



The geopolitical repercussions of climate change

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Università Bocconi

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**Disruptive Digitalization
FOR Decarbonization**



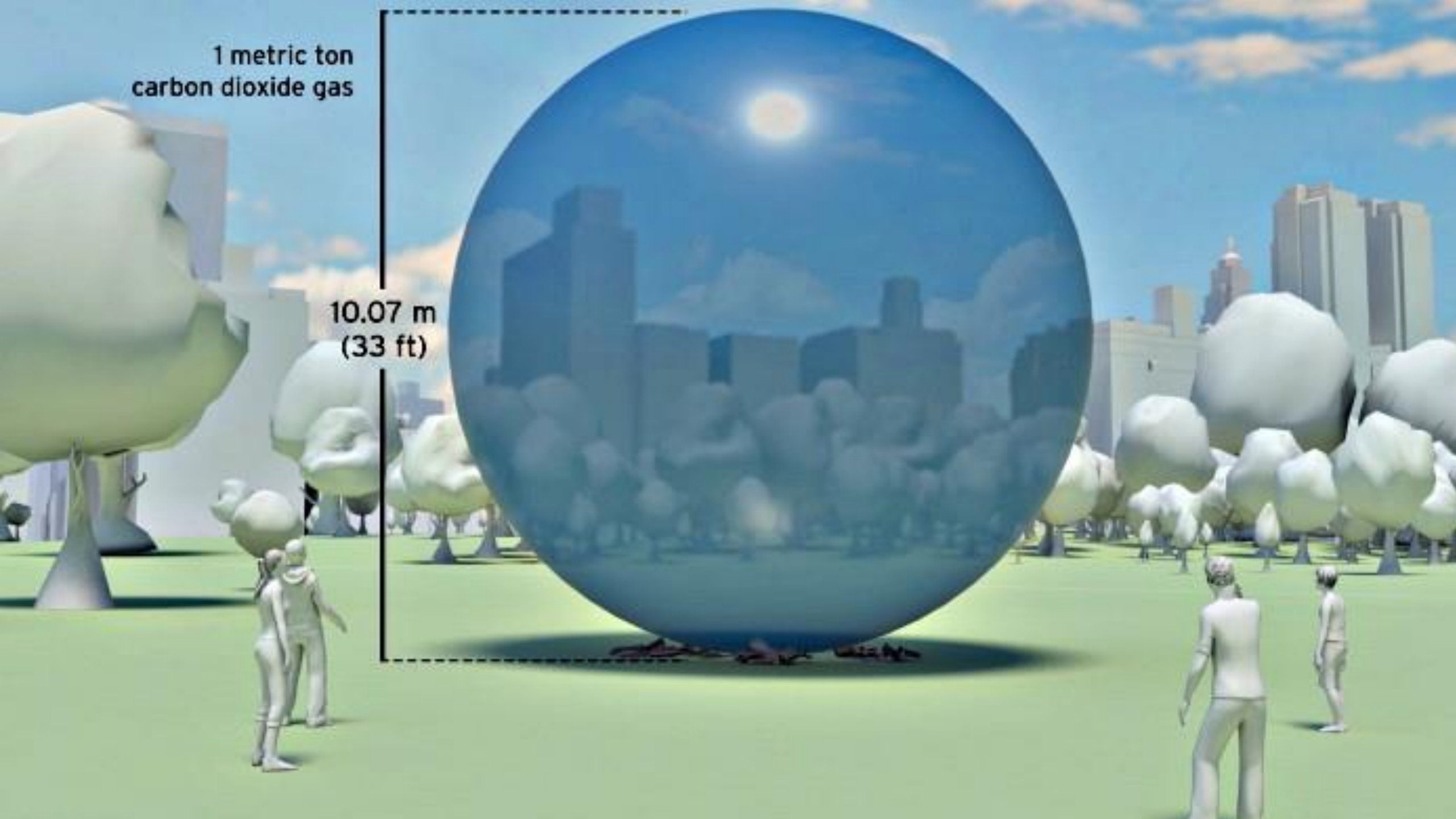
**UNIVERSITÀ
DEGLI STUDI
DI BRESCIA**



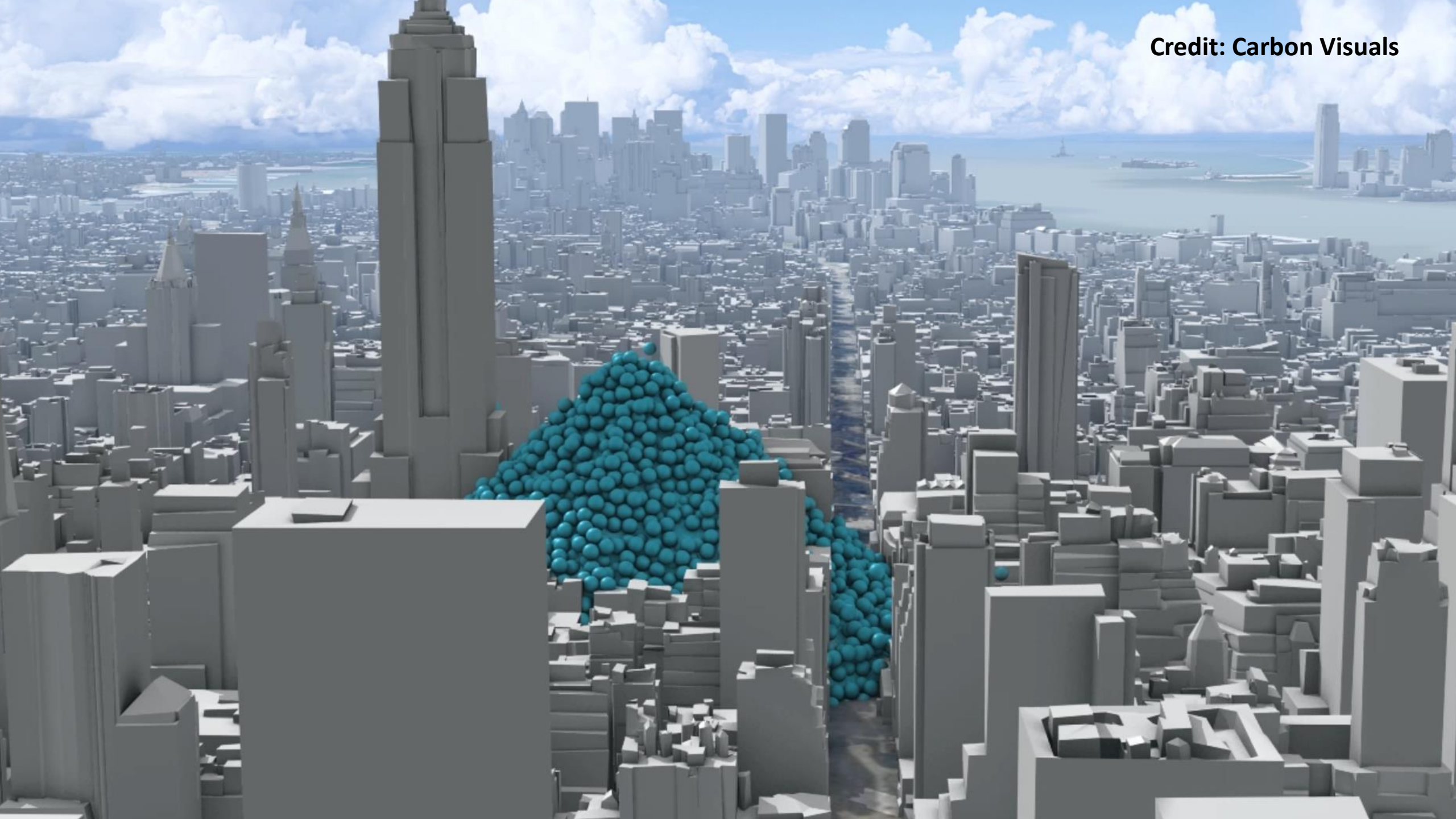
This project has received funding from the European Union's Horizon Europe research and innovation programme G.A.No 101069880 and Horizon 2020 research and innovation programme G.A. 853487

1 metric ton
carbon dioxide gas

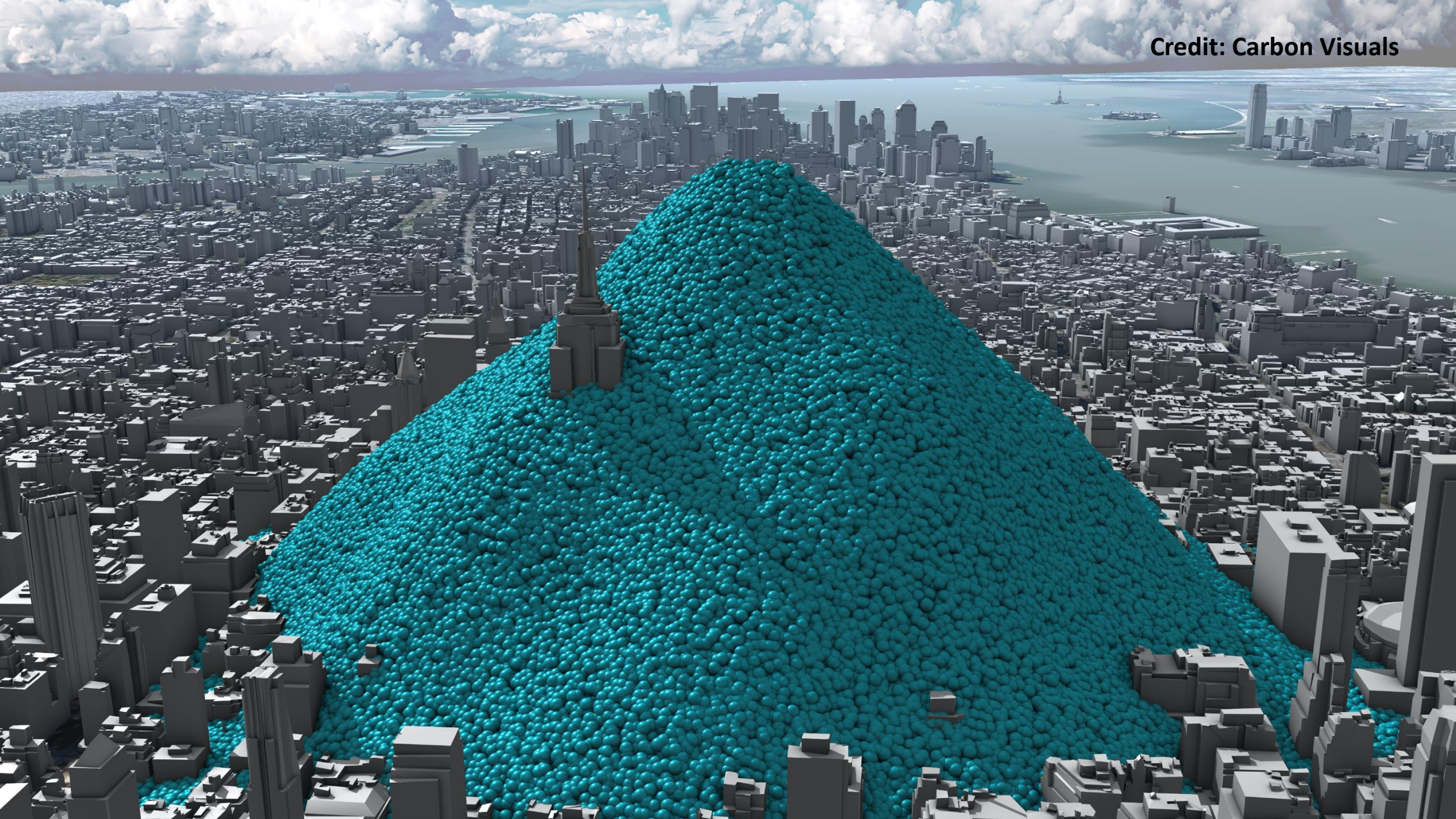
10.07 m
(33 ft)



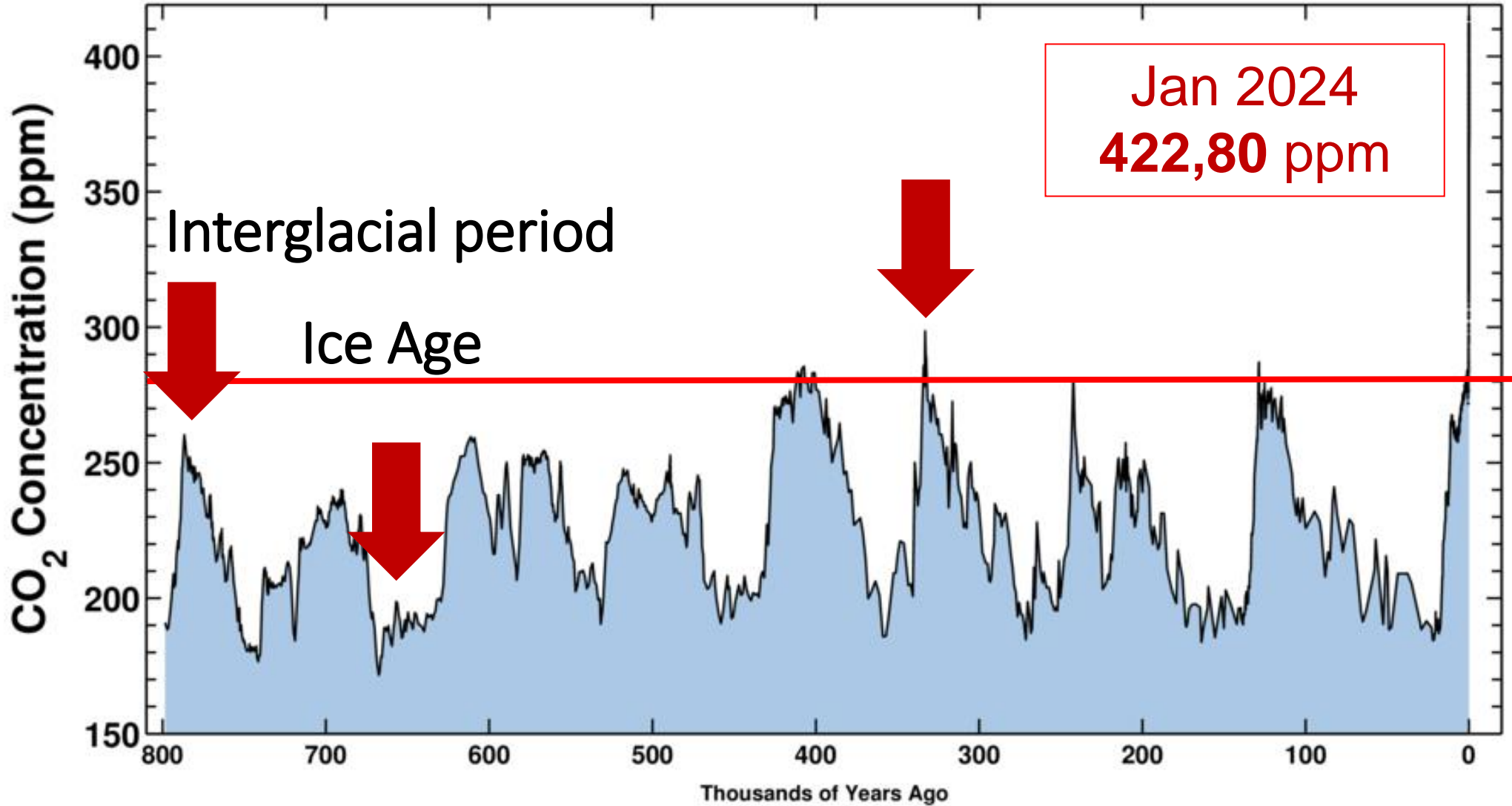
Credit: Carbon Visuals



Credit: Carbon Visuals



Ice-core data before 1958. Mauna Loa data after 1958.



The climate has already changed; risks are high

c) The extent to which current and future generations will experience a hotter and different world depends on choices now and in the near-term

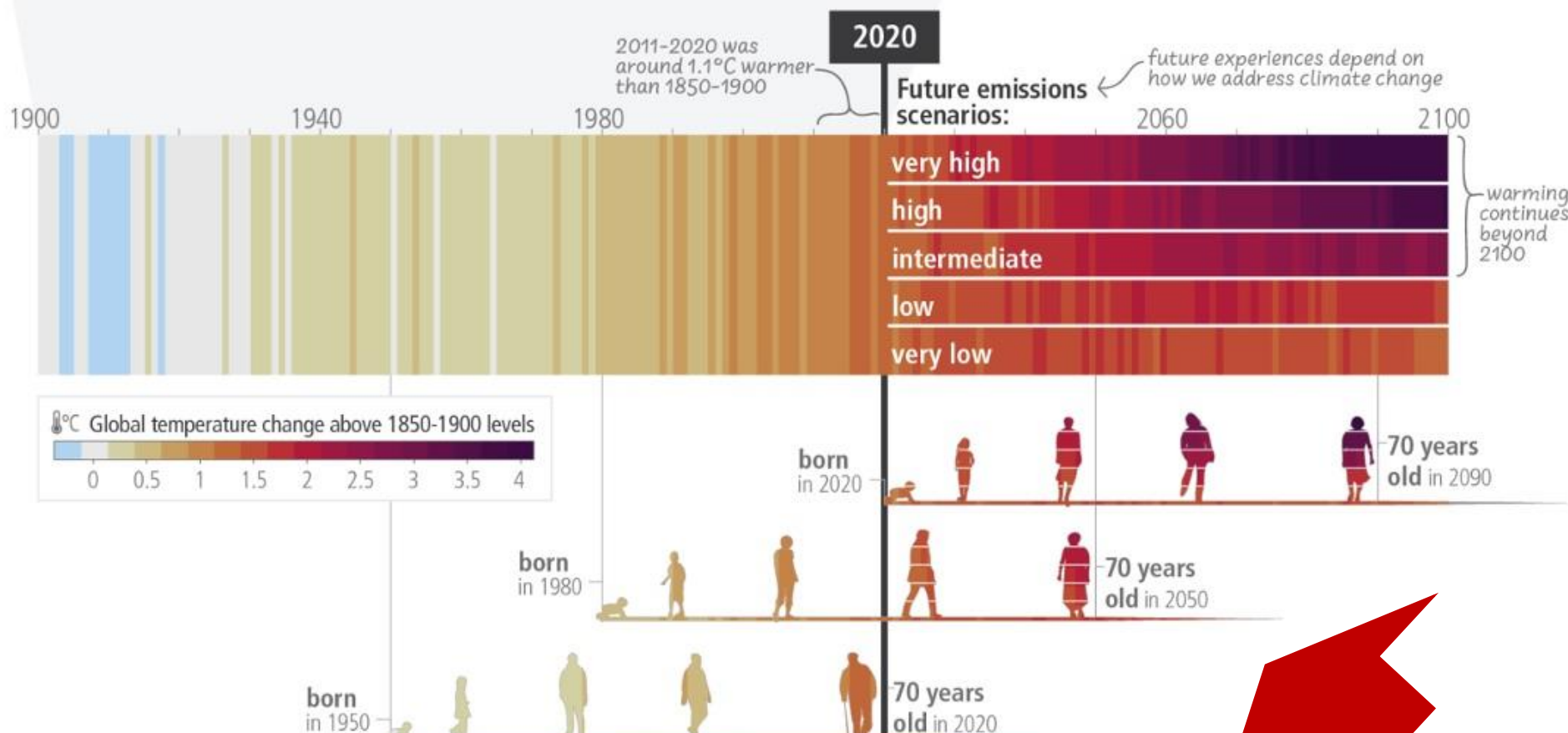
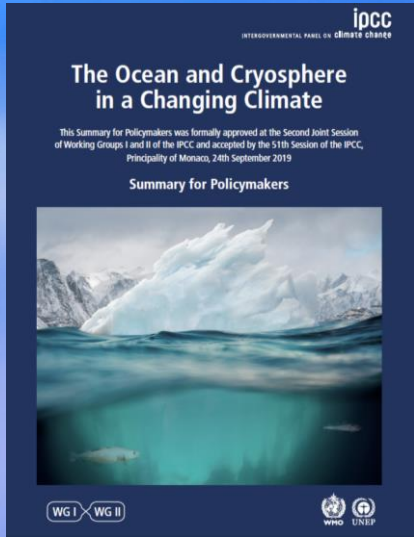
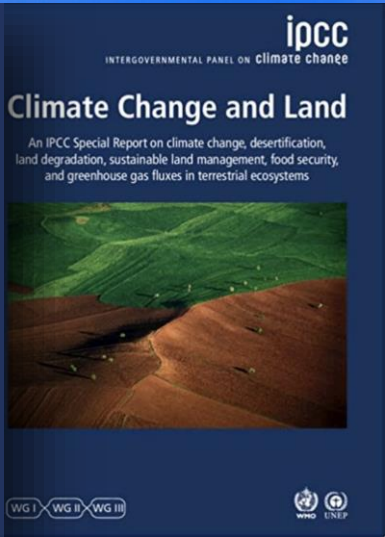


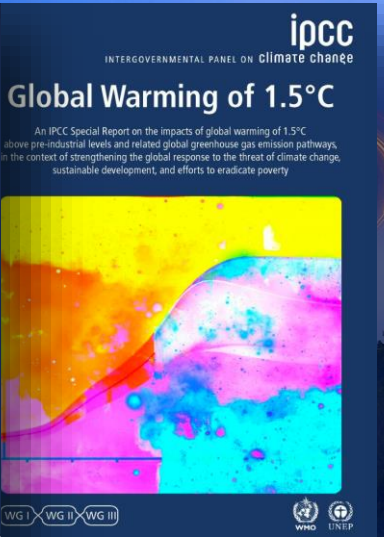
Figure SPM.1: (a) IPCC 2023 SYR



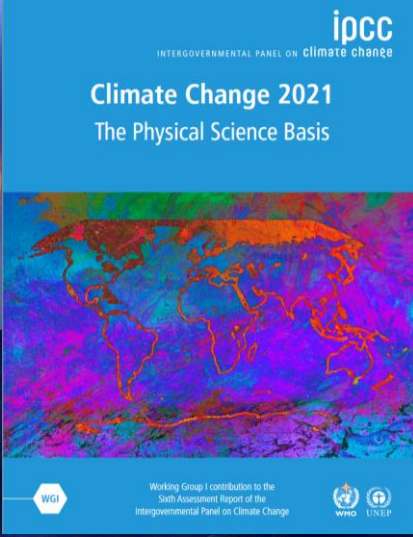
Ocean and Cryosphere in a Changing Climate



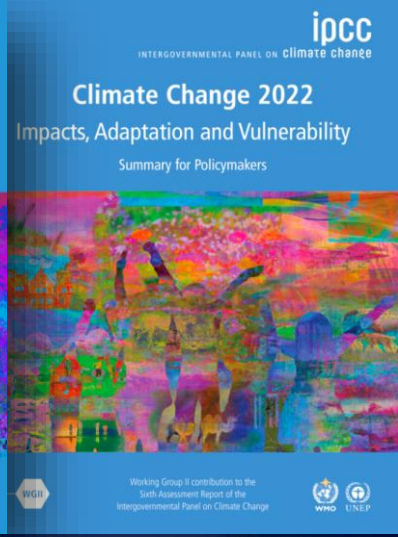
Climate Change and Land



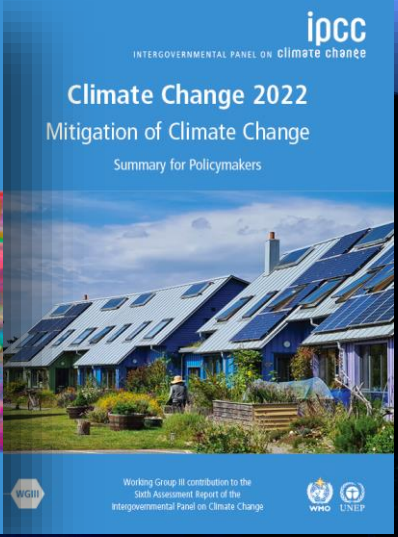
Global Warming of 1.5 °C



AR6 Climate Change 2021: The Physical Science Basis



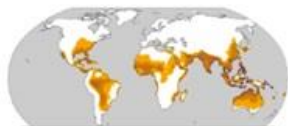
Climate Change 2022: Impacts, Adaptation and Vulnerability



Climate Change 2022: Mitigation of Climate Change

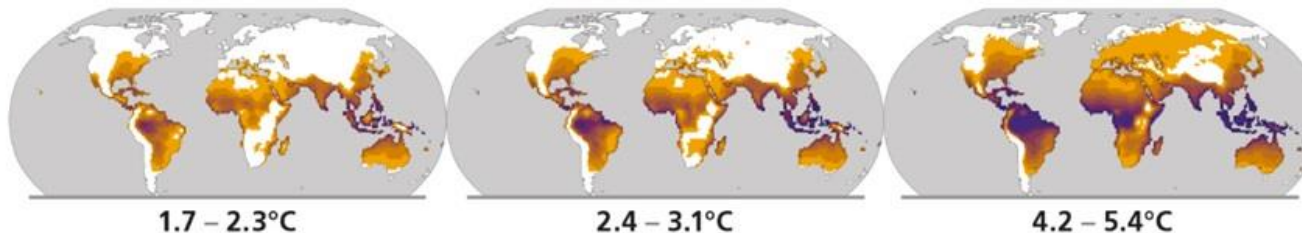
Risks are distributed unequally

b) Heat-humidity risks to human health



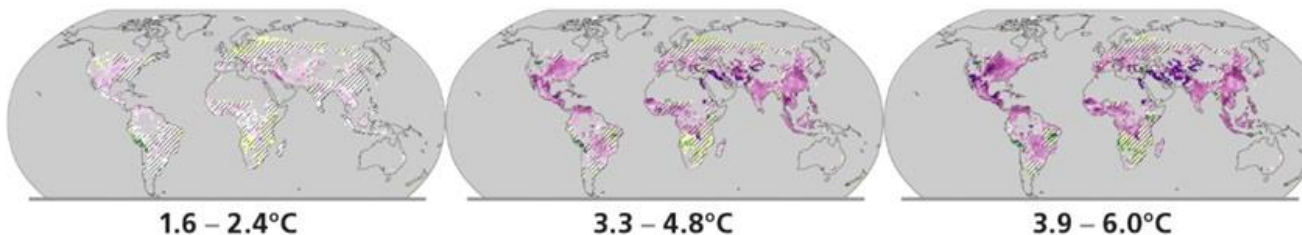
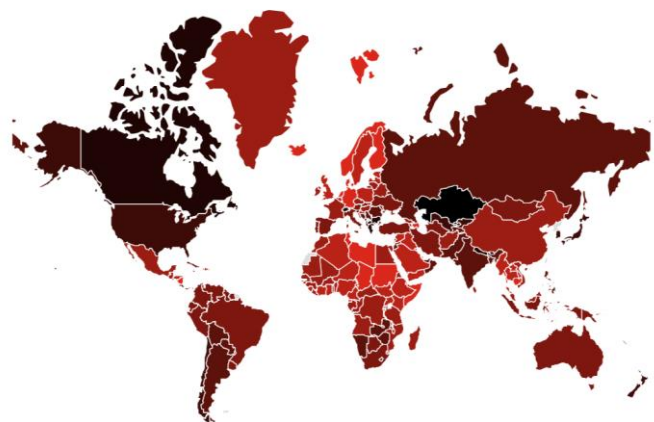
Historical 1991–2005

Days per year where combined temperature and humidity conditions pose a risk of mortality to individuals³



³Projected regional impacts utilize a global threshold beyond which daily mean surface air temperature and relative humidity may induce hyperthermia that poses a risk of mortality. The duration and intensity of heatwaves are not presented here. Heat-related health outcomes vary by location and are highly moderated by socio-economic, occupational and other non-climatic determinants of individual health and socio-economic vulnerability. The threshold used in these maps is based on a single study that synthesized data from 783 cases to determine the relationship between heat-humidity conditions and mortality drawn largely from observations in temperate climates.

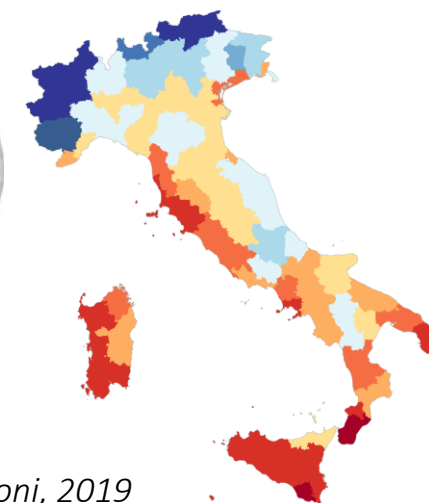
c) Food production impacts



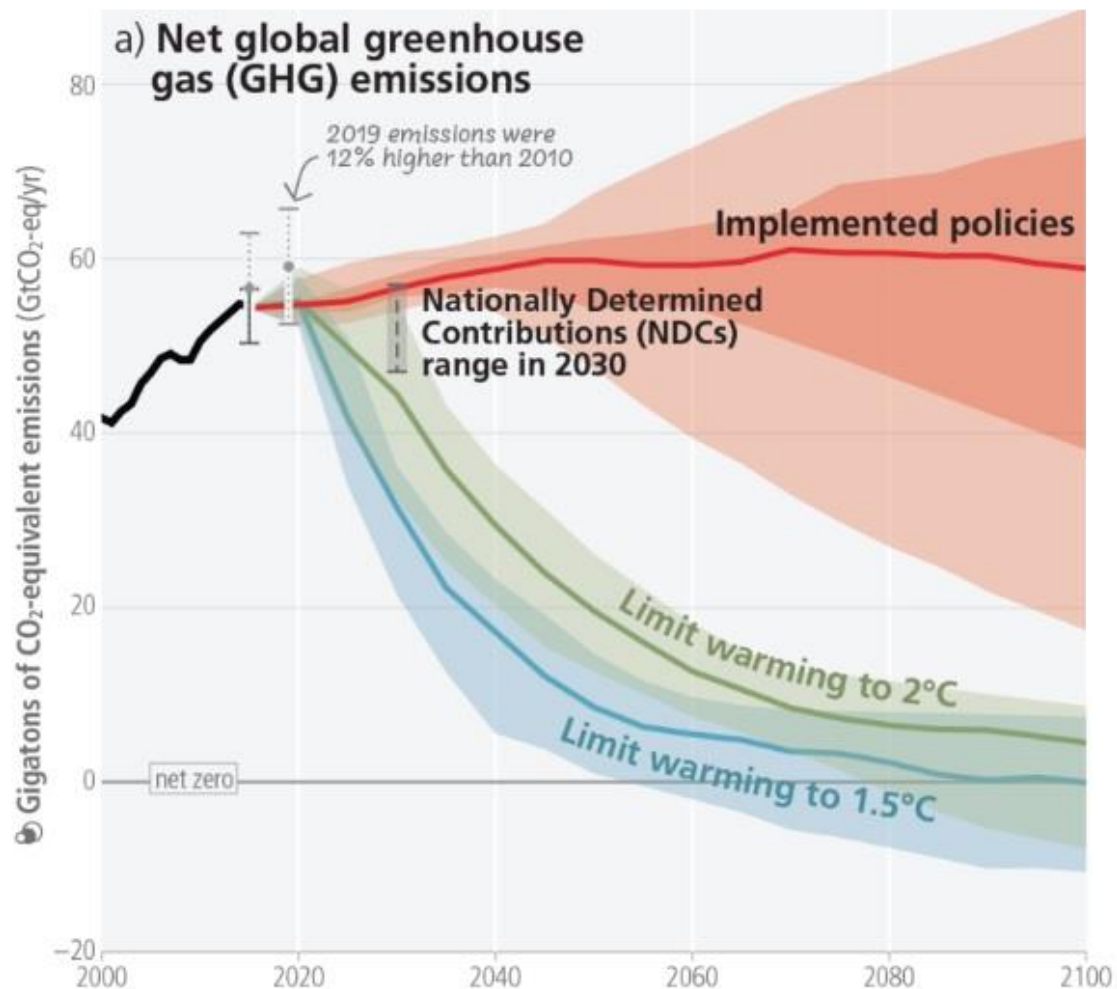
⁴Projected regional impacts reflect biophysical responses to changing temperature, precipitation, solar radiation, humidity, wind, and CO₂ enhancement of growth and water retention in currently cultivated areas. Models assume that irrigated areas are not water-limited. Models do not represent pests, diseases, future agro-technological changes and some extreme climate responses.

Percentage change in GDP in 2100 without climate policy (RCP 8.5). Kahn et al 2019 NBER

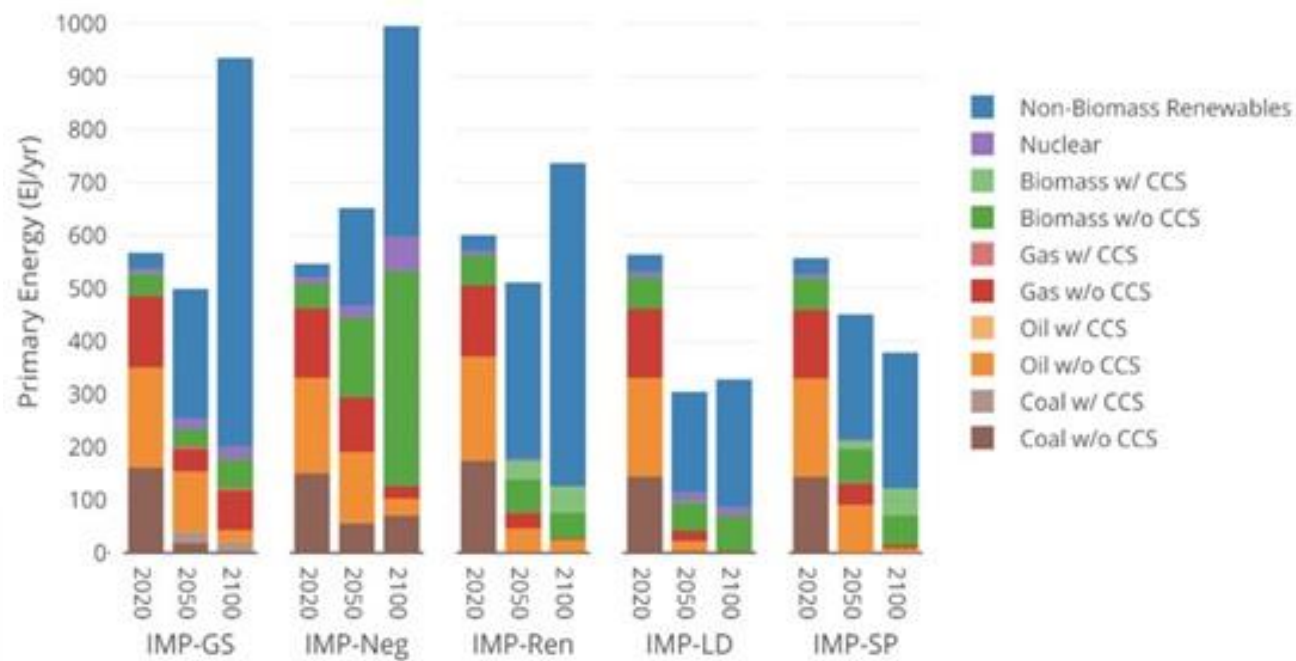
Percentage change in GDP. Bosello, Dasgupta and Tavoni, 2019



Not in line yet, a world of possibilities ahead



a. IMP characteristics: primary energy



There are options available **now** in every sector that can at least **halve emissions by 2030**



Demand and services



Energy



Land use



Industry



Urban



Buildings



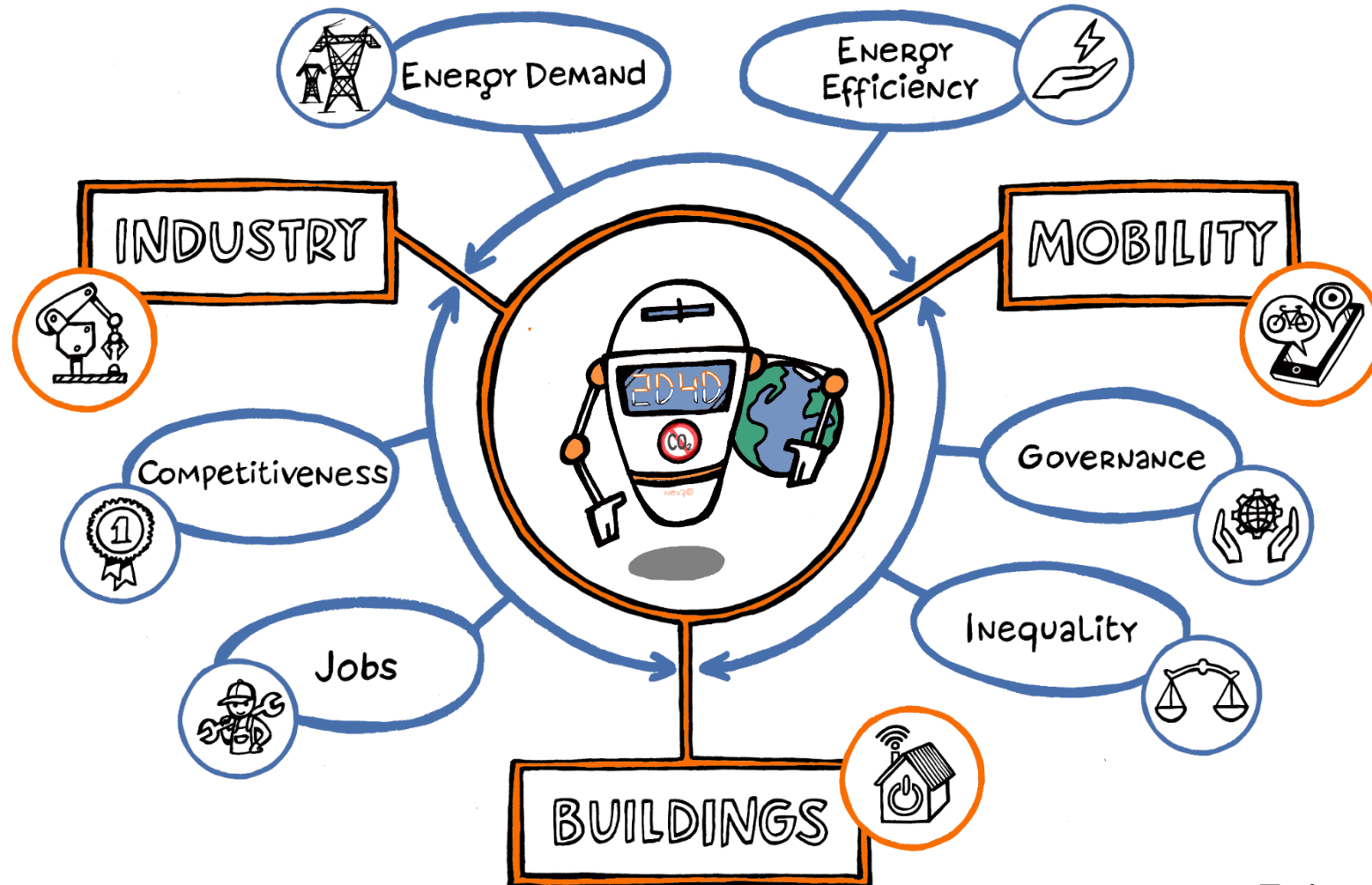
Transport

The geopolitical repercussions of climate change

Energy and geopolitics have been historically linked. Yet, new geopolitical challenges are emerging due to a changing climate.

- Climate change impacts (geopolitics in a changing climate)
 - Change in ecosystems: water, agriculture, food,
 - Distributional repercussions of climate change: vulnerability varies within and across countries
 - Migration, conflict
- Climate change policies (geopolitics of addressing climate change)
 - Technological aspects of the transition: key technologies, critical and rare materials, job-related impacts)
 - Distributional repercussions of climate policies: incidence of climate policy costs varies across and within countries

Disruptive digitalization for decarbonization

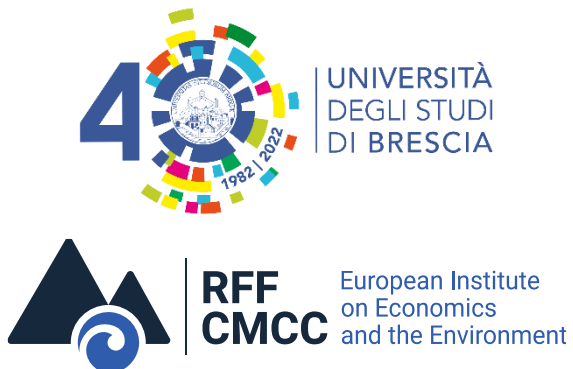




Thank you

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Relevant resources

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- IPCC (2022). Summary for Policymakers. In: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.); **E. Verdolini** as one of the drafting authors]. Cambridge University Press, Cambridge, UK and New York, NY, USA. (doi: 10.1017/9781009157926.001)
- **Verdolini, E.**, F. Vona (2022). “Lavoro e Transizione Energetica”. In XXIV Rapporto Mercato del Lavoro e Contrattazione Collettiva, CNEL – Consiglio Nazionale Economia e Lavoro.
- **Verdolini, E.**, C. Belpietro, Giusta transizione ecologica: l’impatto delle tecnologie digitali in "GIORNALE DI DIRITTO DEL LAVORO E DI RELAZIONI INDUSTRIALI " 174/2022, pp 205-224, DOI: 10.3280/GDL2022-174002
- Alacevic, C., **Verdolini, E.** (in preparation). “Digitalization for decarbonization and the future of work ”.
- Hernandez, I., **E. Verdolini**, M. Tavoni, J. Steckel, F. Vona (in preparation) “ The Economics of a Just Transition ”.

Relevant projects

- 2D4D “Disruptive Digitalization for Decarbonization” (EU H2020 European Research Council Starting Grant). www.2D4D.eu
- AdJUST “ADVANCING THE UNDERSTANDING OF CHALLENGES, POLICY OPTIONS AND MEASURES TO ACHIEVE A JUST EU ENERGY TRANSITION”
<https://www.eiee.org/project/adjust/>
- CircEUlar “Developing circular pathways for a EU low-carbon transition”
<https://circeular.org/>
- EDITS2 “Energy Demand changes Induced by Technological and Social innovations - Low energy demand empirical and modeling work in a post pandemic world”
<https://iiasa.ac.at/projects/edits>