

# Global Partnership for Sustainable Construction and Resource Efficiency



Co-funded by the  
Erasmus+ Programme  
of the European Union



1222-2022  
**800**  
ANNI



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA



DEPARTMENT OF  
GEOSCIENCES



**MERU UNIVERSITY**  
OF SCIENCE & TECHNOLOGY

**UN HABITAT**  
FOR A BETTER URBAN FUTURE

**16 July 2021 – ONLINE EVENT**

**Inter-institutional agreement 2020-2023**



# SUSTAINABLE DEVELOPMENT GOALS

**9** INDUSTRY, INNOVATION  
AND INFRASTRUCTURE



**11** SUSTAINABLE CITIES  
AND COMMUNITIES



**12** RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION



**13** CLIMATE  
ACTION











**17** PARTNERSHIPS  
FOR THE GOALS



17 PARTNERSHIPS FOR THE GOALS



## ISEE Conference, Nairobi, 2019

-  Global and local challenges and/or potentials in construction
-  Potentials for sustainable construction based on education
-  Future skill requirements in civil engineering, architecture and materials
-  Global research and education requirements
-  African research and education requirements
-  Contemporary teaching methods
-  Gender issues in STEM education
-  Language and communication barriers





## The construction industry accounts for a significant share of the global anthropogenic CO<sub>2</sub> emission

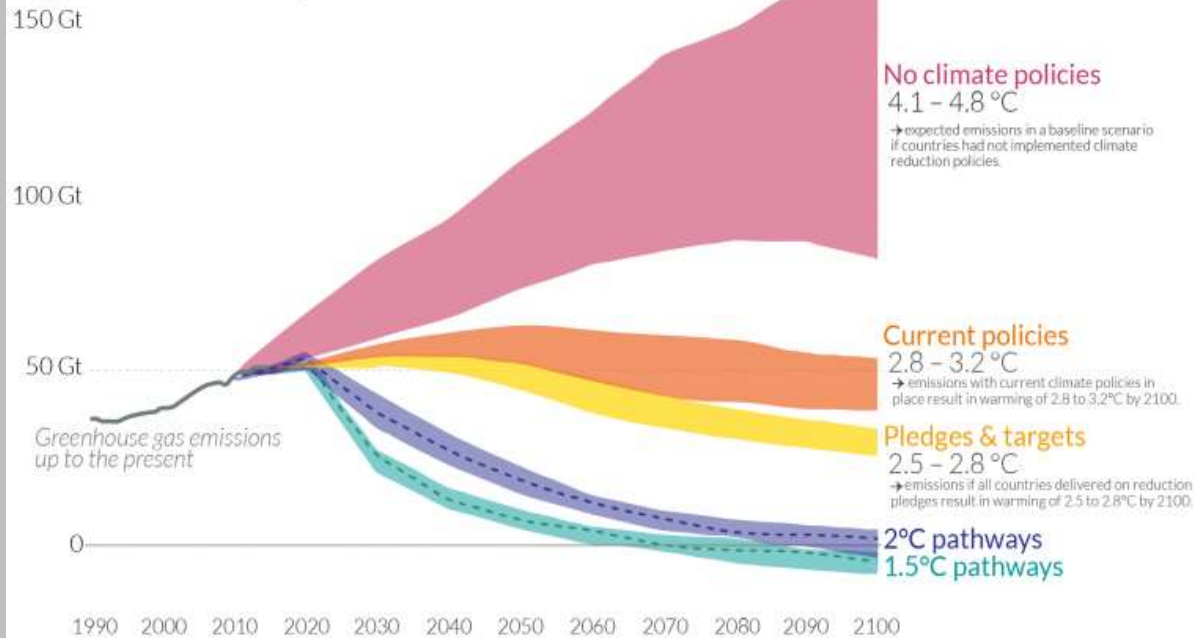
### Low-CO<sub>2</sub> cements

- Blended cements (LC3 and other blended-cements)
- Non-Portland systems (e.g. alkali-activated materials / geopolymers)
  - Carbonation binders, calcium-sulfoaluminate cements etc...

### Global greenhouse gas emissions and warming scenarios Our World in Data

- Each pathway comes with uncertainty, marked by the shading from low to high emissions under each scenario.  
- Warming refers to the expected global temperature rise by 2100, relative to pre-industrial temperatures.

Annual global greenhouse gas emissions  
in gigatonnes of carbon dioxide-equivalents

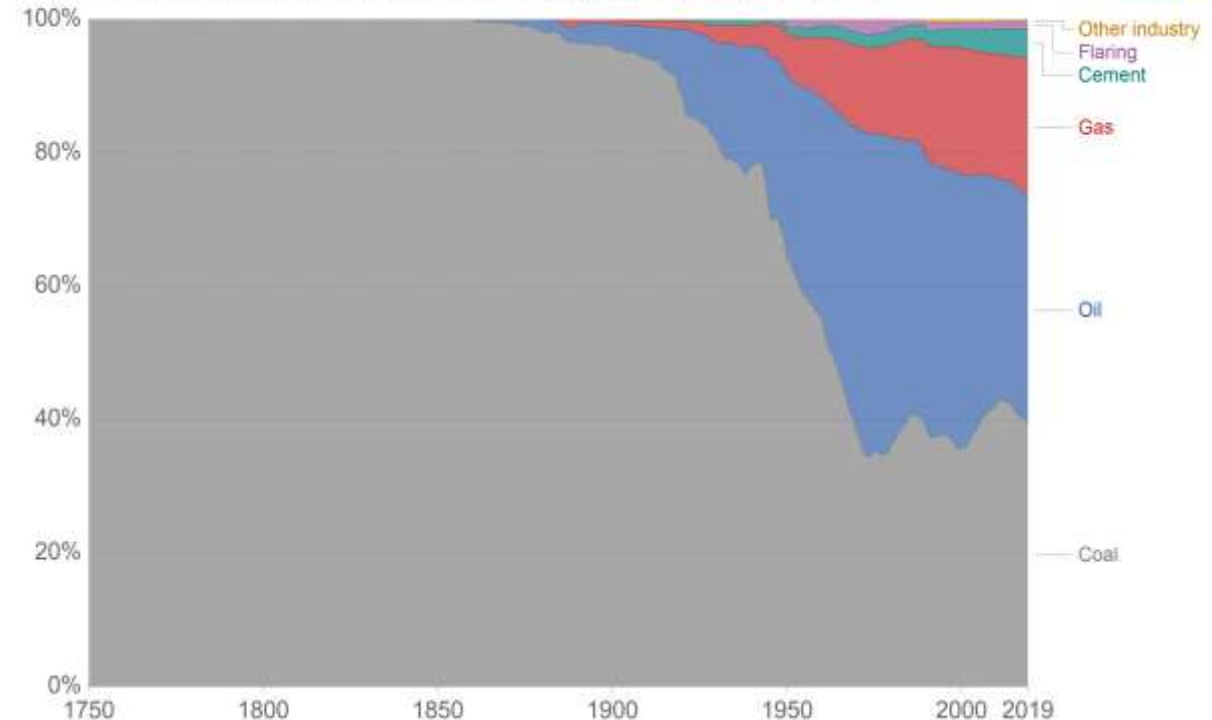


Data source: Climate Action Tracker (based on national policies and pledges as of December 2019).  
OurWorldInData.org – Research and data to make progress against the world's largest problems.

Licensed under CC-BY by the authors Hannah Ritchie & Max Roser.

### CO<sub>2</sub> emissions by fuel type, World Our World in Data

Annual carbon dioxide (CO<sub>2</sub>) emissions from different fuel types, measured in tonnes per year.



Source: Global Carbon Project

OurWorldInData.org/co2-and-other-greenhouse-gas-emissions/ • CC BY

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



11 SUSTAINABLE CITIES AND COMMUNITIES



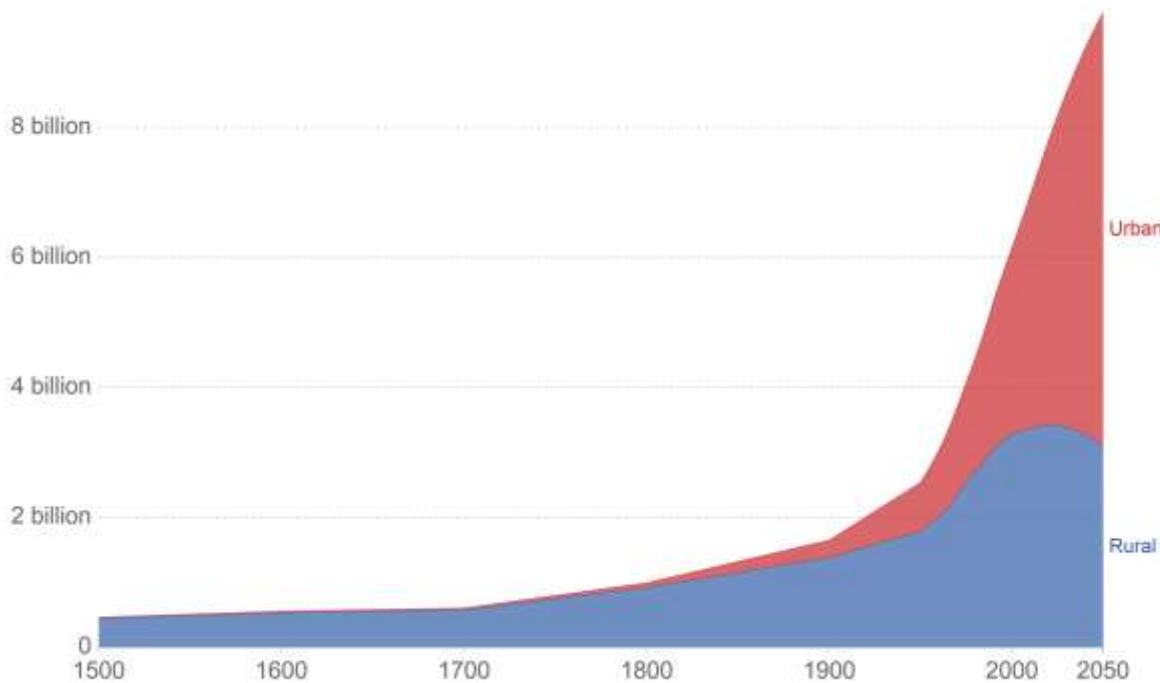
## Urbanisation & demand of building materials

- High rates of urbanisation exert pressure on cities -> *spatial injustice*
- Affordable building materials needed to address housing deficit

### Urban and rural population projected to 2050, World, 1500 to 2050

Total urban and rural population, given as estimates to 2016, and UN projections to 2050. Projections are based on the UN World Urbanization Prospects and its median fertility scenario.

Our World in Data



Source: OWID based on UN World Urbanization Prospects 2018 and historical sources (see Sources)

CC BY

### Housing backlog (units per 1,000 inhabitants)



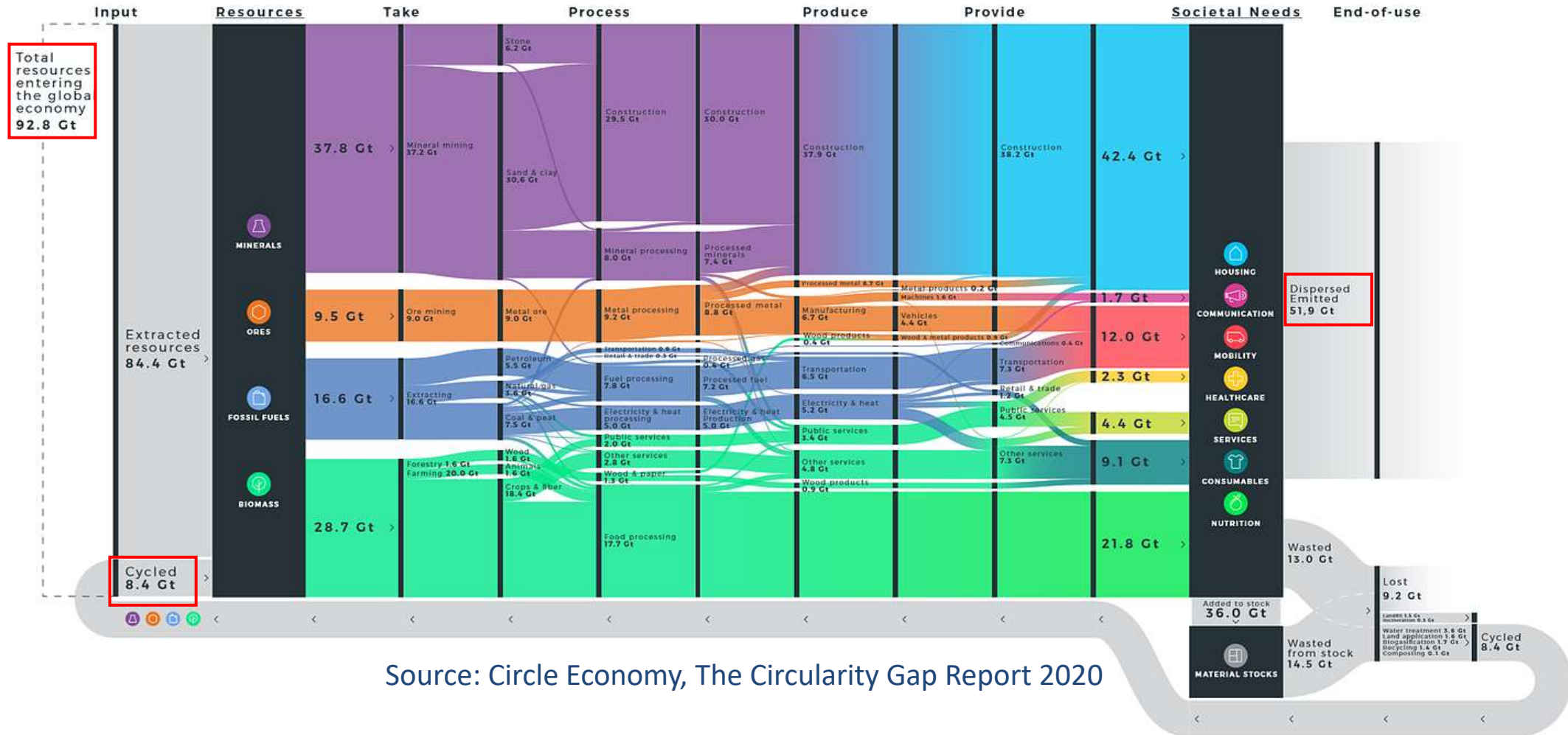
Chart: Luca Valentini - Created with Datawrapper



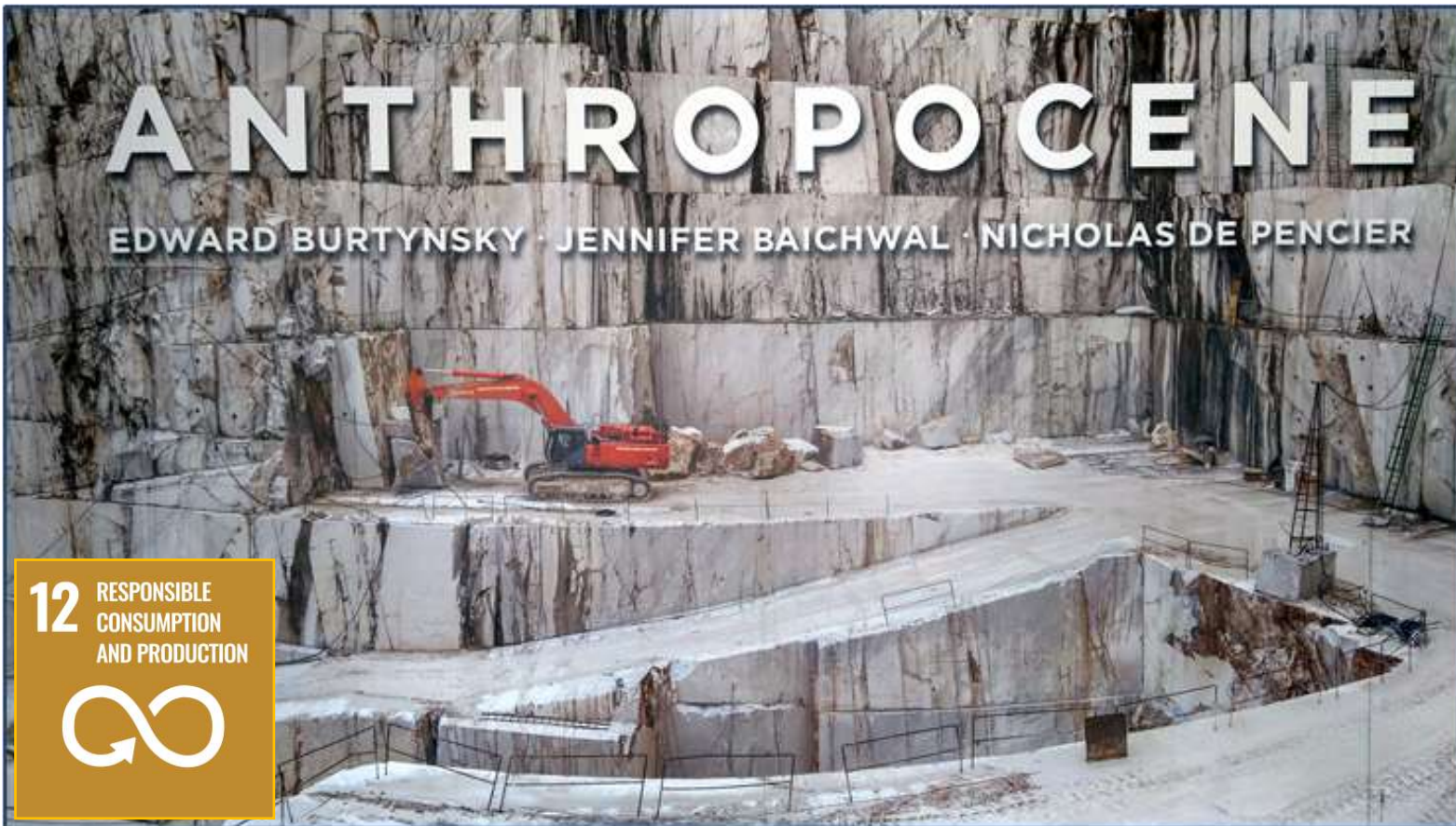
# Anthropogenic metabolism

Nearly 100 Gtonnes of resources of various kind are extracted each year, with more than 40% feeding the construction industry and a big portion of it is emitted to the atmosphere or dispersed in the environment. Less than 10% is cycled

About 40 Gtonnes of sand extracted worldwide each year. The consumption of this resource is triggering illegal extraction activities (*sand mafia*)



Source: Circle Economy, The Circularity Gap Report 2020

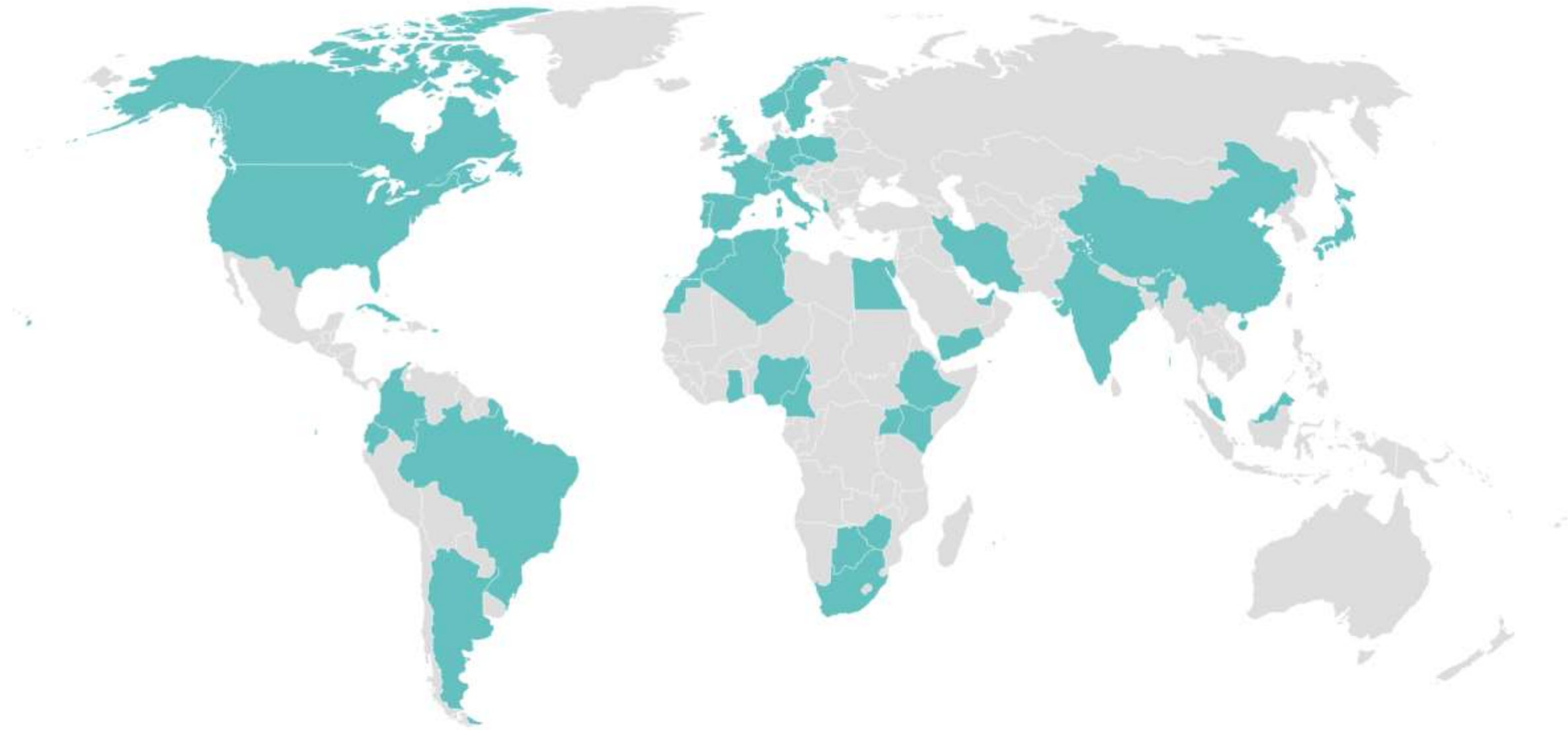


**THE ANTHROPOCENE PROJECT**

[theanthropocene.org](http://theanthropocene.org)

According to some geologists, we have entered a new geological epoch, named **Anthropocene** (*human epoch*) in which the **impact of human activities** on the landscape are comparable to that of geological forces





Created with Datawrapper

252 Participants from 41 countries