

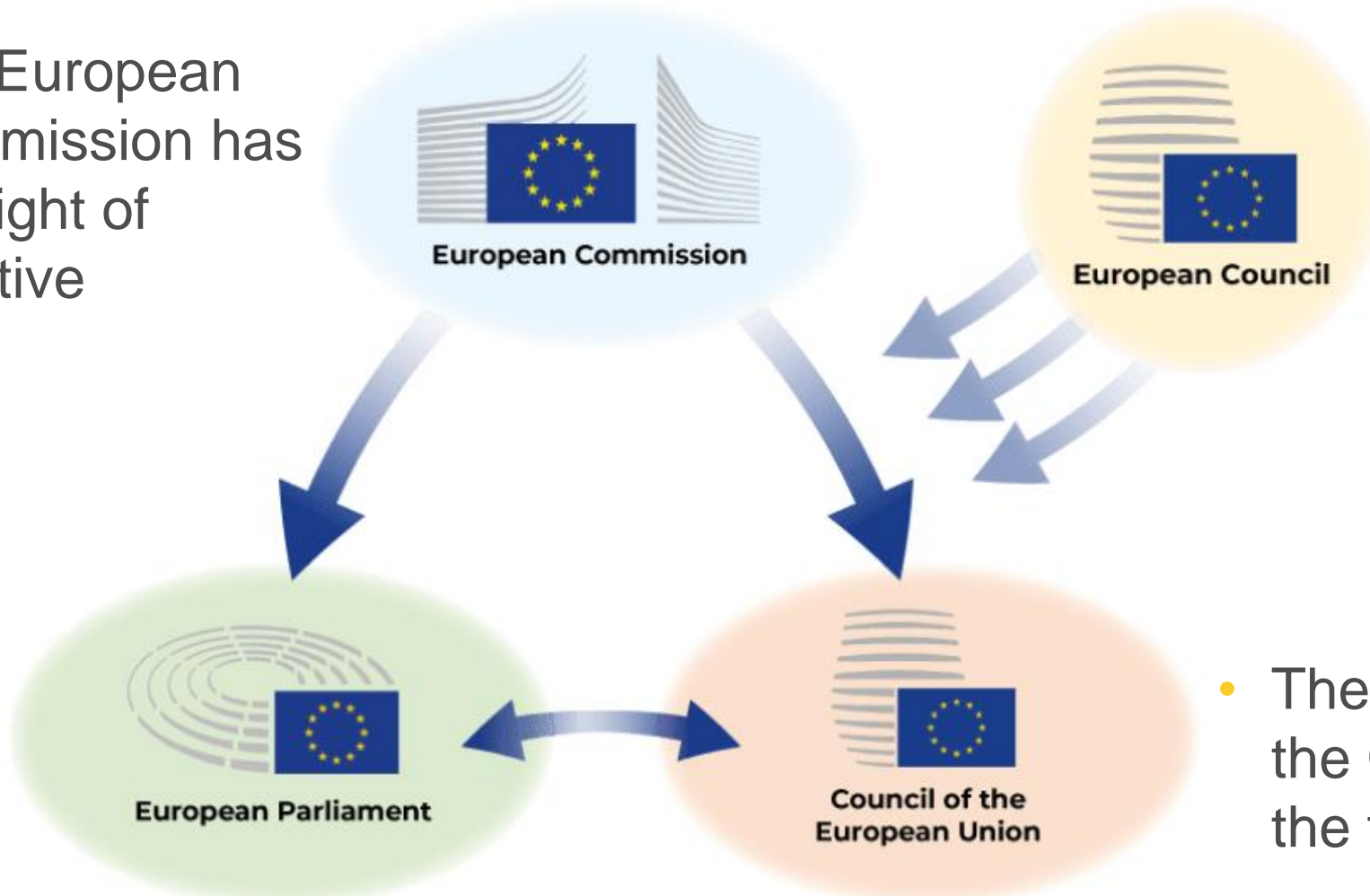
From Science to Policy. Some experiences from the European Commission's Joint Research Centre

Fabio Monforti-Ferrario, Clean Air Climate Unit, Joint Research Centre

Summer school “Physics for a better planet” – Bologna, July 12th, 2024

The functioning of the European Union

- The European Commission has the right of initiative



- The European Council gives general political lines

- The European Parliament and the Council of the EU have the final (co-decided) word

Competences of the European Union

Exclusive competences:

customs, competition, monetary policy (Euro area),..

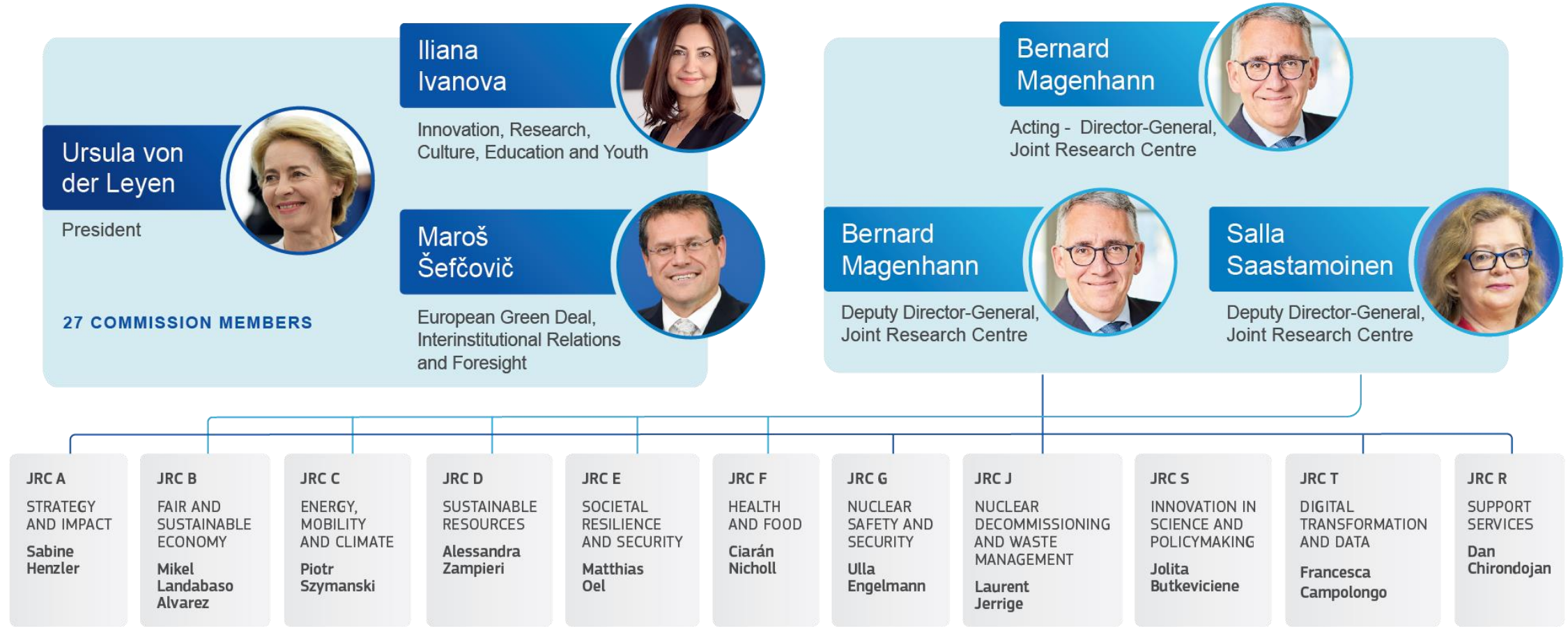
Shared competences:

Energy, environment, agriculture, internal market, transport, research, ...

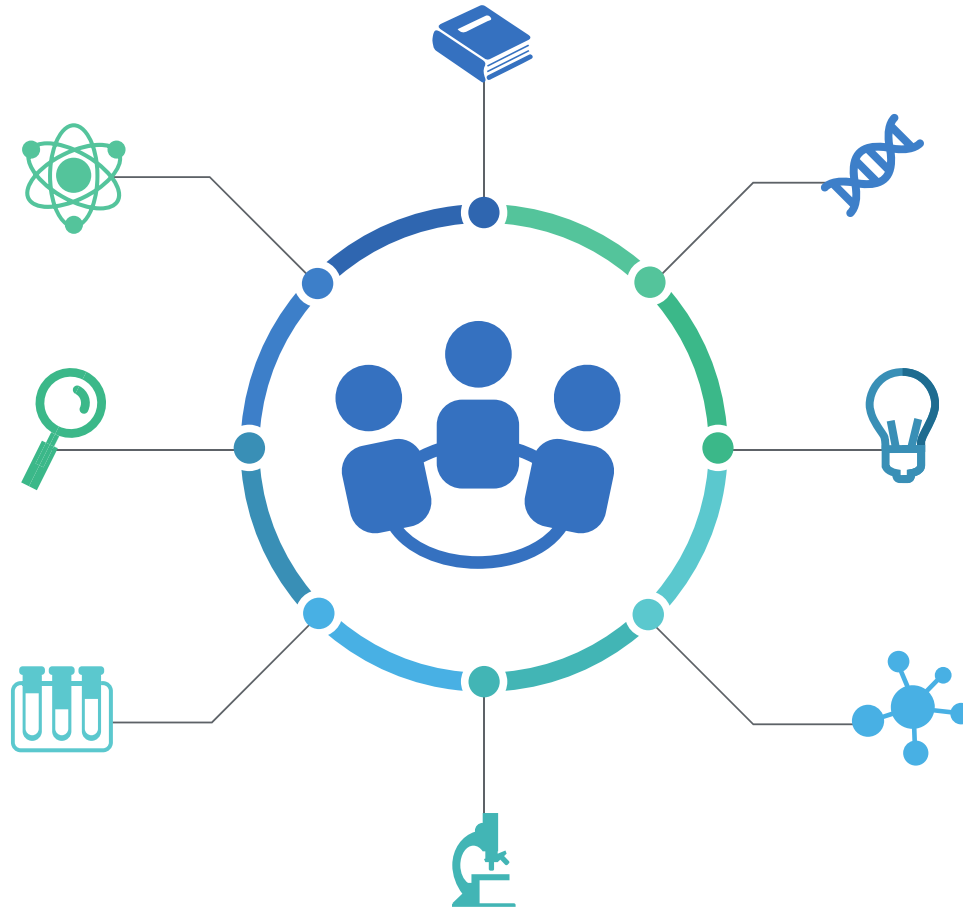
Support, coordination and supplement:

Public health, industry, culture, tourism, ..

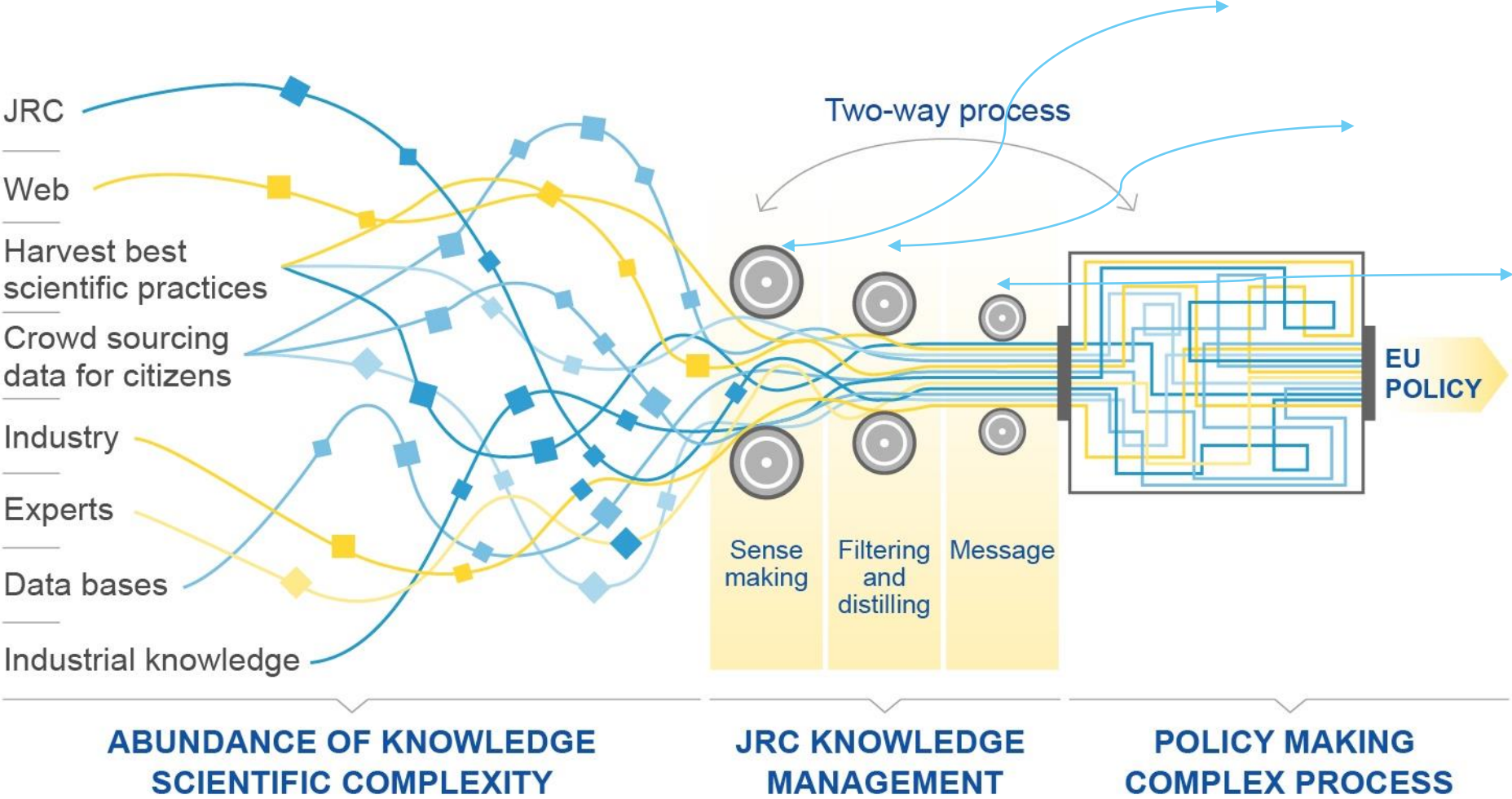
The Joint Research Centre within the Commission



The need for evidence to inform policy

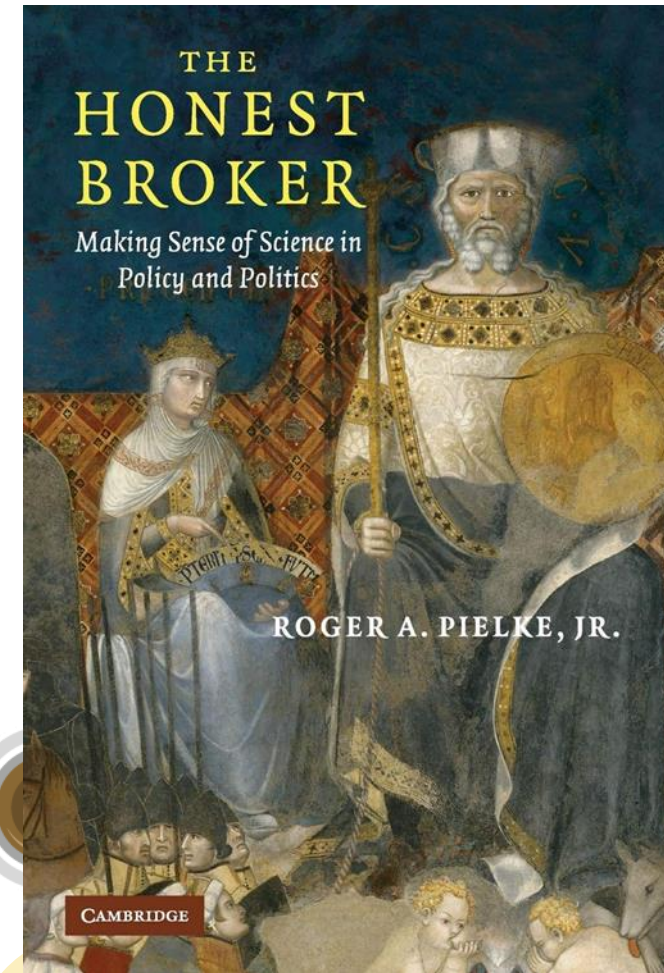


Dealing with the information overload



JRC role

- **Independent** of private, commercial or national interests
- Works for more than **40 European Commission policy departments**



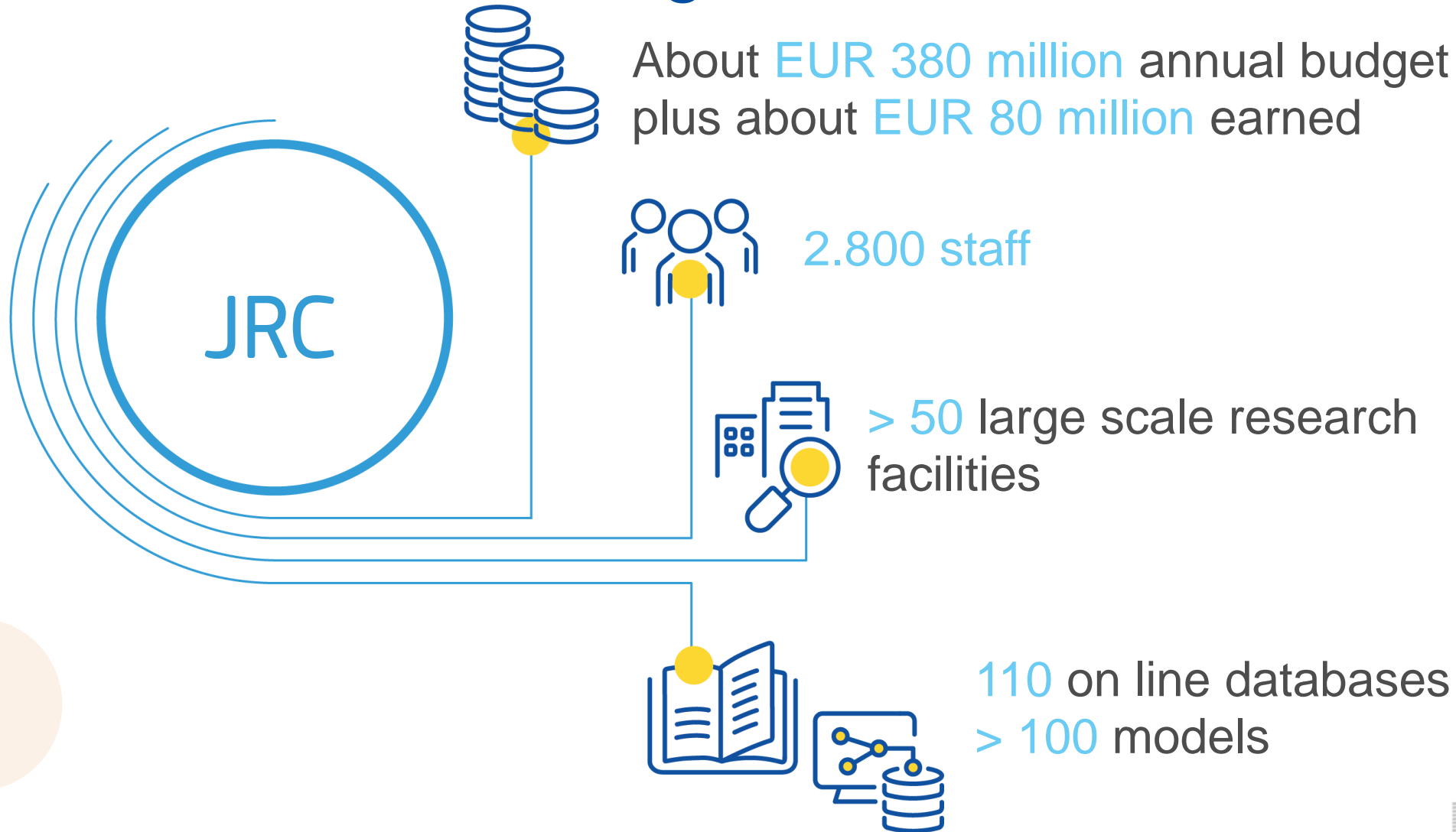
JRC sites

Headquarters in **Brussels**
and research facilities located
in **5 EU Countries:**

- Belgium (Geel)
- Germany (Karlsruhe)
- Italy (Ispra)
- The Netherlands (Petten)
- Spain (Seville)

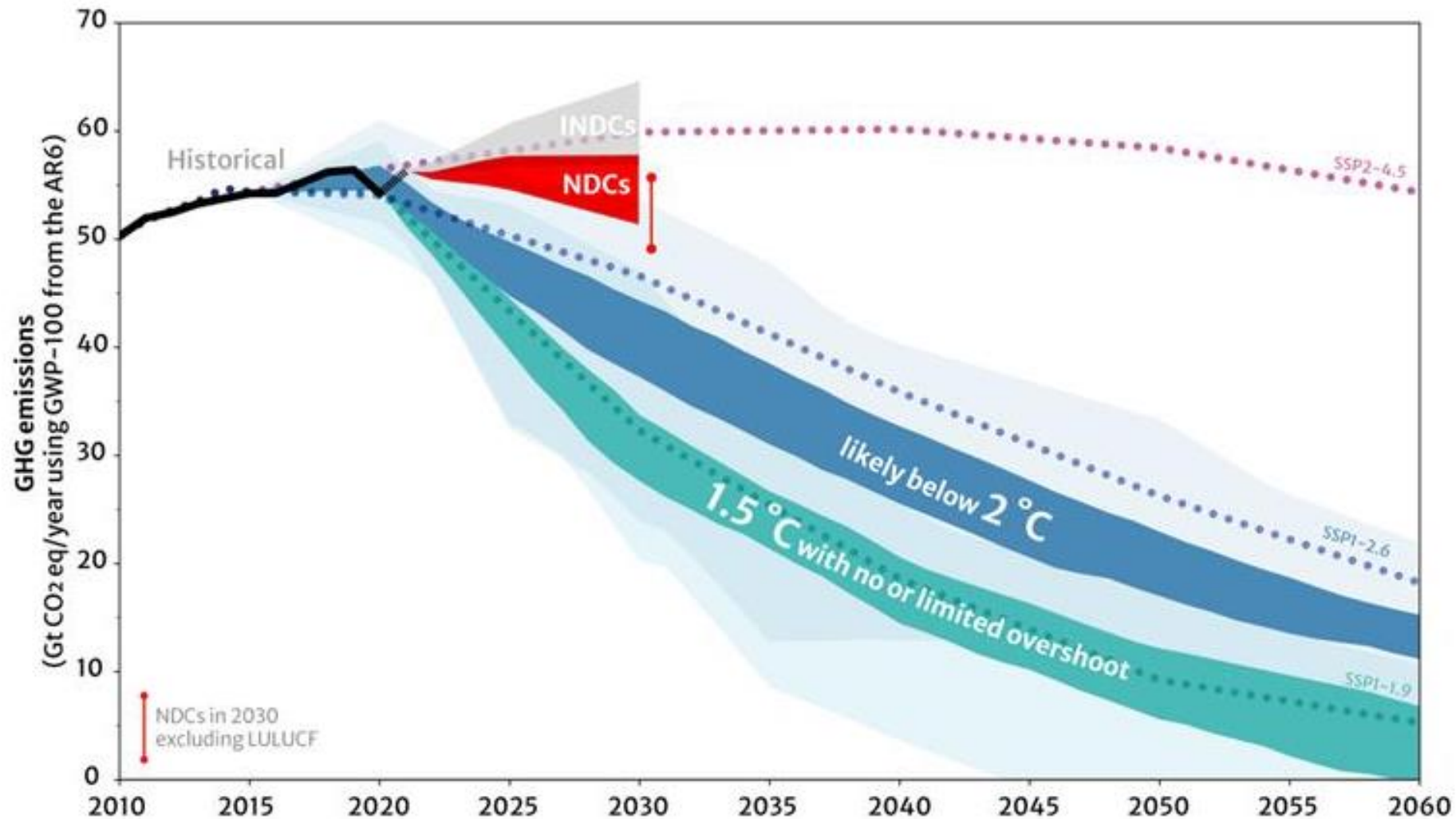


JRC – Facts and figures



Climate

GHG emissions – are we doing enough?

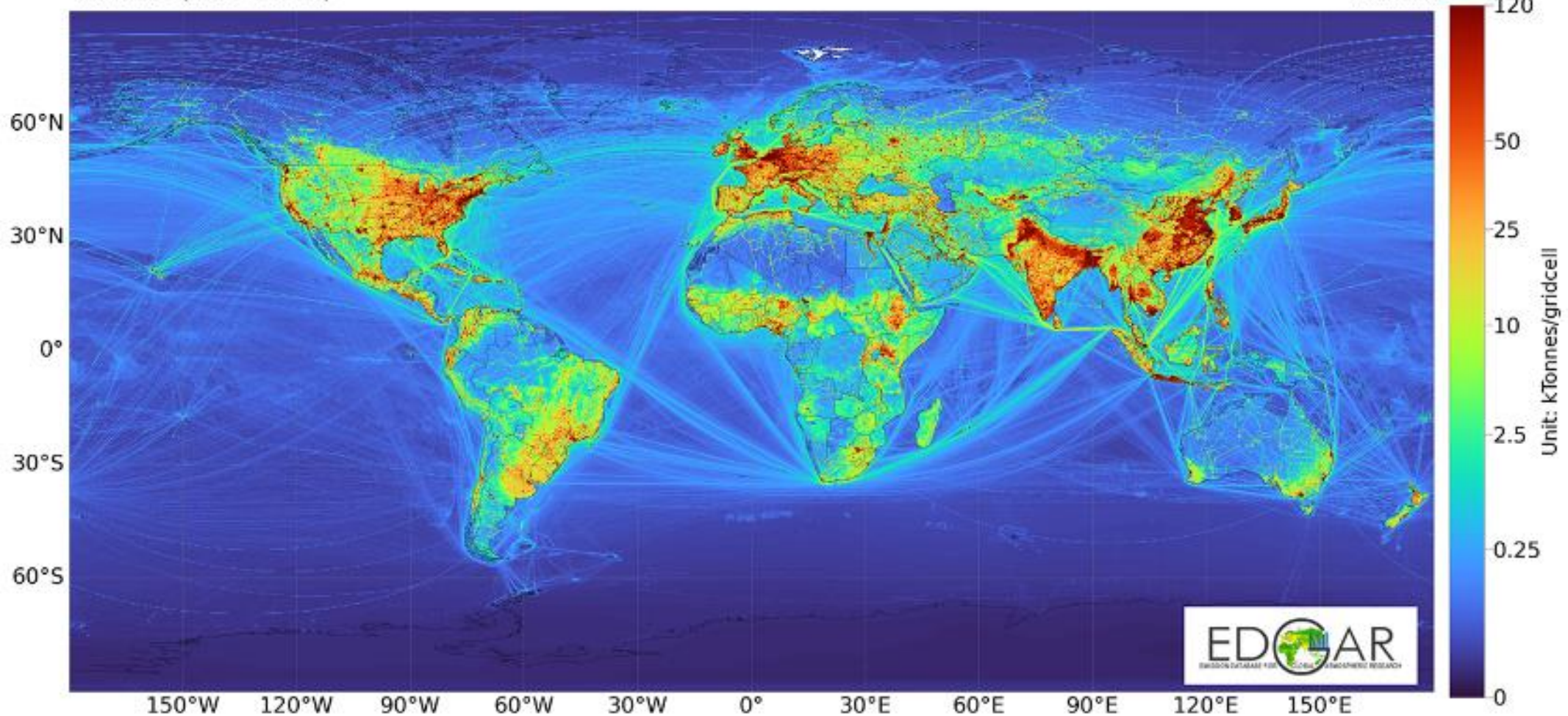


EDGAR – Global GHG Emission Database

Crippa et al., ESSD, 2024

GWP_100_AR5_GHG emissions:
TOTALS (Year 2022)

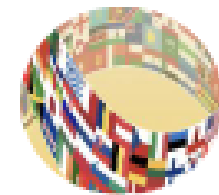
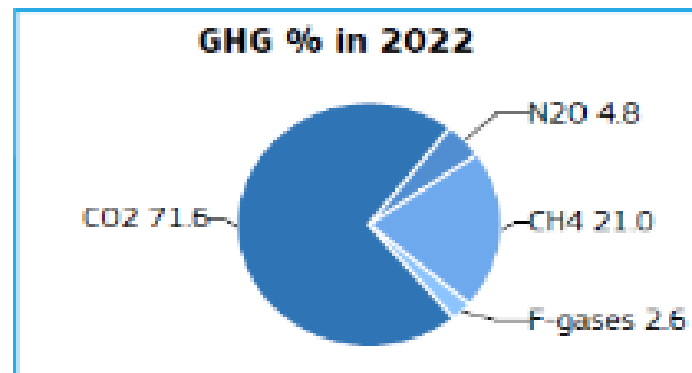
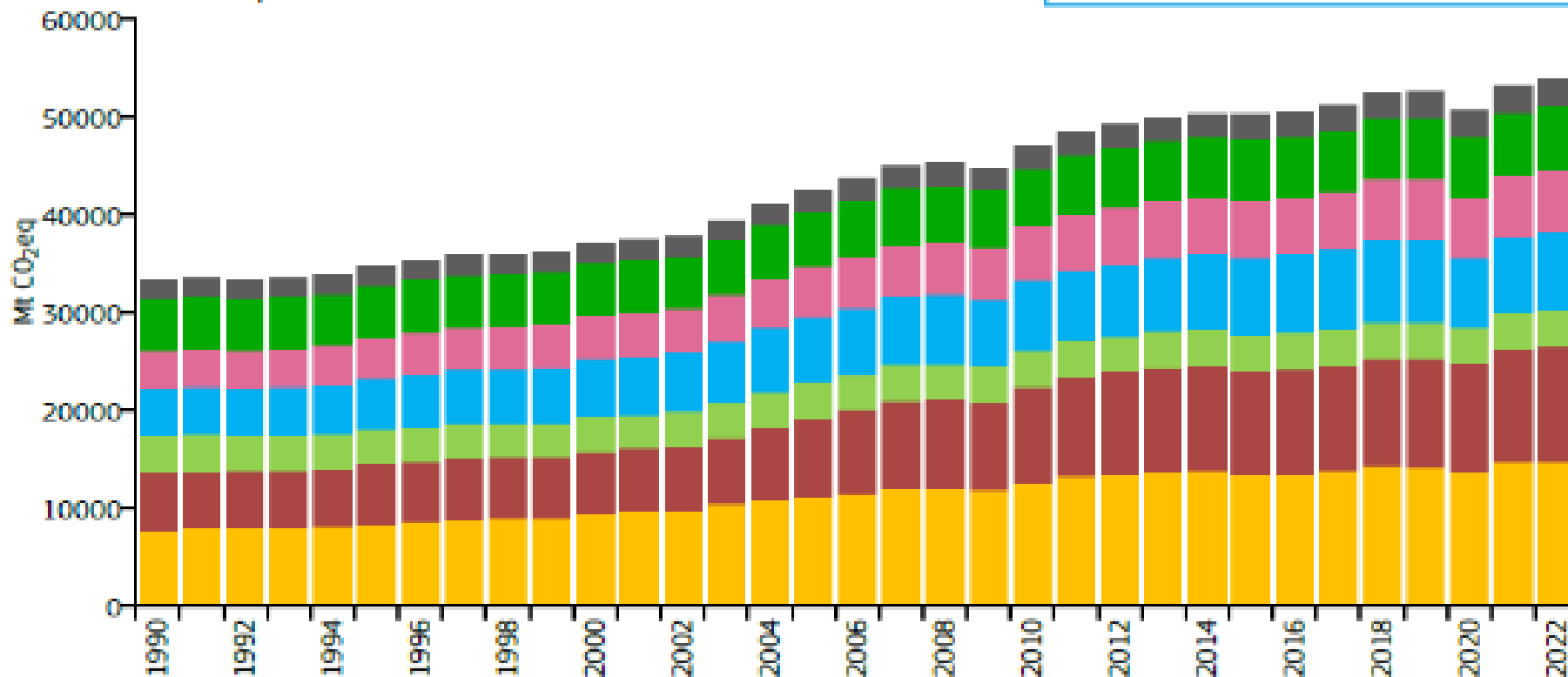
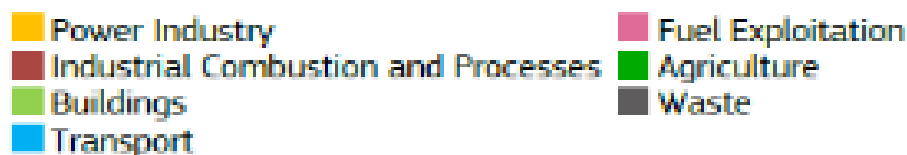
Global total: 53.79Gt
EDGARv8.0



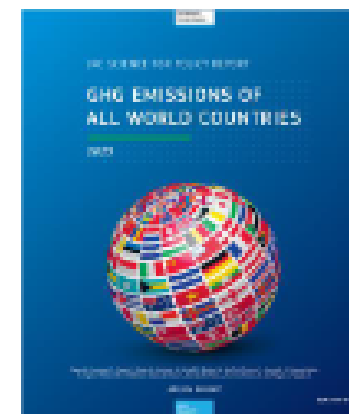
Global emissions of GHG

major sectors

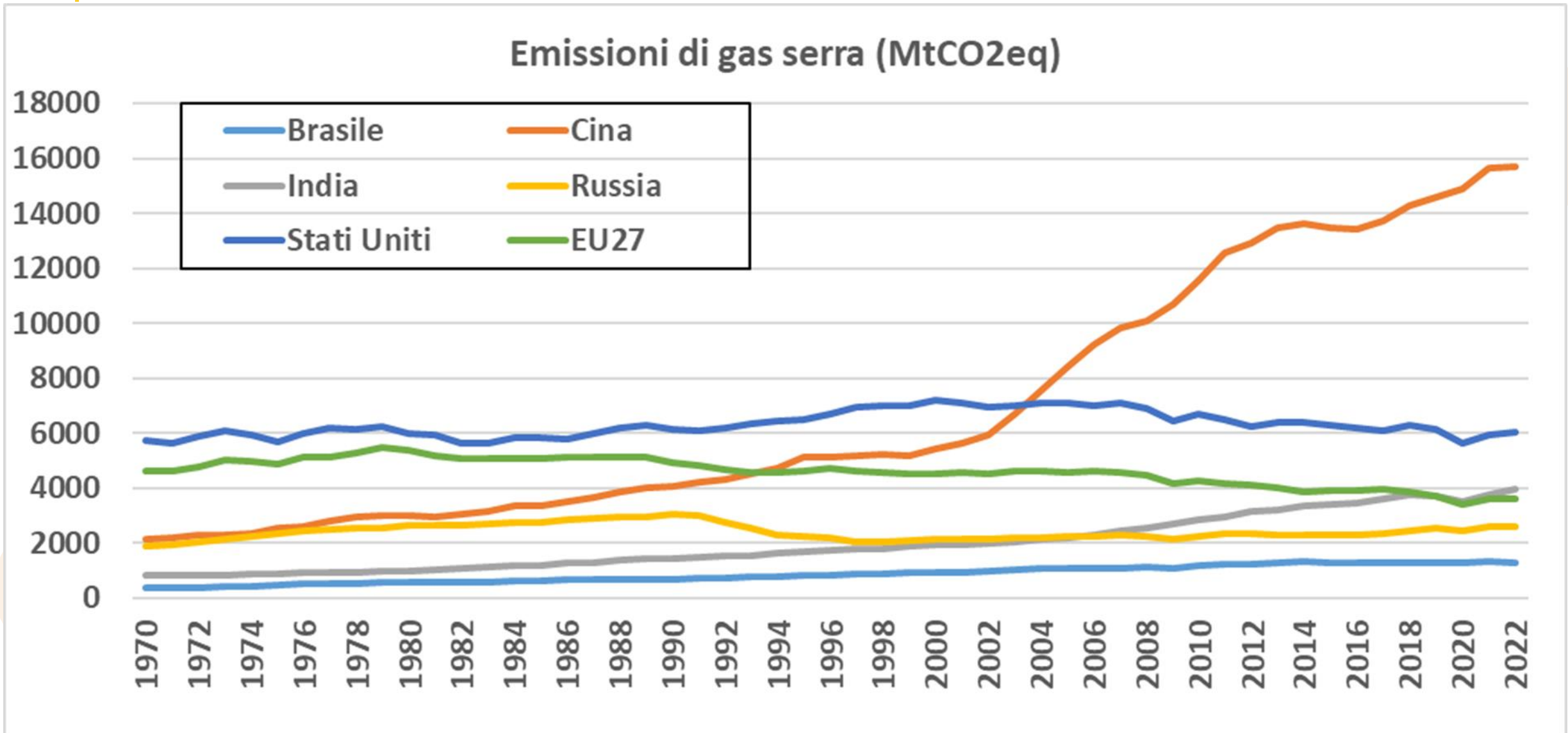
GHG emissions by sector



Slide
Courtesy of
E. Vignati

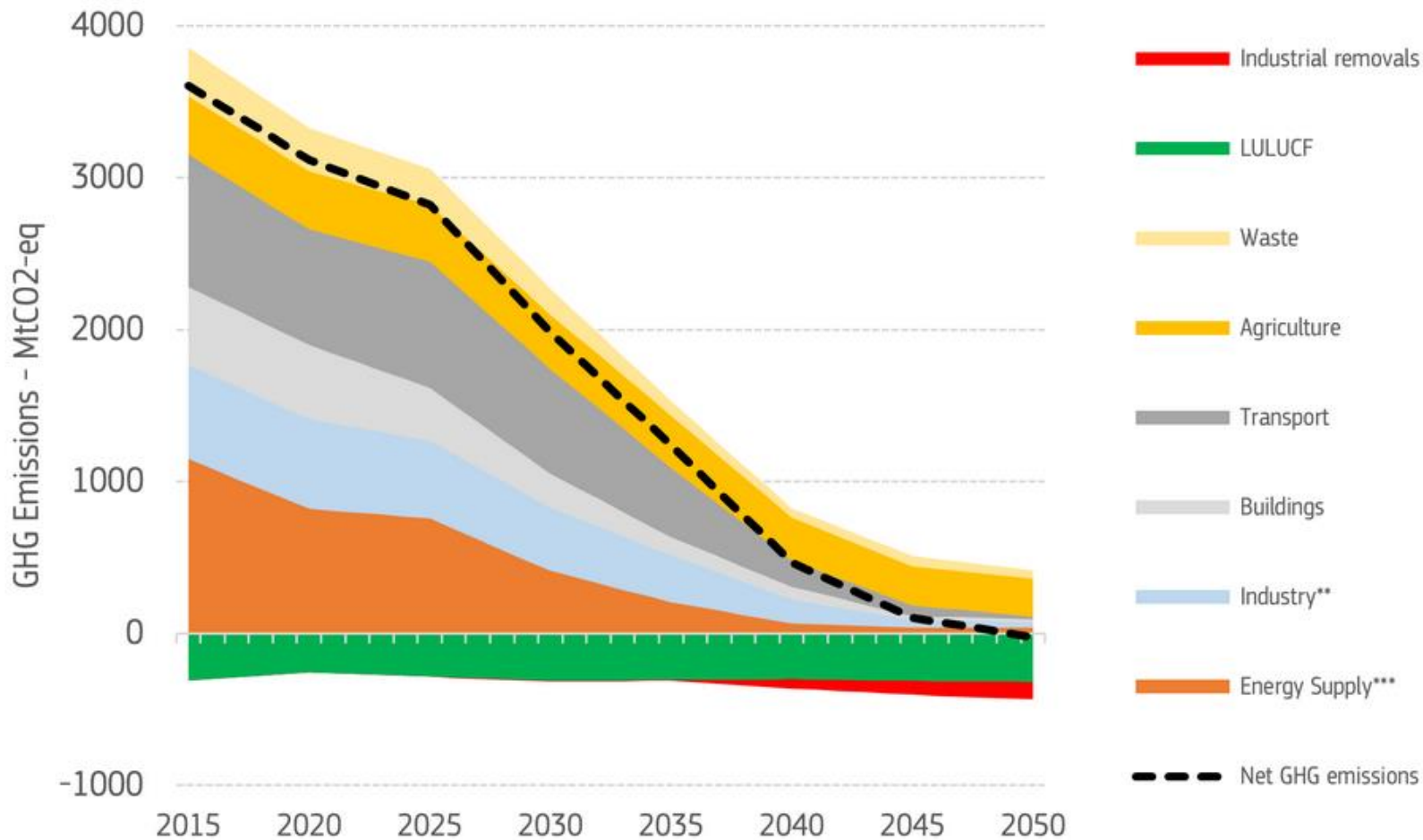


GHG emissions – “the big six”



EU GHG emissions – targets and scenarios

Greenhouse gas emissions in the period 2015-2050*



1990: 4650 MtCO₂eq

2022: -32.5%

2030: -55%

2040: -90%

2050: net zero

EU GHG emissions – behind the scenarios

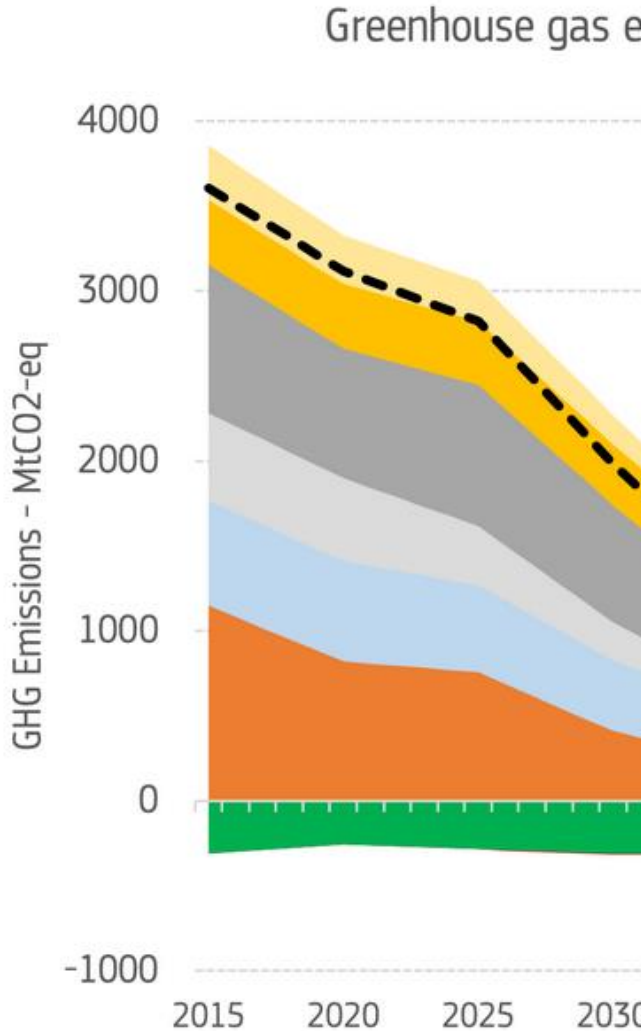
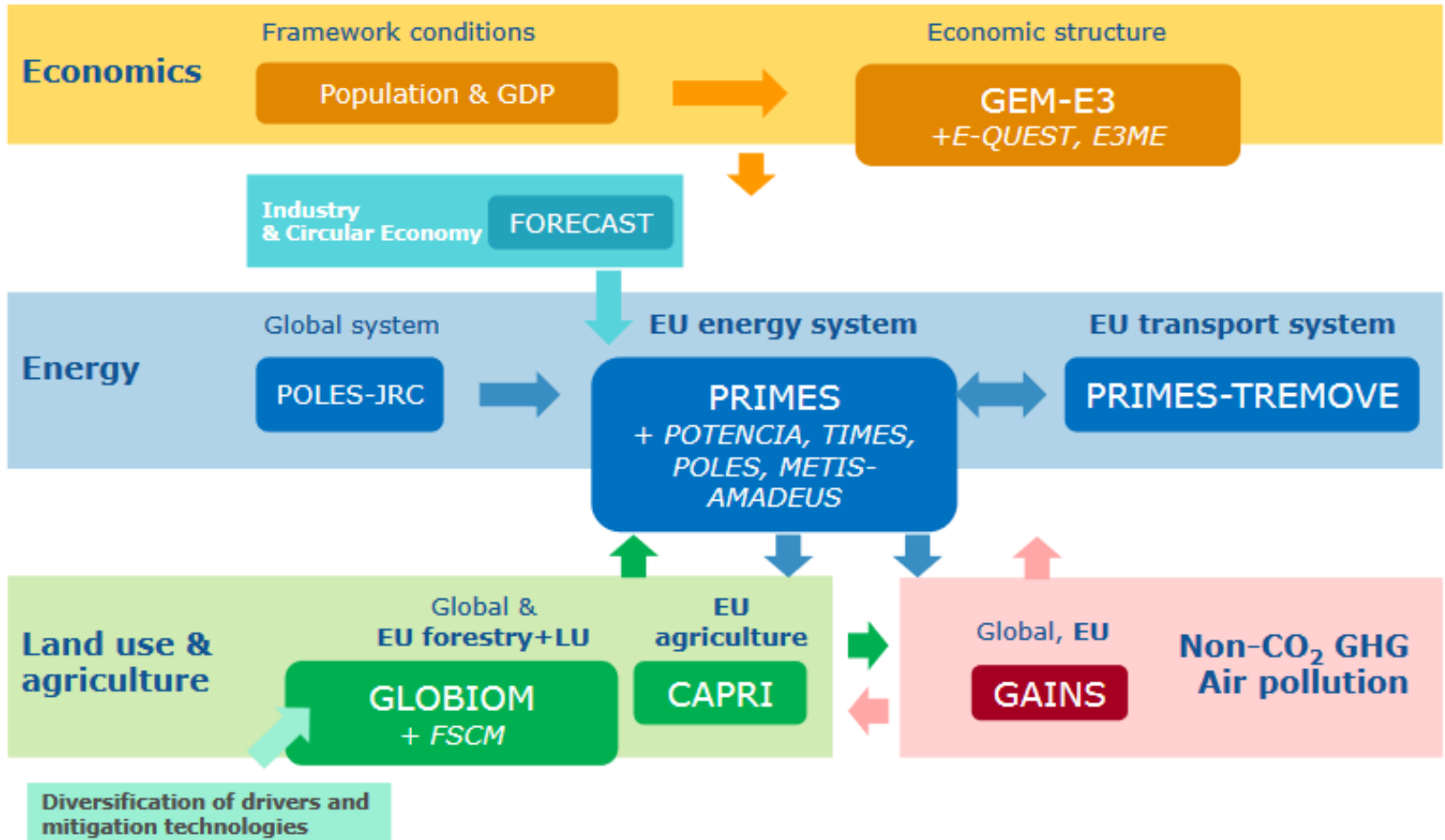


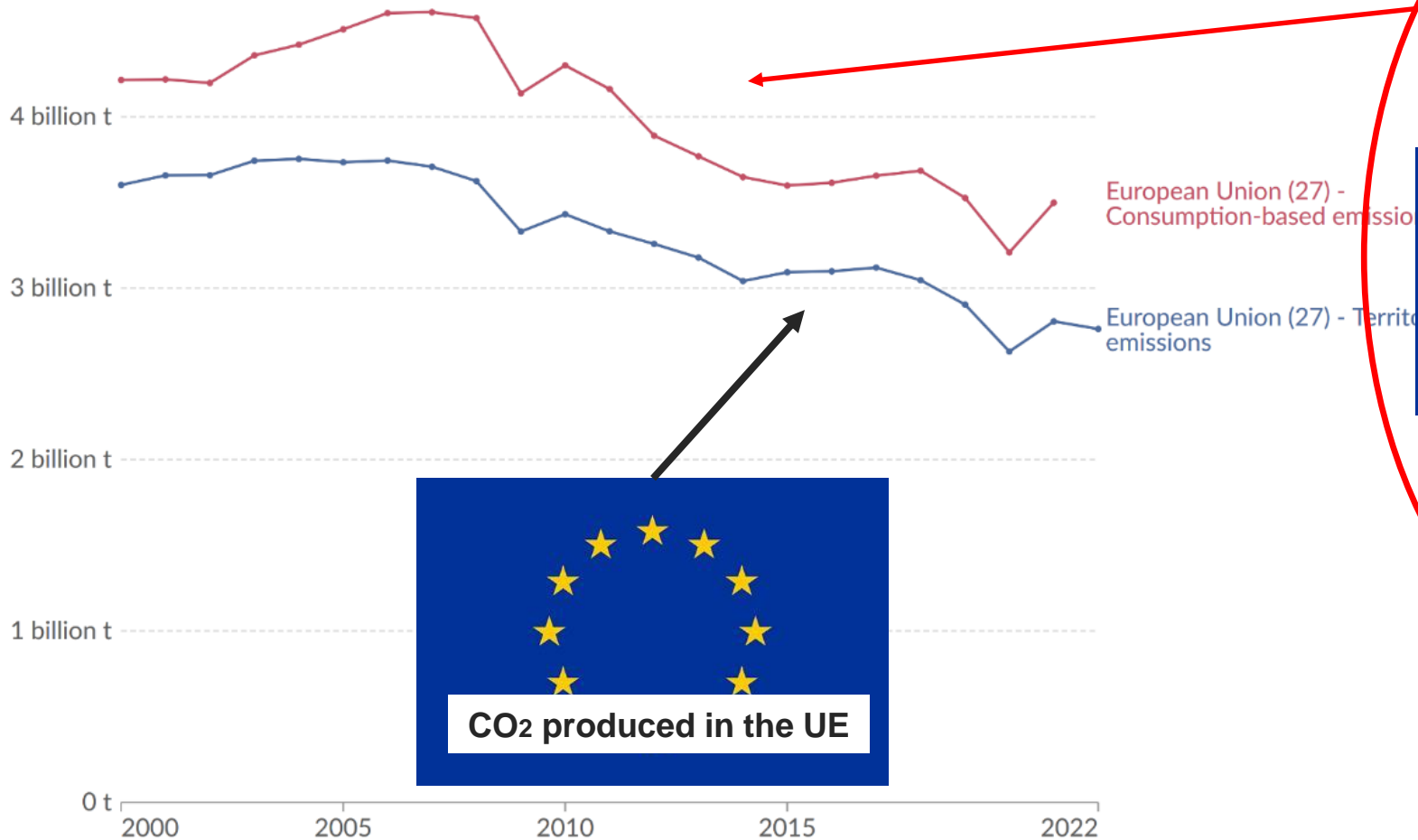
Figure 5: Modelling tools used for the impact assessment



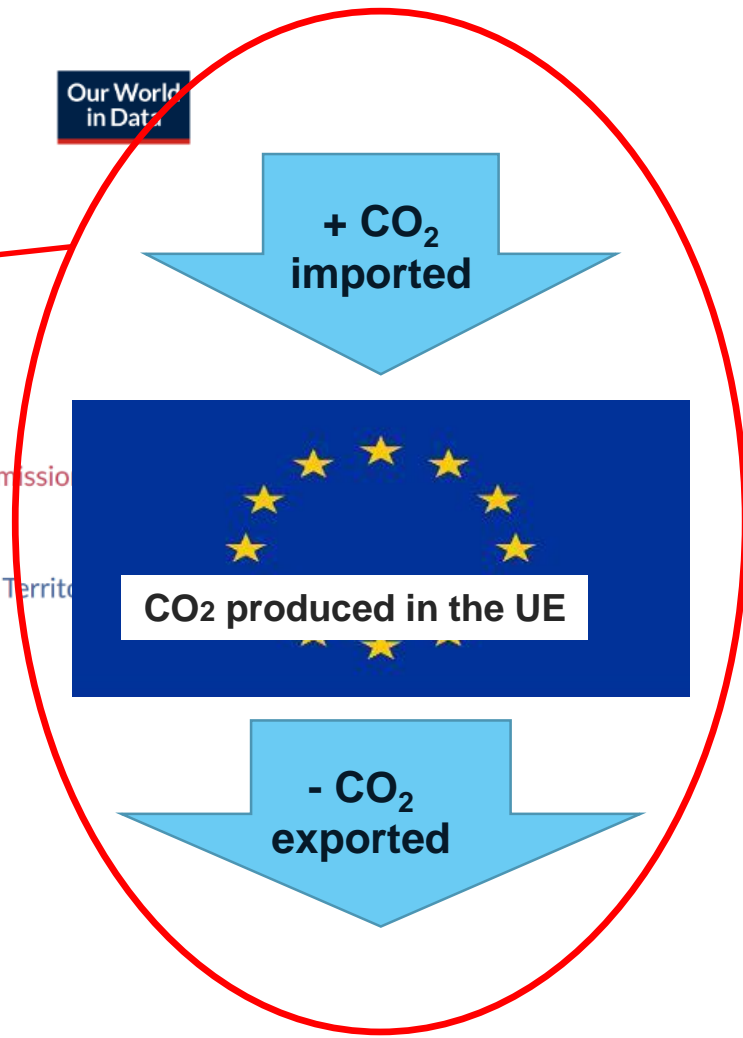
Production vs. consumption based

Territorial and consumption-based CO₂ emissions, European Union (27)

Consumption-based emissions¹ include those from fossil fuels and industry². Land-use change emissions are not included.



Our World in Data

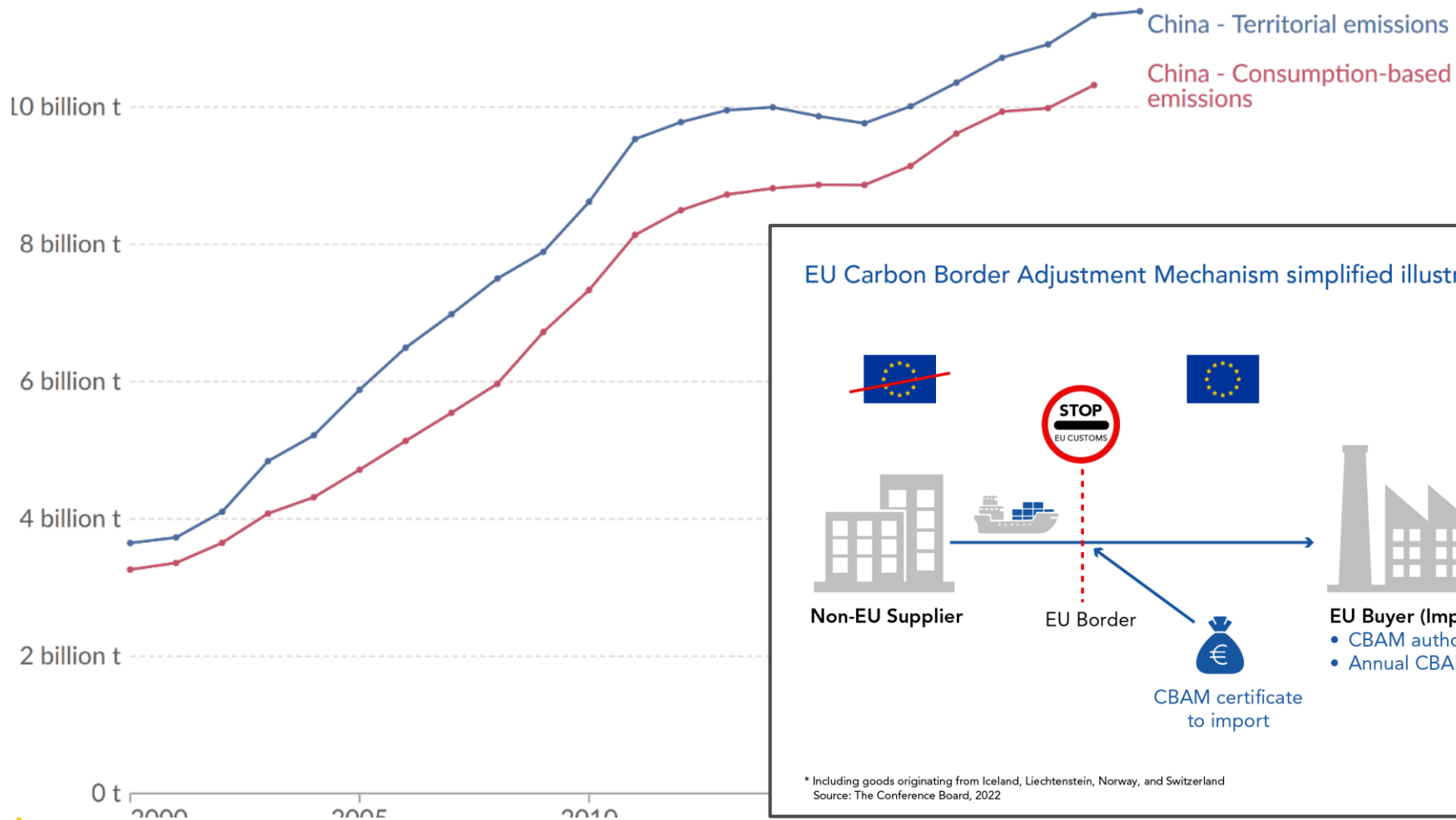


Carbon leakage

Territorial and consumption-based CO₂ emissions, China

Our World
in Data

Consumption-based emissions¹ include those from fossil fuels and industry². Land-use change emissions are not included.



Proper application of CBAM



Figure 7. GHG emission intensity for CN codes 7211 13 00, 7211 14 00, 7211 19 00 - Hot-rolled flat products of non-alloy steel.

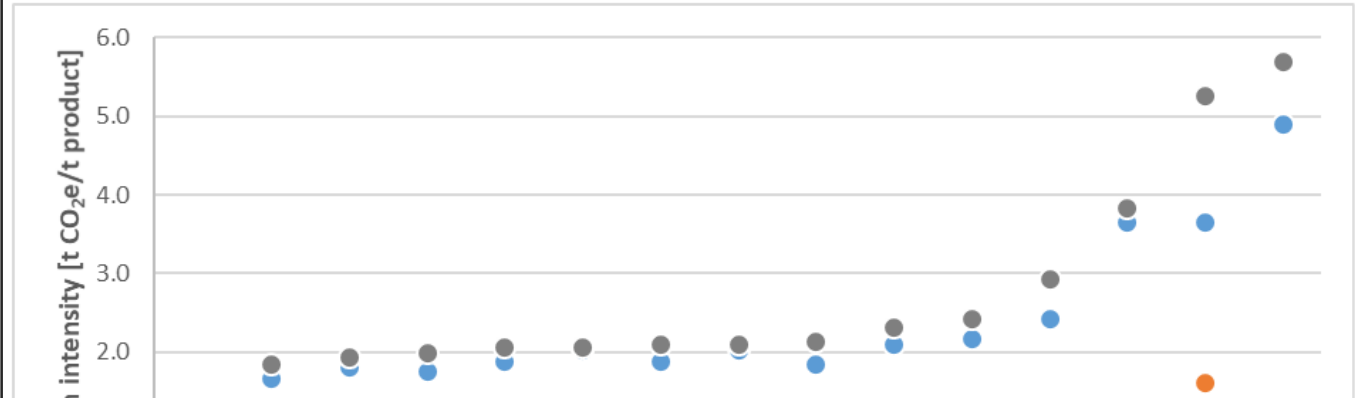
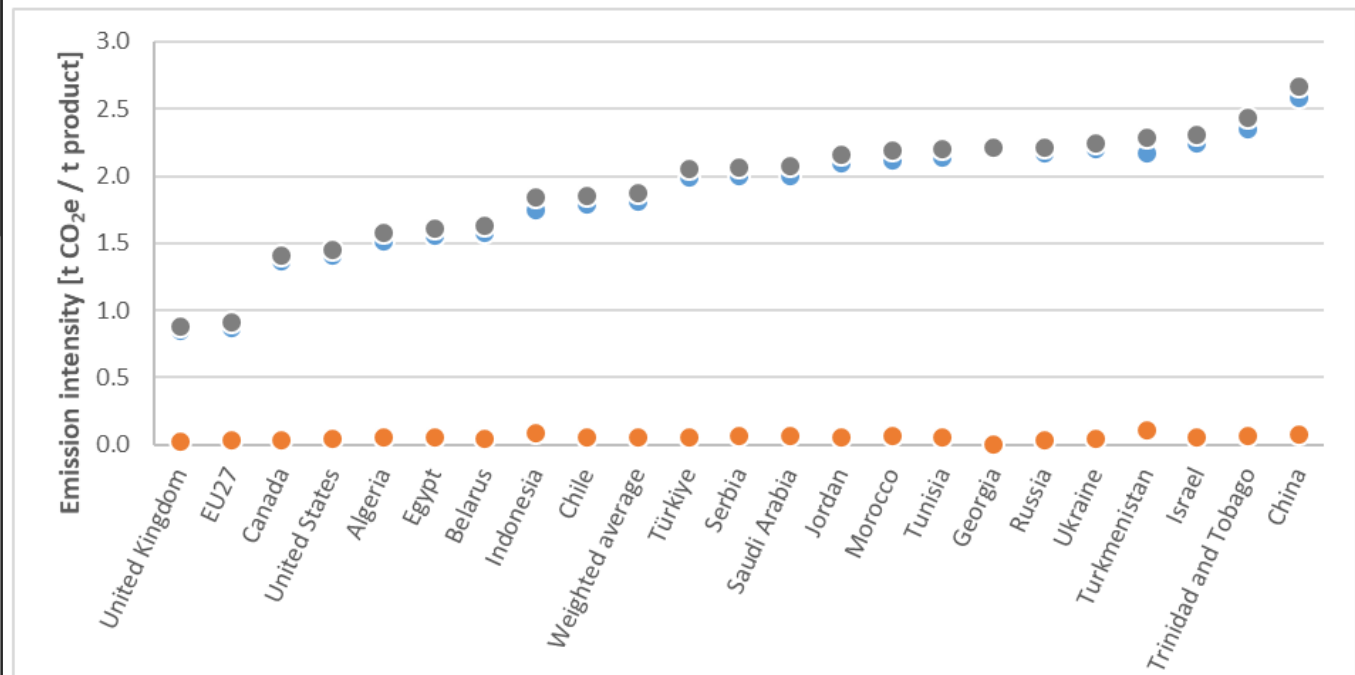


Figure 25. GHG emission intensity for CN code 2834 21 00 – Nitrates of potassium.

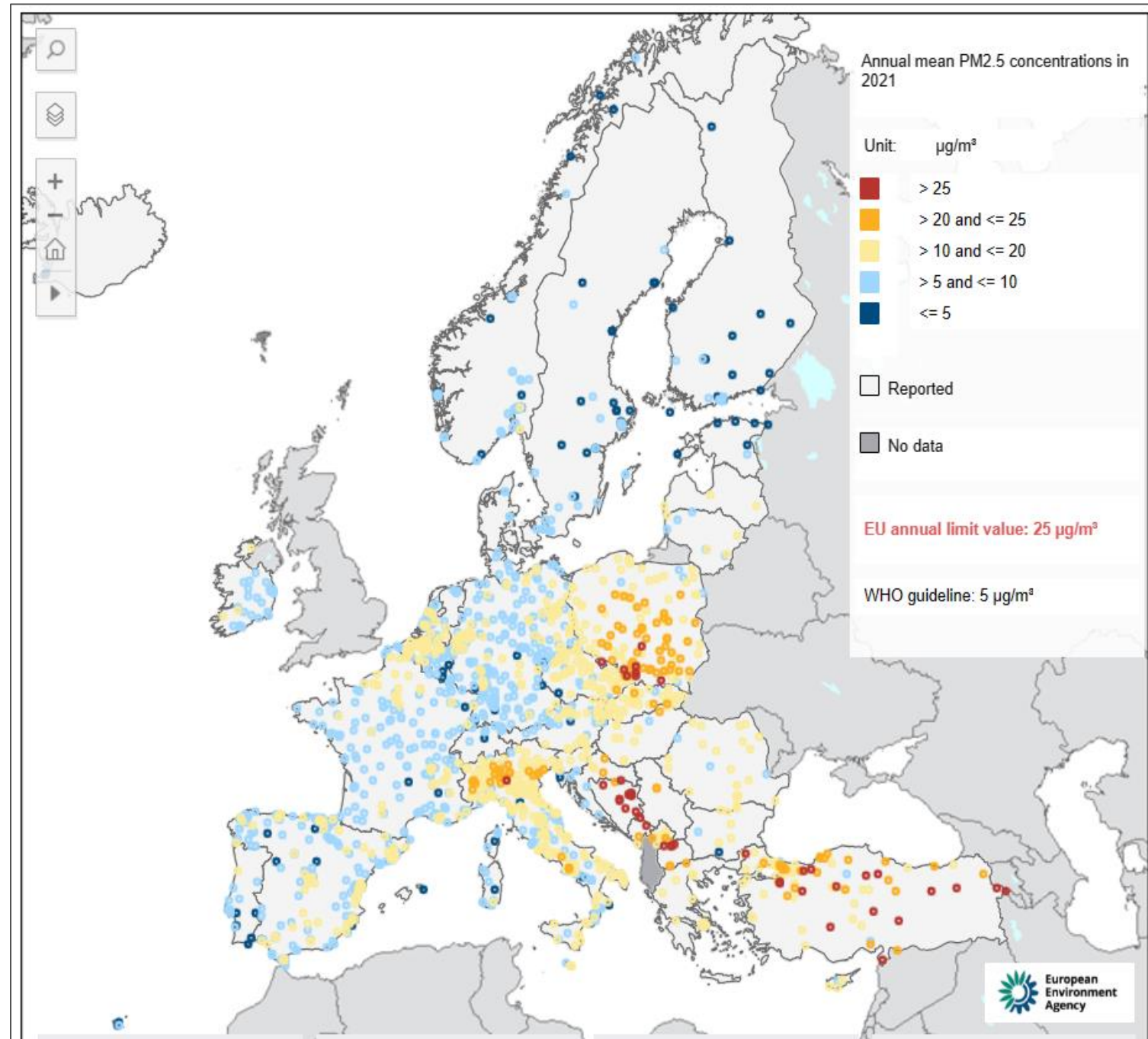


Air Quality

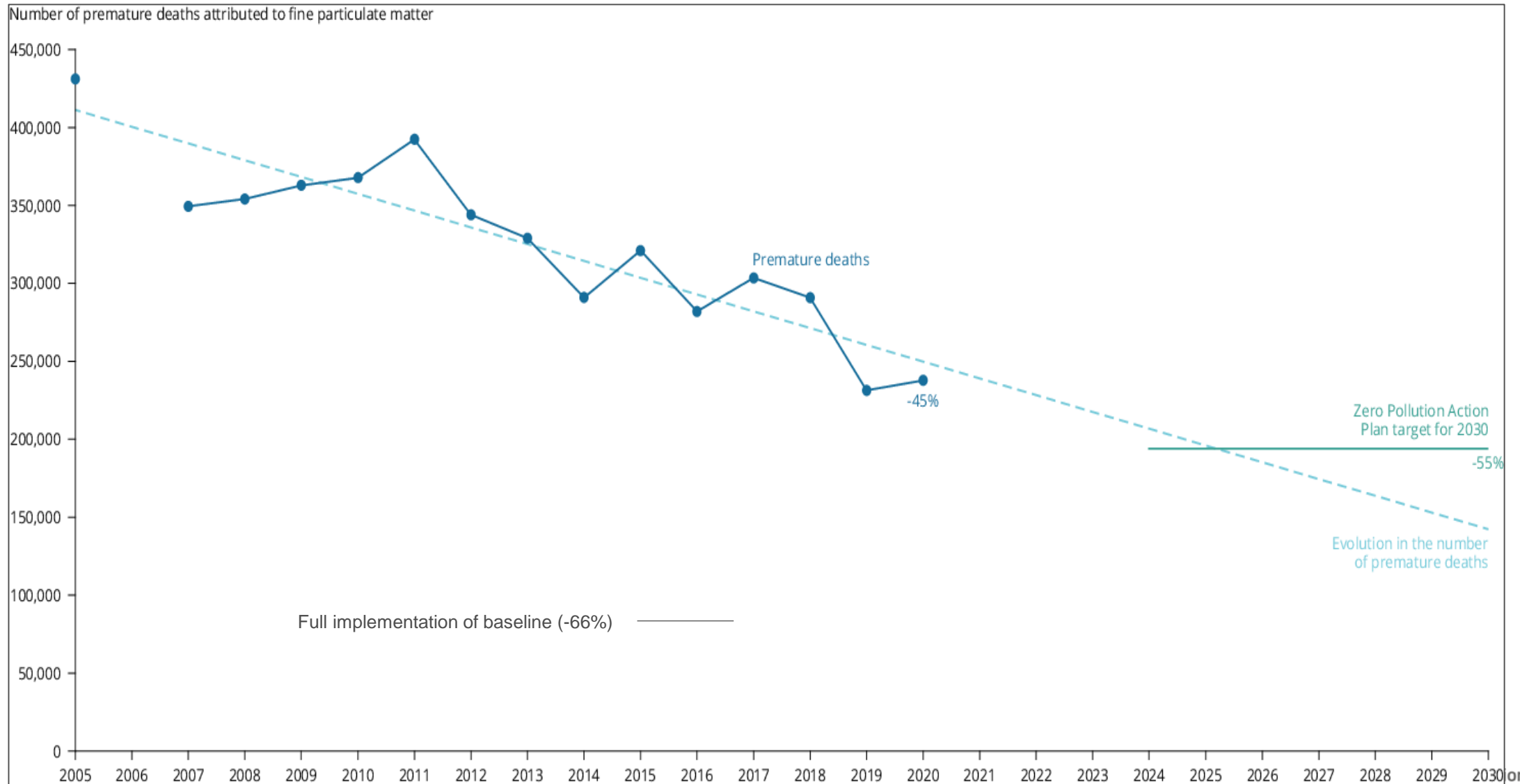
PM 2.5



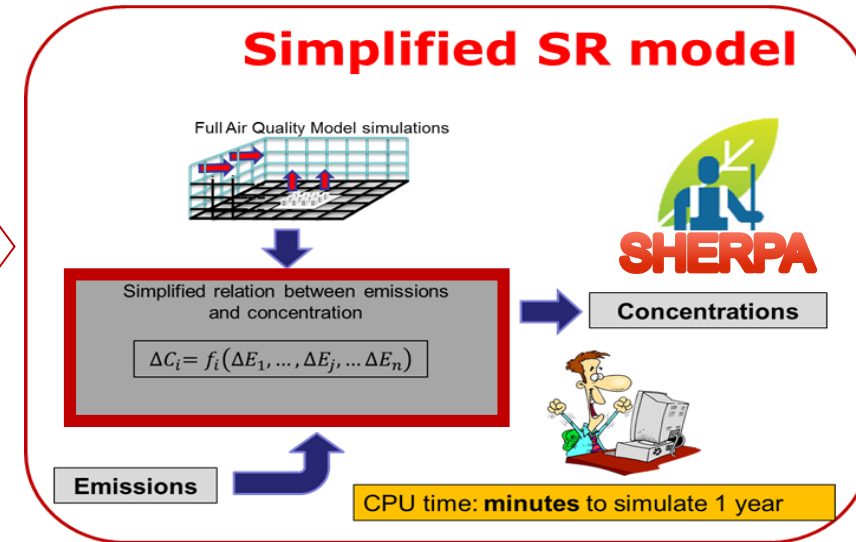
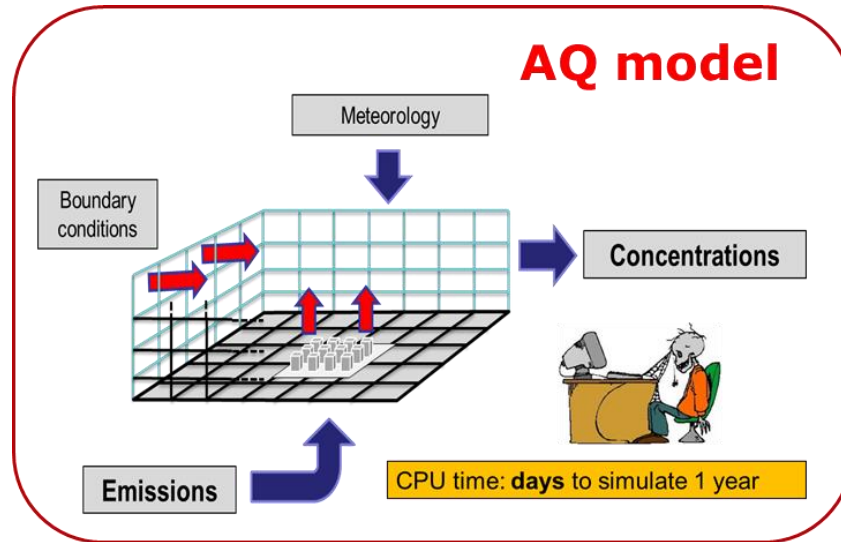
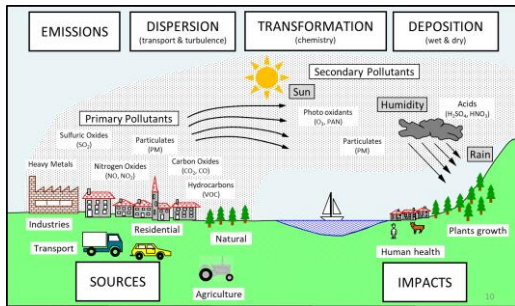
Share of the EU urban population exposed to air pollutant concentrations above the WHO guidelines ($5 \mu\text{m}^{-3}$) in 2021 (EEA, 2023)



Decreasing trend, work still to be done

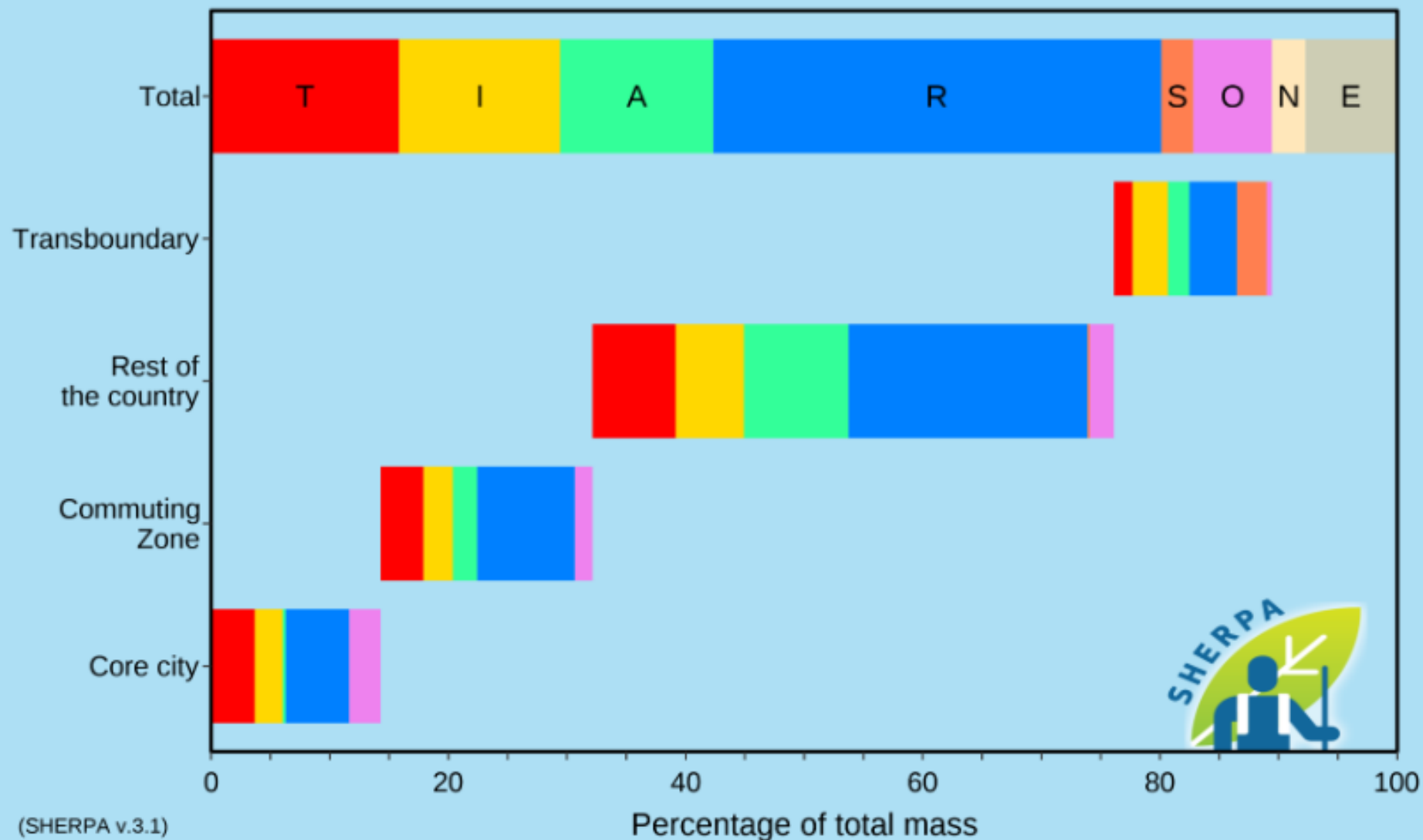


How: from real world to models



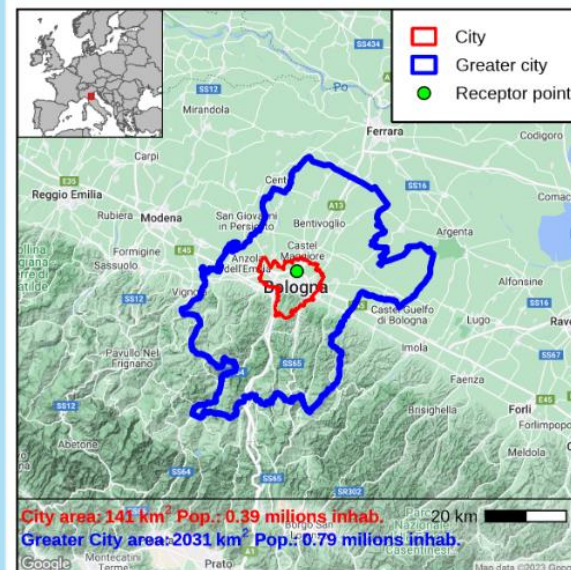
Focus on Bologna

PM_{2.5} Spatial and sectoral allocation

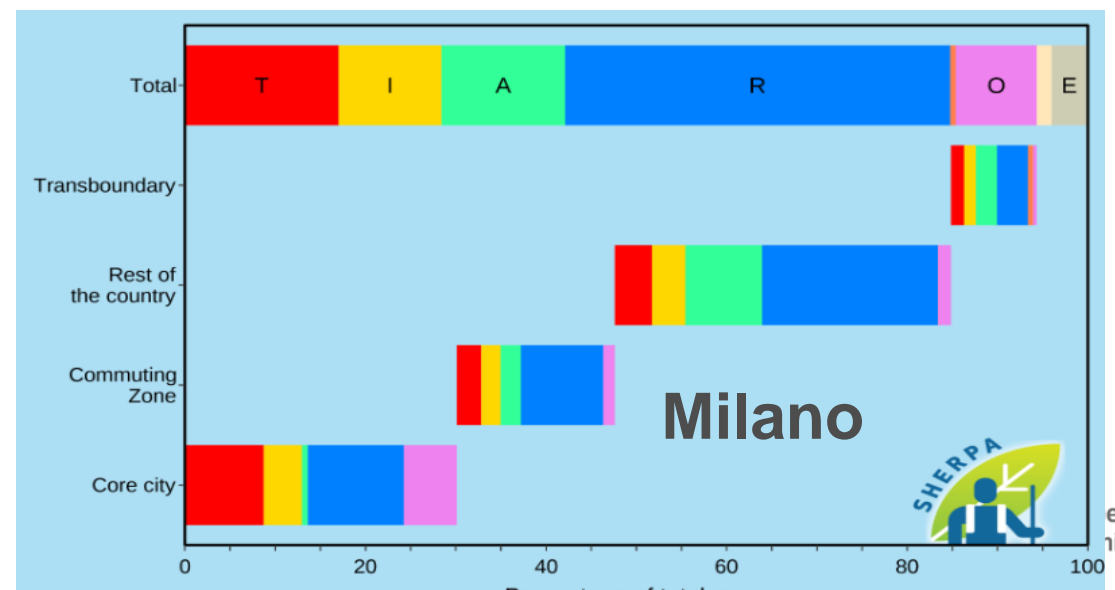
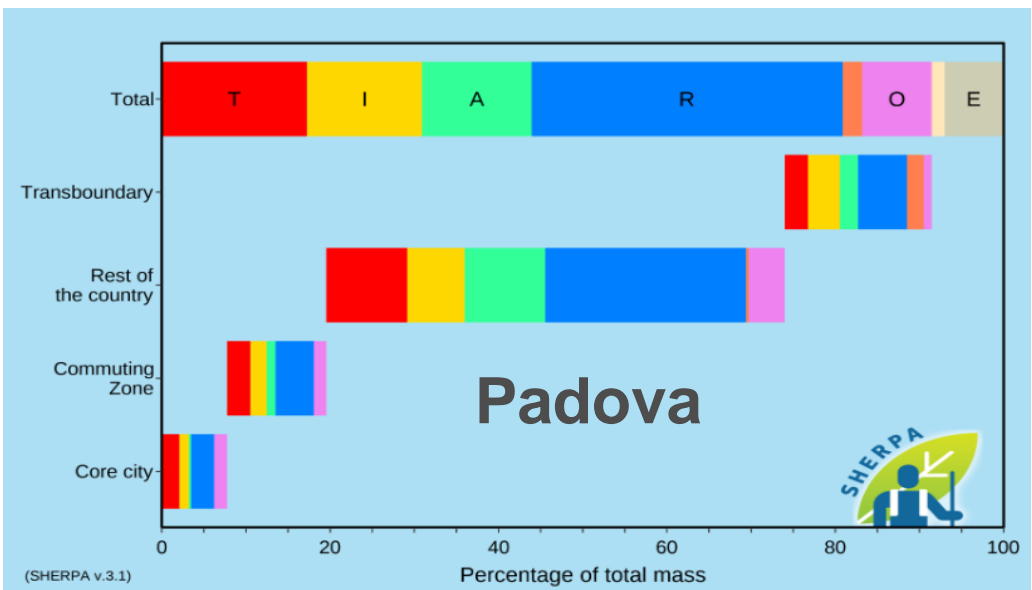
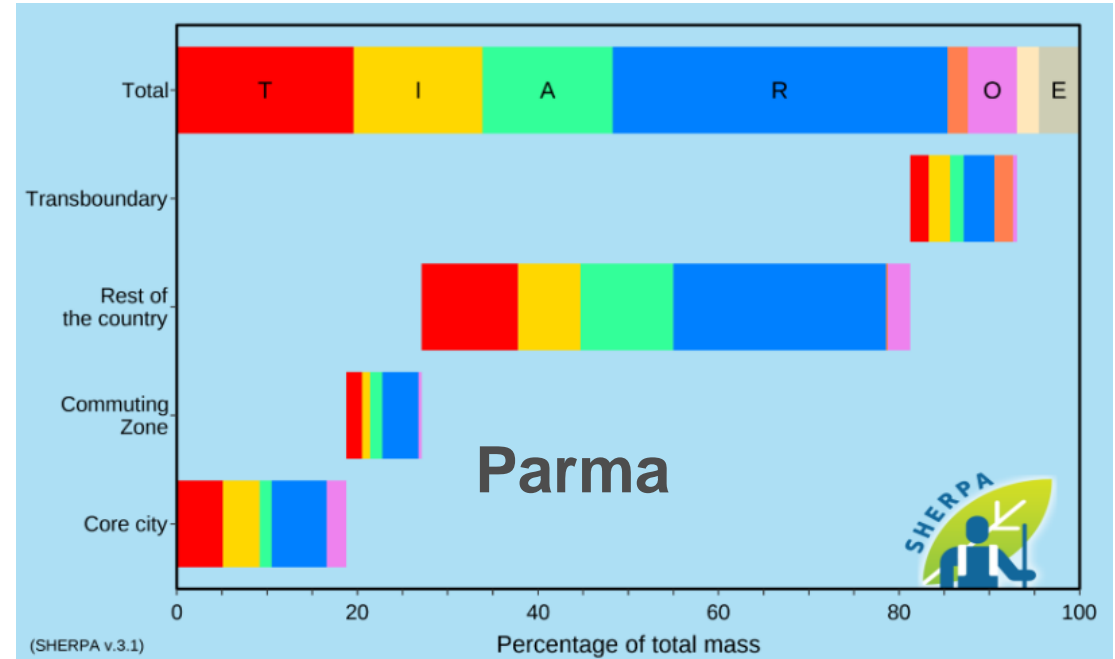
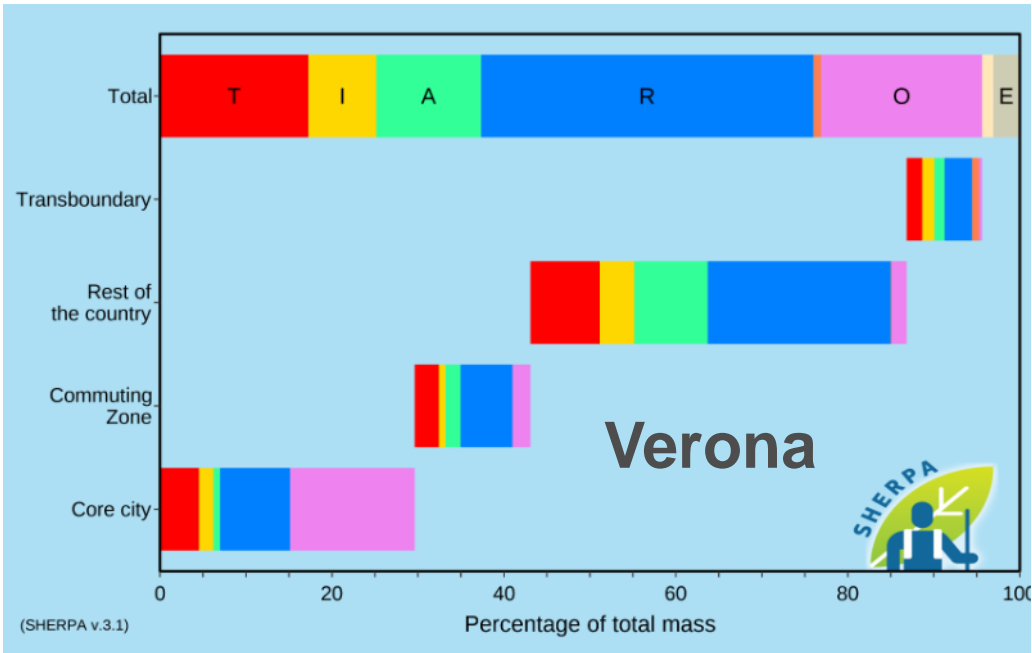


Sectors

- T - Transport
- I - Industry
- A - Agriculture
- R - Residential
- S - Shipping
- O - Other
- N - Natural
- E - External



Po Valley as a “basin”



Policy consistency

The Global Covenant of Mayors

The Covenant of Mayors was launched in 2008 in Europe with the ambition to gather local governments **voluntarily committed to achieving and exceeding the EU climate and energy targets.**

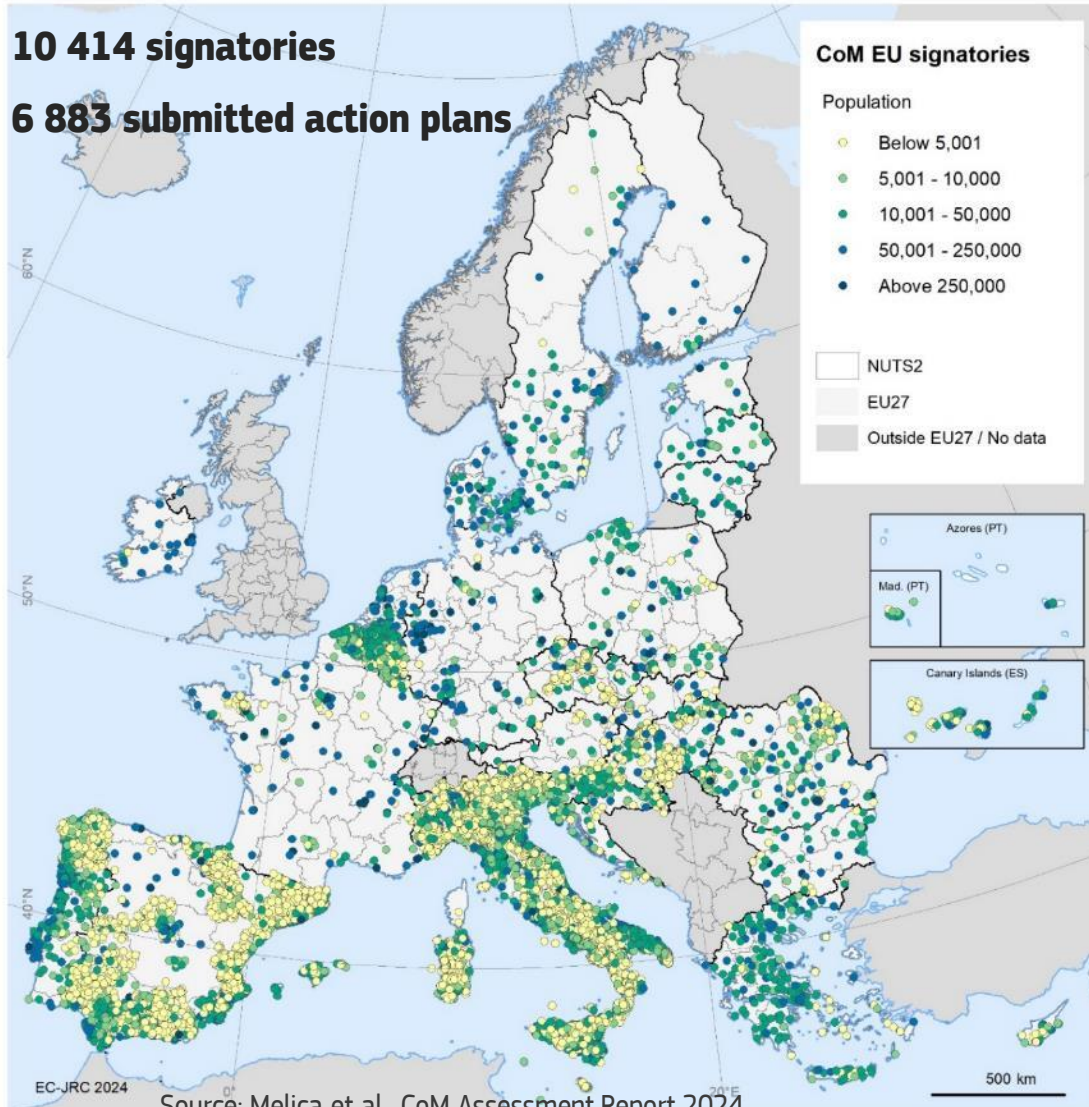


The initiative expanded to other areas of the world and since 2016 the **Global Covenant of Mayors for Climate and Energy** is a worldwide initiative that invites cities and local governments to play a direct role in climate actions now involving more than **13 000 signatories**, representing **more than 1 billion people.**

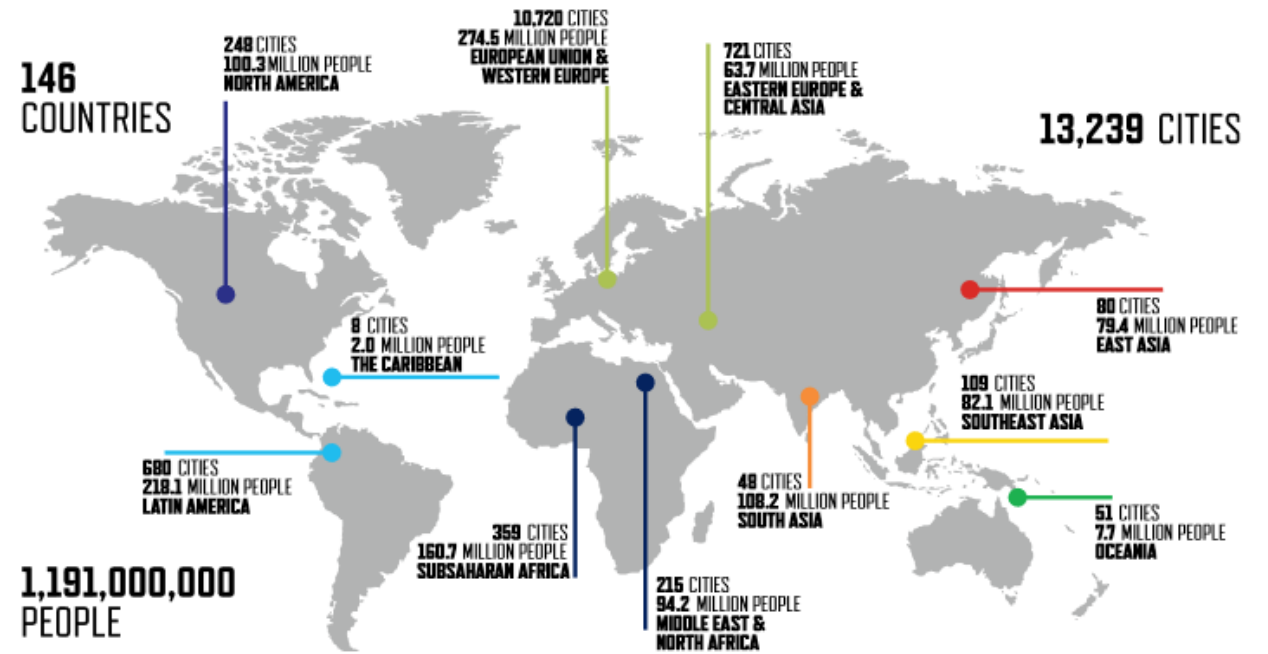
CoM – From EU to Global

10 414 signatories

6 883 submitted action plans



Source: Melica et al., CoM Assessment Report 2024



100 Neutral cities

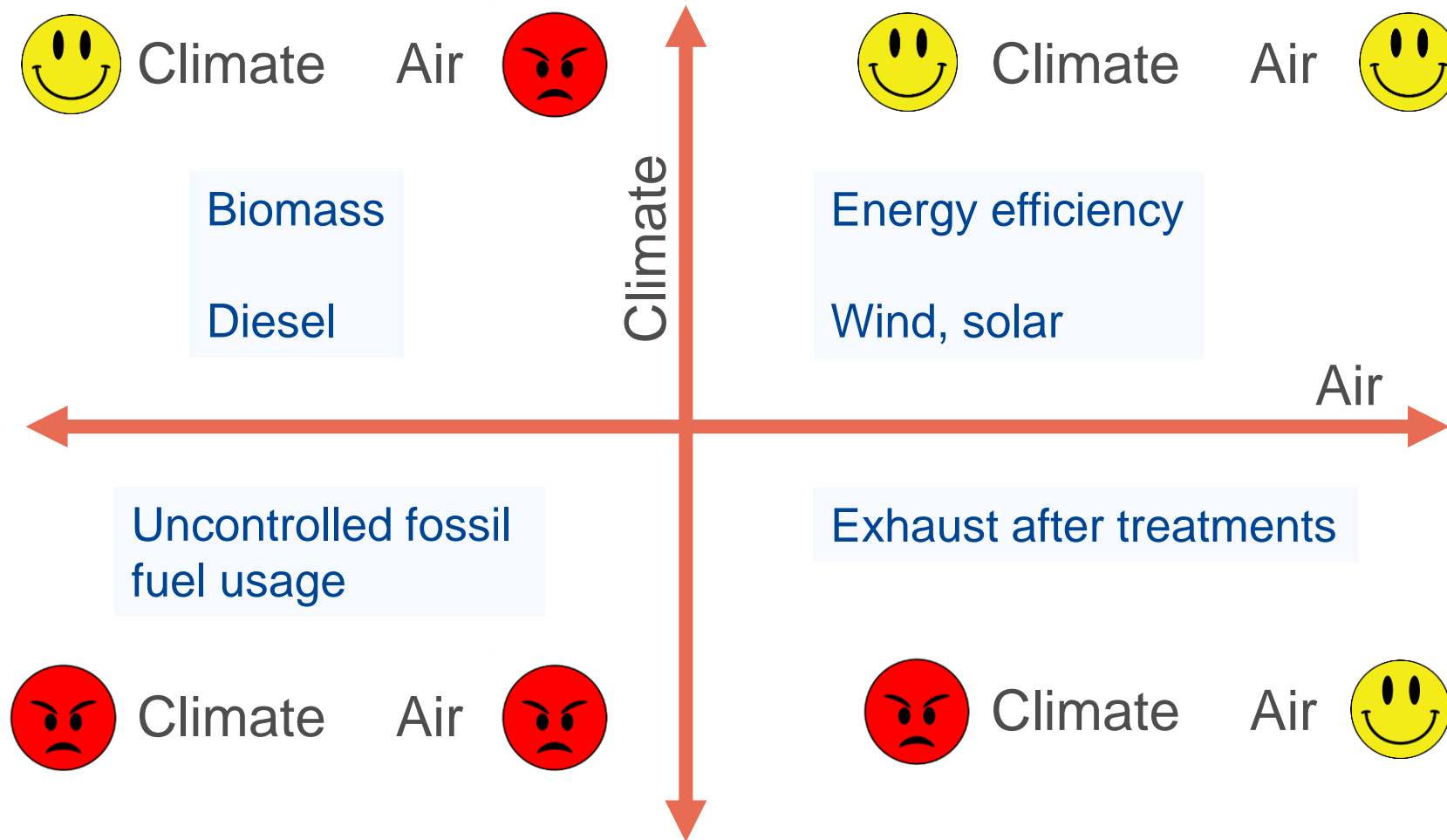
EU CITIES



In Italy:

- Bergamo,
- Bologna,
- Firenze,
- Milano,
- Padova,
- Parma,
- Prato,
- Roma
- Torino

Air Quality & Climate Actions



Adapted from: Air quality and climate--synergies and trade-offs, von Schneidemesser E. and P. Monks, Environ Sci. Process Impacts, 2013

Infrastructures

JRC facilities – some examples

Virtual tour at <https://visitors-centre.jrc.ec.europa.eu/en/media?type=8>

Neutron beams
to explore
the femtoscale
(MONNET)



Food Contact
Materials
(EURL FCM)

Nanobiotechnology
Laboratory



JRC neutron
time-of-flight
facility (GELINA)

Reference Material
Processing Hall



Water Laboratory

JRC facilities – some examples

Virtual tour at <https://visitors-centre.jrc.ec.europa.eu/en/media?type=8>

European Laboratory for Structural Assessment (ELSA)



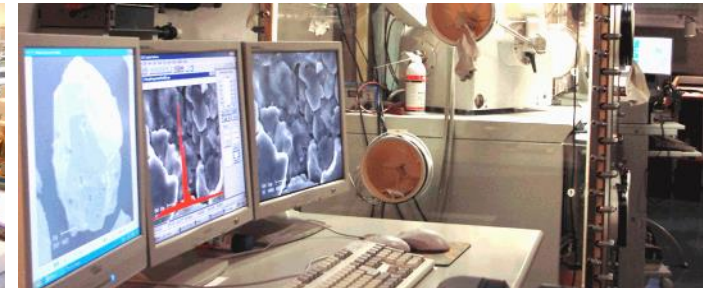
Hopkinson Bar facility (HOPLAB)

Vehicle Emission Laboratory (VELA)+ vehicle Market Surveillance Laboratory



European Interoperability Centre for Electric Vehicles and Smart Grids

Battery Testing Facility Laboratory



Nuclear Forensic Laboratory

JRC facilities – some examples

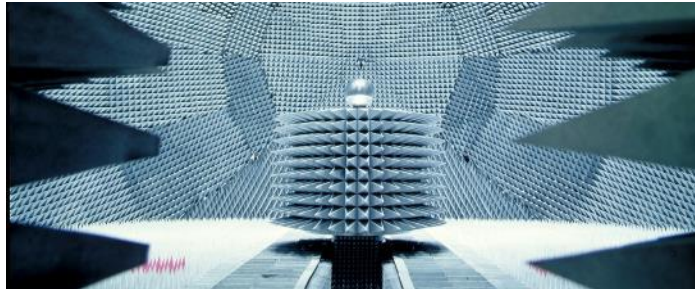
Virtual tour at <https://visitors-centre.jrc.ec.europa.eu/en/media?type=8>

JRC ultra low-background gamma-ray spectrometry facility (HADES)



European Solar Test Installation (ESTI)

European Microwave Signature Laboratory (EMSL)



Gas Testing Laboratory

JRC radionuclide metrology laboratory (RADMET)

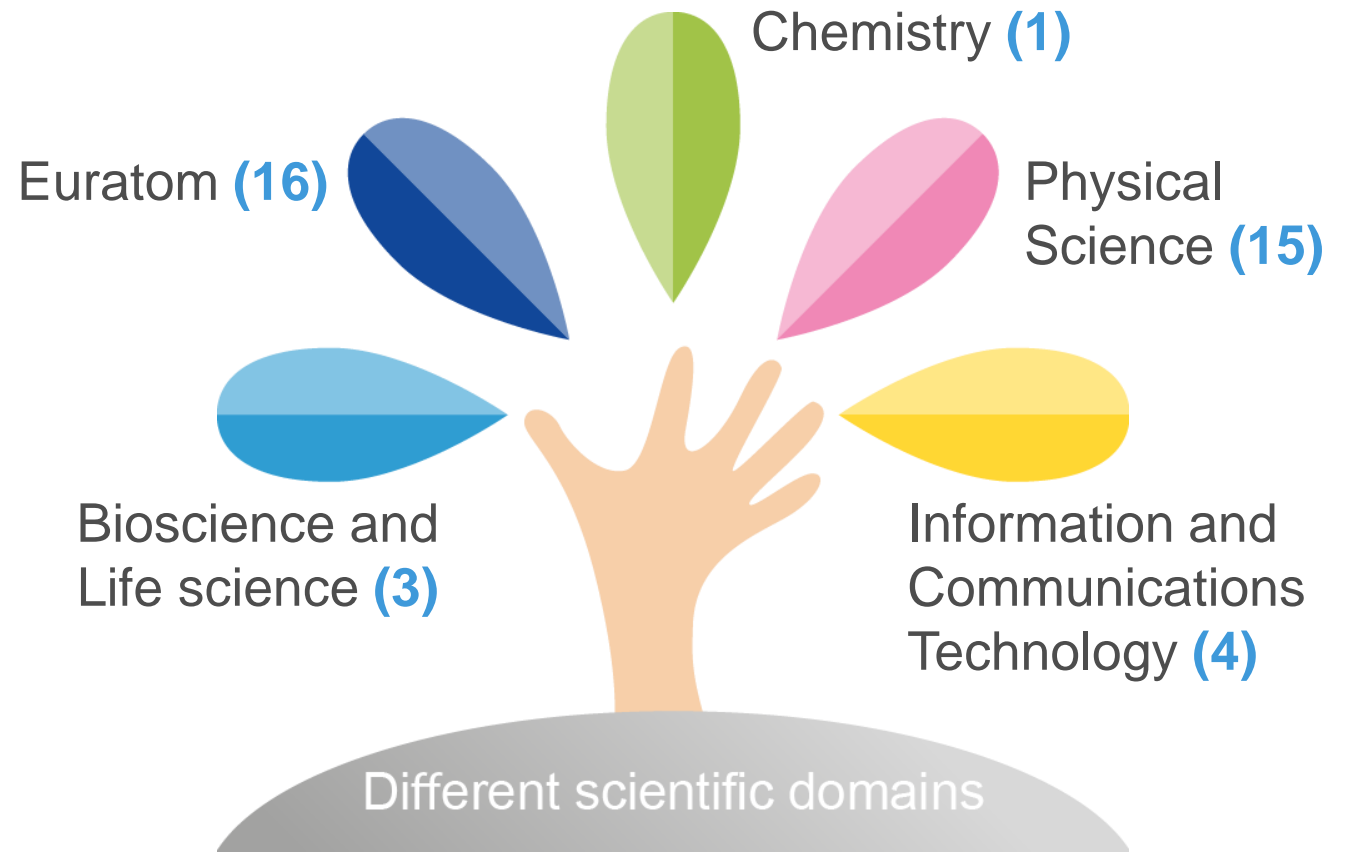


European Crisis Management Laboratory (ECML)

Open access to JRC Research Infrastructures

The JRC hosts **39 physical Research Infrastructures (RI)** with a potential of **opening to external users** (out of a total of **56**)

<https://europa.eu/!CM63UK>



We are hiring



Check our vacancies
recruitment.jrc.ec.europa.eu

Thank you

Fabio.monforti-ferrario@ec.europa.eu



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EU Science Hub

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