University of Palermo | Department of Architecture
Master Programme in Spatial Planning | Year II
Academic Year 2026-2027 | First semester

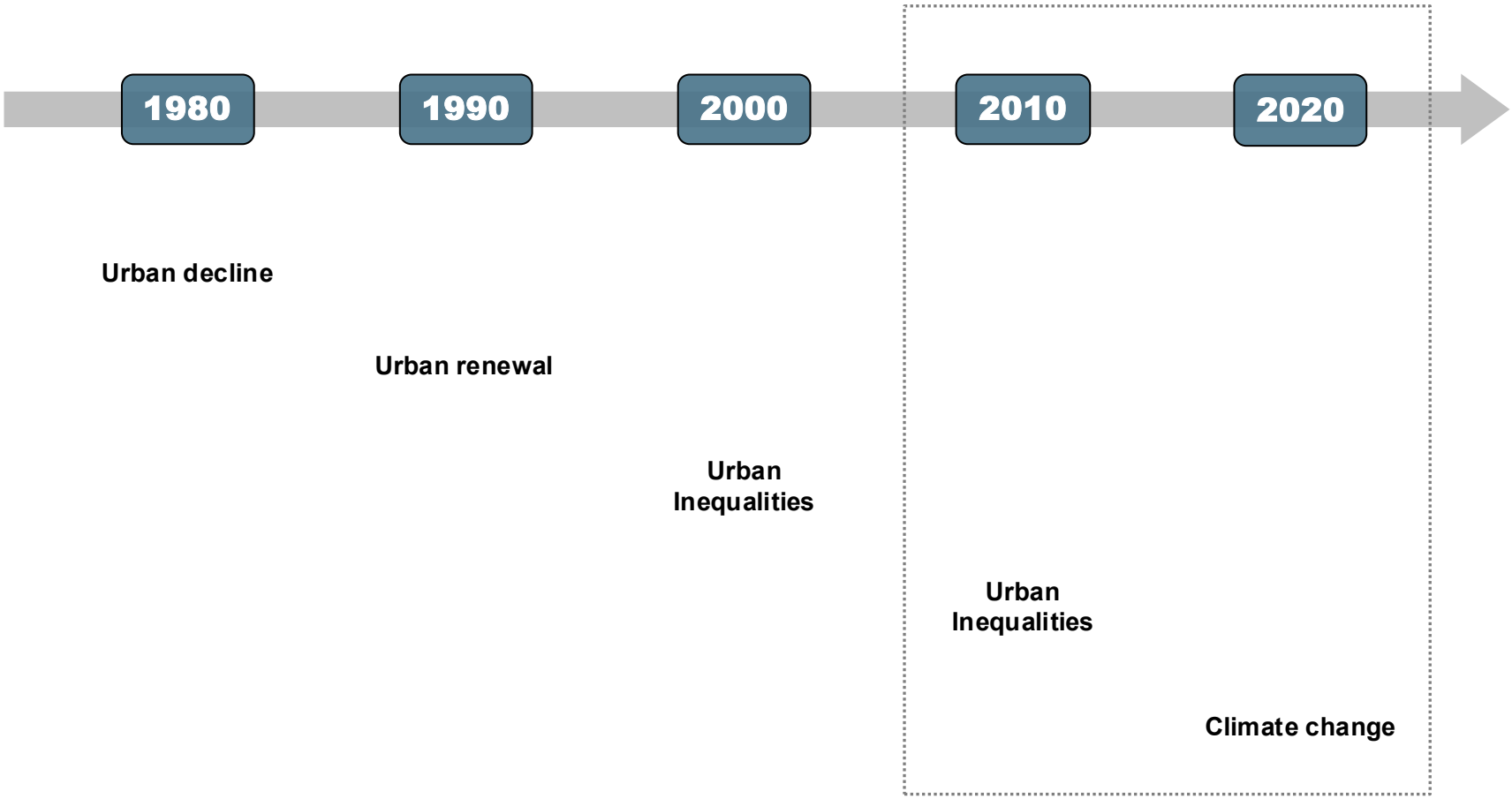
Urban and Regional Policies

Module of Planning 2 Studio + Urban And Regional Policies Integrated Course

Prof. Ignazio Vinci

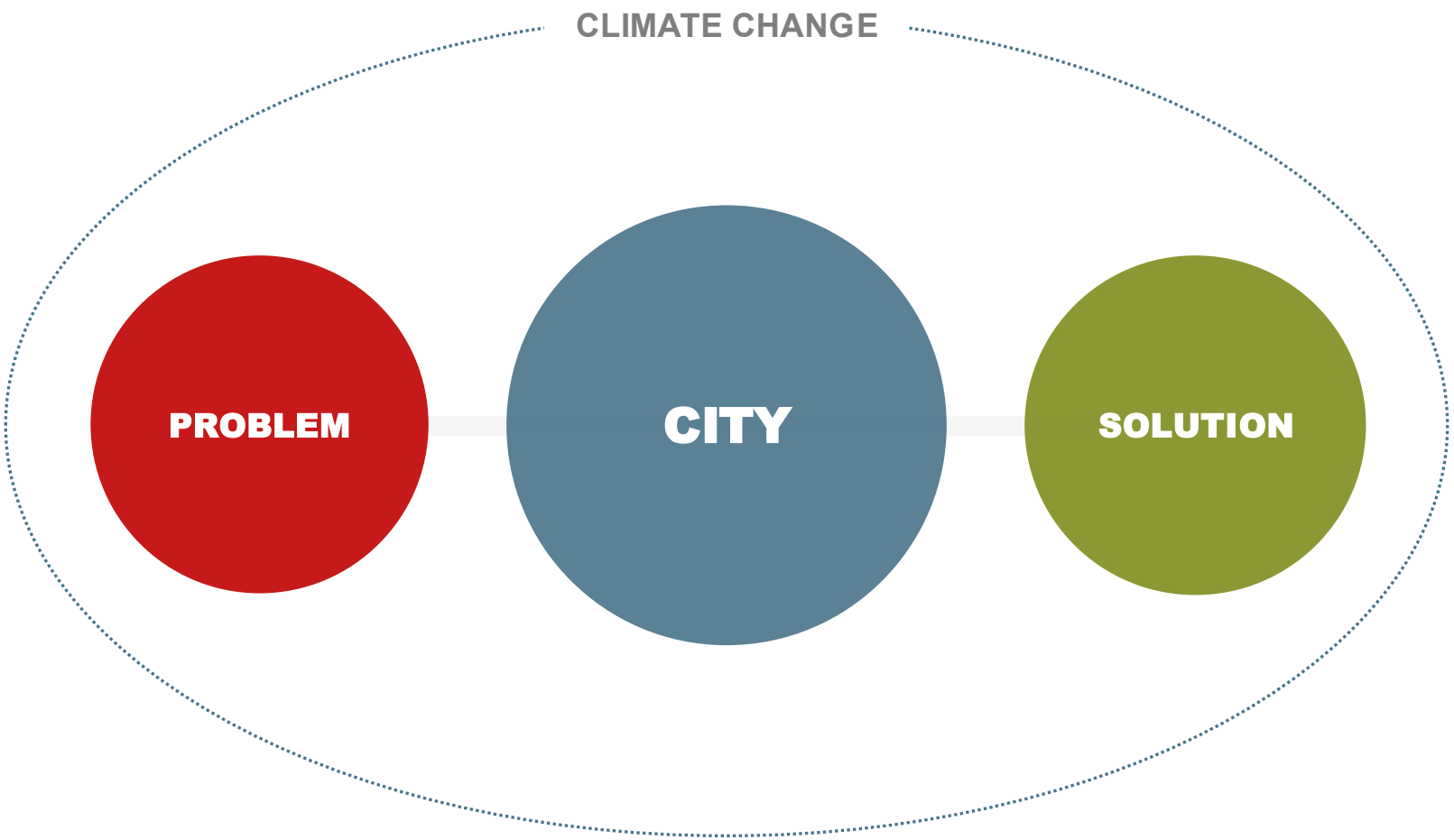
Policy challenges in contemporary urban areas (Part IIc)

DRIVERS OF URBAN CHANGE



CLIMATE CHANGE AND THE CITY

Urban areas as the problem and the solution



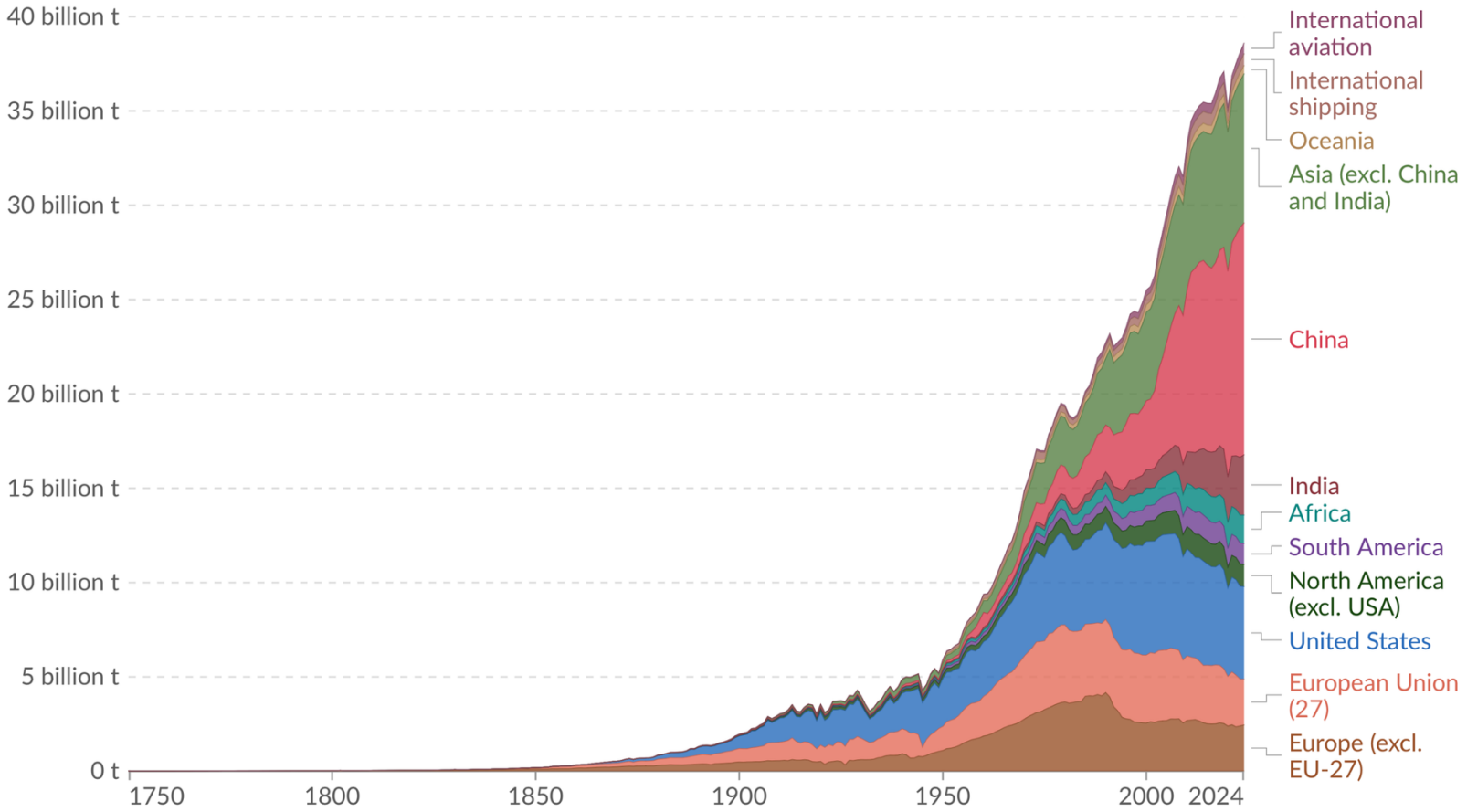
CLIMATE CHANGE AND THE CITY

Urban areas as the problem

- By 2030, almost **5 billion** of the world's **8.3 billion people** will live in cities.
- Cities have historically developed in **locations** that are highly **vulnerable to to the effects of climate change** (e.g. coastal or river areas).
- **Rapid urbanization** is creating significant urban challenges that will be exacerbated by climate change.
- Cities represent **concentrations** of economic and social activities that produce Greenhouse Gas (GHC) emissions.
- Cities and towns produce over **70%** of global energy-related **CO2 emissions**.
- By 2030, **over 80%** of the increase in global annual energy demand above 2006 level **will come from cities** in non-OECD countries .

CLIMATE CHANGE AND THE CITY

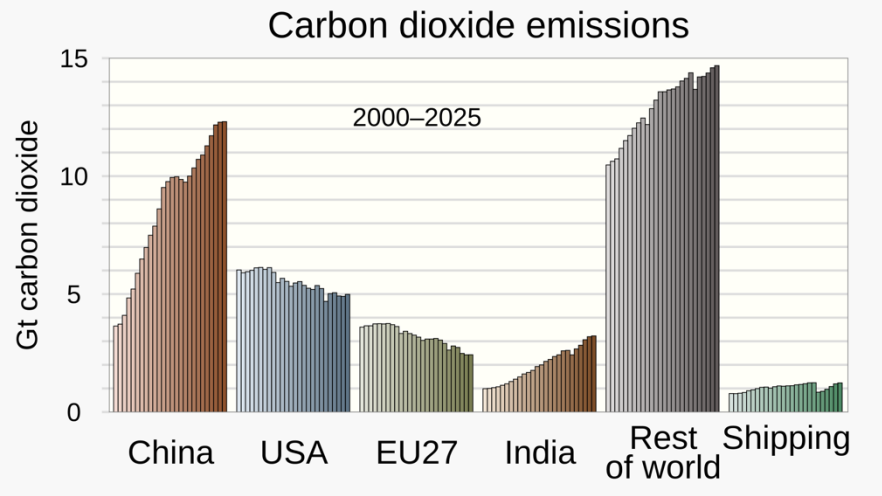
Historical growth of emissions by world region

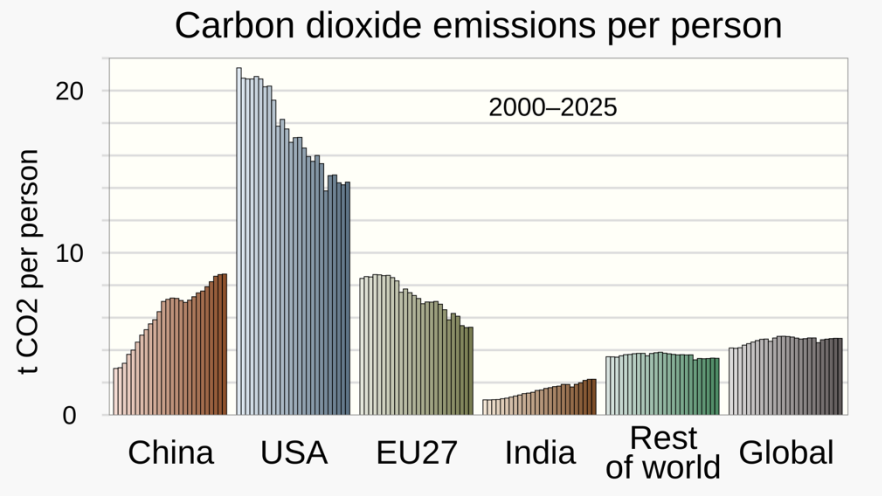


Source: GCB, 2025

CLIMATE CHANGE AND THE CITY

Recent growth of emissions by world region

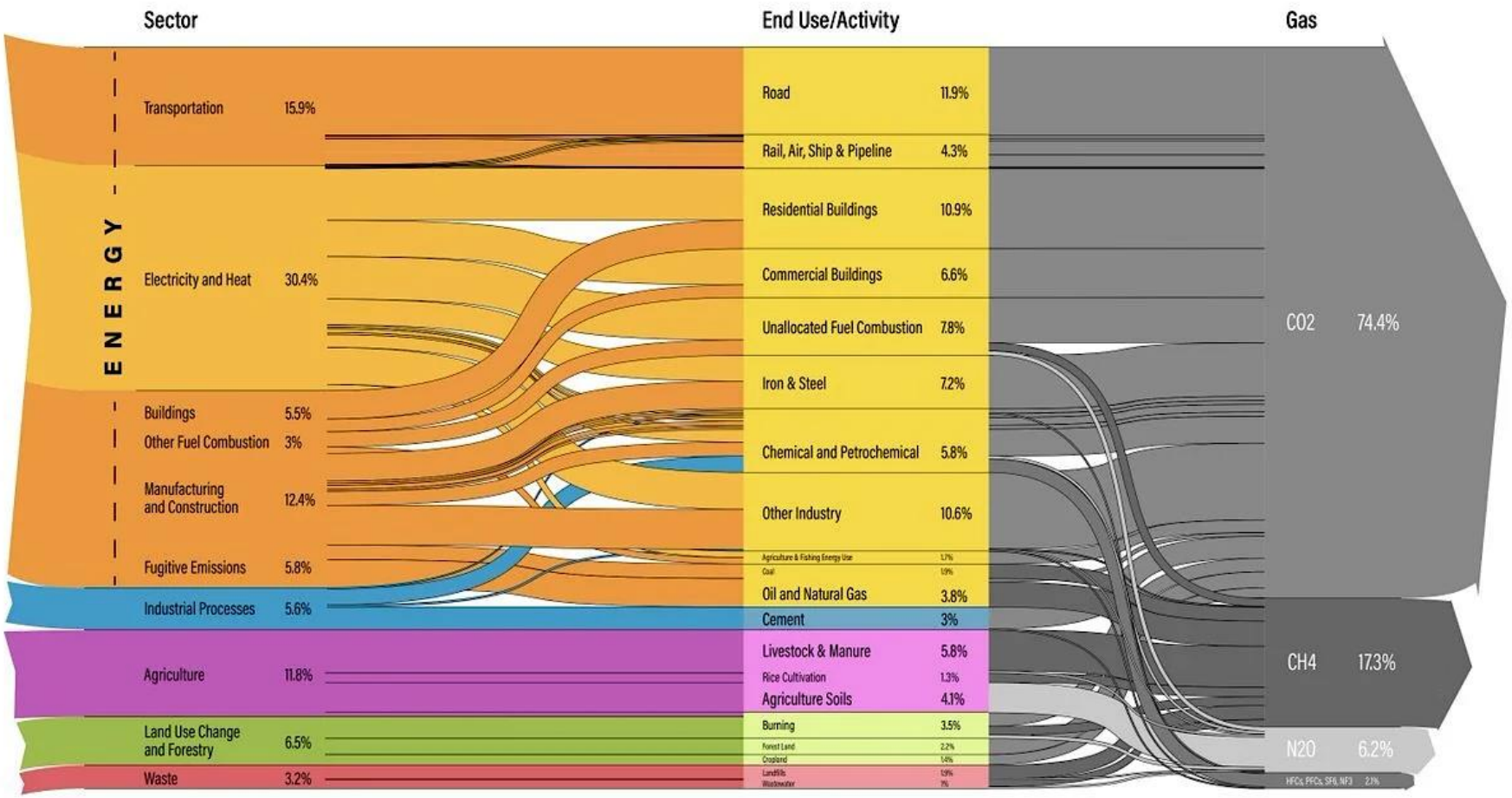




Source: GCB, 2026

DRIVERS OF CLIMATE CHANGE

World Greenhouse emissions by sector (2016)

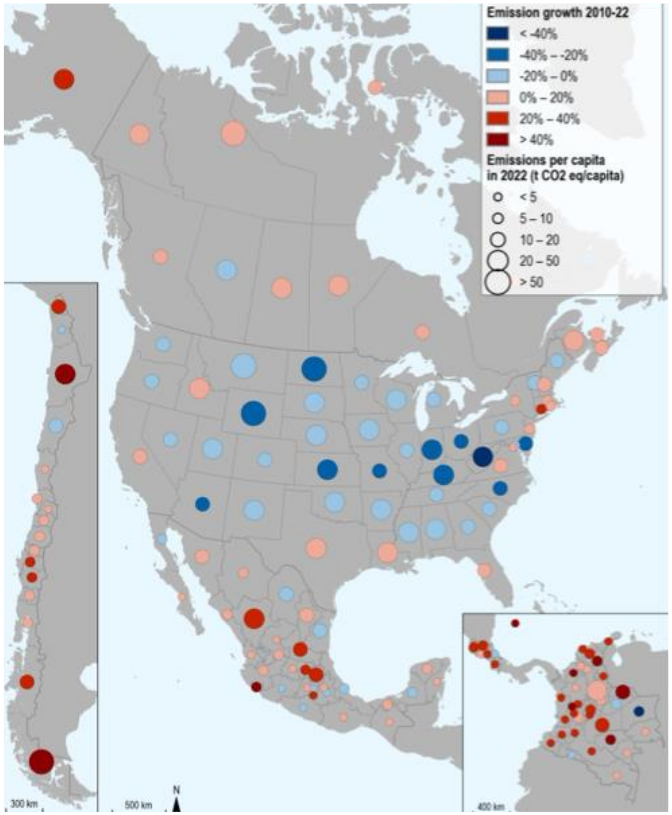


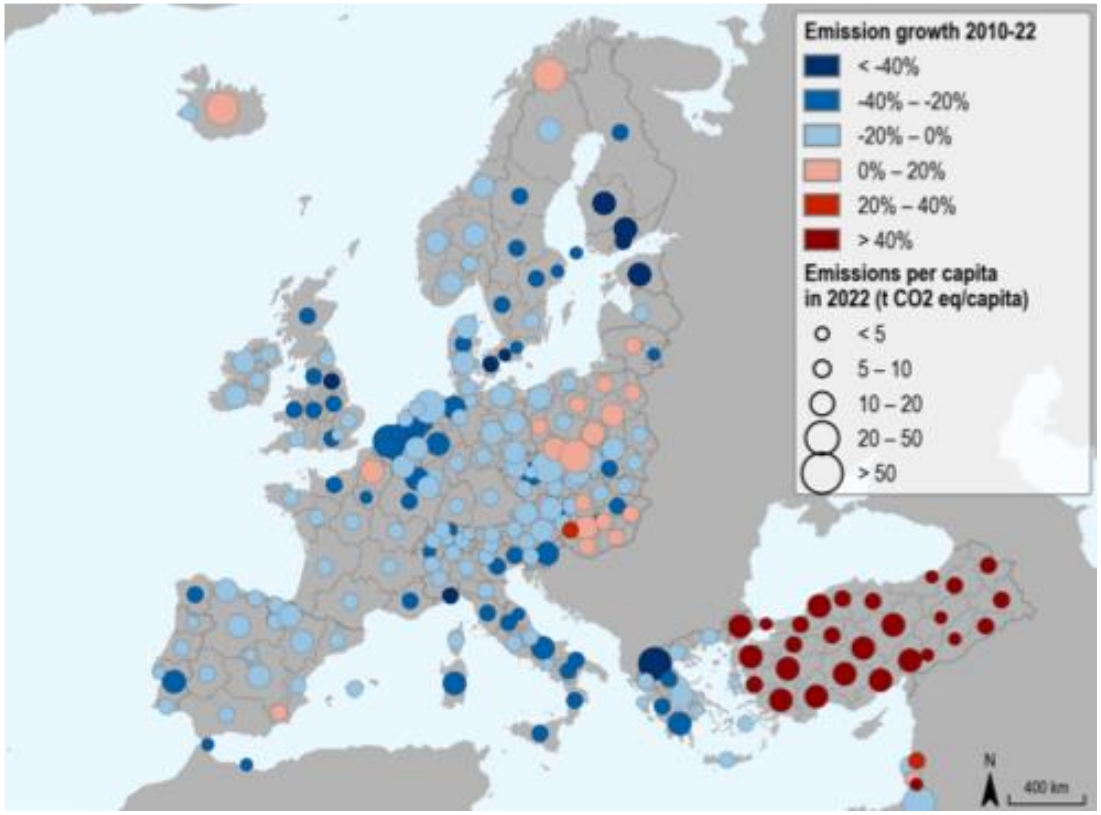
CO_2 Carbon Dioxide | CH_4 Methane | N_2O Nitrous Oxide

Source: WRI, 2016

CLIMATE CHANGE AND THE CITY

Urban areas as source of emissions

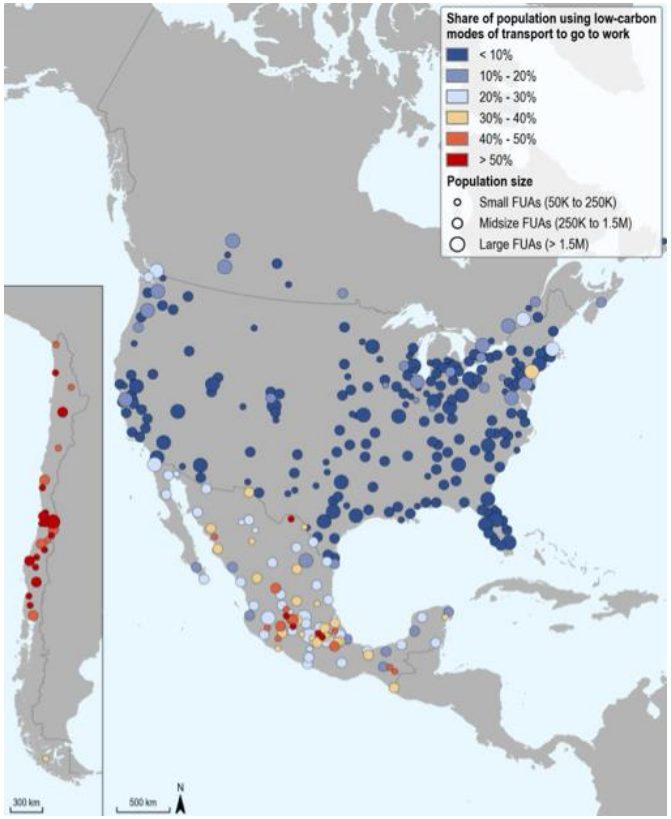


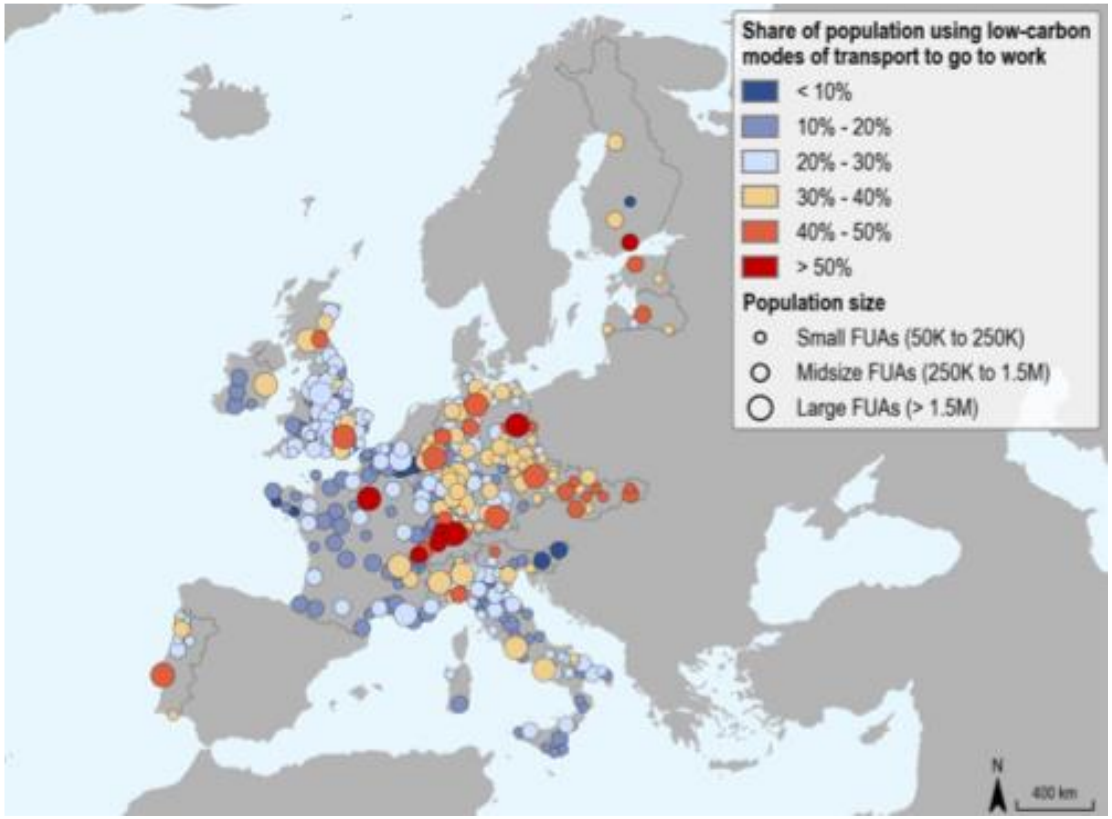


Source: OECD, 2024

CLIMATE CHANGE AND THE CITY

Urban areas as source of emissions

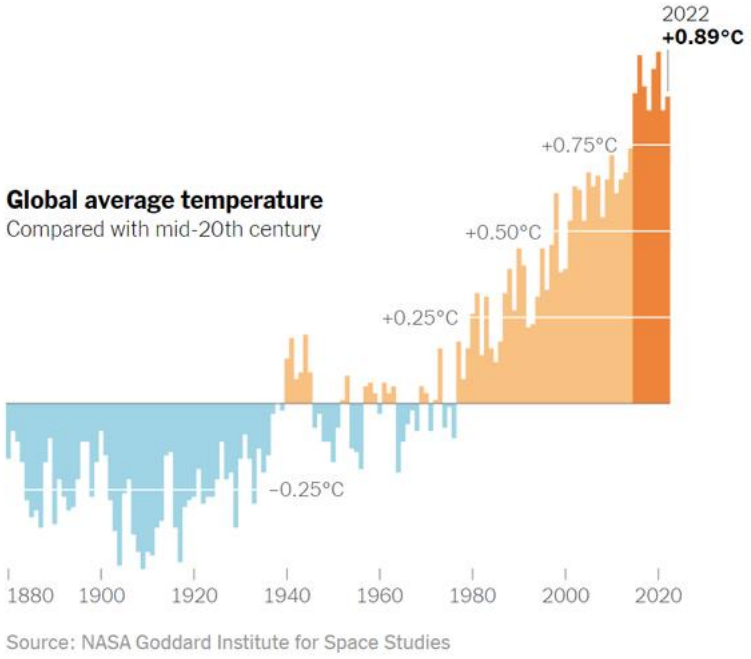


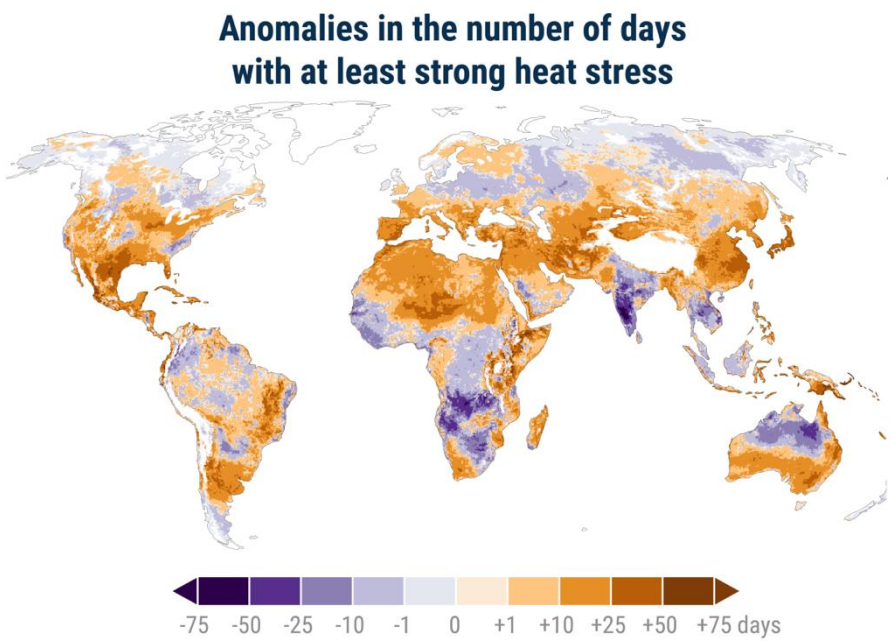


Source: OECD, 2024

CLIMATE CHANGE AND THE CITY

Growth of temperature

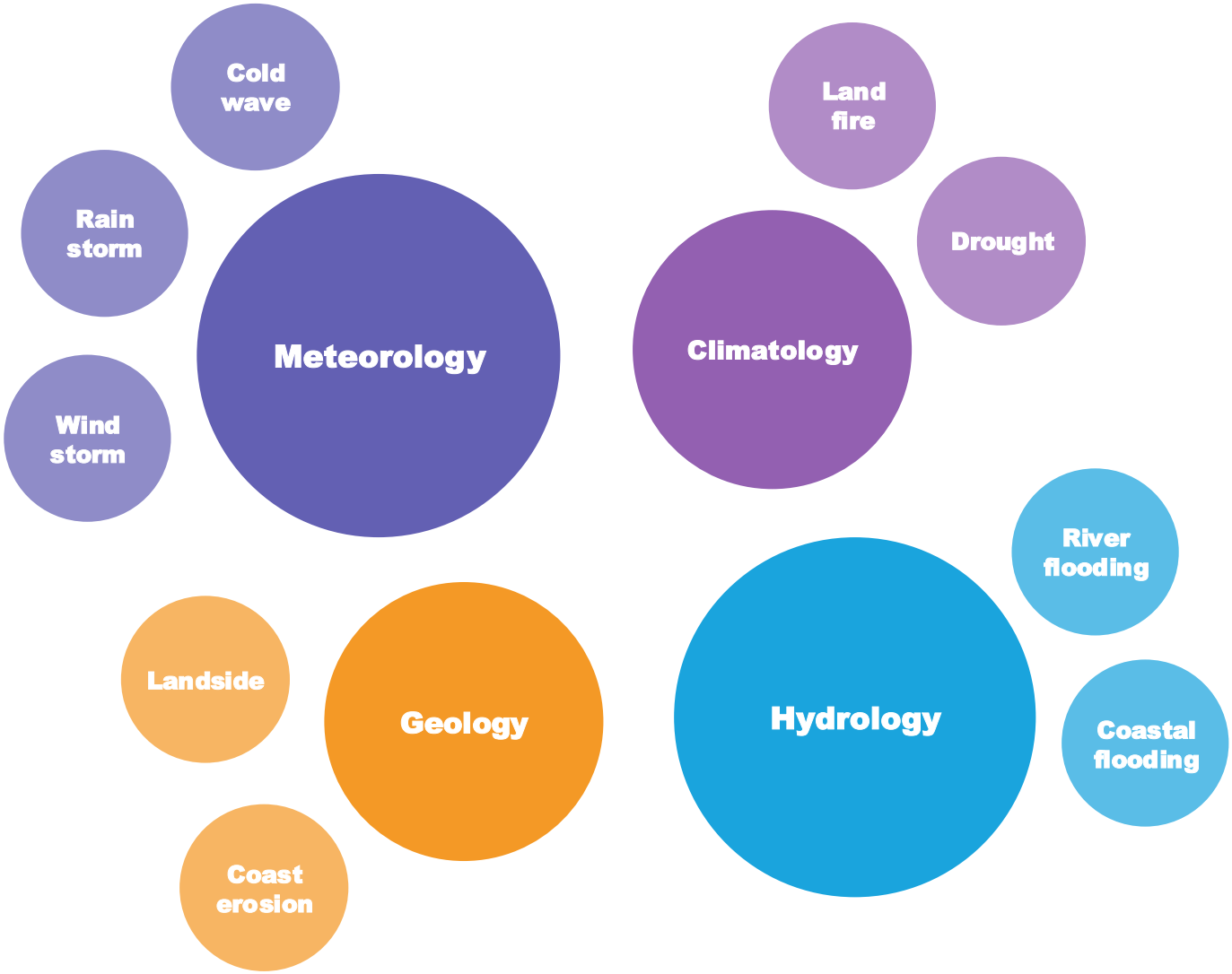




Source: NASA, 2022; EU, 2025

CLIMATE CHANGE AND THE CITY

Urban areas as hotspots of climate risks



CLIMATE CHANGE AND THE CITY

Urban areas as hotspots of climate risks – Flooding



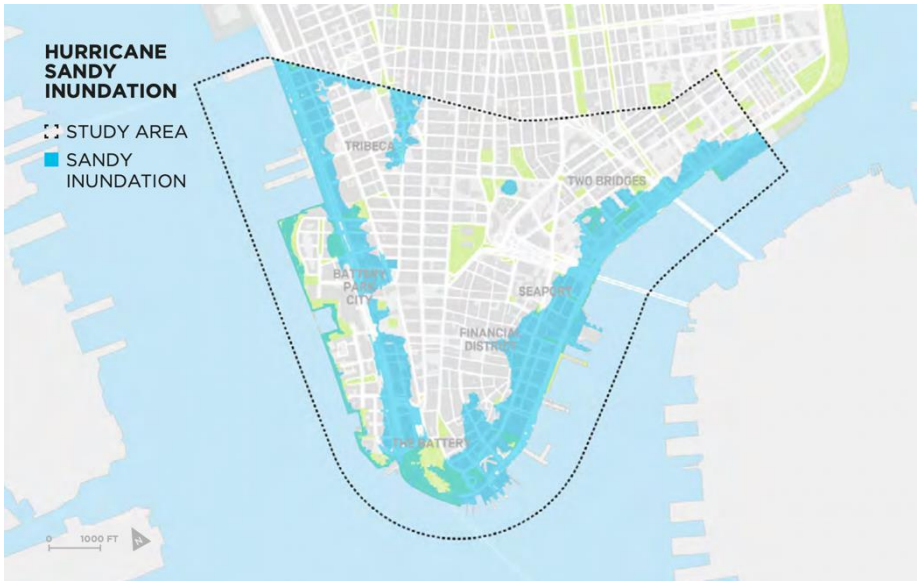
Poland



Brasil

CLIMATE CHANGE AND THE CITY

Urban areas as hotspots of climate risks – Flooding



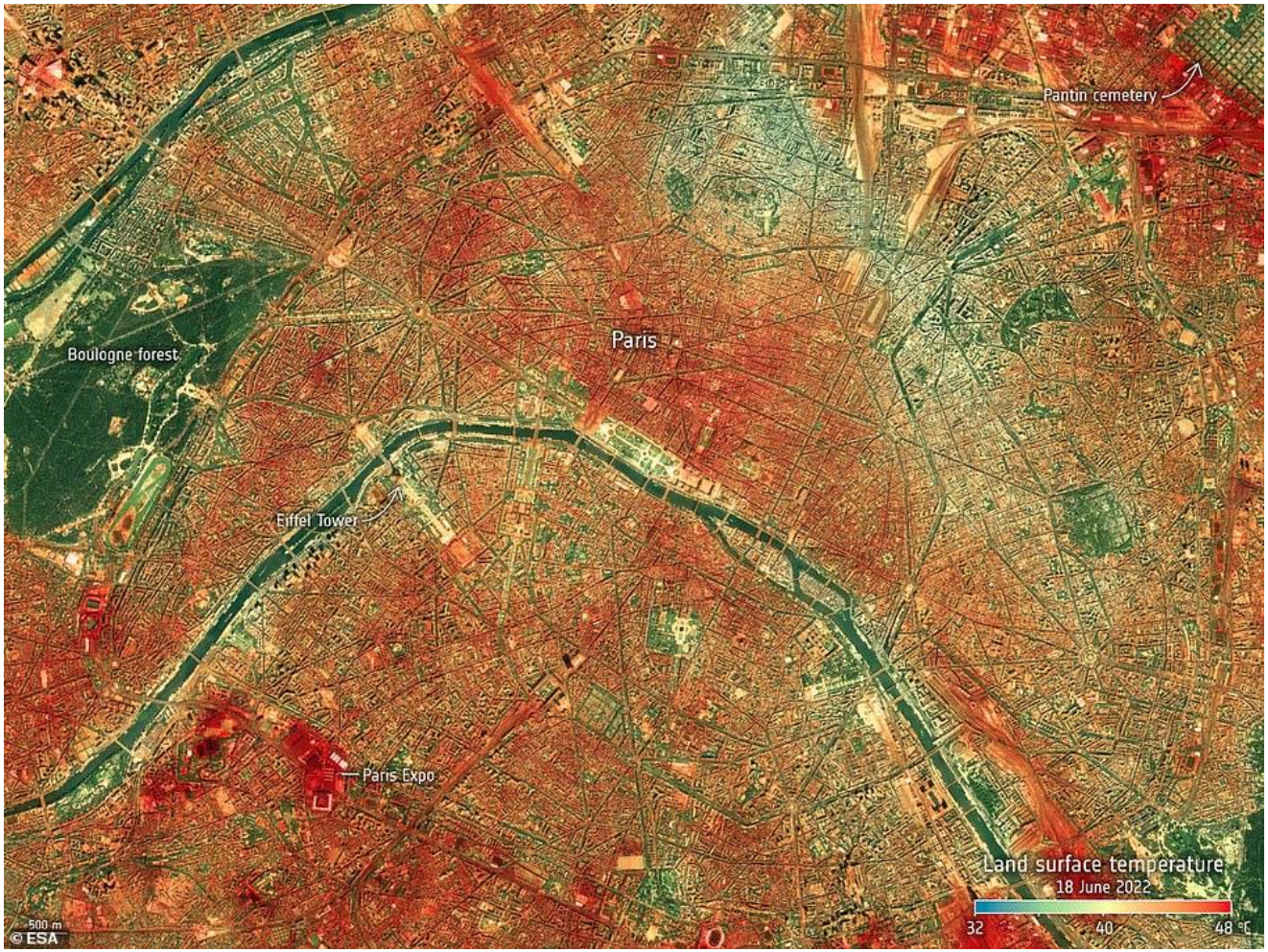


New York City (Sandy Hurricane)

Source: C40 Cities, 2020

CLIMATE CHANGE AND THE CITY

Urban areas as hotspots of climate risks – Heat stress

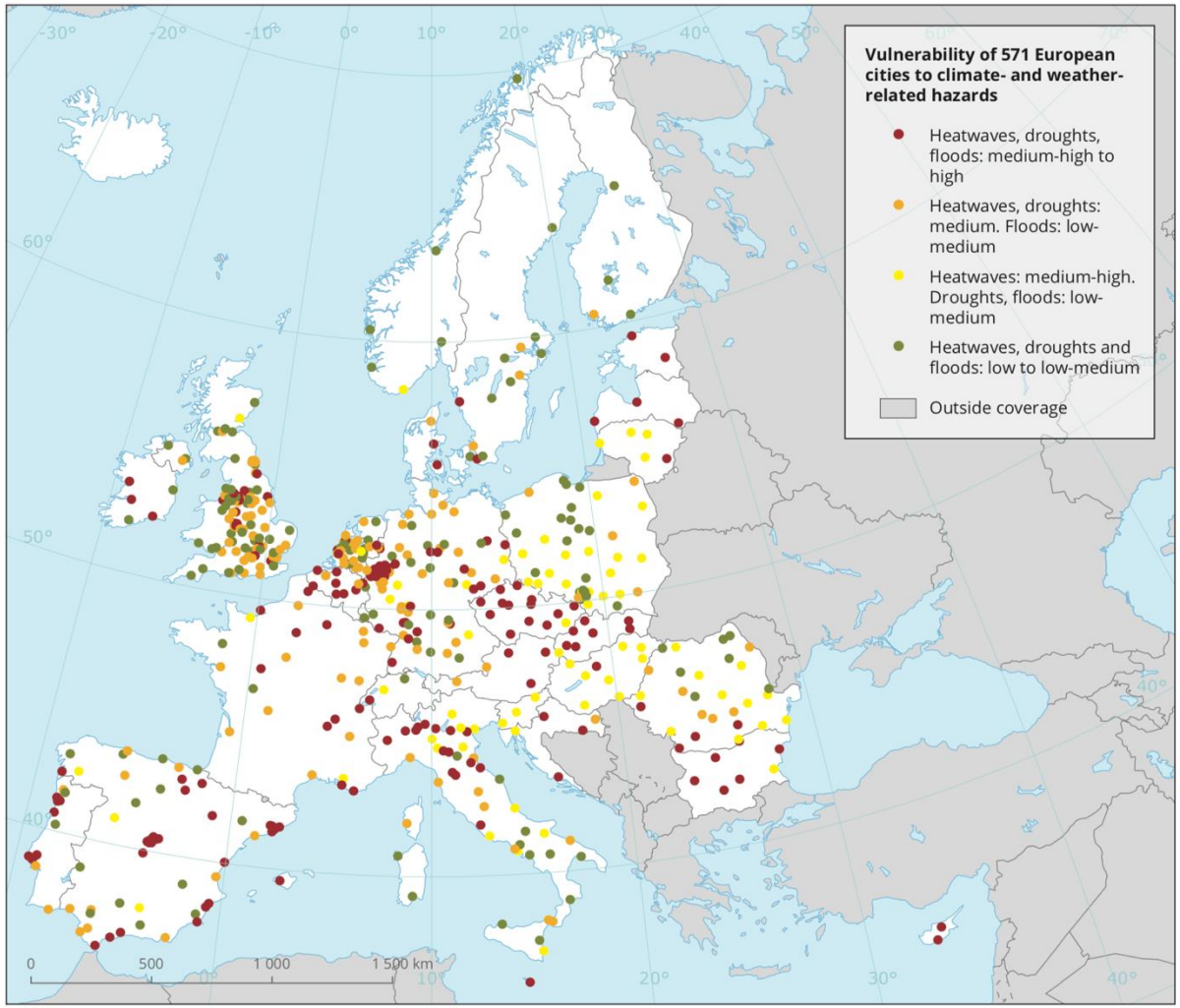


Paris

Source: ESA, 2022

CLIMATE CHANGE AND THE CITY

Vulnerability of European Cities



Source: EEA, 2020

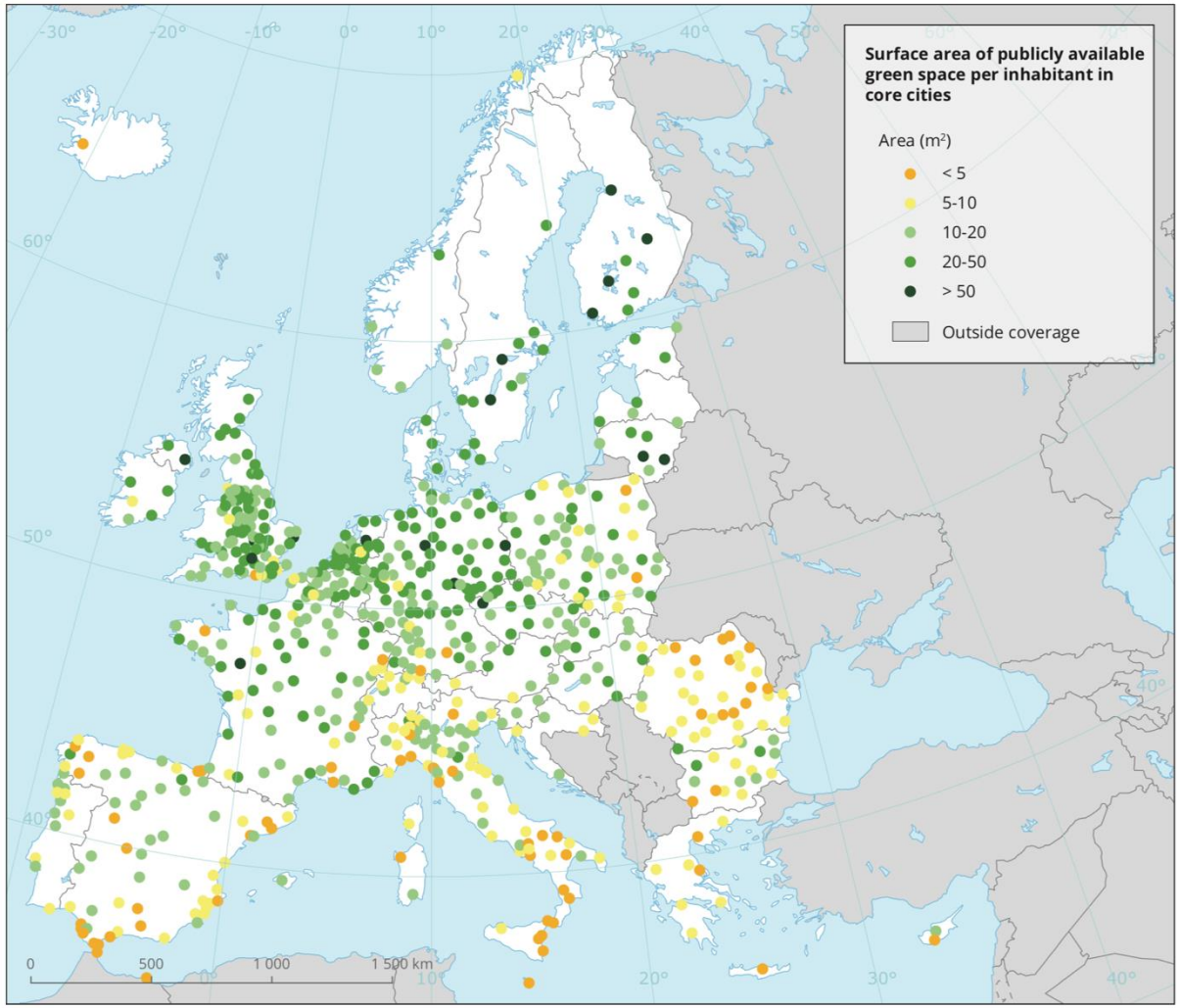
CLIMATE CHANGE AND THE CITY

Urban areas as the solution

- Municipal authorities are **responsible** for many processes and policies that can affect **urban vulnerability** and **GHG emissions**.
- Municipalities have a **democratic mandate** from local populations that helps to reduce **potential conflicts** related to climate policies.
- Cities represent high concentrations of **private stakeholders** with activities that can impact on climate change.
- Cities provide arenas within which **civil society and public-private partnership** can mobilizing to address climate change.
- Municipalities have a **history** in addressing environmental issues and can still act as a '**laboratory**' for testing innovative approaches.

CLIMATE CHANGE AND THE CITY

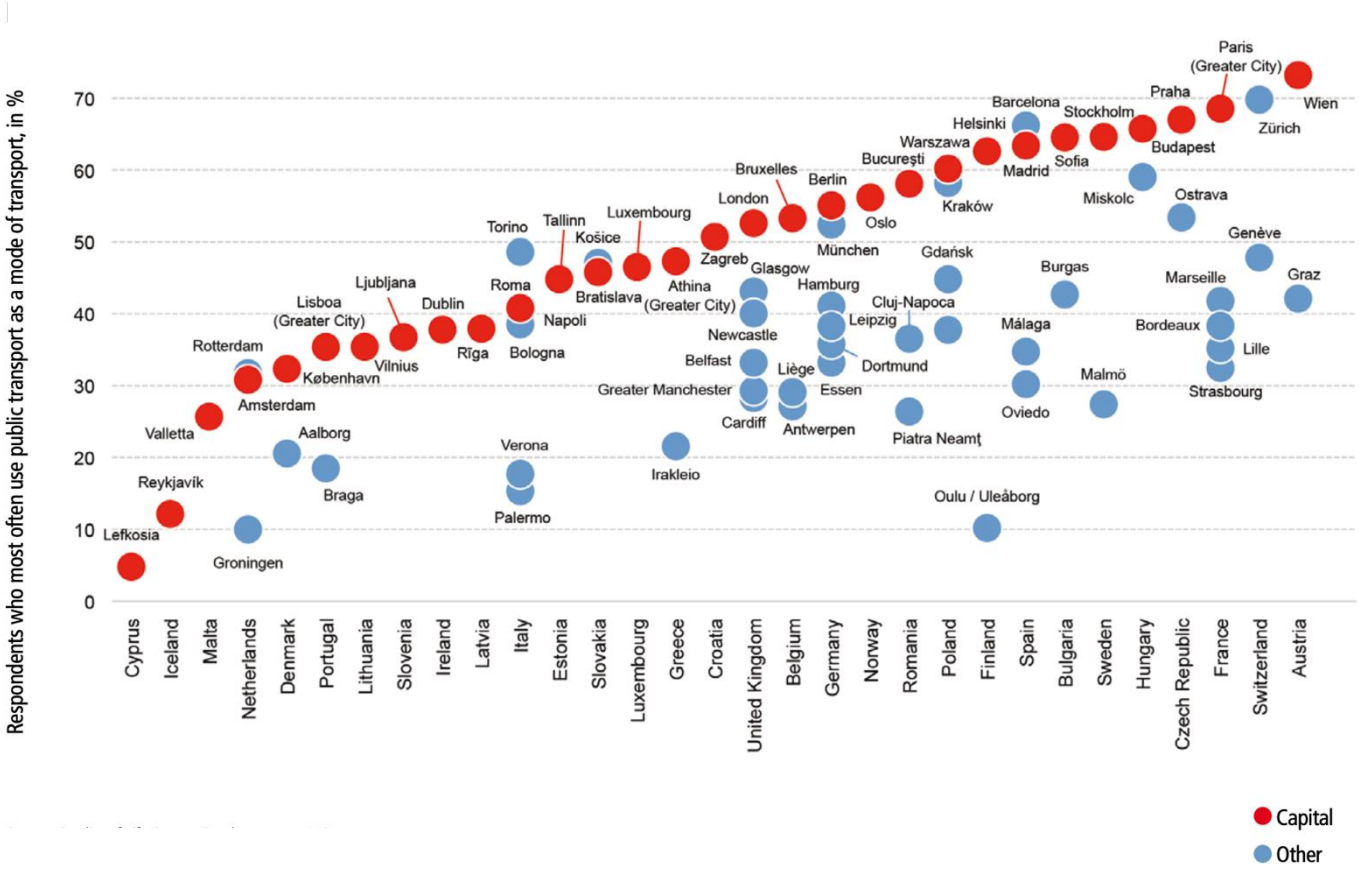
Preparedness of European Cities



Source: EEA, 2020

CLIMATE CHANGE AND THE CITY

Urban areas as hotspots for the risks



Public transport use in European cities (2015)

Source: EUROSTAT, 2024

CONCEPTUAL FRAMEWORK

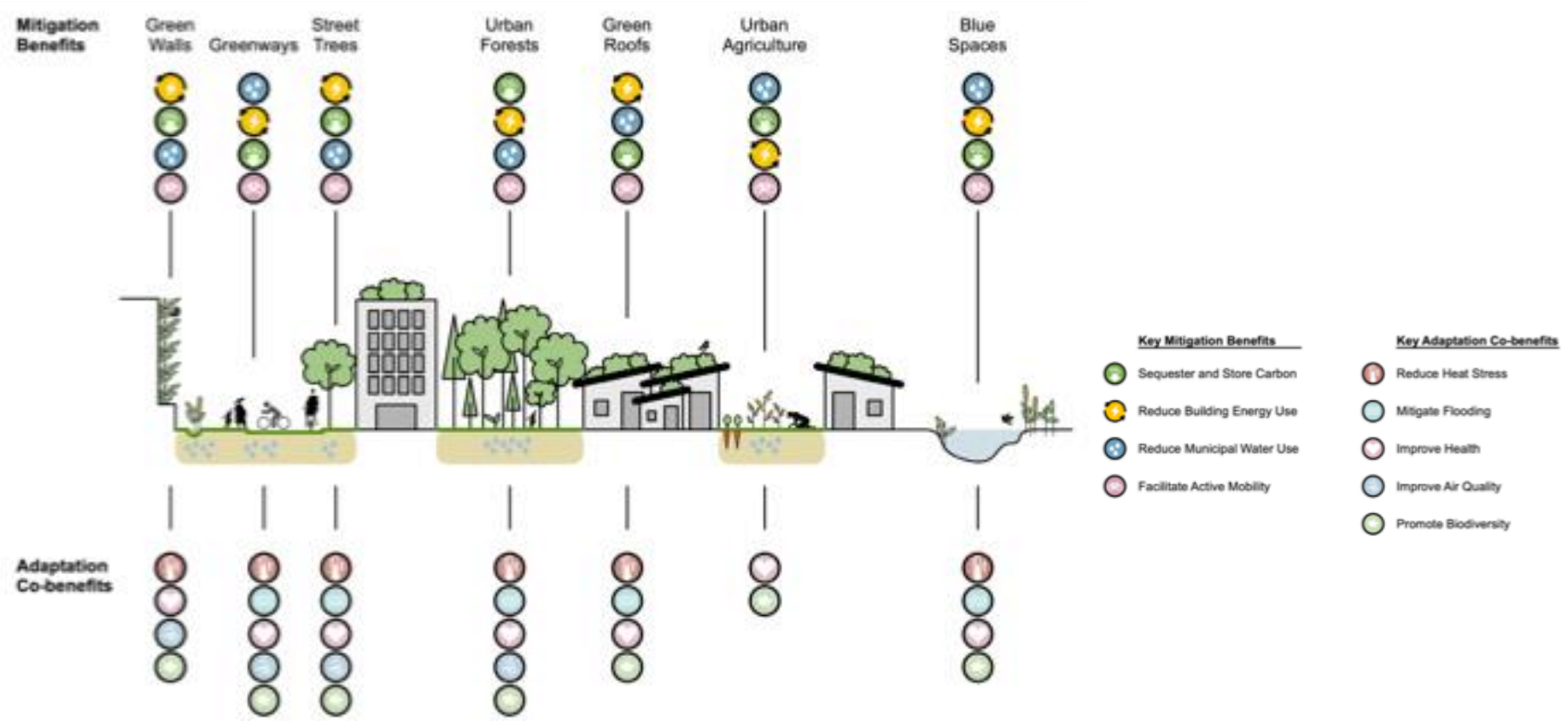
Adaptation vs Mitigation

ADAPTATION means **anticipating the adverse effects of climate change** and taking appropriate action to **prevent or minimise the damage** they can cause. Examples of adaptation measures include **large-scale infrastructure changes**, such as building defenses to protect against sea-level rise, or **green infrastructure** to make cities more resilient. In essence, **adaptation** can be understood as the **process of adjusting to the current and future effects of climate change**.

MITIGATION means making the impacts of climate change less severe by preventing or **reducing the emission of greenhouse gases (GHG)** into the atmosphere. Mitigation is achieved either by **increasing the share of renewable energies**, establishing a **cleaner mobility system**, or by **enhancing the storage of these gases** (e.g. by increasing the size of forests). In short, **mitigation** is a **human intervention that reduces the sources of GHG emissions** and/or enhances the sinks.

CONCEPTUAL FRAMEWORK

Adaptation vs Mitigation in urban interventions



Source: IPCC, 2022

CONTACTS AND MATERIALS

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ignazio.vinci@unipa.it

Teaching materials for the course will be published on a web page at the following link: **www.ignaziovinci.net**