Evento in streaming
www.youtube.com/user/KyotoClub

11 dicembre 2020, ore 10:00-12:30

Clima, trasporti e Recovery Fund
Next Generation EU

Le evidenze scientifiche sul clima e l'urgenza di agire

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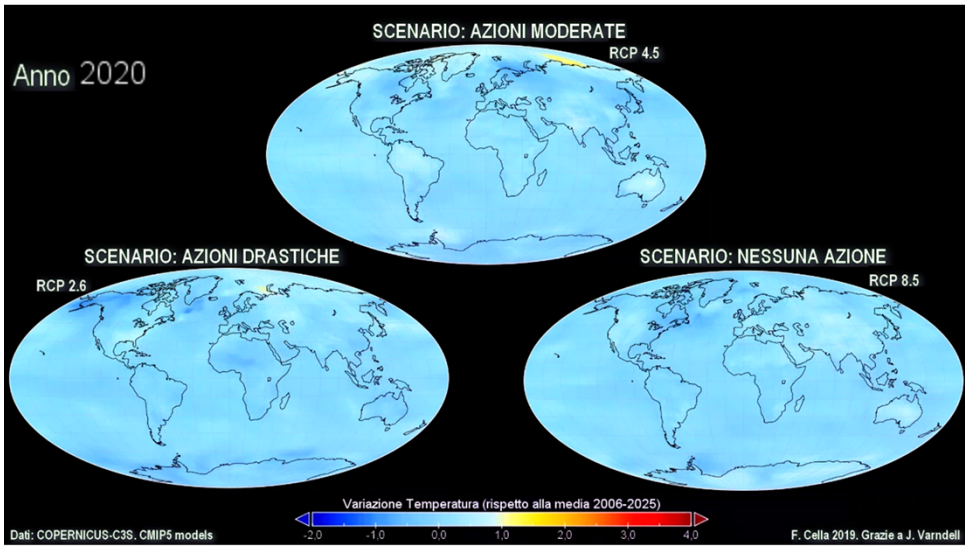
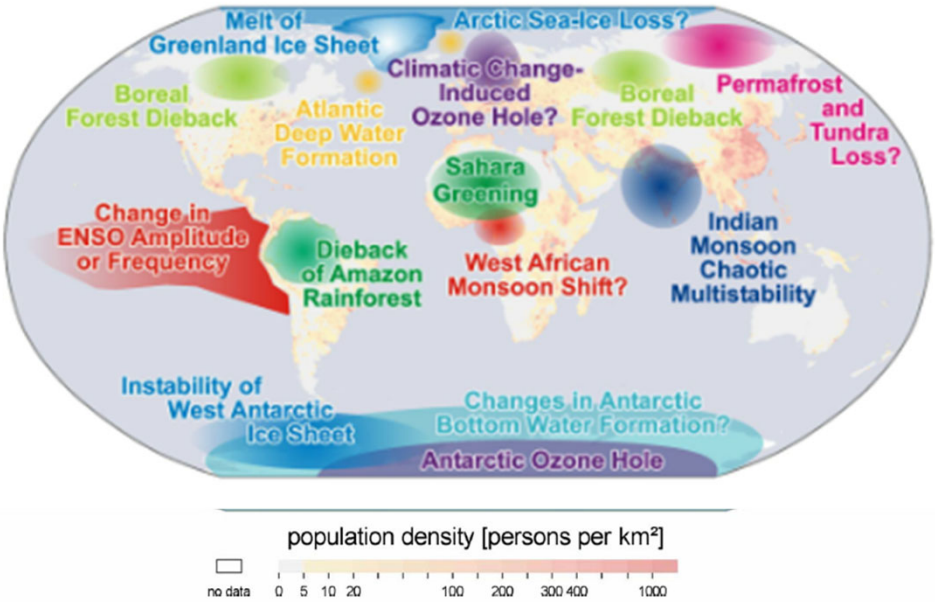

Anno 2020
SCENARIO: AZIONI MODERATE
RCP 4.5
SCENARIO: AZIONI DRASTICHE
RCP 2.6
SCENARIO: NESSUNA AZIONE
RCP 8.5
Variazione Temperatura (rispetto alla media 2006-2025)
-2.0 -1.0 0.0 1.0 2.0 3.0 4.0
Dati: COPERNICUS-C3S. CMIP5 models
F. Cella 2019. Grazie a J. Varndell

«Il pH oceanico è diminuito di 0,1 unità dal periodo preindustriale, una variazione che non ha precedenti negli ultimi 65 milioni di anni (alta confidenza)».
IPCC, Special Report 1,5° di riscaldamento globale, 3.3.10



Mappa dei potenziali "tipping elements" nel sistema climatico sovrapposti alla mappa della densità della popolazione mondiale (Lenton et al., 2008)

Proiezioni del contributo di Groenlandia e Antartide all'aumento del livello del mare: incertezze in diminuzione, preoccupazioni in aumento,

DeConto & Pollard (2016) Contribution of Antarctica to past and future sea-level rise. Nature 531, 591–597.

ARTICLE

doi:10.1038/nature17145

Contribution of Antarctica to past and future sea-level rise

Robert M. DeConto[1] & David Pollard[2]

Polar temperatures over the last several million years have, at times, been slightly warmer than today, yet global mean sea level has been 6–9 metres higher as recently as the Last Interglacial (130,000 to 115,000 years ago) and possibly higher during the Pliocene epoch (about three million years ago). In both cases the Antarctic ice sheet has been implicated as the primary contributor, hinting at its future vulnerability. Here we use a model coupling ice sheet and climate dynamics—including previously underappreciated processes linking atmospheric warming with hydrofracturing of buttressing ice shelves and structural collapse of marine-terminating ice cliffs—that is calibrated against Pliocene and Last Interglacial sea-level estimates and applied to future greenhouse gas emission scenarios. Antarctica has the potential to contribute more than a metre of sea-level rise by 2100 and more than 15 metres by 2500, if emissions continue unabated. In this case atmospheric warming will soon become the dominant driver of ice loss, but prolonged ocean warming will delay its recovery for thousands of years.

"Antarctica has the potential to contribute more than a metre of sea-level rise by 2100 and more than 15 metres by 2500, if emissions continue unabated"

Garbe et al. (2020) The hysteresis of the Antarctic Ice Sheet, Nature

Article

The hysteresis of the Antarctic Ice Sheet

https://doi.org/10.1038/s41586-020-2727-5
Received: 5 April 2019
Accepted: 11 August 2020
Published online: 23 September 2020
Check for updates

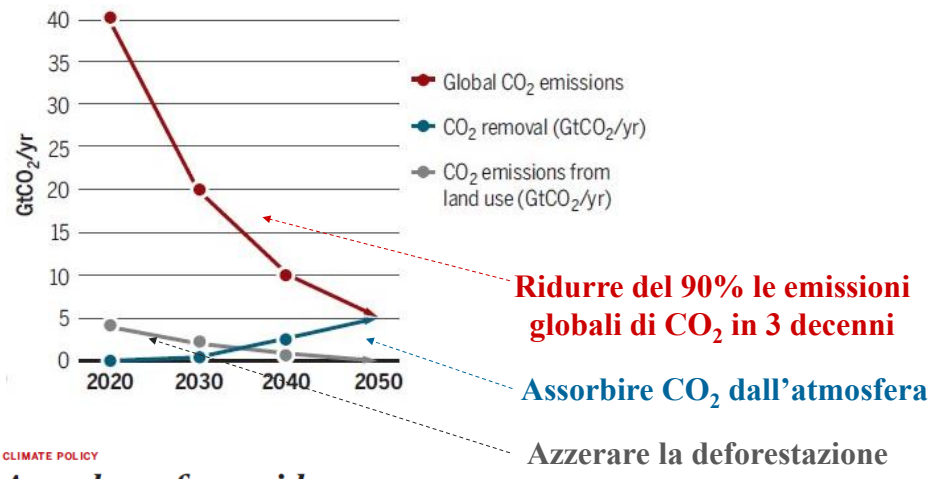
Julius Garbe[1,2], Torsten Albrecht[1], Anders Levermann[1,3], Jonathan F. Donges[1,4] & Ricarda Winkelmann[1,5]

More than half of Earth's freshwater resources are held by the Antarctic Ice Sheet, which thus represents by far the largest potential source for global sea-level rise under future warming conditions[1]. Its long-term stability determines the fate of our coastal cities and cultural heritage. Feedbacks between ice, atmosphere, ocean, and the solid Earth give rise to potential nonlinearities in its response to temperature changes. So far, we are lacking a comprehensive stability analysis of the Antarctic Ice Sheet for different amounts of global warming. Here we show that the Antarctic Ice Sheet

Consistent with palaeodata we find, using the Parallel Ice Sheet Model, that at global warming levels around 2 degrees Celsius above pre-industrial levels, West Antarctica is committed to long-term partial collapse owing to the marine ice-sheet instability.

Il compito stra-ordinario

Ridurre quasi a zero le emissioni globali di gas serra in 3 - 4 decenni



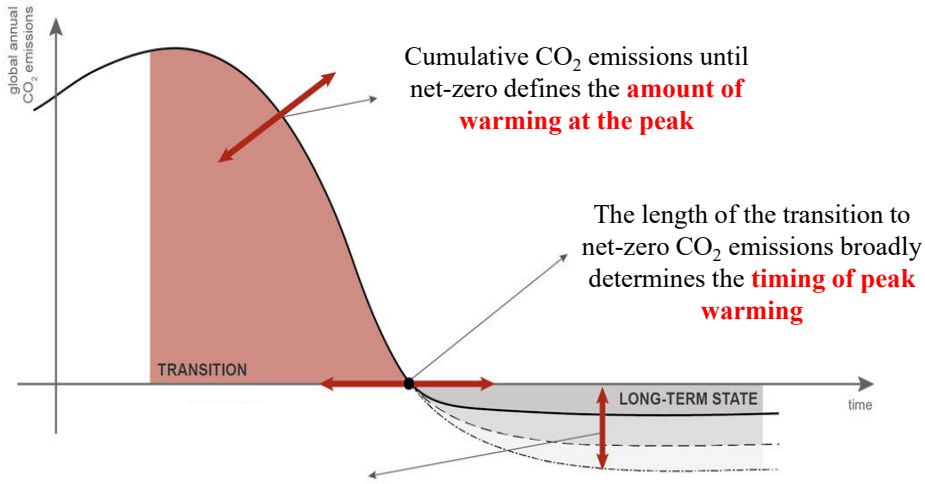
CLIMATE POLICY

A roadmap for rapid decarbonization

Emissions inevitably approach zero with a "carbon law"

Fonte: Rockstrom et al., 2017, A roadmap for rapid decarbonization. Science, vol. 355, issue 6331, 1269-1271

Ogni Gt di CO_2 è importante



Cumulative CO_2 emissions until net-zero defines the **amount of warming at the peak**

The length of the transition to net-zero CO_2 emissions broadly determines the **timing of peak warming**

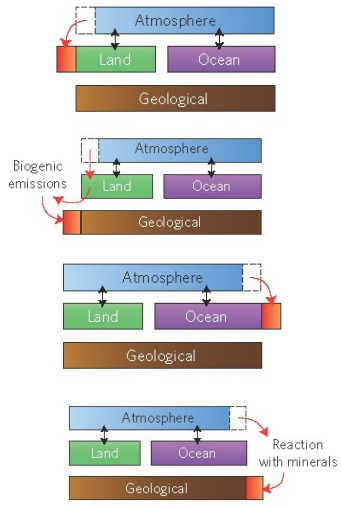
The amount of net CO_2 emissions in the long term, which can be zero or net-negative determines **long term temperature trend** (whether temperatures stabilise at the peak, or decline).

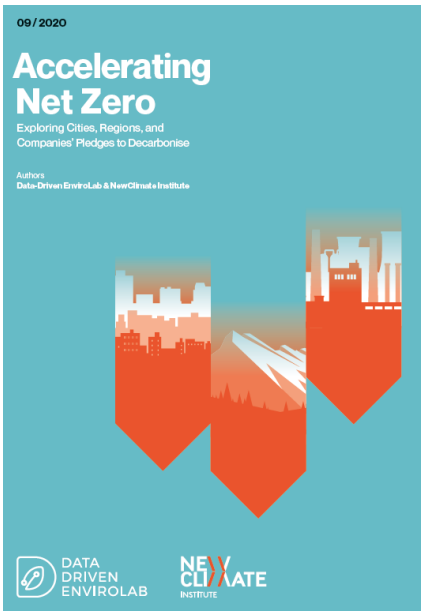
Source: Rogelj et al. (2019) How to avoid 'unfair and risky' climate change scenarios. www.carbonbrief.org/guest-post-how-to-avoid-unfair-and-risky-climate-change-scenarios

Many option are available for CO_2 removal from the atmosphere

NEGATIVE EMISSION TECHNOLOGIES (NET)
CARBON DIOXIDE REMOVAL (CDR) TECHNOLOGIES

- **Afforestation** and Reforestation
- **Soil Carbon Sequestration**
- **Biochar**
- **Bioenergy with carbon capture and storage**
- **Direct Air Carbon Capture and storage**
- **Artificial Ocean alkalinisation**
- **Enhanced weathering of minerals**
- Building with biomass
- Enhancing cement carbonation
- Enhanced ocean productivity
- Forest wood burial and storage
- Enhanced upwelling/downwelling





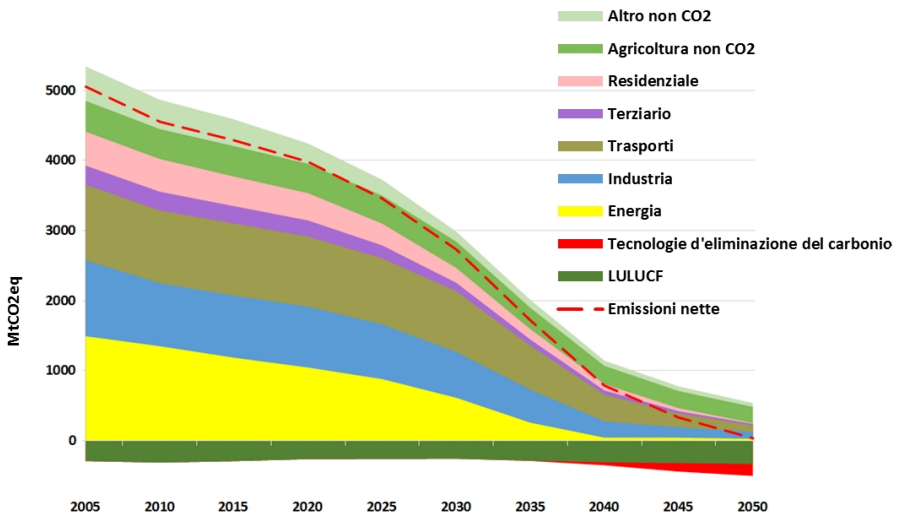
The shift towards net-zero greenhouse gas emission pathways is accelerating, and the group of actors pledging net-zero targets is substantial:

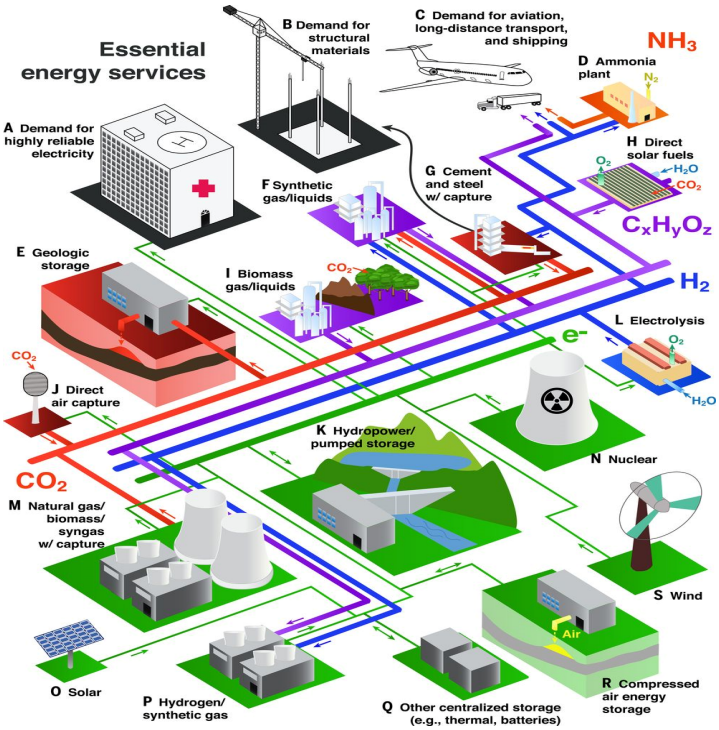
- 823 cities and 101 regions have net-zero targets. These local governments represent more than 846 million people across every continent.
- 1,541 companies pledge to net-zero targets. They have a combined revenue of over US$ 11.4 trillion
- The number of net-zero pledges has roughly doubled in less than a year.

China will become carbon neutral by 2060, Xi Jinping, 24/9/2020

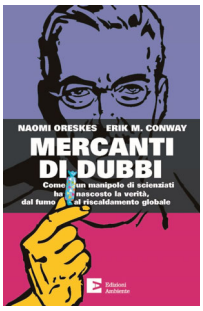
Traiettoria delle emissioni di gas serra europee in uno scenario a 1,5°C

(Fonte: Commissione Europea, «Un pianeta pulito per tutti. Visione strategica europea a lungo termine per un'economia prospera, moderna, competitiva e climaticamente neutra», 2018,.





Davis et al. (2018) Net-zero energy systems. Science



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GLOBALIZATIONS
https://doi.org/10.1080/14747731.2020.1807856

Routledge
Taylor & Francis Group

Check for updates

The appallingly bad neoclassical economics of climate change

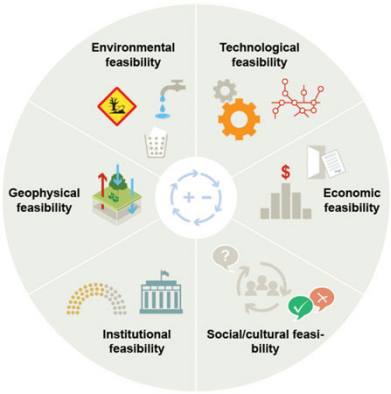
Steve Keen

Institute for Strategy, Resilience and Security, University College London, London, UK

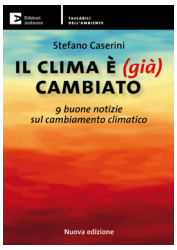
È fattibile il contenimento delle temperature a 1,5°C?

La fattibilità ha diverse dimensioni

- Geofisica: capacità dei sistemi fisici di permettere lo sviluppo su larga scala di una opzione
- Ambientale: capacità delle risorse naturali di supportare le conseguenze delle misure implementate
- Tecnologica: capacità delle tecnologie di svilupparsi e diffondersi in modo sufficientemente rapido
- Economica: risorse economiche e finanziarie da rendere disponibili
- Sociale – culturale: implicazioni per i comportamenti e la salute umana
- Istituzionale: capacità di governance e sostegno politico alla transizione



Fonte: IPCC – SR1,5°C Fig. FAQ4.1-1



«Per quanto riguarda il futuro, non si tratta di prevederlo, ma di renderlo possibile»

Antoine de Saint Exupéry, La Citadella, 1948