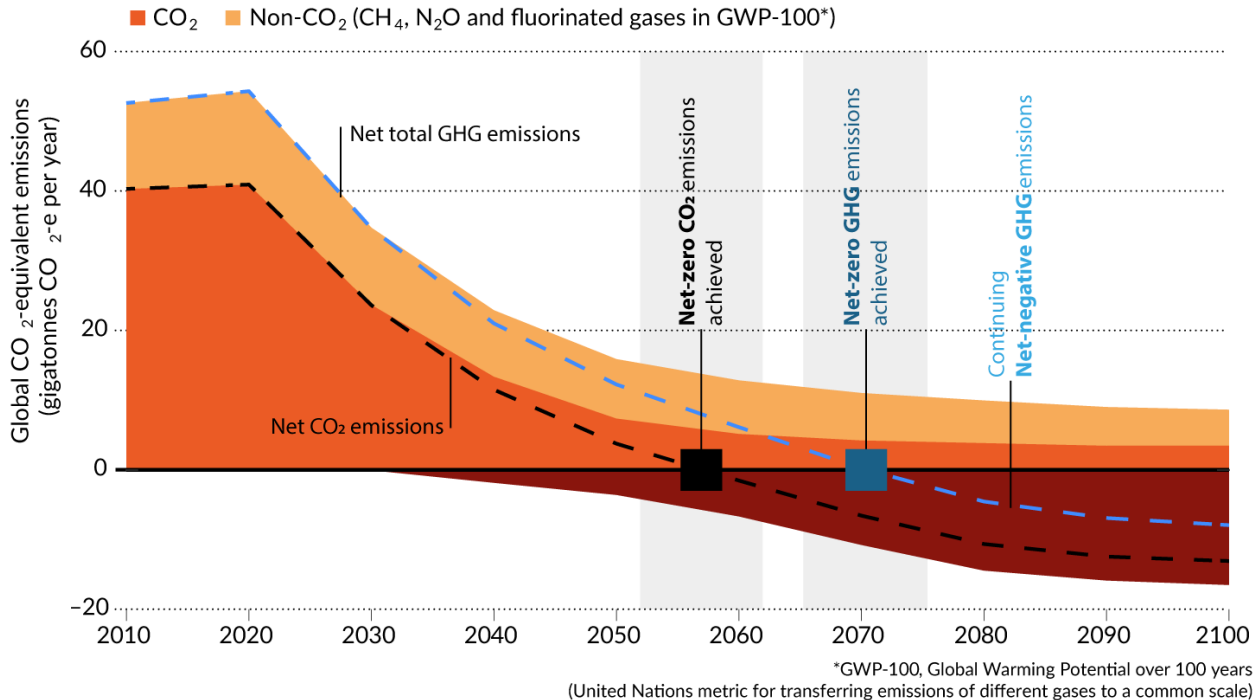
- Concept emerged in policy literature
- Net zero **greenhouse gas** (GHG) emissions
- Achieves more than carbon neutrality

NET-ZERO BASICS:

A key part of any Paris-aligned pathway

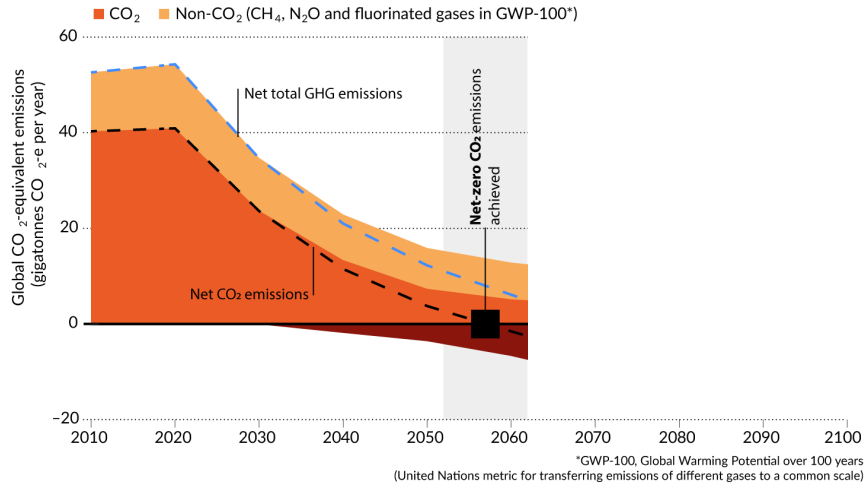
Global greenhouse-gas (GHG) emissions

Illustrative pathway for reaching net-zero carbon dioxide and net-zero GHG emissions.



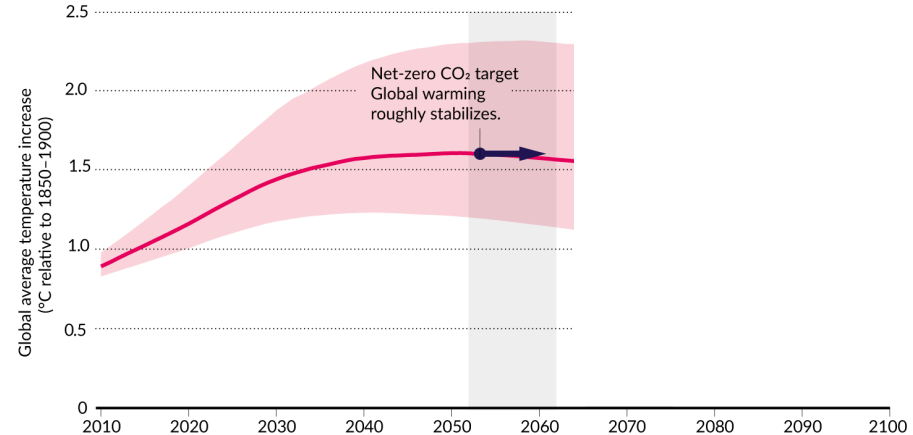
The Paris Agreement net-zero target achieves more than stabilisation: a peak and decline in global warming

Global greenhouse-gas (GHG) emissions
Illustrative pathway for reaching net-zero carbon dioxide and net-zero GHG emissions.



Global-warming implications

Estimated global temperature peaks (in pink) and declines (arrows) under net-zero GHG emissions.

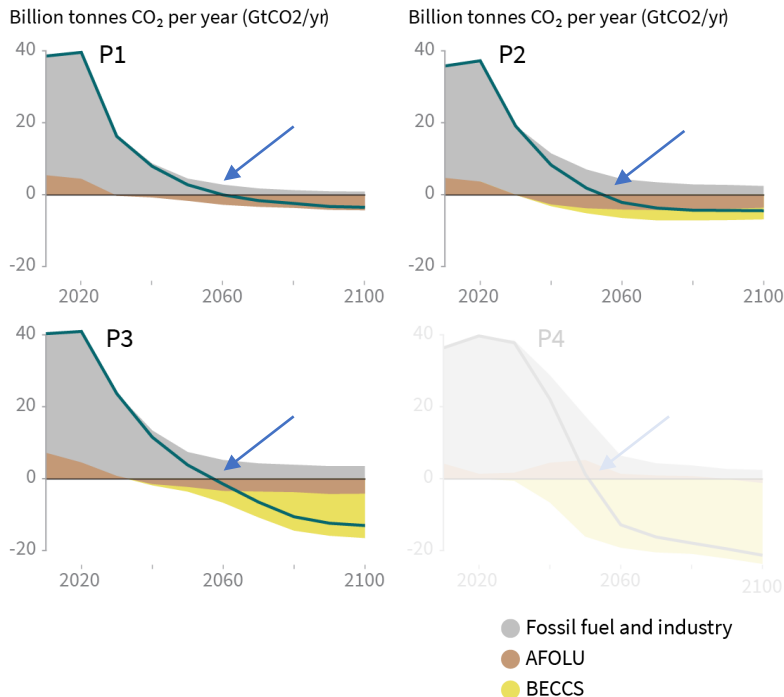


NOT ALL PATHWAYS ARE CREATED EQUAL

Societal choices about the strategies to reach net zero determine benefits or challenges for sustainable development



Similar cumulative carbon dioxide until net zero, but different strategies

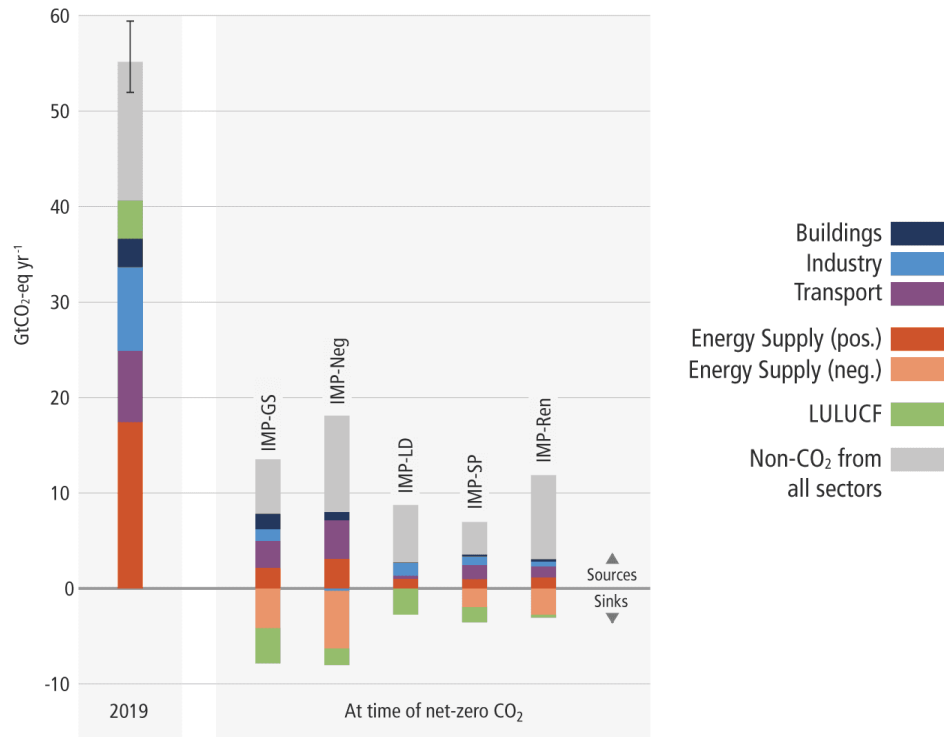


NOT ALL PATHWAYS ARE CREATED EQUAL

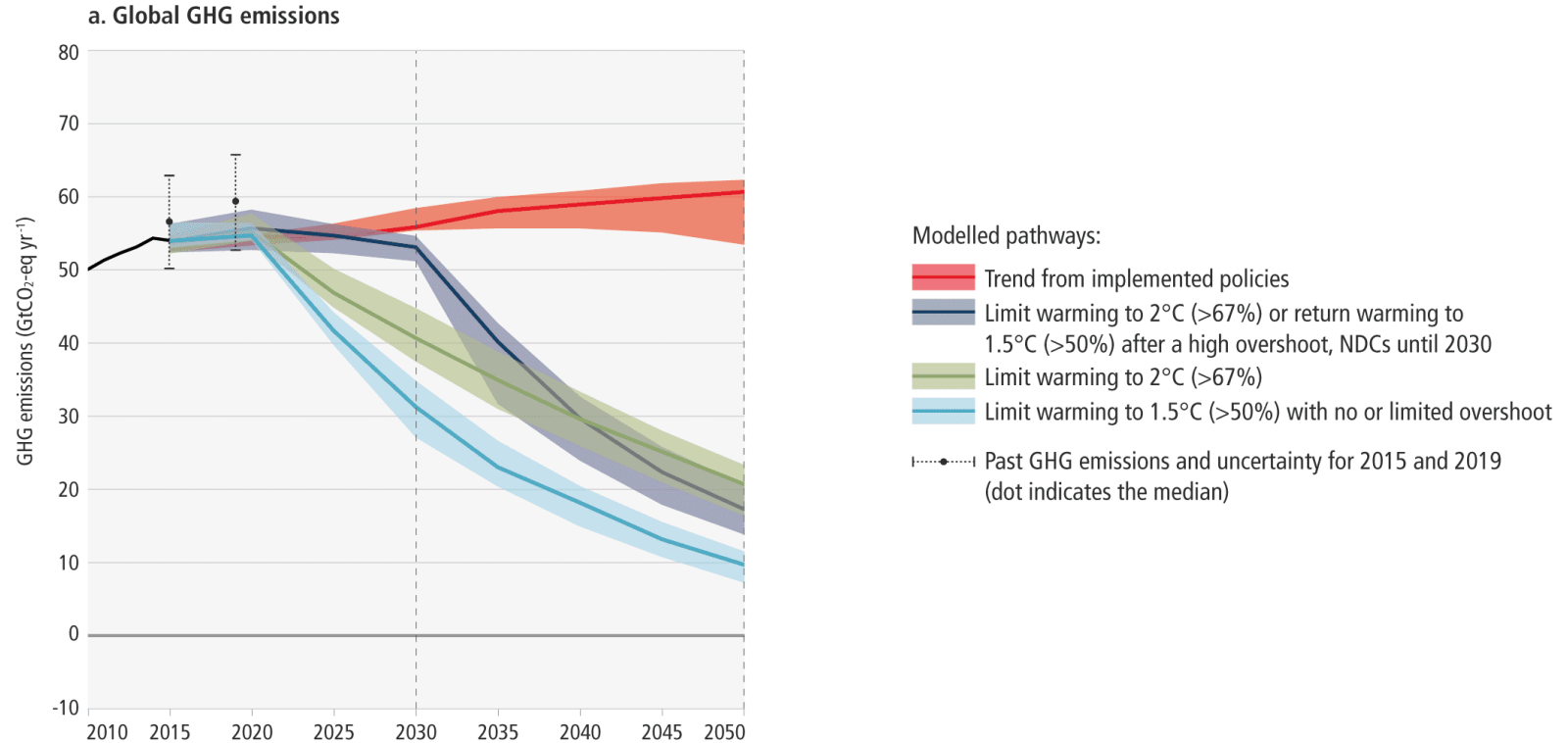
Societal choices about the strategies to reach net zero determine benefits or challenges for sustainable development



e. Sectoral GHG emissions at the time of net-zero CO₂ emissions (compared to modelled 2019 emissions)



THE EMISSIONS GAP REMAINS LARGE



The Heat Is On

A world of climate promises
not yet delivered

UN 
environment
programme

50
1972-2022

 UNEP DTU
PARTNERSHIP

Emissions Gap
Report 2021

Merci

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