Materiali e Sistemi per il Fotovoltaico e l'Accumulo di Energia Elettrica

Vanni Lughi – Alessandro Massi Pavan

A.A. 2021-22

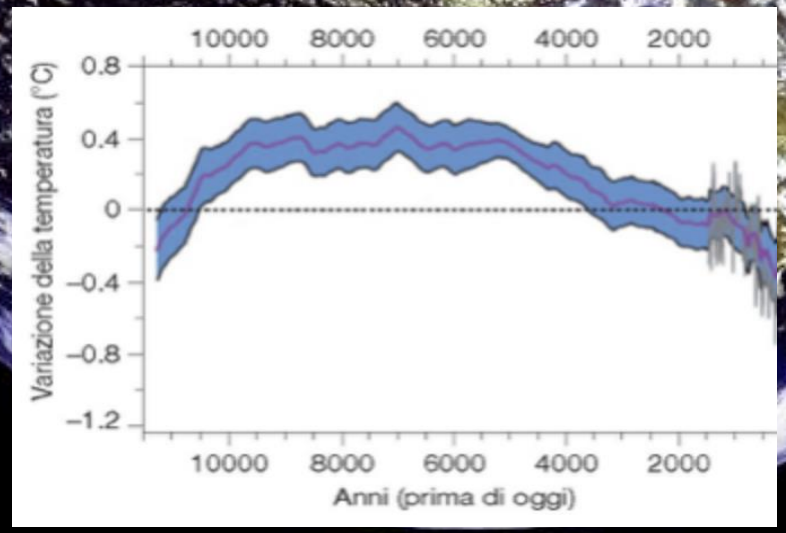
Struttura del Corso

- Due moduli:
  - Materiali (Vanni Lughi)
  - Sistemi (Alessandro Massi Pavan)

  + introduzione (Vanni Lughi e Alessandro Massi Pavan)

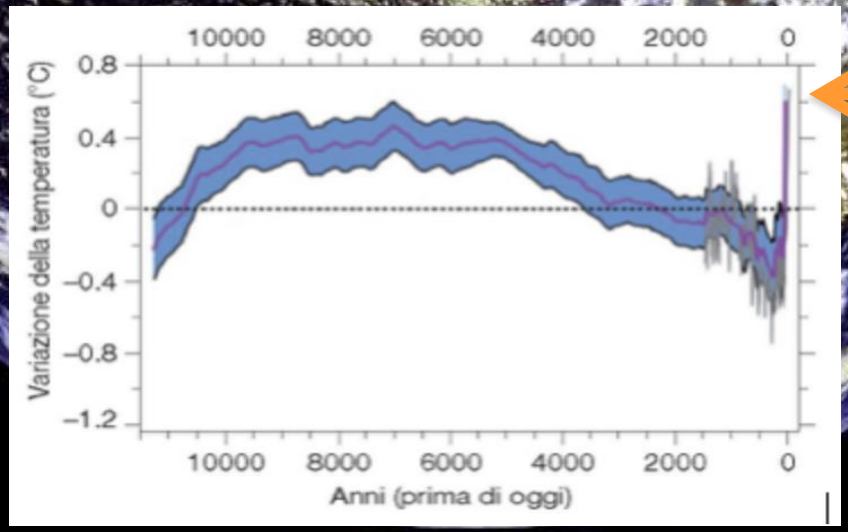
- Due argomenti:
  - Fotovoltaico
  - Accumulo

La temperatura del pianeta e rimasta relativamente stabile per gli ultimi 11,400 anni (Olocene)



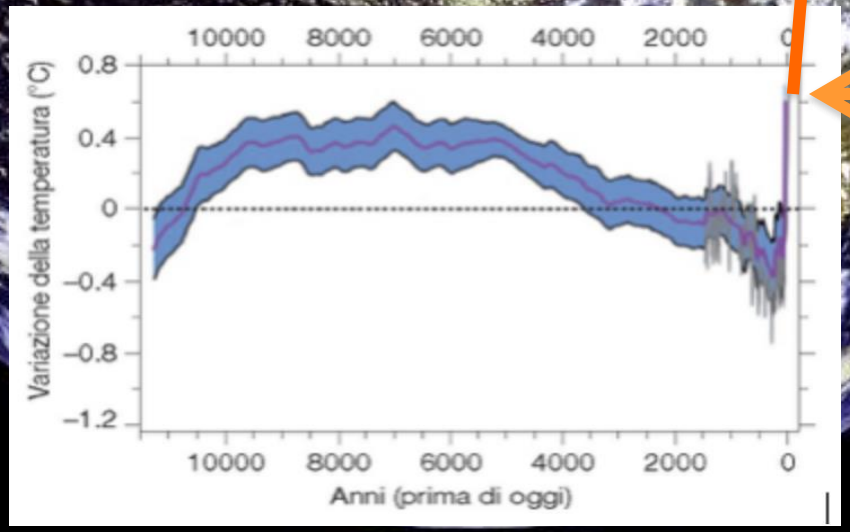
rcott et al.
3; Science

desso il pianeta ha una “febbre anomala”



Oggi

Che potrebbe crescere nel futuro



Accordo di Parigi

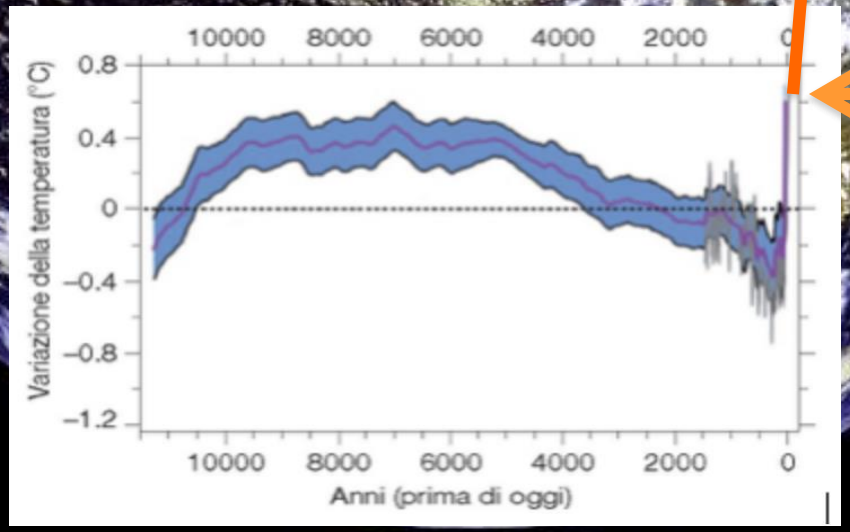
Oggi

Fino a diventare
na minaccia per la
pravvivenza della
società’ come la
conosciamo

Business
as usual

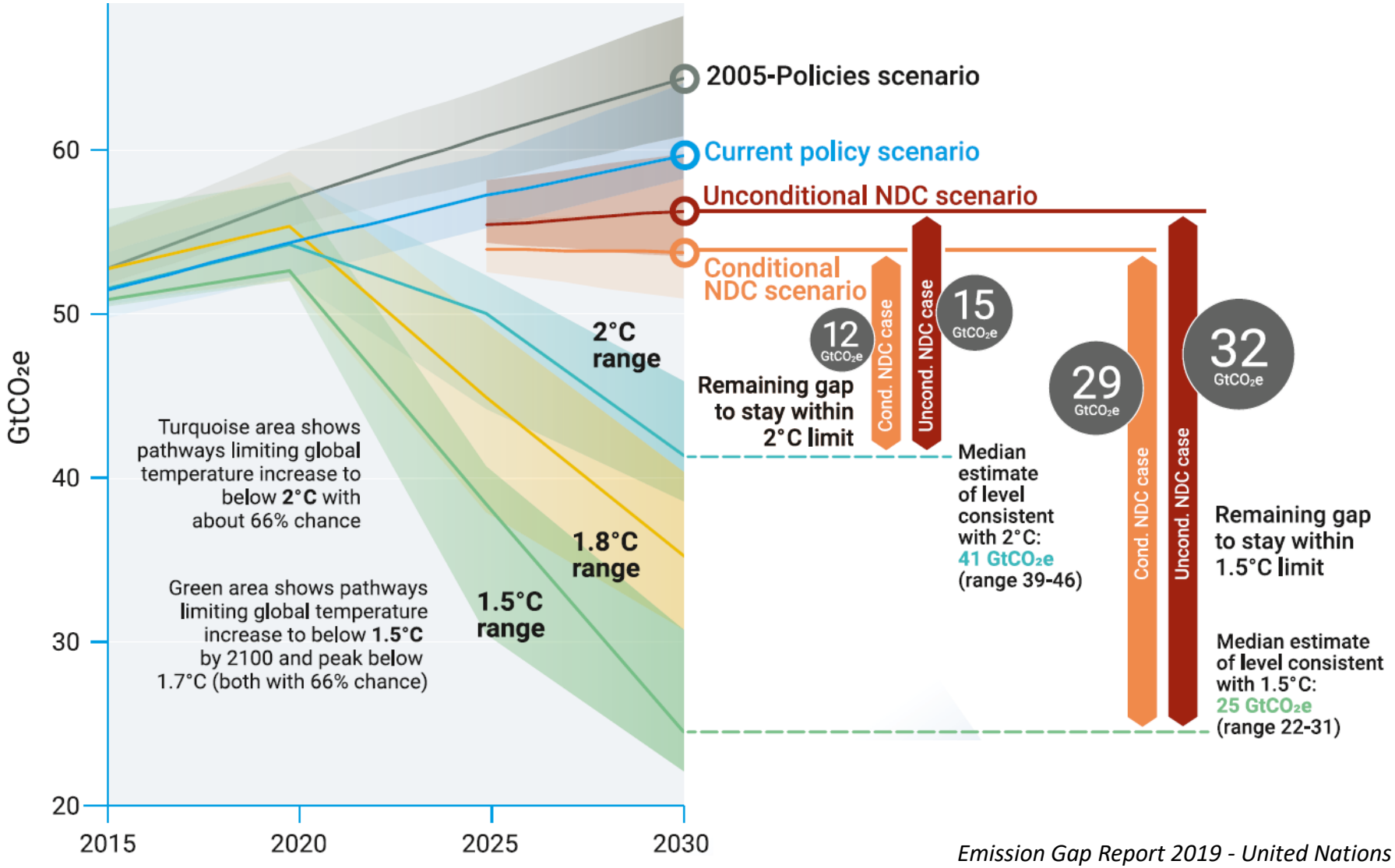
Accordo di
Parigi

Oggi



La sfida dell' *"Emission Gap"*

Enorme divario tra la necessaria riduzione delle emissioni e la quantità di emissioni prevista



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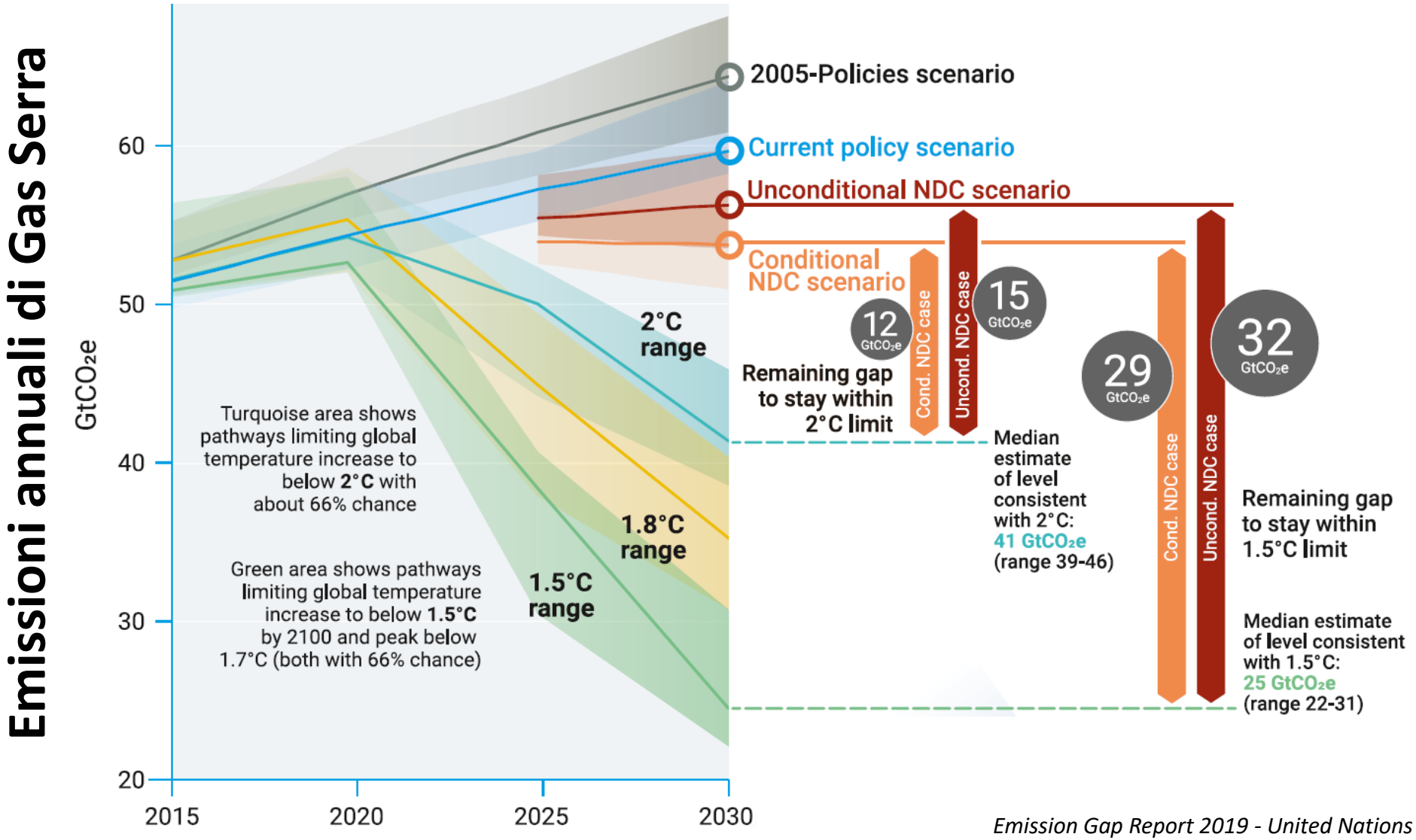

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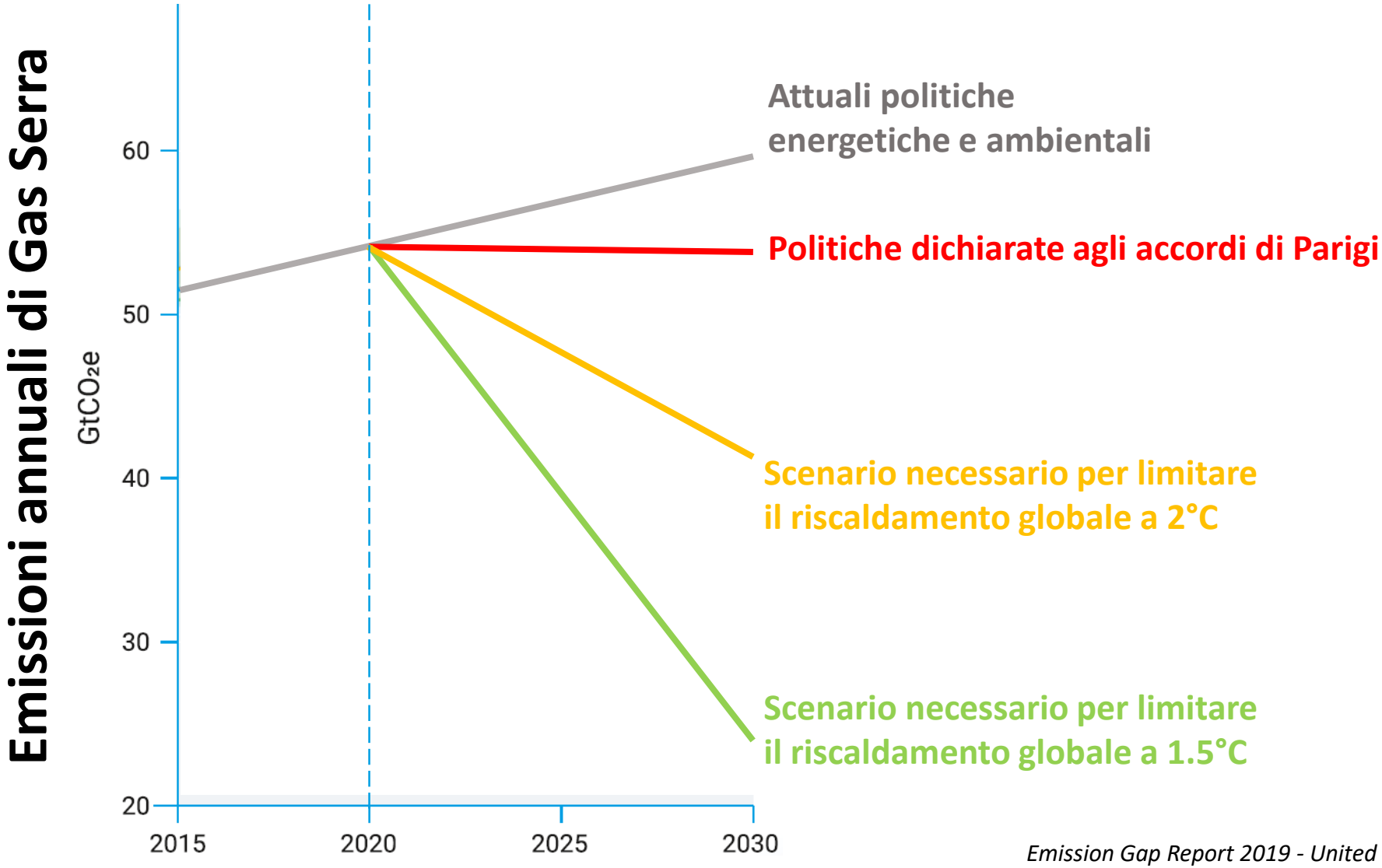

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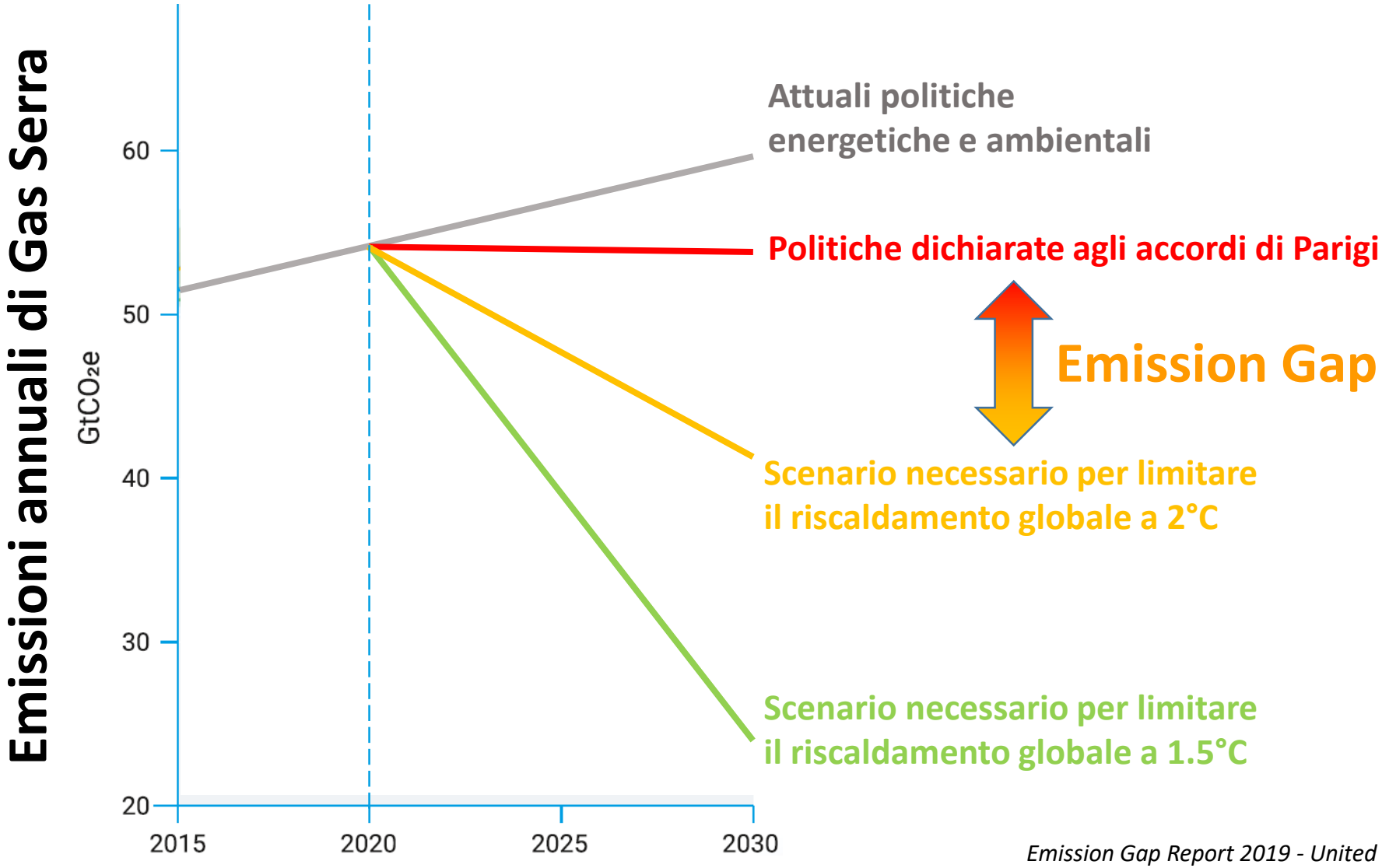

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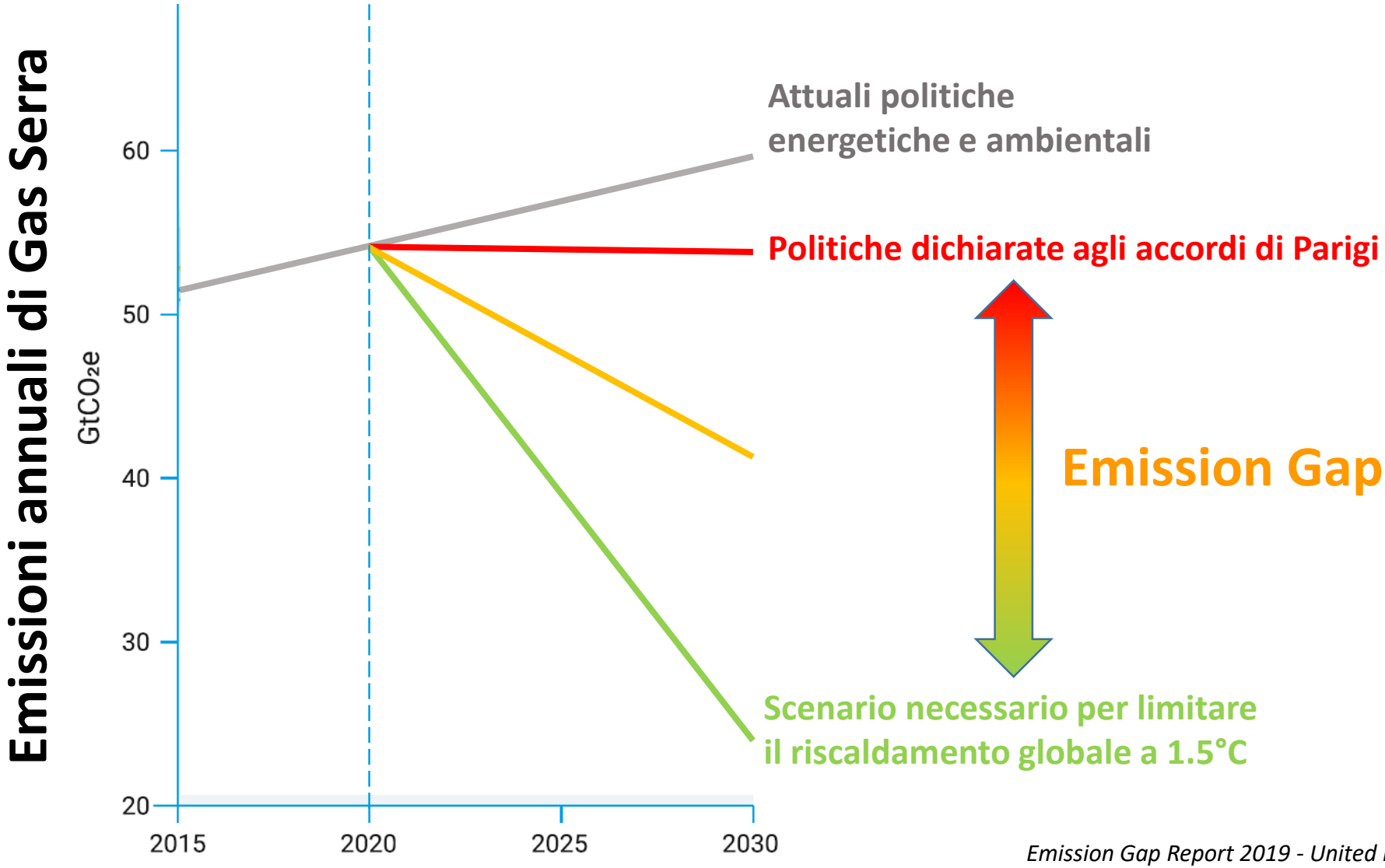

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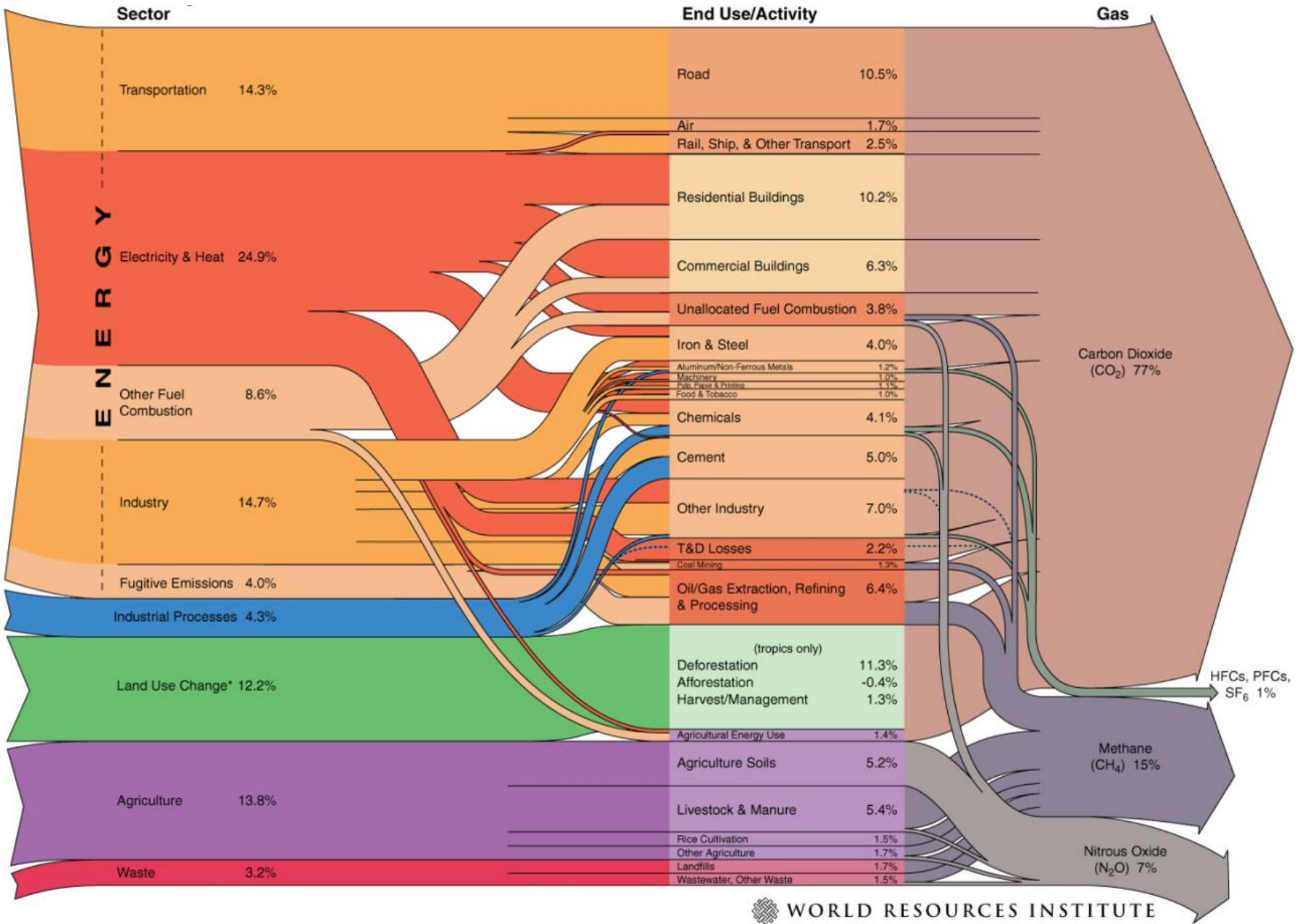
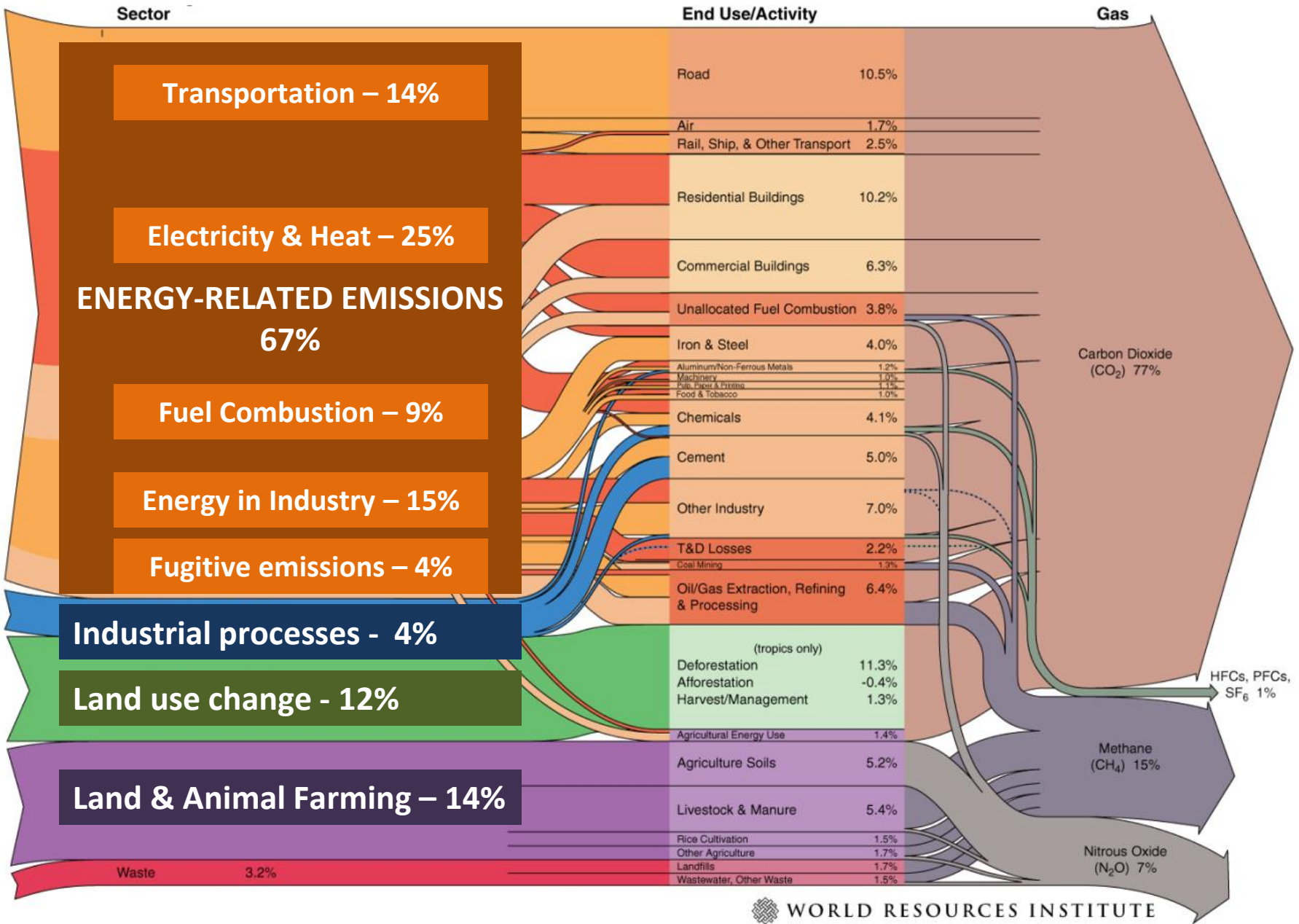
Emissioni di gas serra

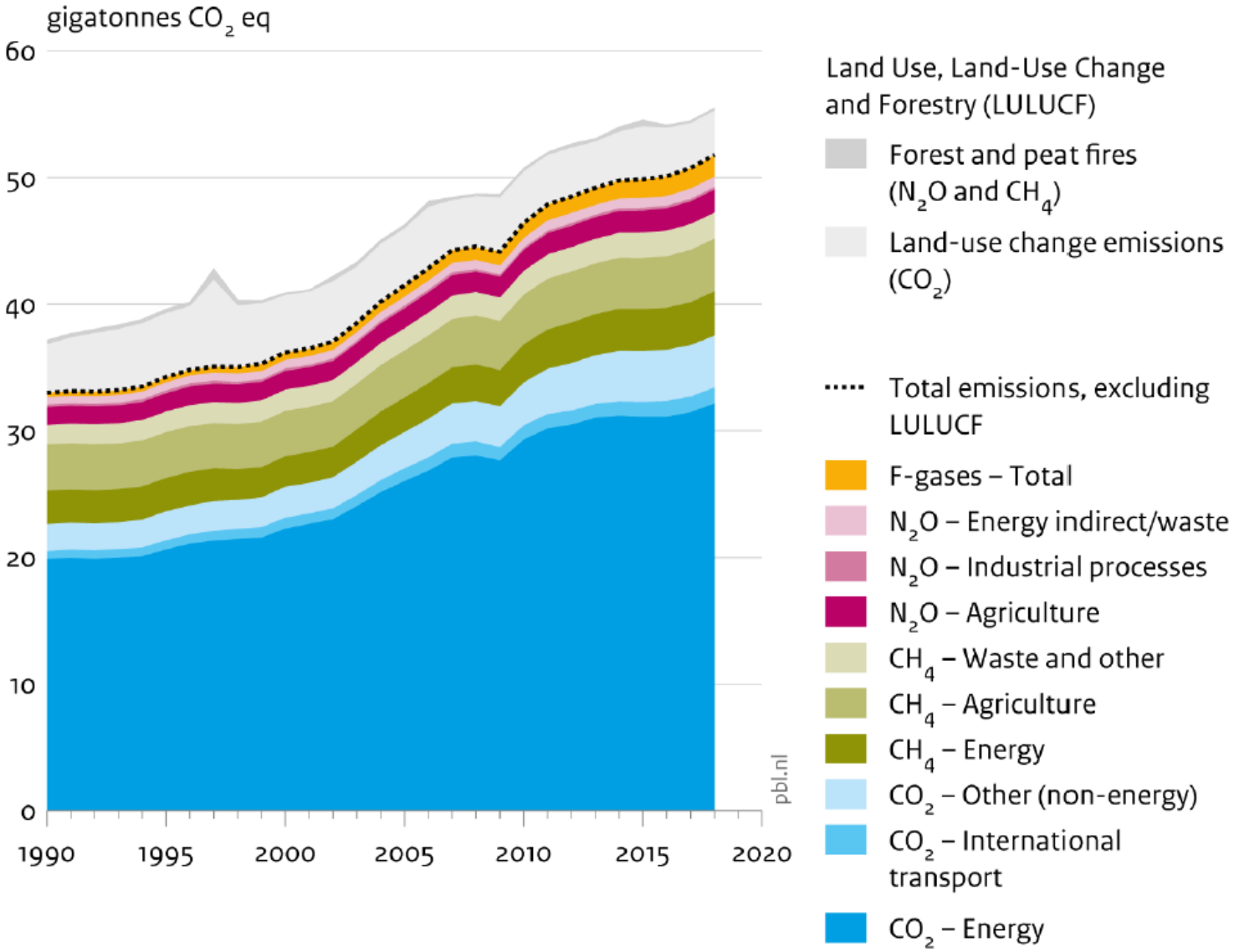


Da dove vengono le emissioni? Dal sistema energetico!



Il trend delle emissioni di gas serra

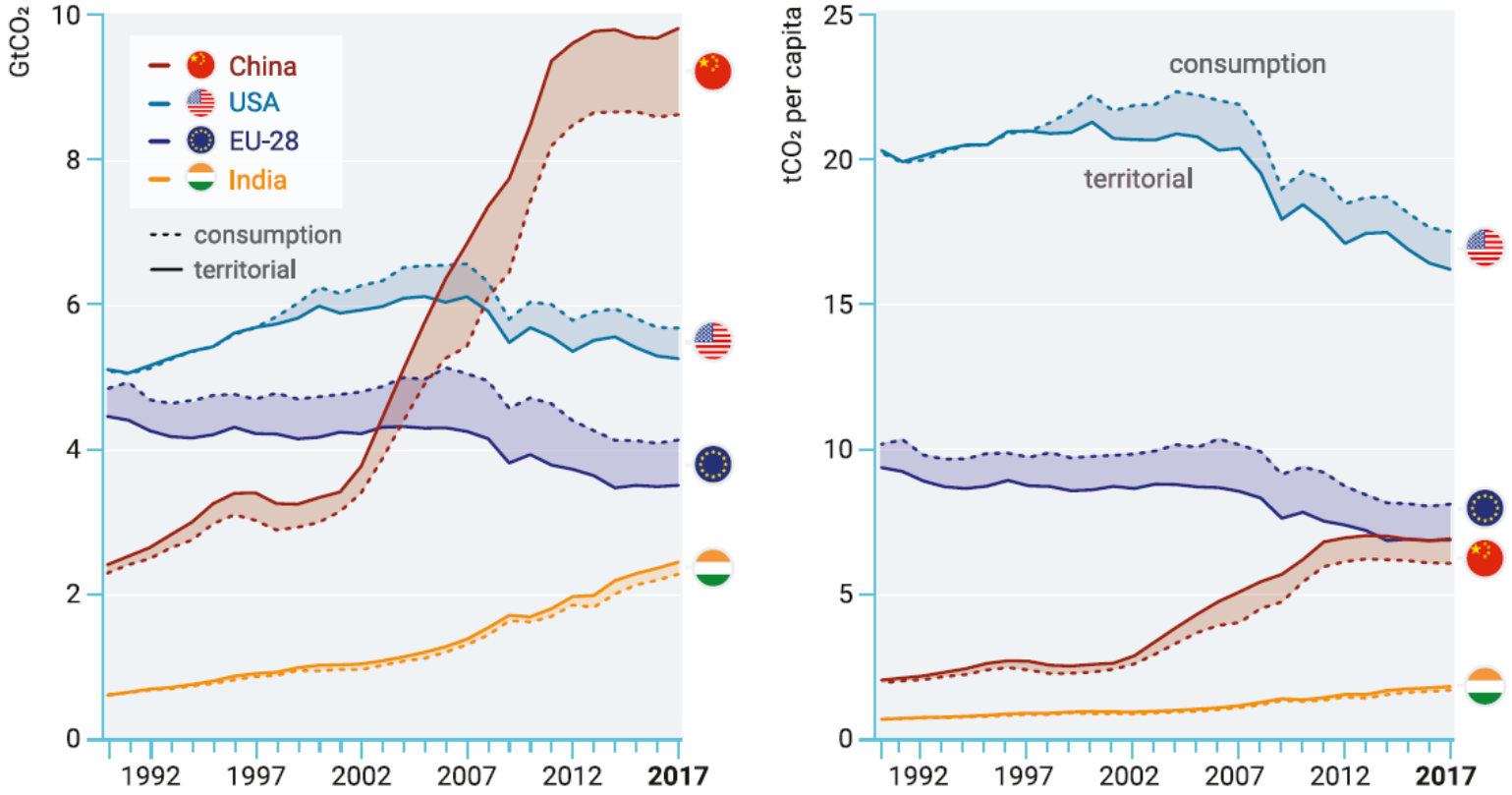
Le emissioni di gas serra continuano a crescere, nonostante tutto



J.G.J. Olivier and J.A.H.W. Peters, *Trends in Global CO2 and Total Greenhouse Gas Emissions - 2019 Report,* PBL Netherlands Environmental Assessment Agency

Il trend delle distribuzioni territoriali di emissioni

I maggiori responsabili sono Cina, USA e EU. Ma tenendo conto delle esternalizzazioni…



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Scelte politiche inadeguate

Le politiche proposte dagli stati nazionali (NDP) sono completamente inadeguate per ridurre l'*emission gap*

POLICY FORUM | CLIMATE POLICY

A roadmap for rapid decarbonization

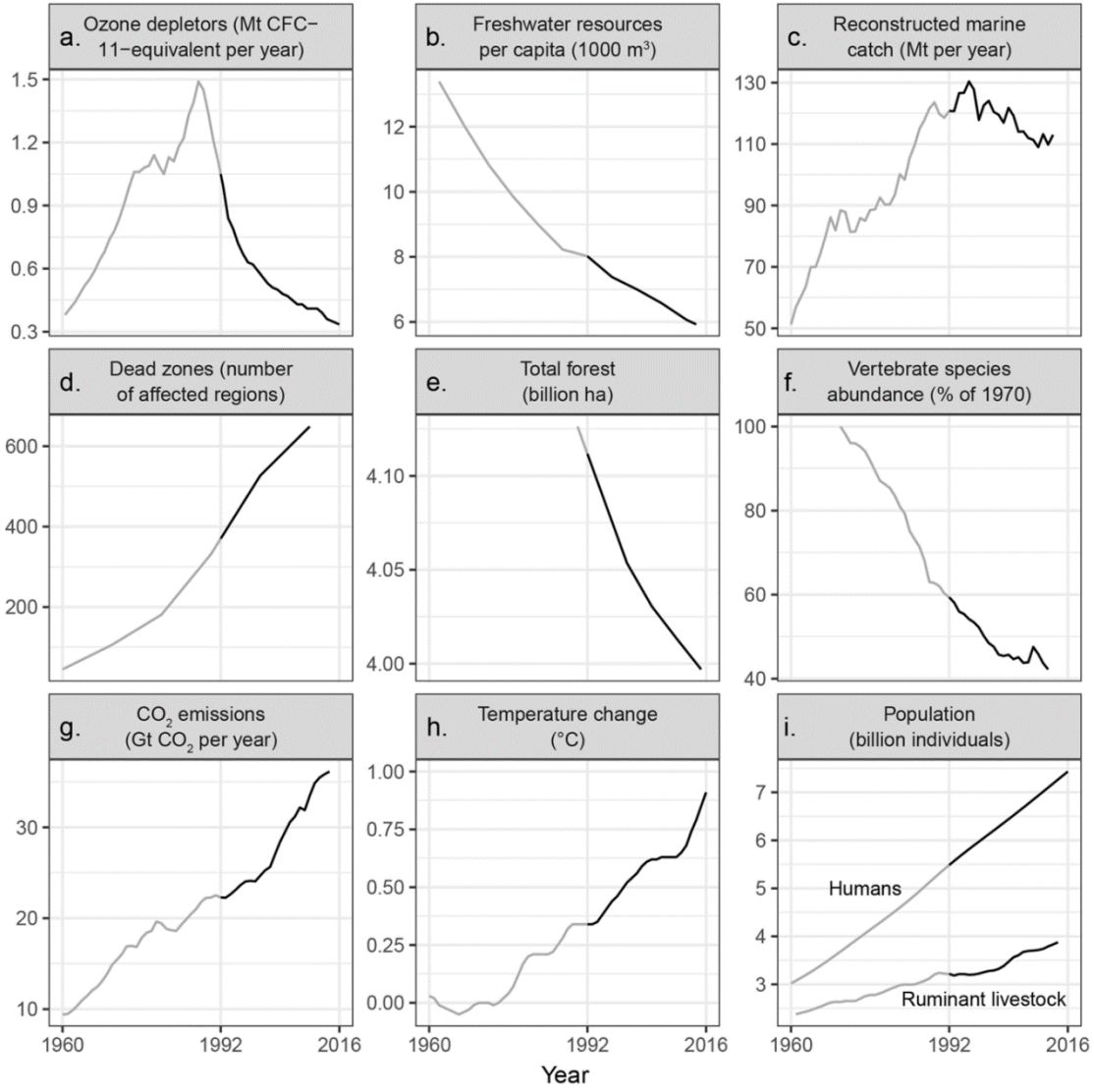
Johan Rockström[1], Owen Gaffney[1,2], Joeri Rogelj[3,4], Malte Meinshausen[5,6], Nebojsa Nakicenovic[3]
+ See all authors and affiliations

Science 24 Mar 2017:
Vol. 355, Issue 6331, pp. 1269-1271
DOI: 10.1126/science.aah3443

« *Per quanto gli obiettivi degli Accordi di Parigi siano allineati con la scienza e possano, in linea di principio, essere fattibili tecnicamente ed economicamente, rimangono inconsistenze allarmanti tra gli obiettivi basati scientificamente e gli impegni presi dalle Nazioni.* »

Il fallimento della comunicazione scientifica

I numerosi tentativi di comunicare la gravità della situazione hanno effetti del tutto trascurabili

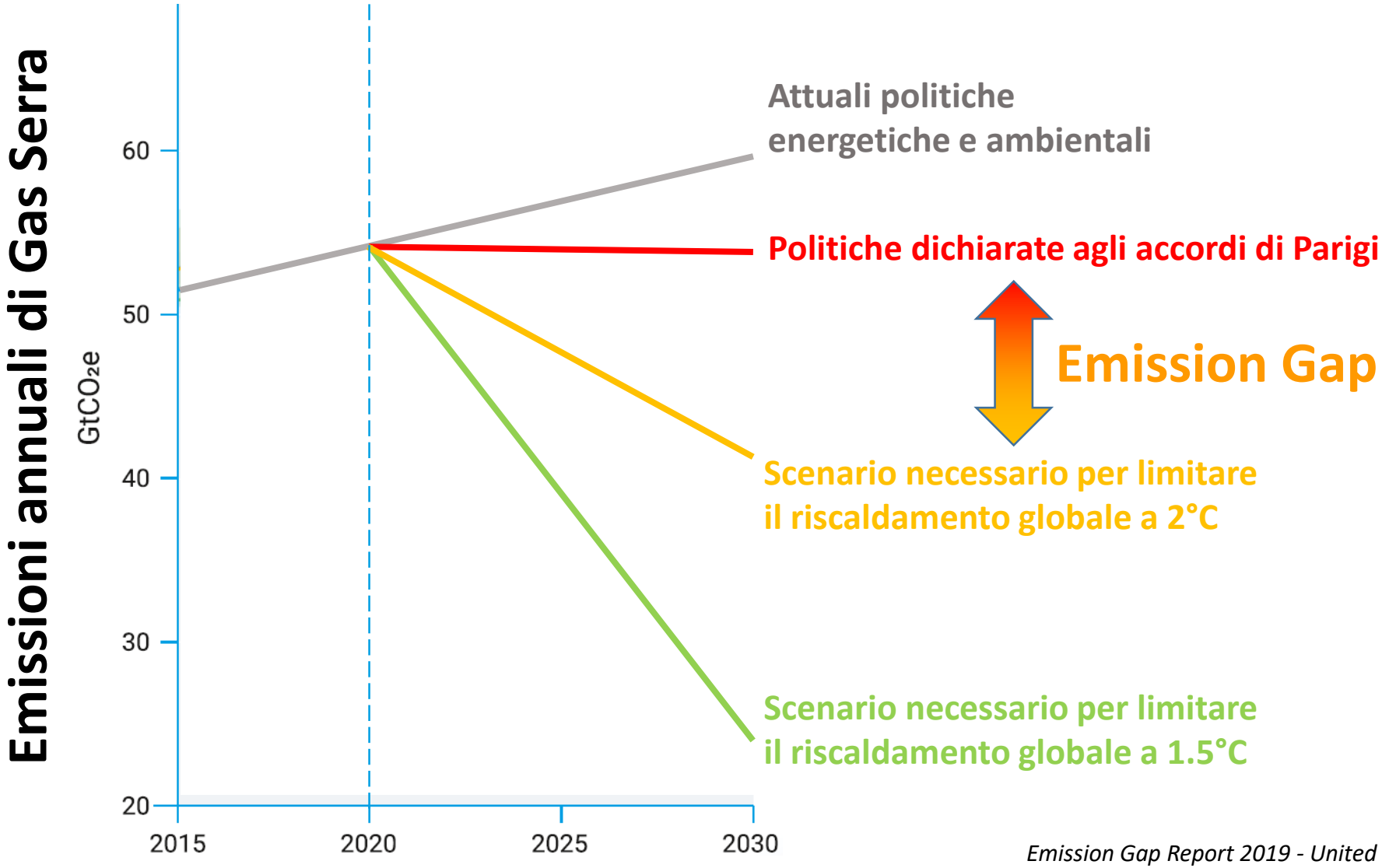


"World Scientists' Warning to Humanity: A **Second** Notice"

BioScience, November 13, 2017

15,364 scientist signatories from 184 countries

La sfida dell' *"Emission Gap"*



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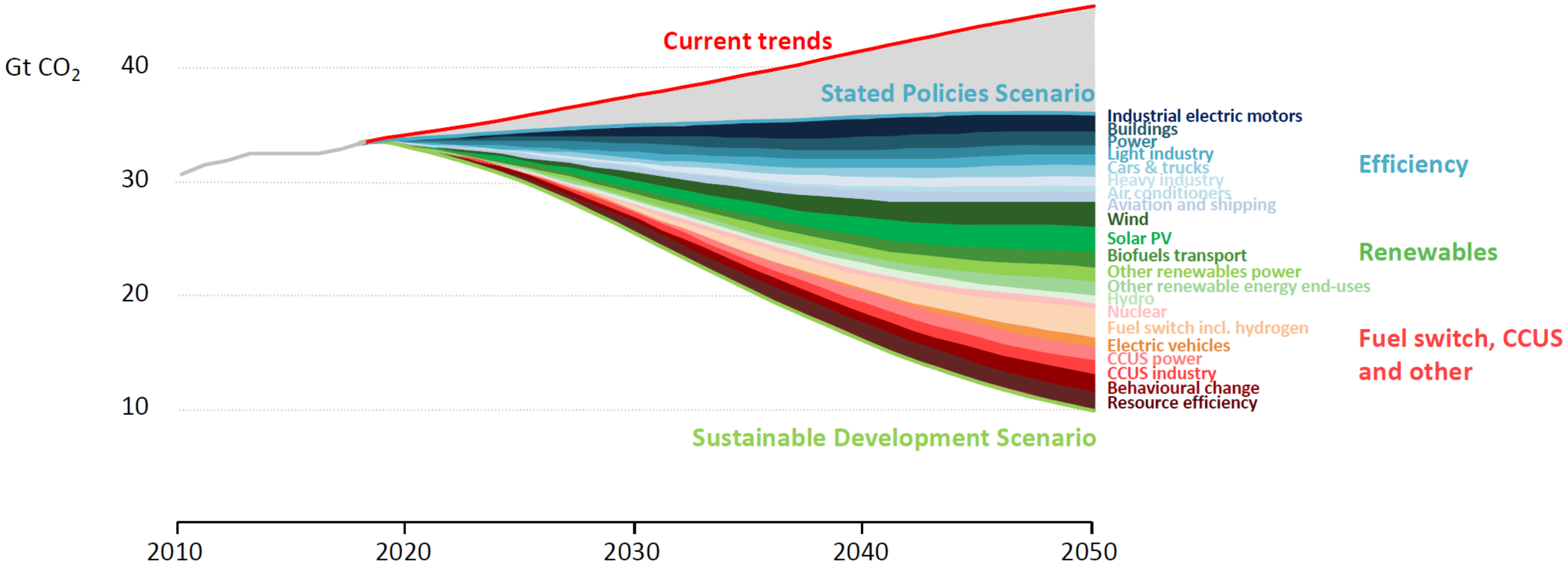

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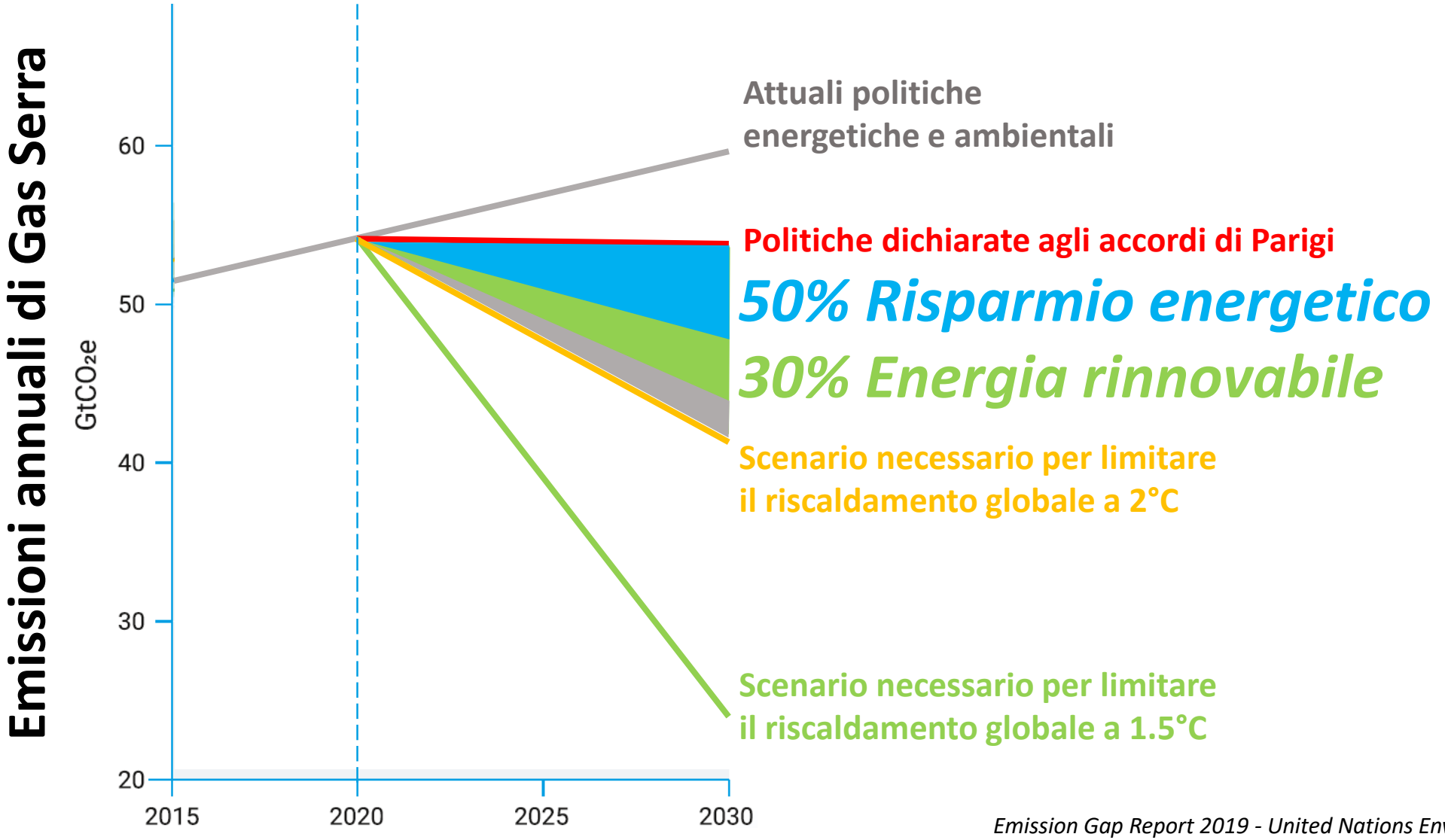
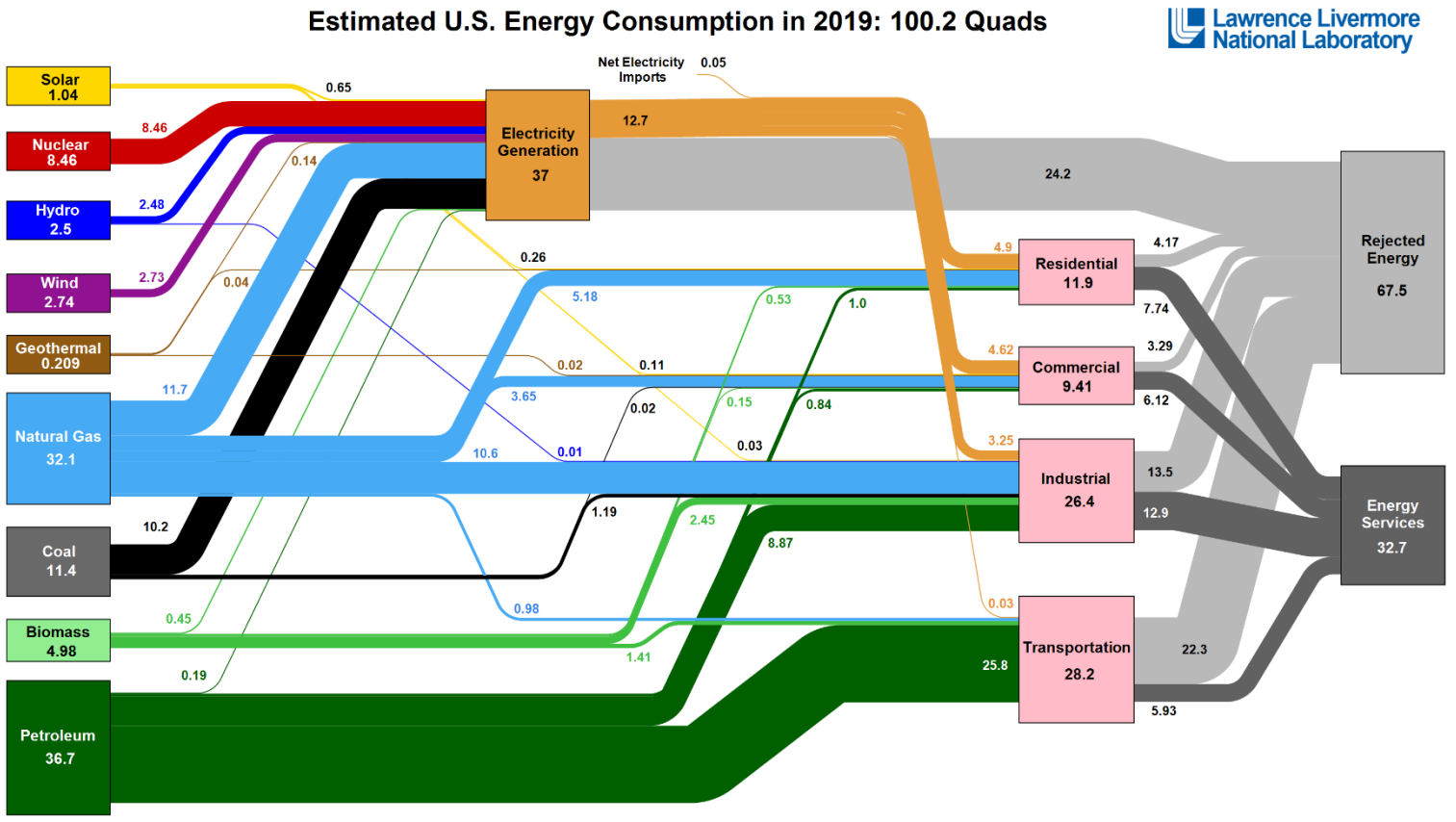


Emission Gap Report 2019 - United Nations Environment Programme

L’inefficienza del sistema energetico

Agire sulla riduzione della domanda ha l’effetto più sensibile!



Source: LLNL March, 2020. Data is based on DOE/EIA MER (2019). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant heat rate. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 65% for the commercial sector, 21% for the transportation sector and 49% for the industrial sector, which was updated in 2017 to reflect DOE’s analysis of manufacturing. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

L’energia rinnovabile come soluzione

Giacomo Ciamician, il pioniere (triestino) dell’energia del sole

SCIENCE

FRIDAY, SEPTEMBER 27, 1912

CONTENTS

THE PHOTOCHEMISTRY OF THE FUTURE[1]

MODERN civilization is the daughter of coal, for this offers to mankind the solar energy in its most concentrated form; that is, in a form in which it has been accumulated in a long series of centuries. Modern man uses it with increasing eagerness and thoughtless prodigality for the conquest of the world and, like the mythical gold of the Rhine, coal is to-day the greatest source of energy and wealth.

"...if our black and nervous civilization, based on coal, shall be followed by a quieter civilization based on the utilization of solar energy, that will not be harmful to progress and to human happiness."

La rivoluzione delle rinnovabili

La visione di Ciamician sta rapidamente prendendo corpo!