# The role of university in implementing sustainable development challenges of cities and communities

Patrizia Lombardi

*Politecnico di Torino*

Politecnico di Torino

Politecnico di Torino

# Who is talking?

## BACKGROUND

BA/MA in ***Architecture*** in IT
M.Sc in ***Urban Planning and Real Estate Market*** in IT
PhD in ***Business & Informatics*** in UK in 1999

## CURRENT OCCUPATION

**Full Professor** in Urban planning evaluation & Decision making at Politecnico di Torino
**Vice Rector** *for Sustainable campus & communities* and *Green team* **coordinator** at Politecnico di Torino
**President** of the Italian Network of Universities for Sustainable Development (RUS)
**Member** of the *Technical Mission Structure* of the Sustainable Mobility & Infrastructure Ministry (MIMS)

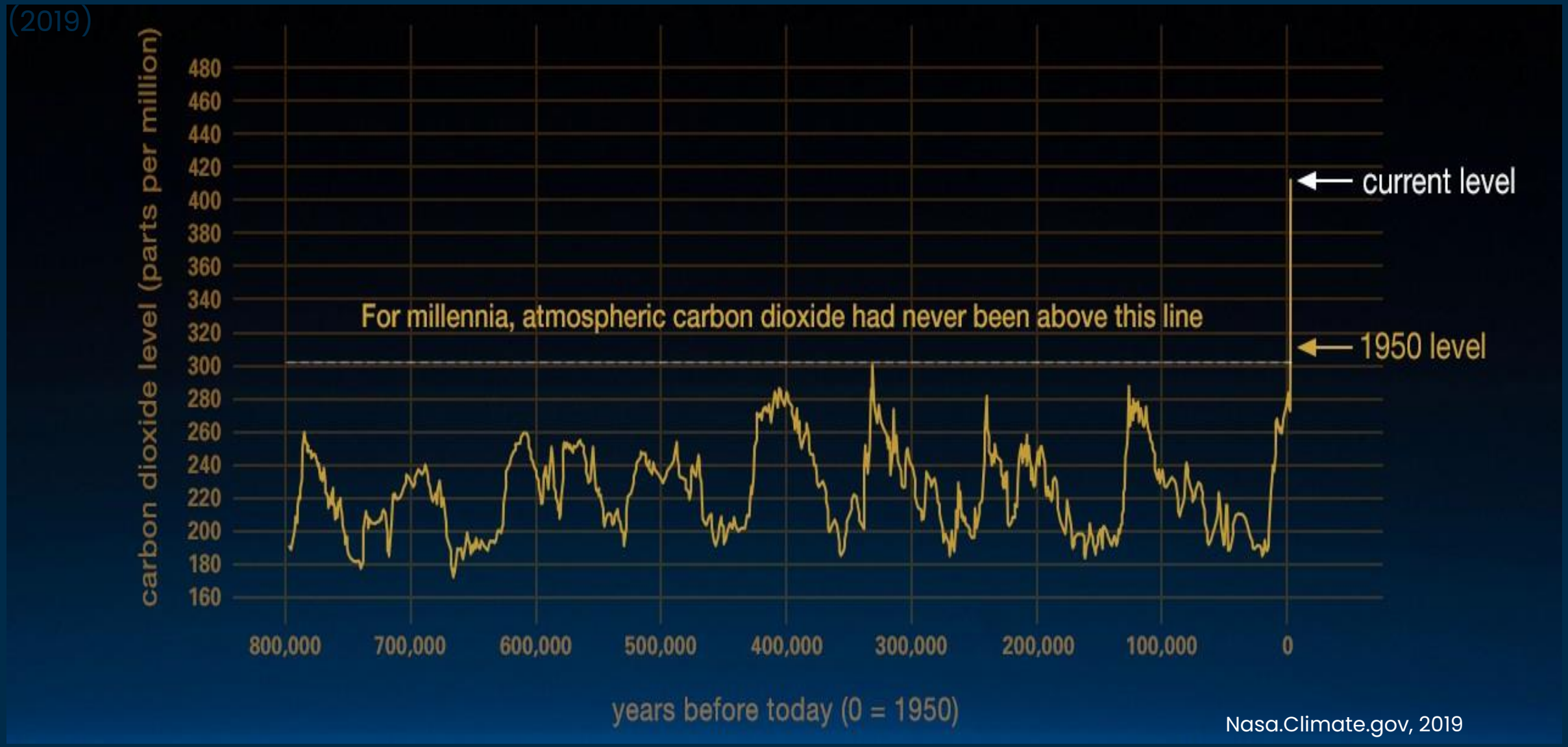
In times of profound crisis in the economy and in politics, non-profit organizations, like **universities**, are the only social actors able to make a change towards new sustainable trajectory

**Joseph Stiglitz,**
premio Nobel per l'economia

# «Antropocene»

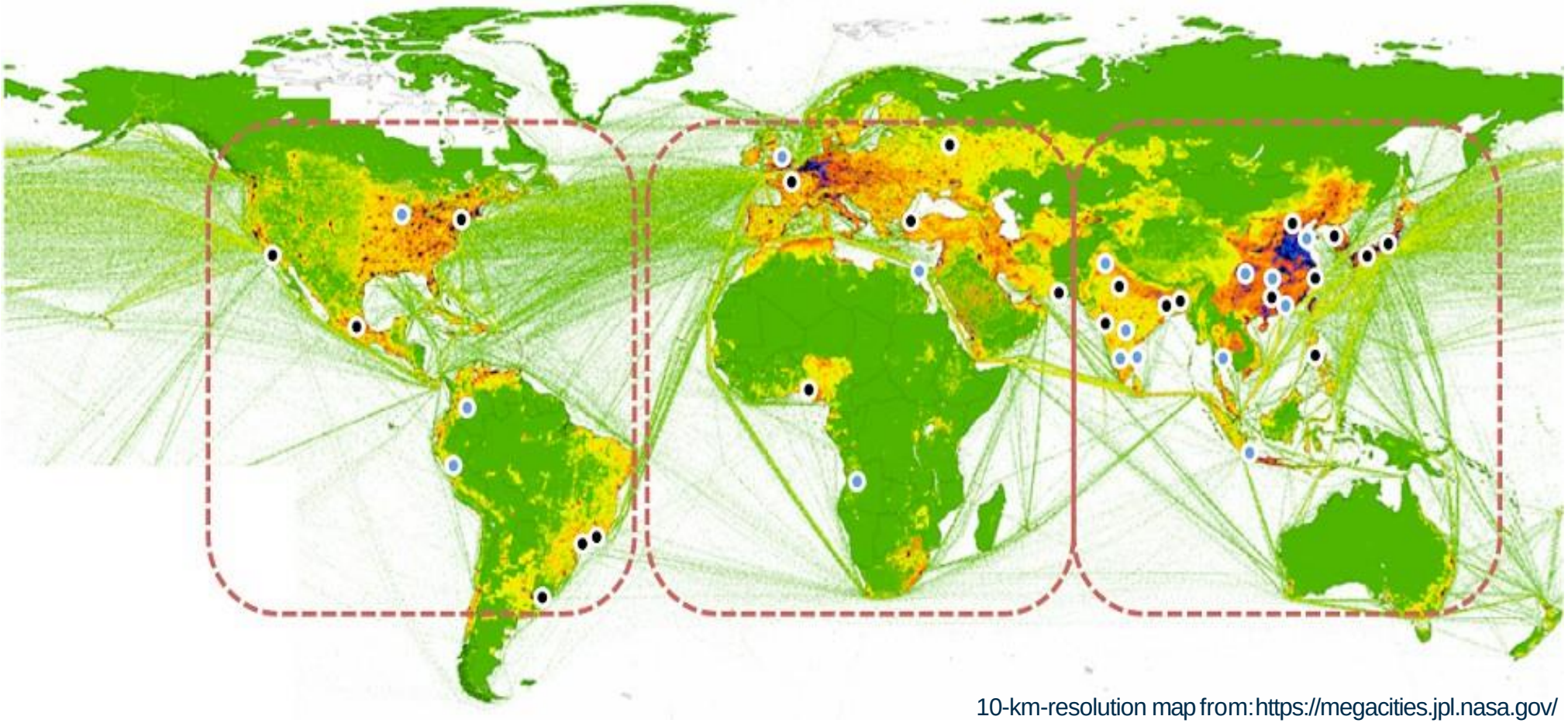
*Paul J. Crutzen, Nobel Prize 1995*

(2019)




Nasa.Climate.gov, 2019

# Fossil fuel $CO_2$ emission sources: distribution and intensity



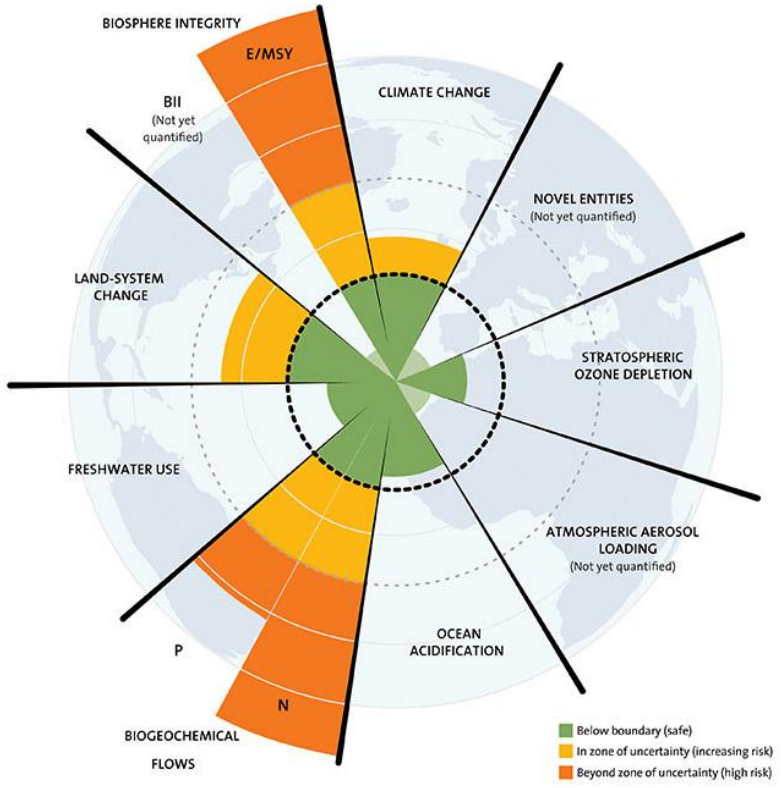
10-km-resolution map from: https://megacities.jpl.nasa.gov/

## Shenzhen, 1980

## Shenzhen, 2013

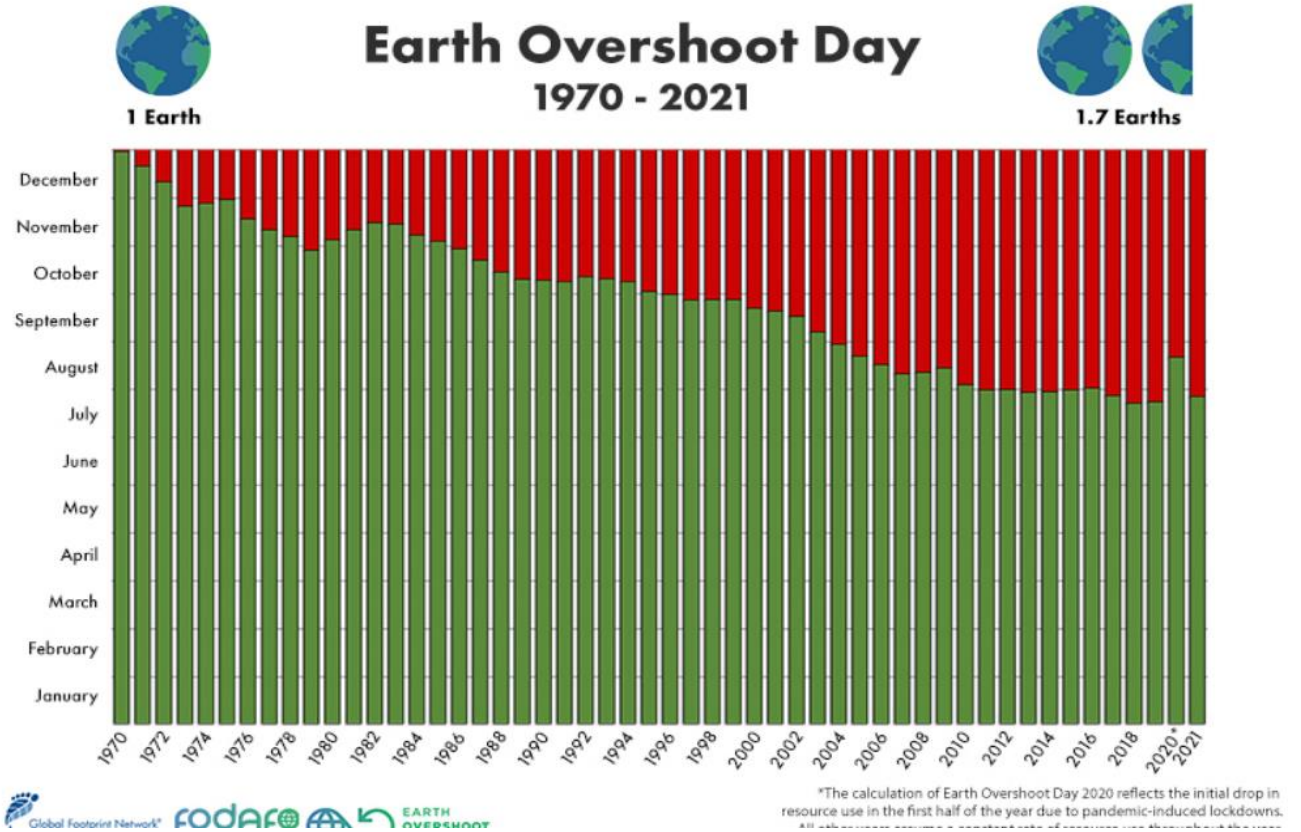
# HUMAN IMPACTS ON THE PLANET

## Planetary limits

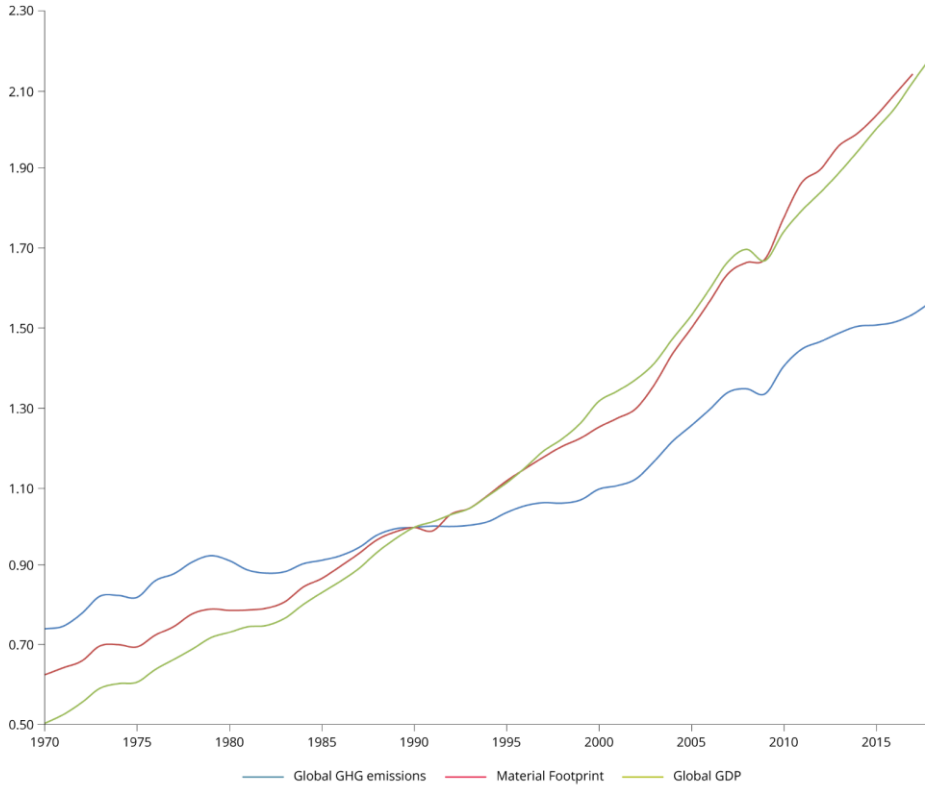


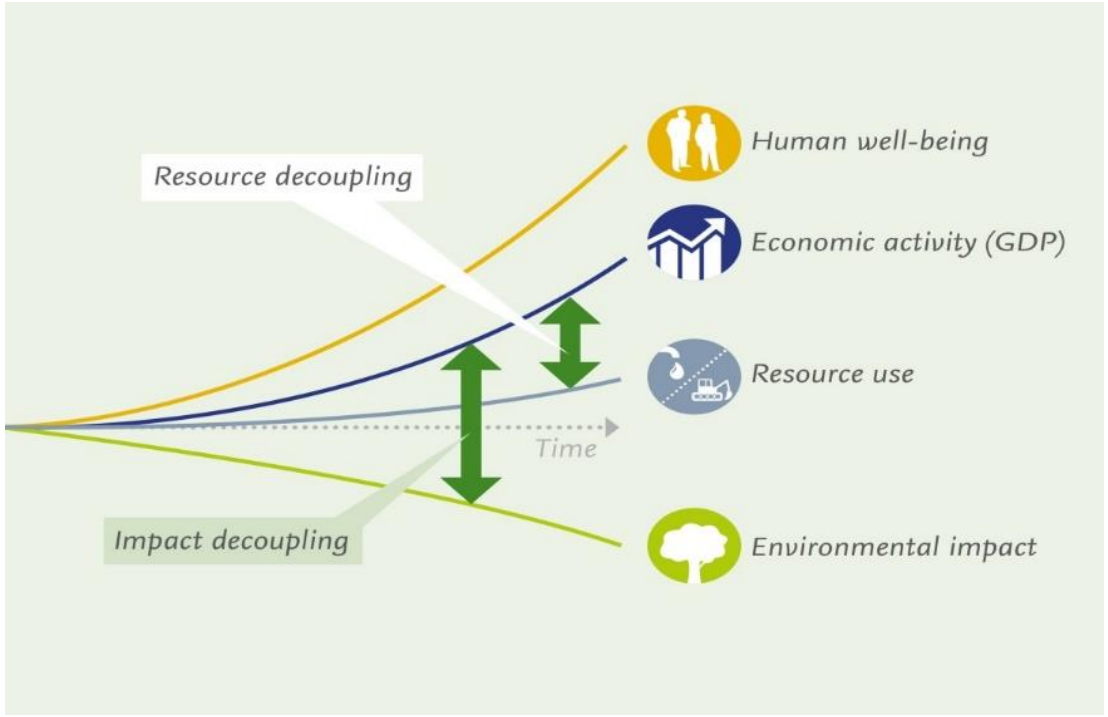

Source: Steffen et al. 2015

## **29 July 2021** was the Earth Overshoot Day and for Italy was 13 May



# Correlation between GDP and GHG

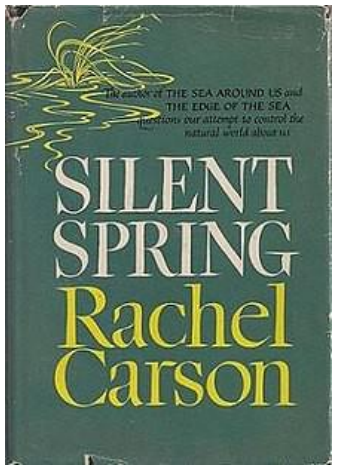


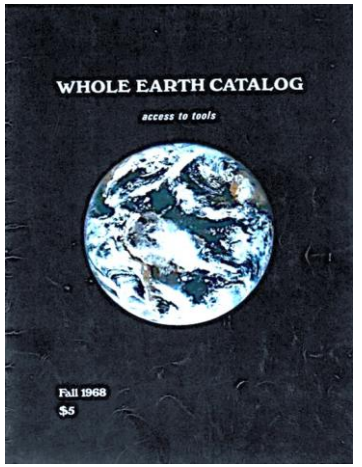

Sources: Modified from Wiedmann et al. (2020).

# Youth protagonism

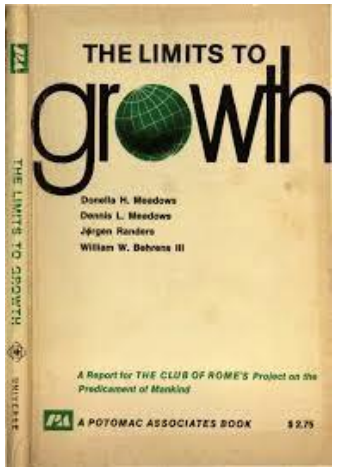
Rachel Carson, *Silent Spring*, 1962

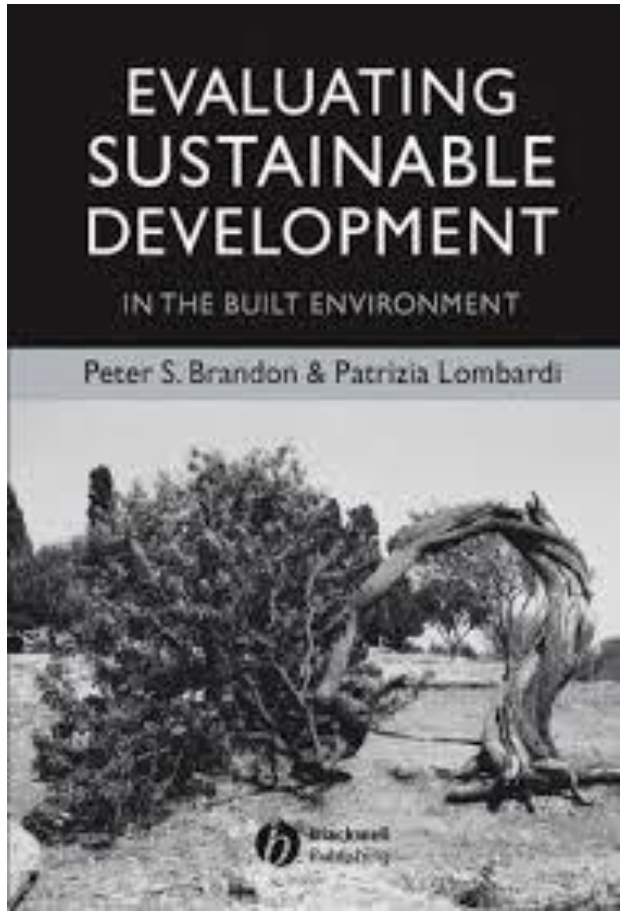



Stewart Brand, *Whole Earth Catalog*, 1968




D. H. Meadows, D. L. Meadows, J. Randers e W. W. Behrens III, *The limits to growth*, 1972



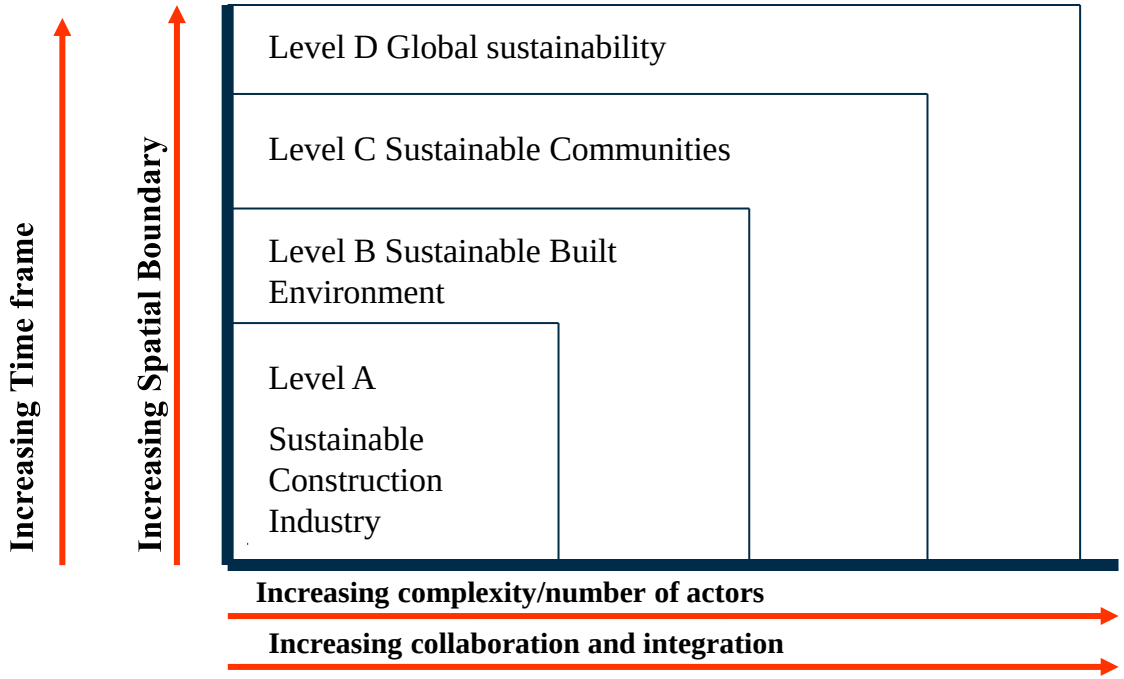


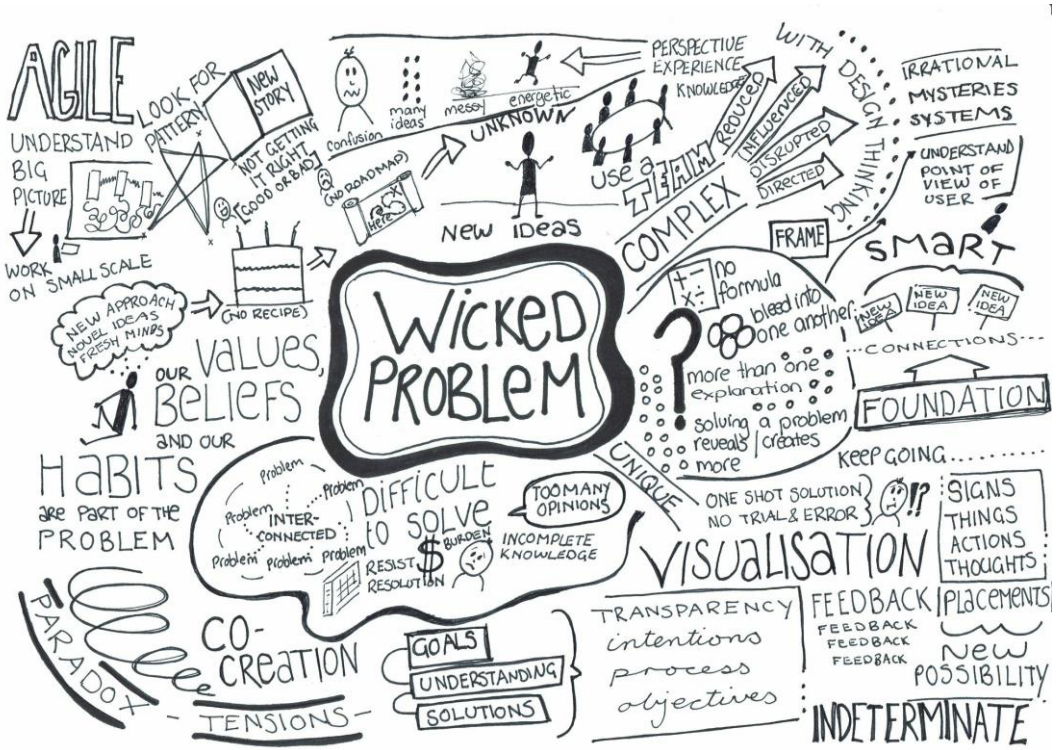

## "At the heart of the sustainable development agenda is the question of management"

(Brandon and Lombardi, 2005; II ed. 2011)

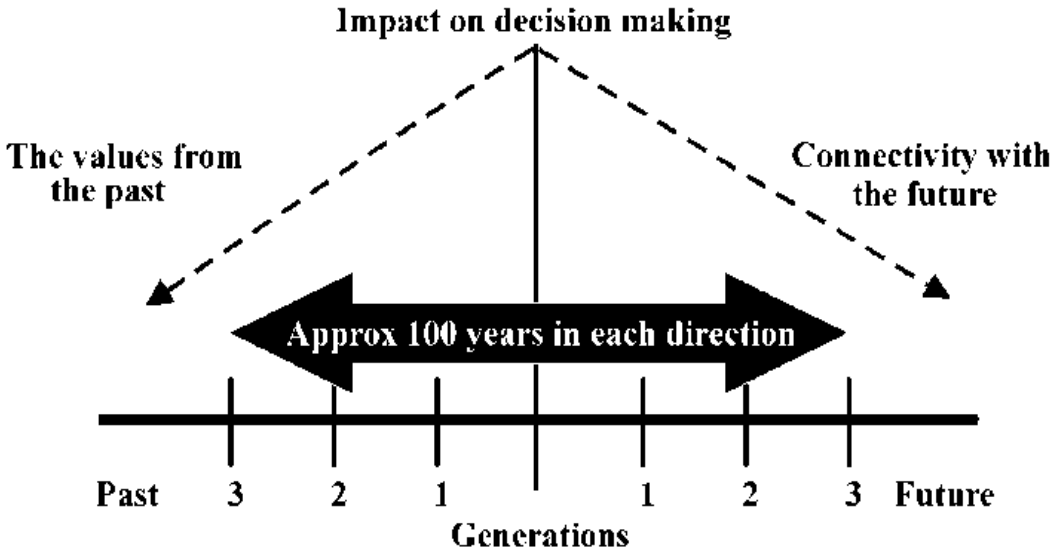
- Wrong decisions can lead to critical consequences, increase human suffering, and precipitate current environmental and economic crises.
- **Improving the basis for sound decision-making is a high priority.**

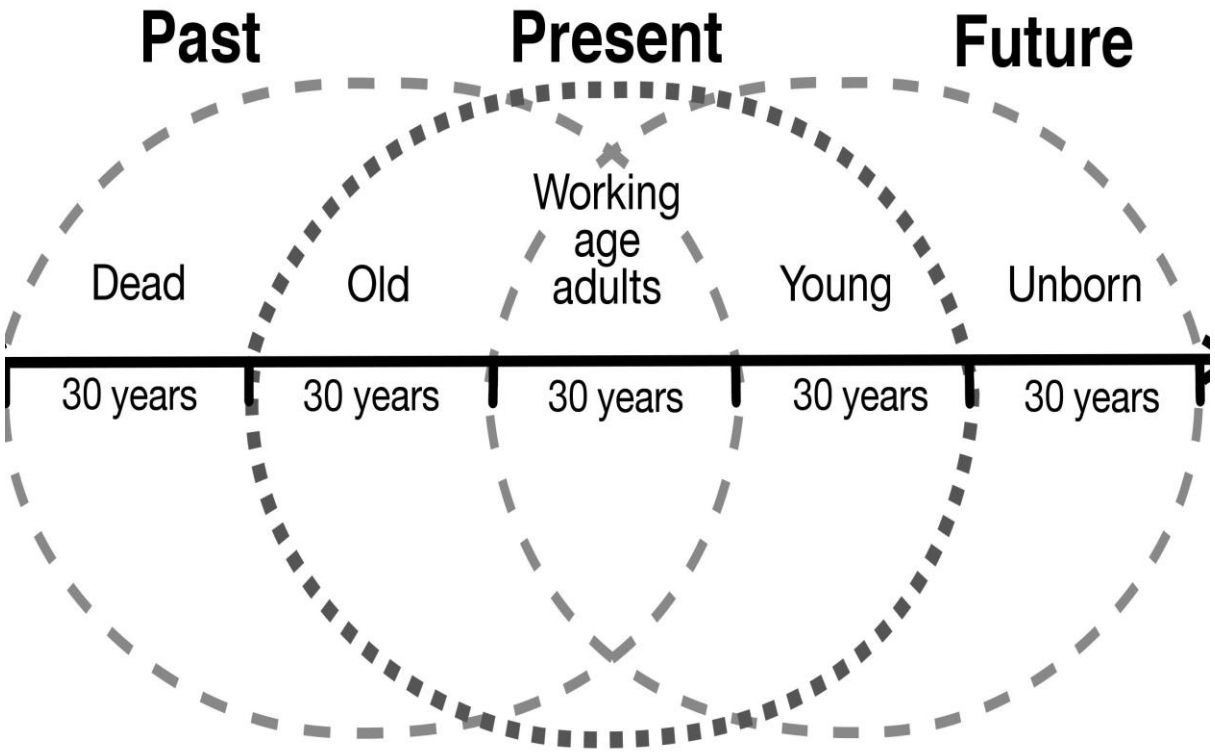
# Decision making problems at territorial level



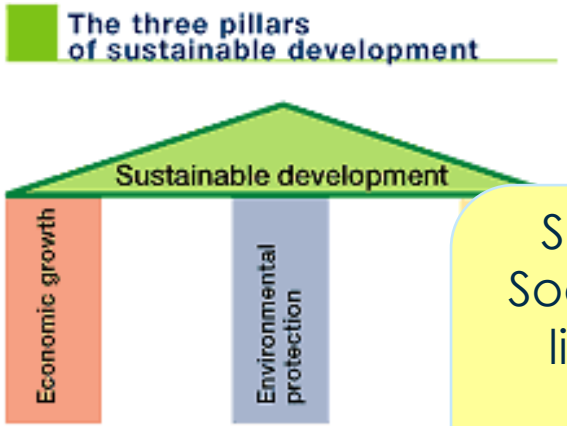



# Impact on decision making

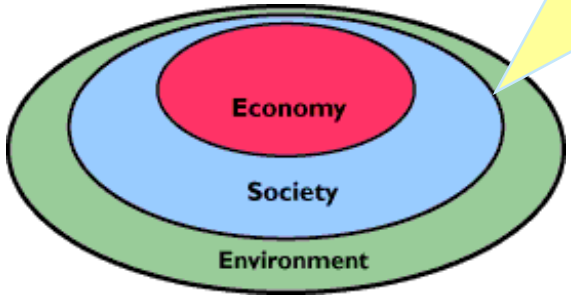


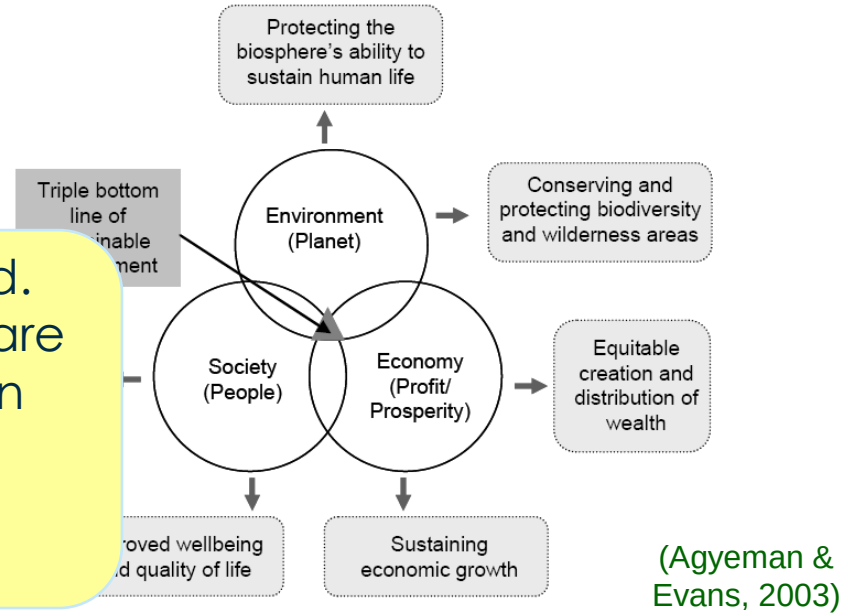
# Sustainable development models




SD dimensions are nested. Socio-ecological systems are linked: one impacts upon another and society is depending on the environment



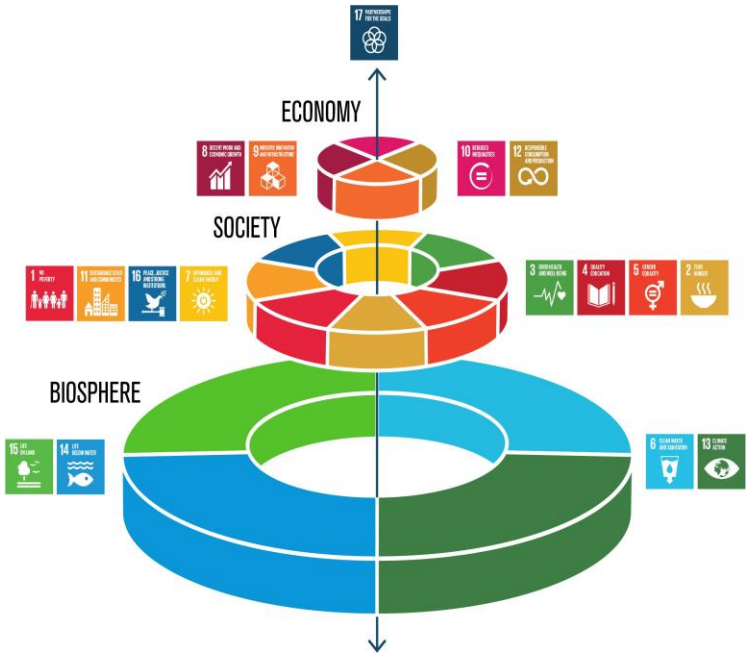

(Hart, 2002)



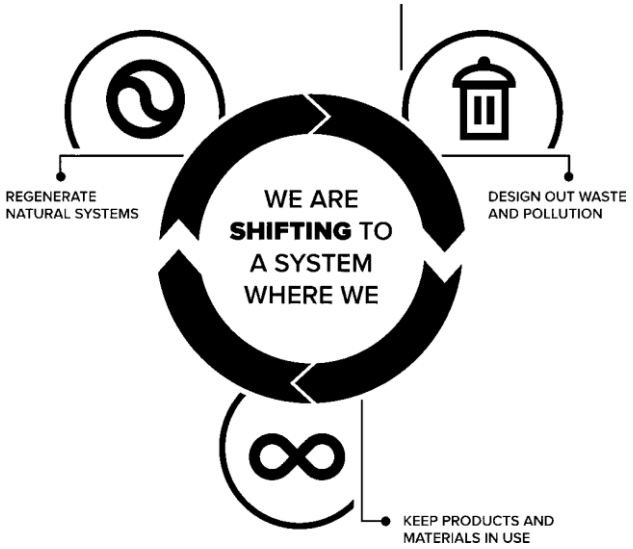

(Agyeman & Evans, 2003)

(The World Conservation Union, 2006)

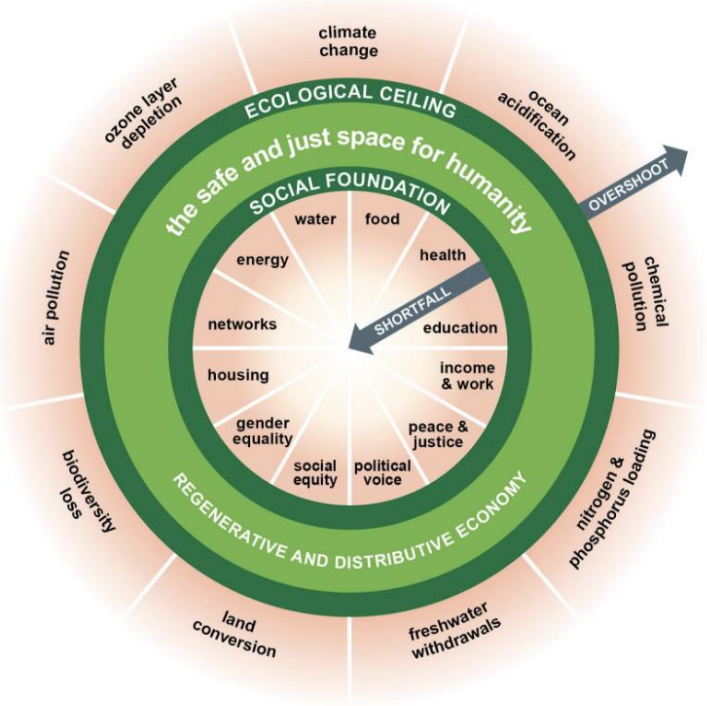
# New frameworks for decision making




Rockstrom



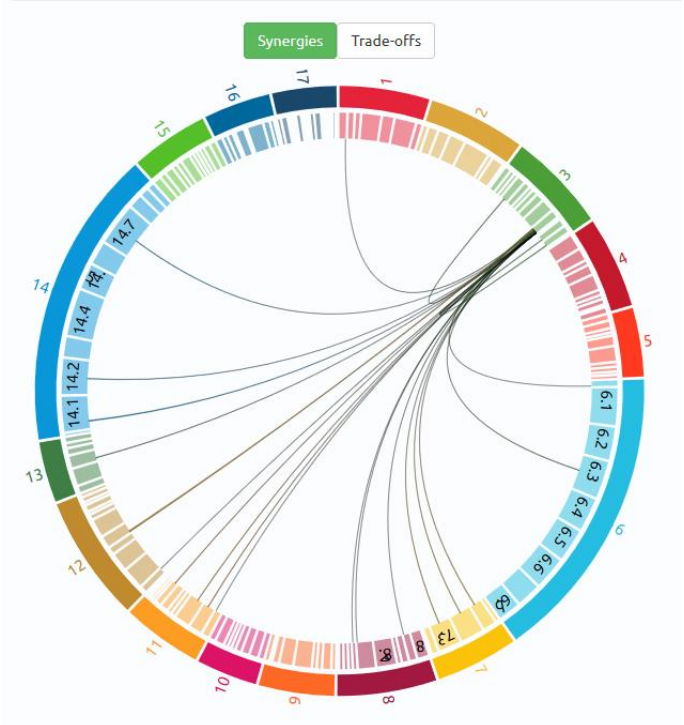

Ellen MacArthur Foundation




Kate Raworth

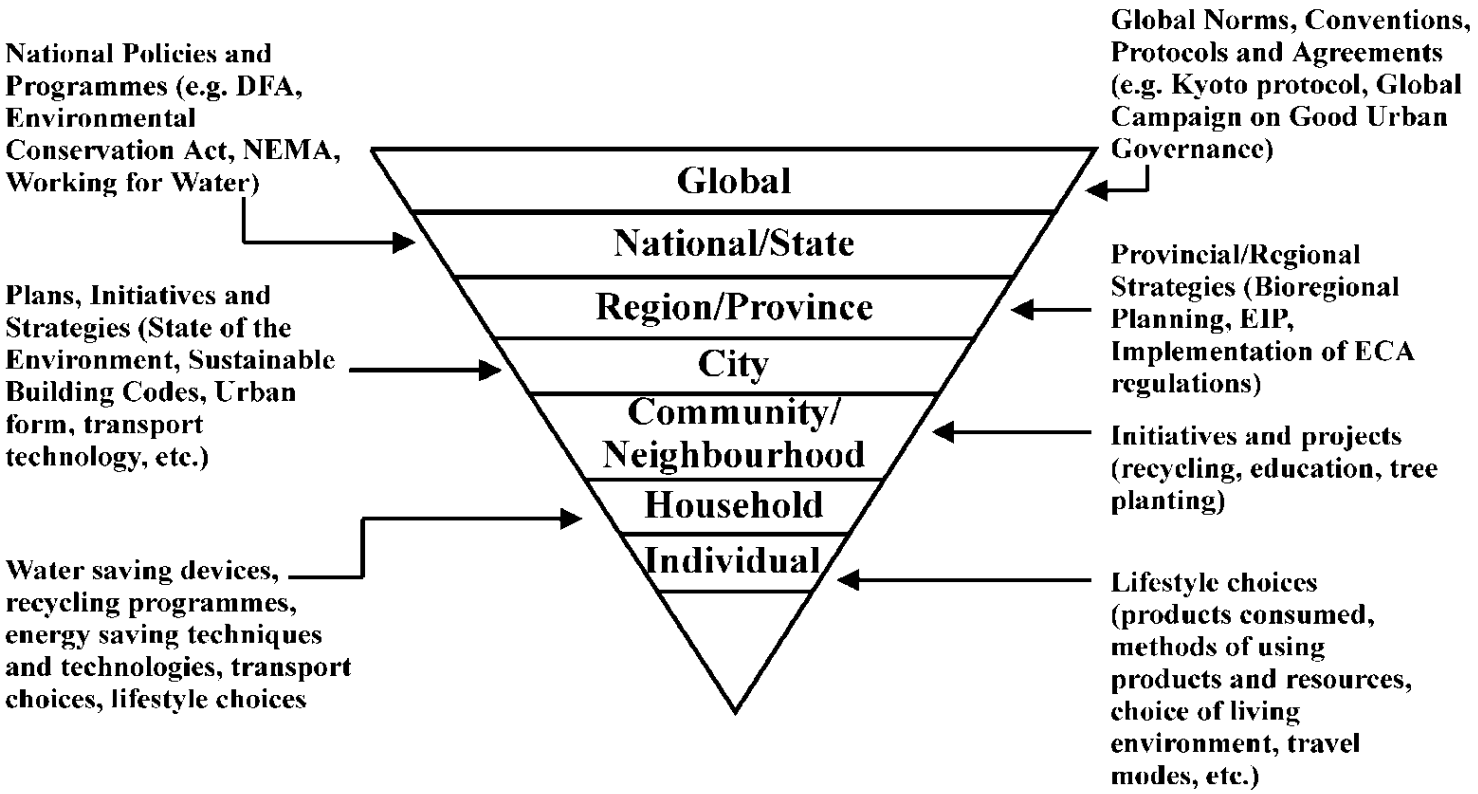
# New measuring systems with interlinkages

**ISTAT** (2019) analyses interconnections based on the use of same metadata and indicators for the assessment of the achievement of SDGs.



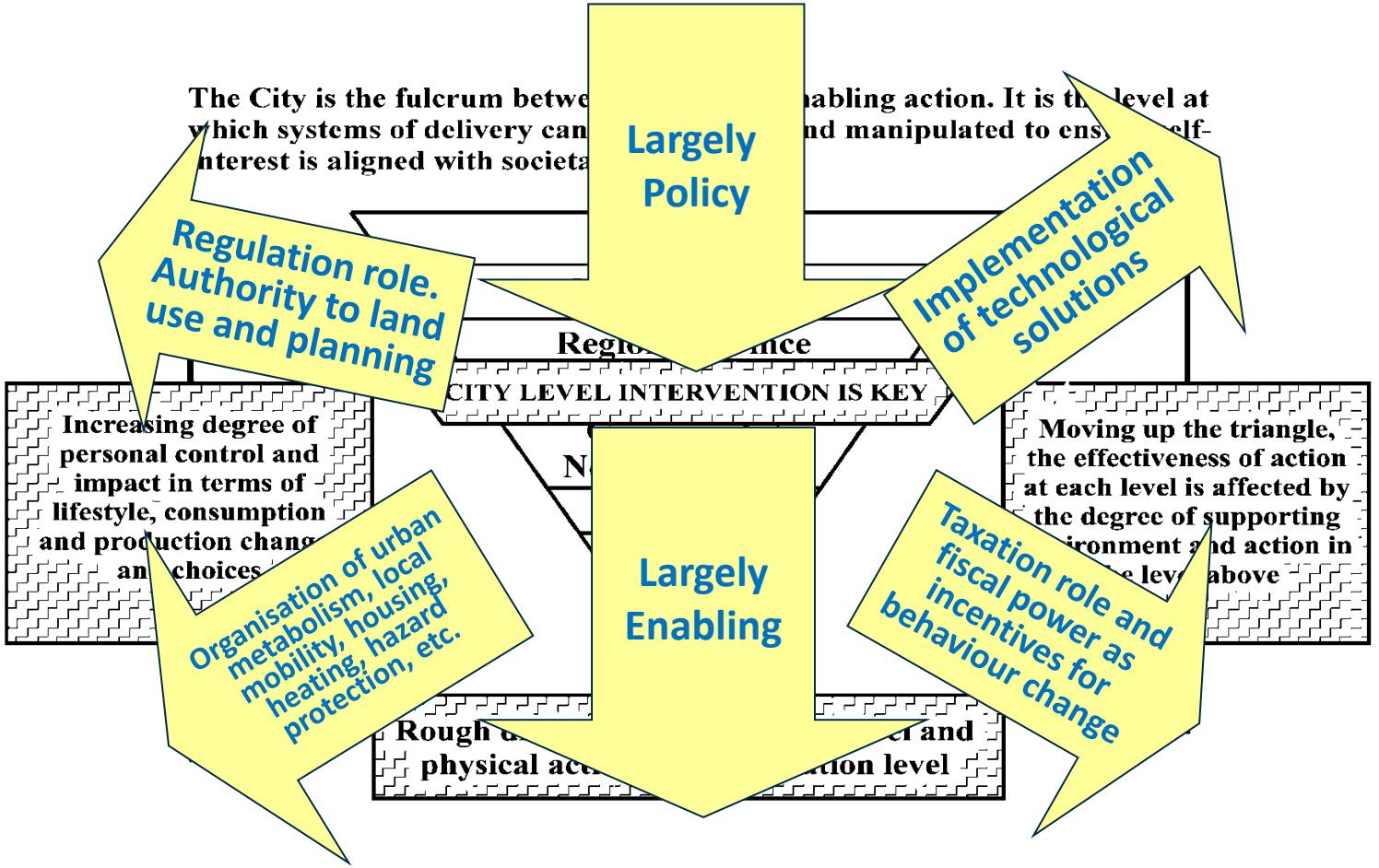

**KnowSDG platform.** The JRC started to experiment the analysis of interlinkages between different SDGs through a literature approach that also included European Policies about Sustainable Development. They develop a platform that provides a tool to visualize the cumulated interlinkages.

# The role of cities is crucial



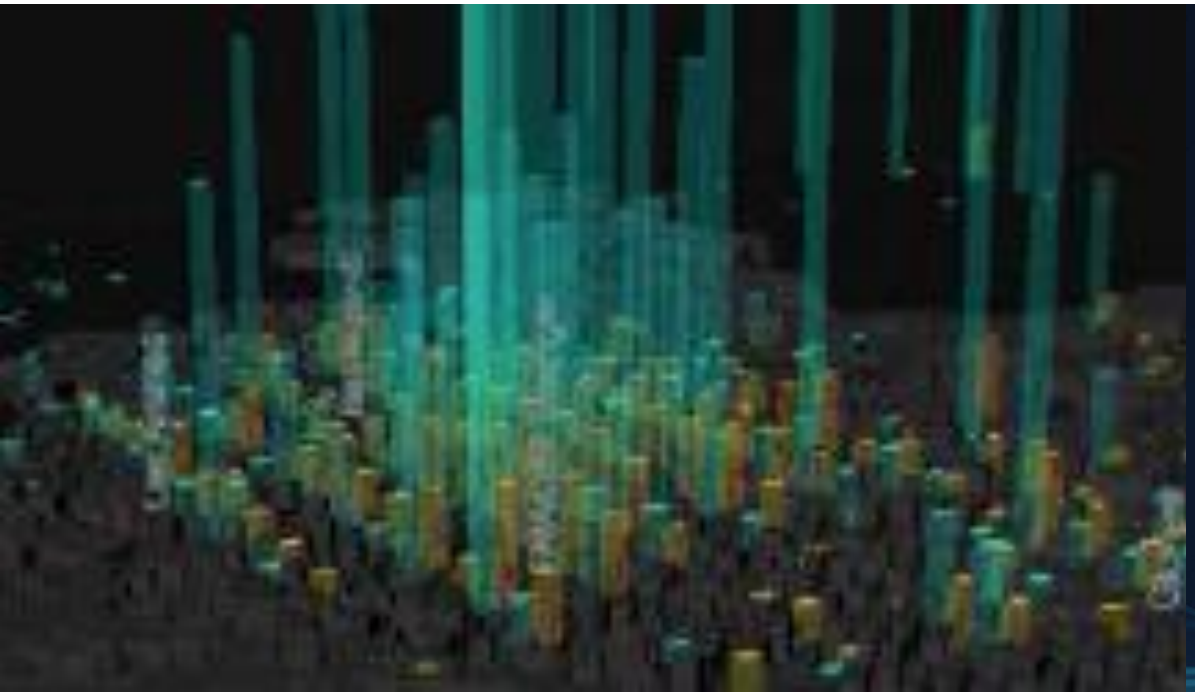

(Brandon & Lombardi 2011)

# The role of cities is crucial




(Brandon & Lombardi 2011)

# Technology can help



https://www.agendadigitale.eu/smart-city

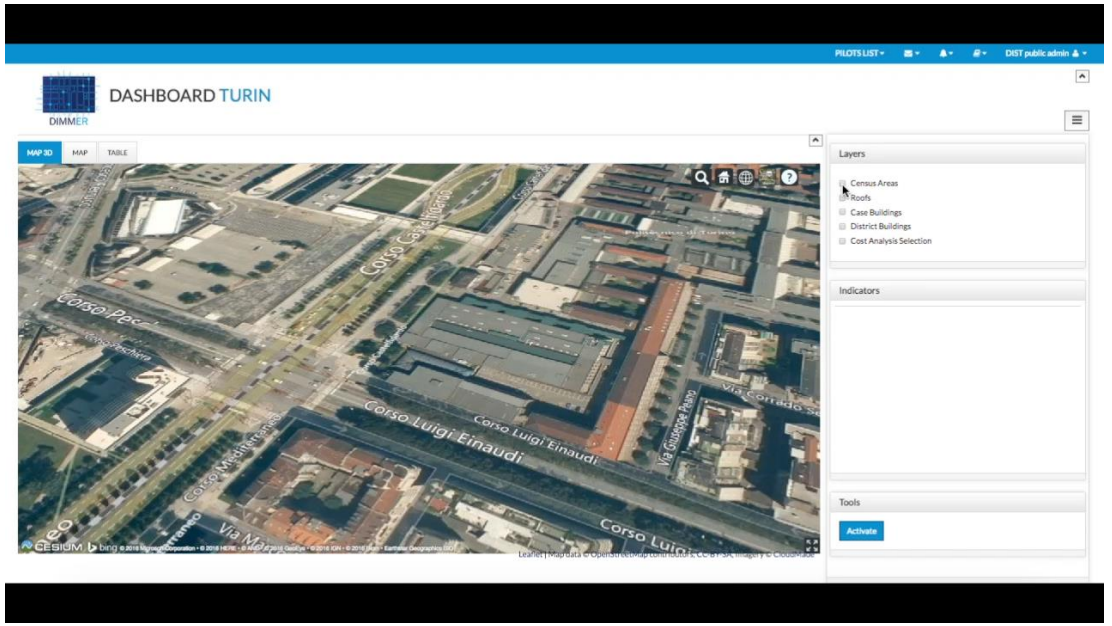
The visualisation strenghtness the human visual system to support the analysis of **large amount of information**

(Heer e Agarwala, 2008)

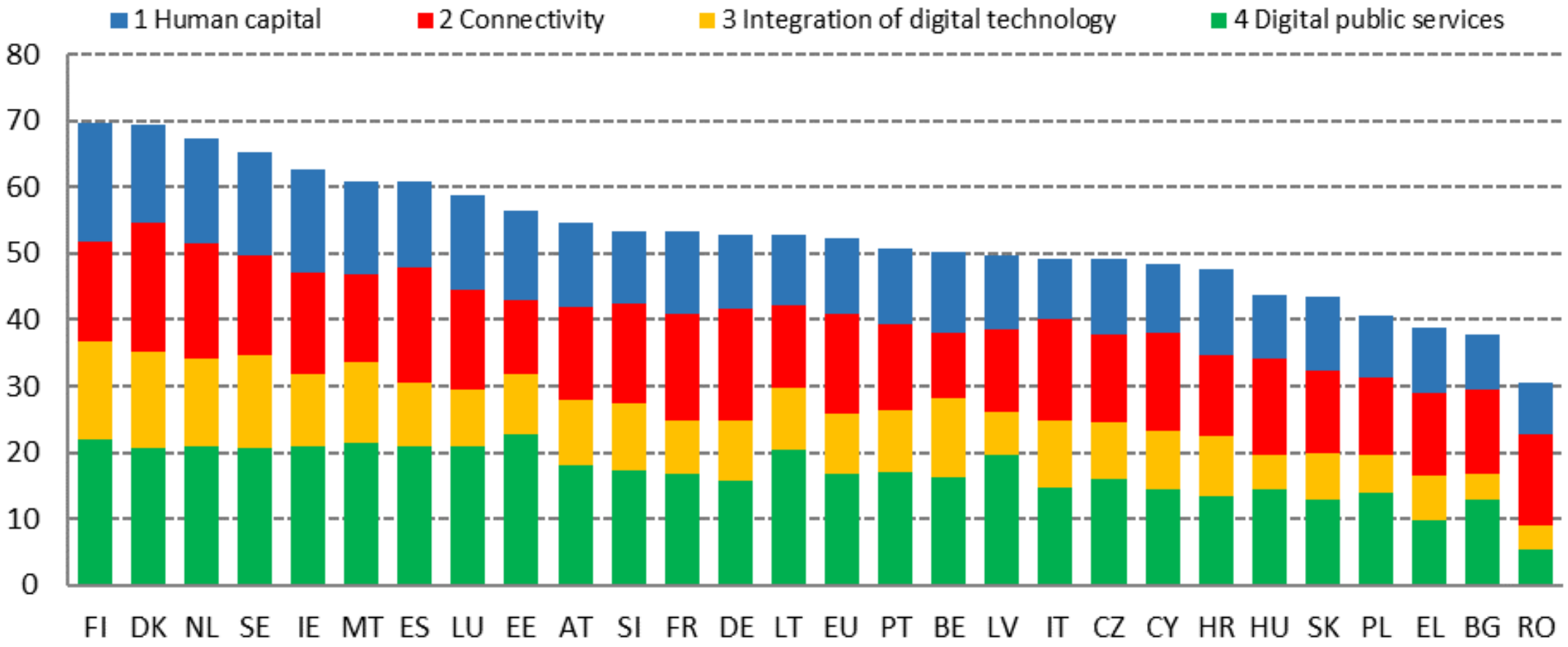
**DIGITAL TWINS**

**3-dimensional modeling of cities**

# New interactive participative dashboards for smart cities



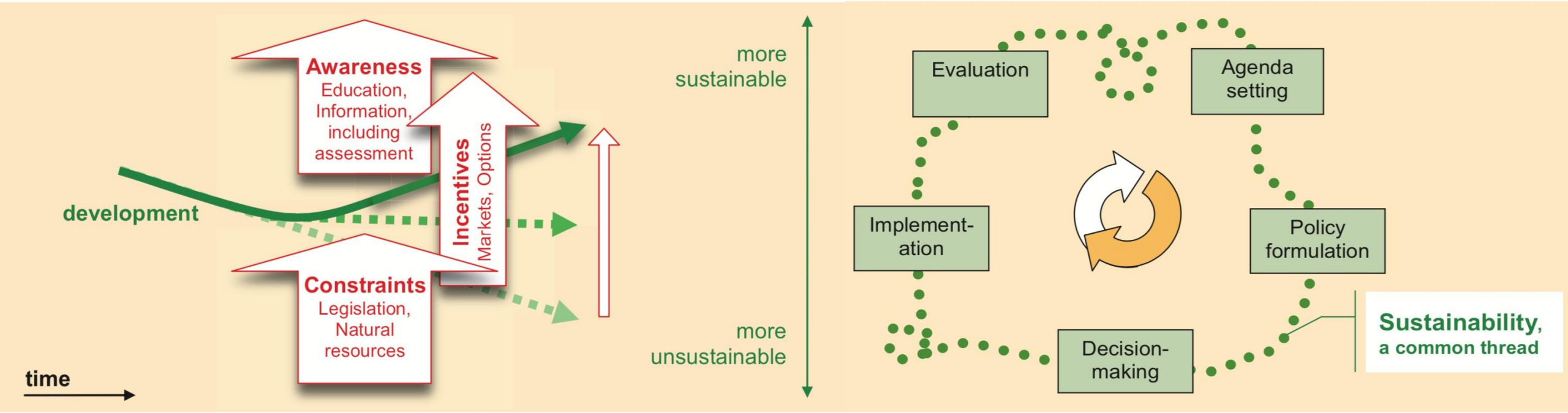
# The need for digital competences





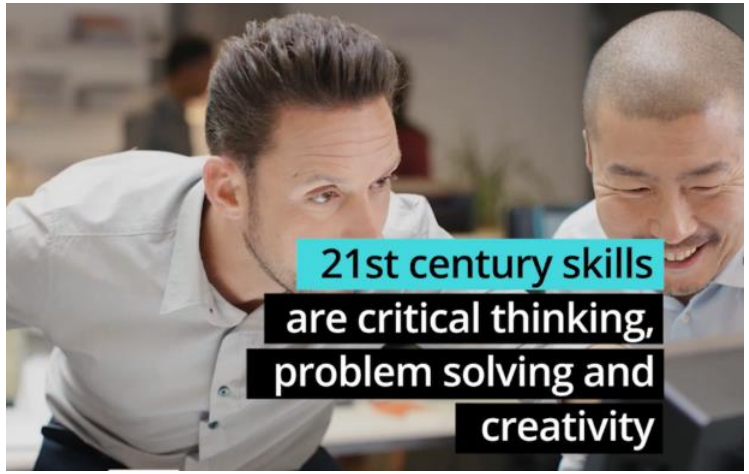

*Source: DESI 2022, European Commission*

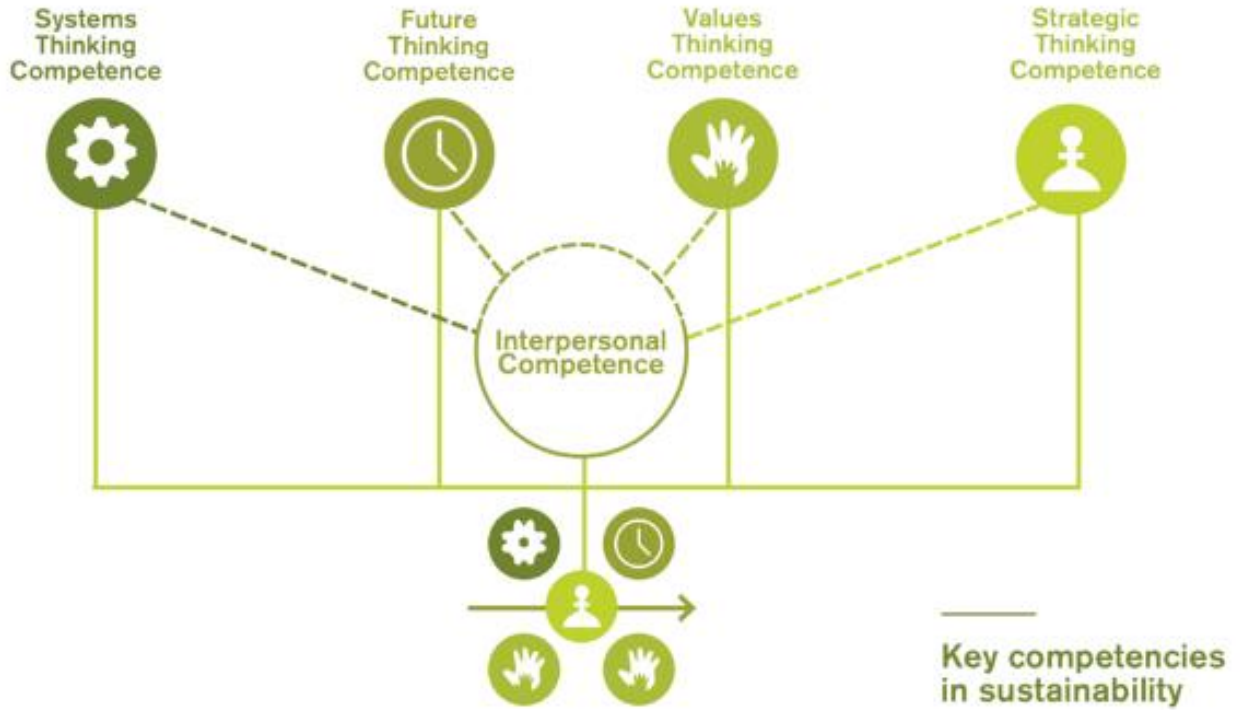
# The role of education and evaluation




Nick Bonvoisin

# The competences for sustainability

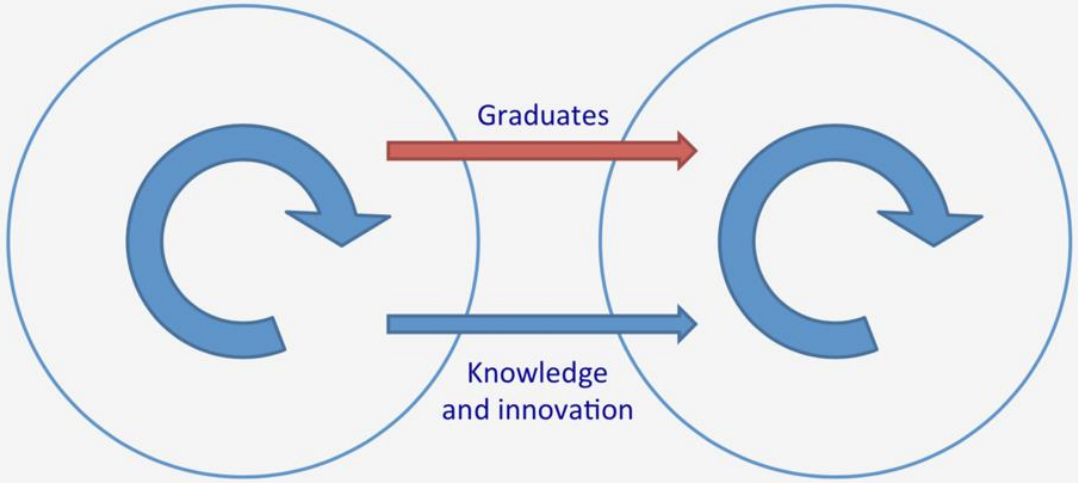




# Paradigm shift for university

From: Peter Edwards, Director, Future Cities Lab, Singapore-ETH Centre

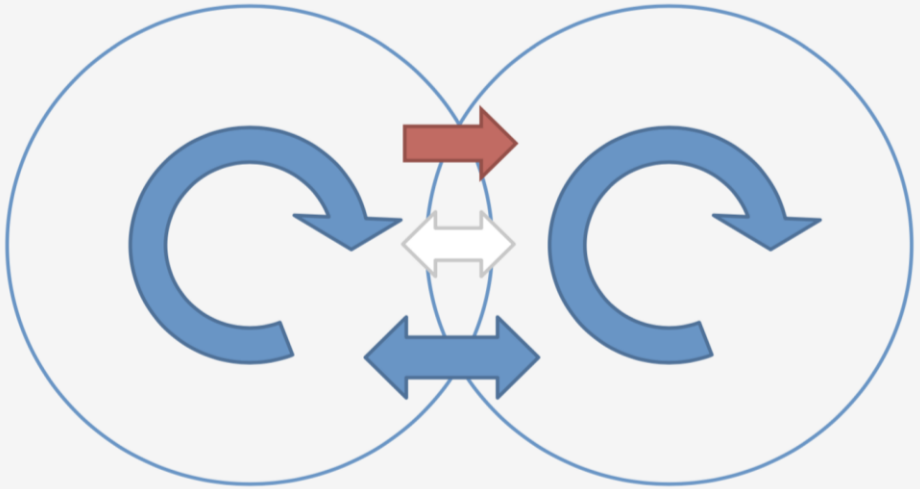
## Supporting a growth-based economy




Innovations judged by their success in the market place

From: Peter Edwards, Director, Future Cities Lab, Singapore-ETH Centre

## Supporting societal transformation

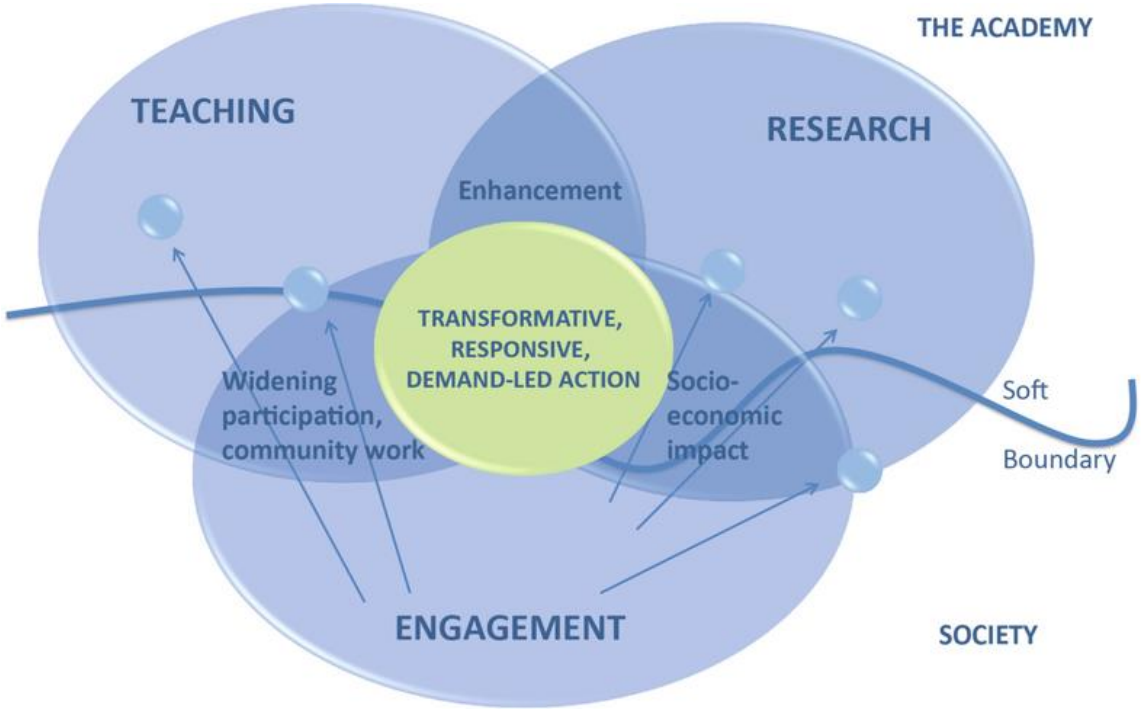



Education
Staff mobility
Co-production of knowledge

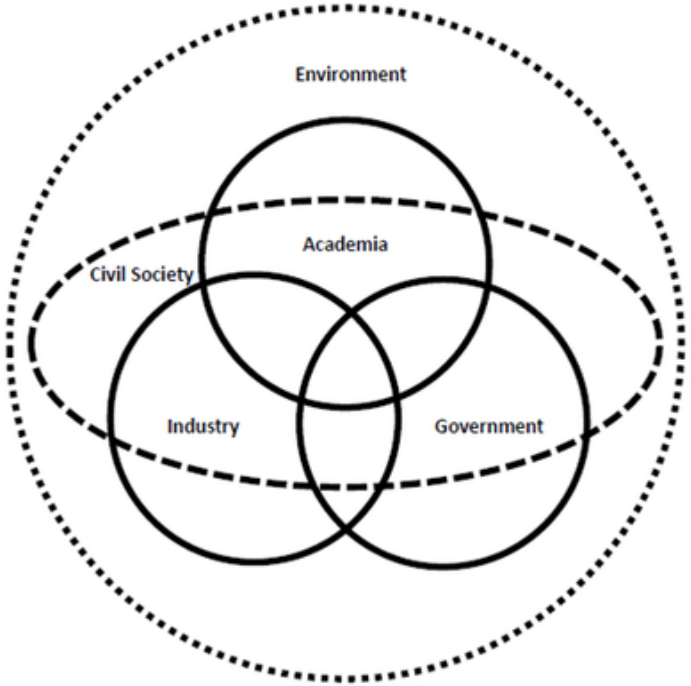
Innovations also by their contribution to societal goals

# New frameworks for university

**European Strategy for Universities** (Com/2022/16 Final)




Goddard, Hazelkorn, Kempton and Vallance (The Civic University, 2016)




Elias G. Carayannis and David F.J. Campbell,

### How do the SDGs help universities?

Create increased demand for SDG related education

Provide a comprehensive and globally accepted definition of a responsible university

Offer a framework for demonstrating impact

Create new funding streams

Support collaboration with new external and internal partners

**Knowledge**

**Learning**

**Demonstration**

**Impact**

**Collaboration**

### How do universities help the SDGs?

Provide knowledge, innovations and solutions to the SDGs

Create current and future SDG implementers

Demonstrate how to support, adopt and implement SDGs in governance, operations and culture

Develop cross-sectoral leadership to guide the SDG response

An overview of university contributions to the SDGs.

# THE NETWORK OF UNIVERSITIES FOR SUSTAINABLE DEVELOPMENT

**82**

Italian Universities

90% CRUI associated Universities

## Officially established in 2015 by CRUI

CRUI Conferenza dei Rettori delle Università Italiane

ASViS Alleanza Italiana per lo Sviluppo Sostenibile

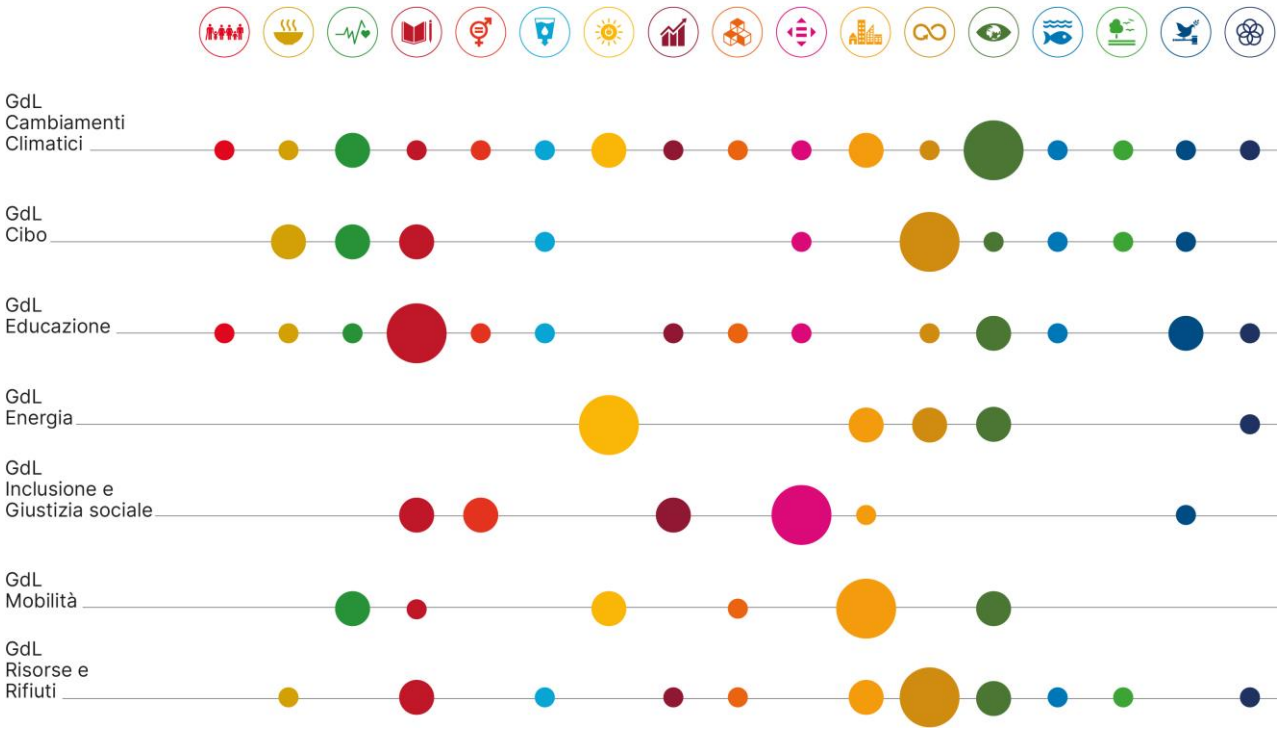
**~700**
delegats

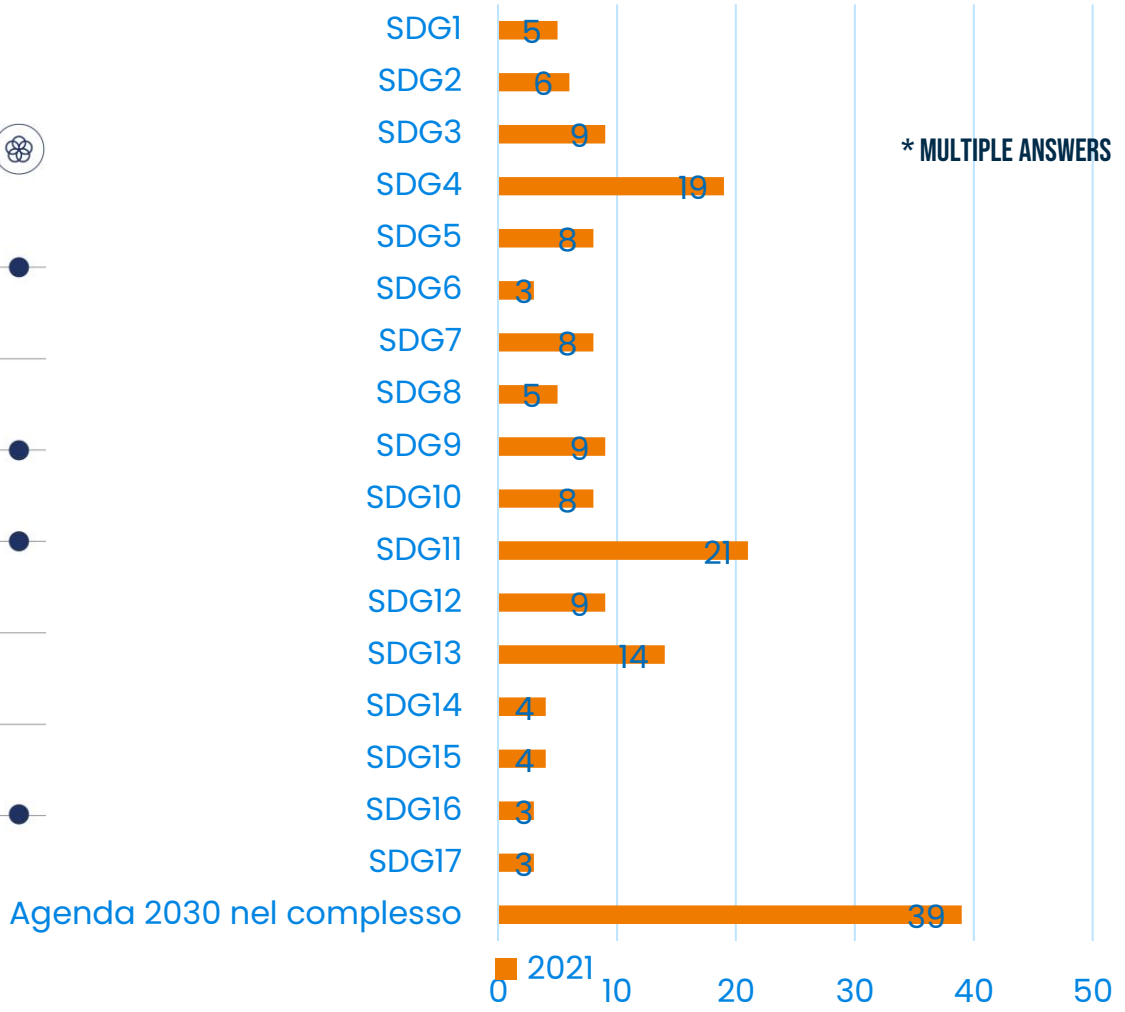
**~1,8M**
students

**7**
Working groups

- climate change
- food
- education
- energy
- inclusion and social justice
- mobility
- resources and waste

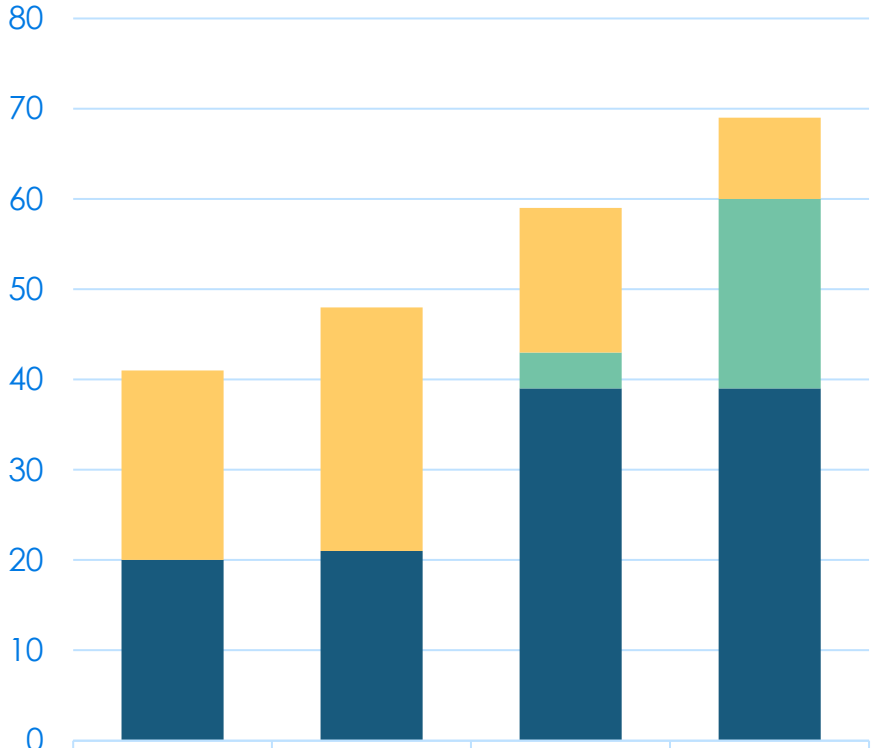
# SDGs – FIELDS OF ACITIVITES



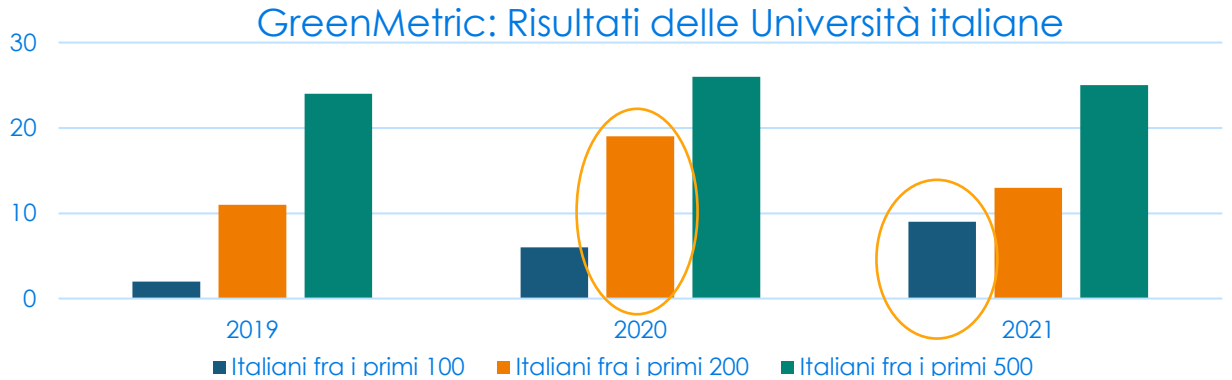



# Some evidence

## University units dedicated to sustainability

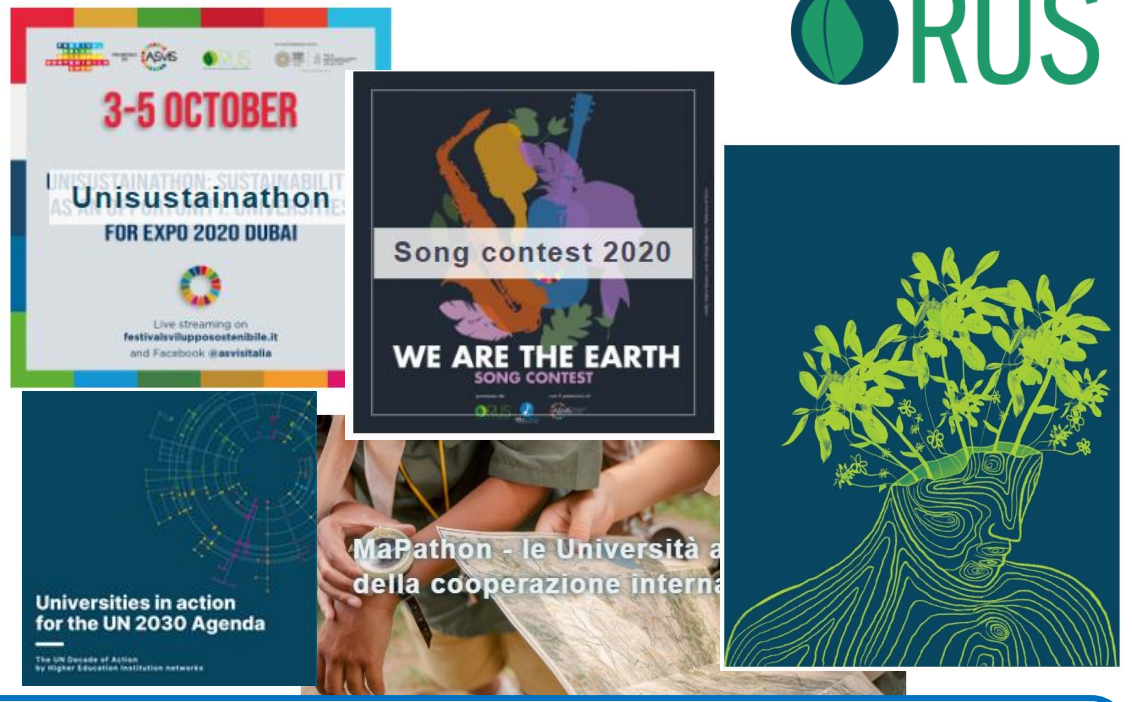



| | 2017 | 2019 | 2020 | 2021 |
|---|---|---|---|---|
| no | 21 | 27 | 16 | 9 |
| planned | | | 4 | 21 |
| yes | 20 | 21 | 39 | 39 |




Source:
RUS universities annual survey

# Awareness




## Target –public audience

Conferences (e.g.):

- The Rectors Manifesto, Udine, 2019
- Climate Exp0, May 2021
- Expo2020, Dubai, 2022

Terza Edizione
CLIMBING FOR CLIMATE

## Target - students

Challenge-based activities: Unisustainathon, Mapathon, Expo2020, …
Contests: song contest,,contest for the cover of the annual RUS report

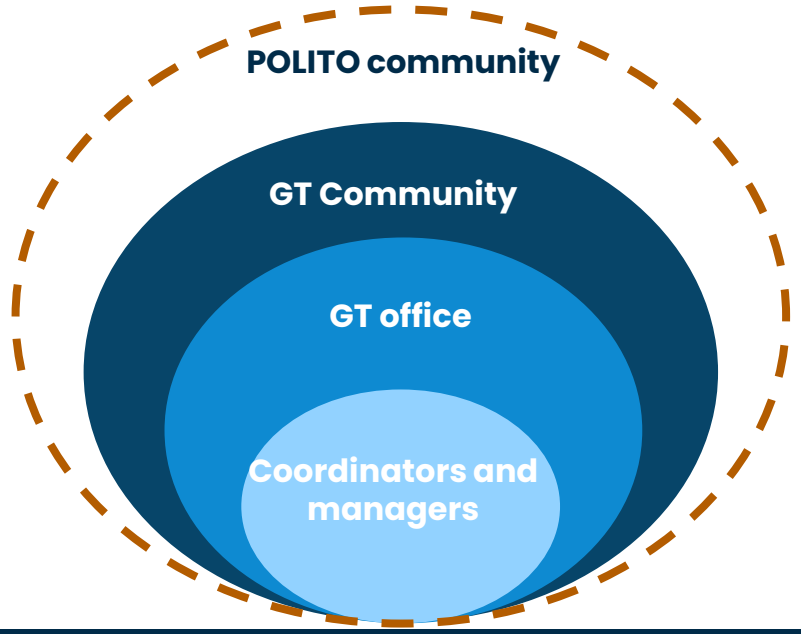
## Target - RUS universities' communities

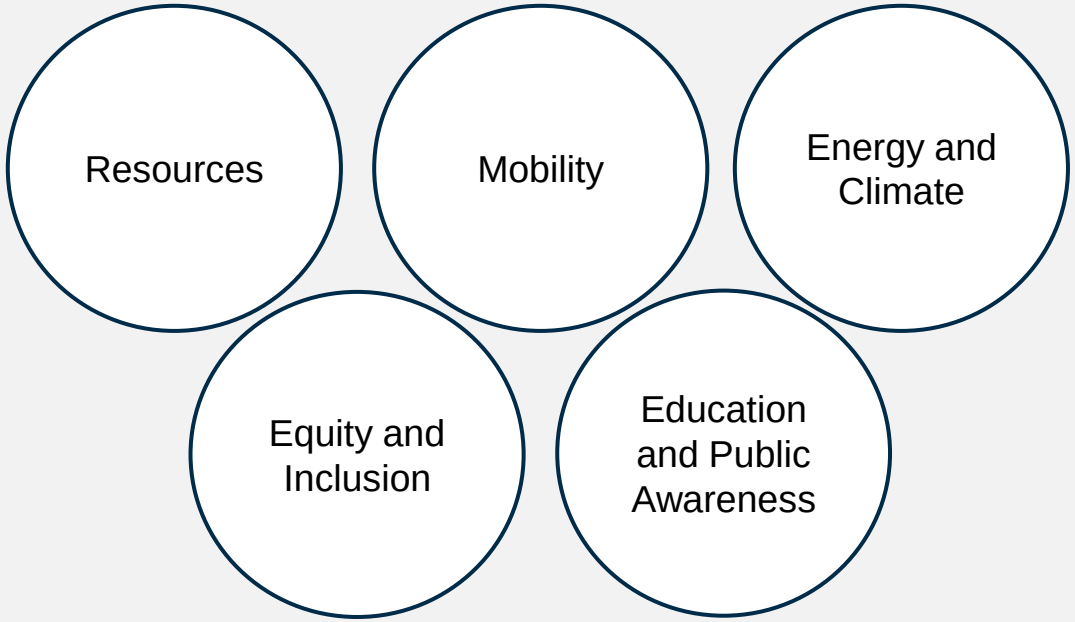
Annual conferences
Climbing for climate
Collection of initiatives for national events: M'illumino di meno, Festival for Sustainable development by ASviS

# The green team – *A Multidisciplinary Team for a Sustainable Campus*

## OBJECTIVES

- Raise awareness on sustainability issues
- Develop external actions to promote the 2030 Agenda
- Support sustainable development policies in the local and regional frameworks
- Measure impacts of sustainability-focused actions




Five workgroups
Around 60 participants

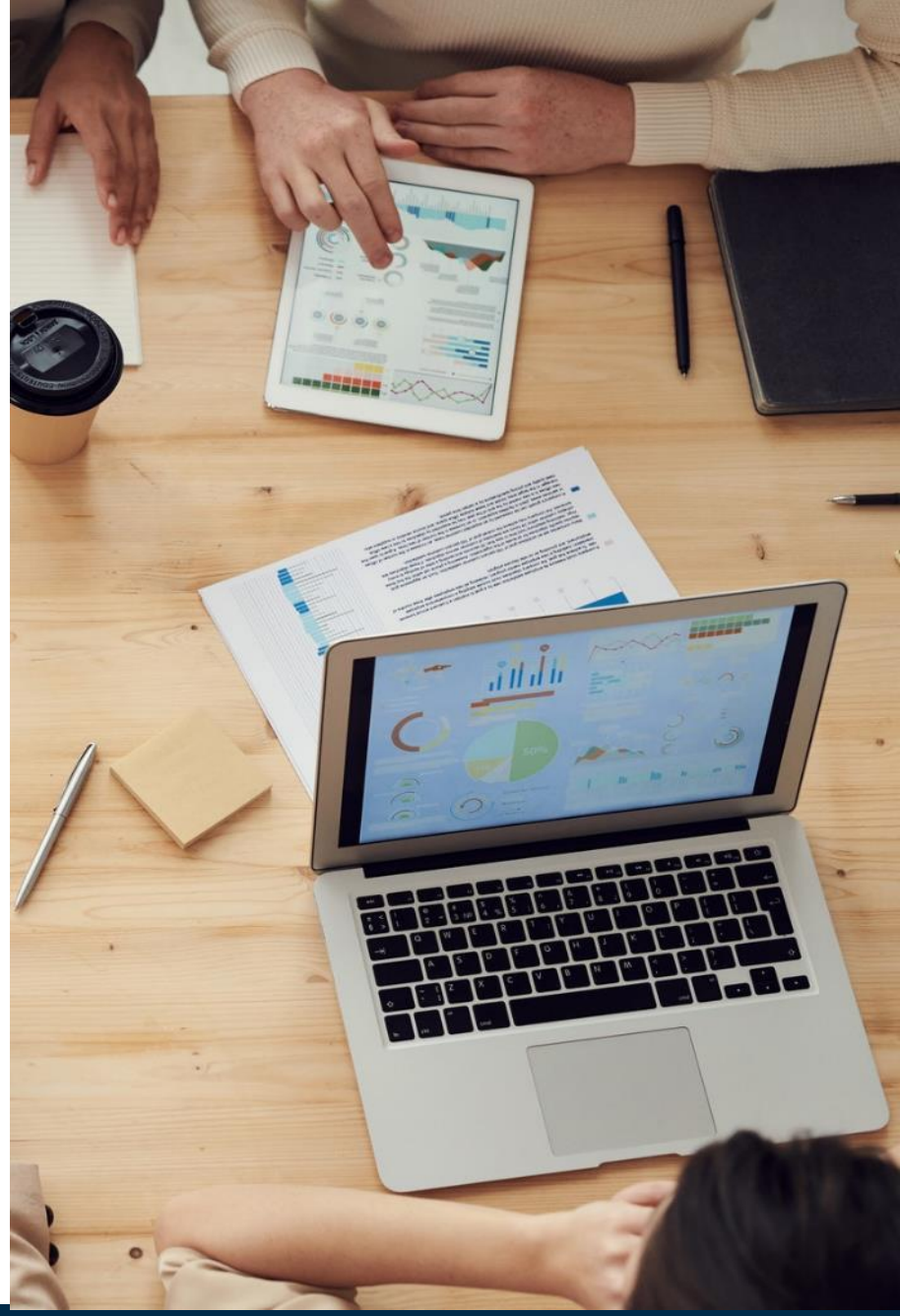
# Ranking

**GreenMetric**
edizione 2021

**20°** worldwide

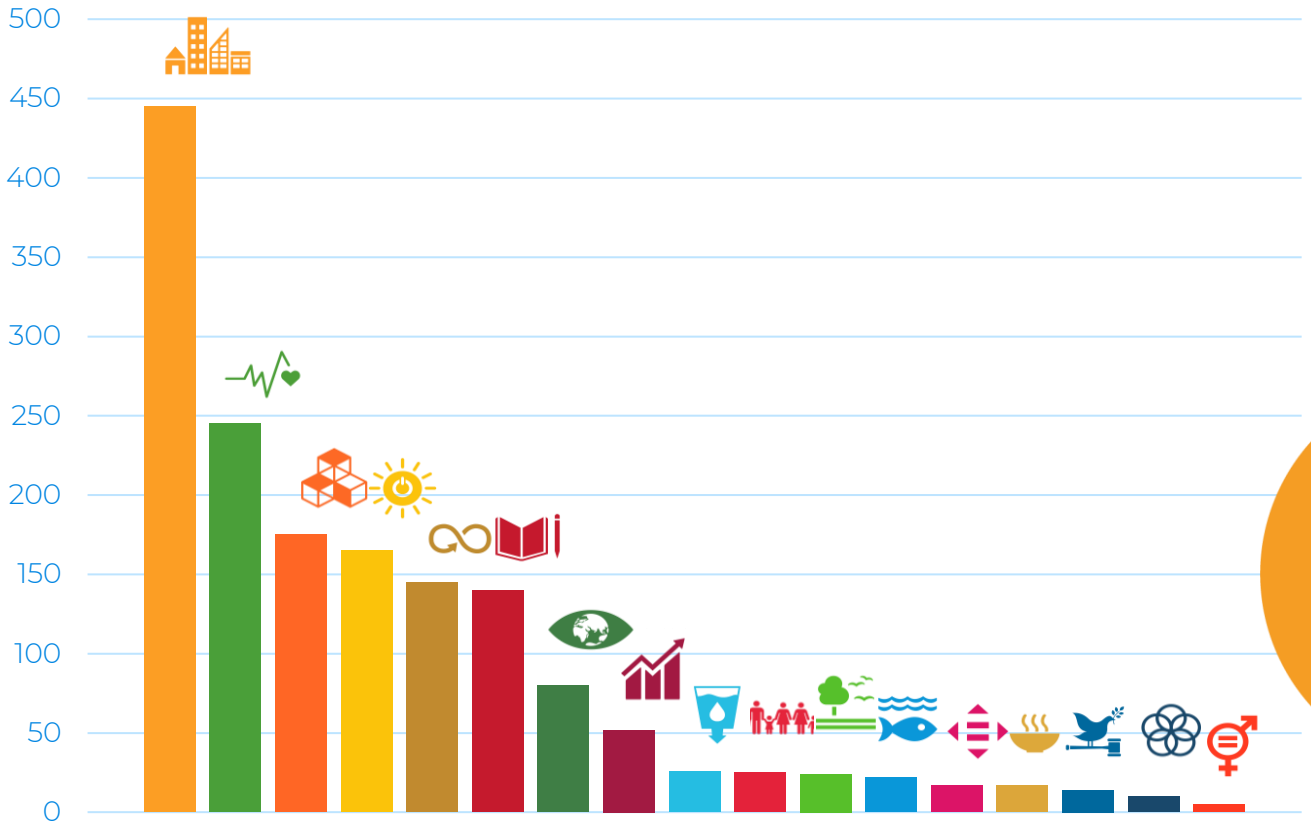
**THE Impact**
**(Times Higher Education)**
edizione 2021

**88°** worldwide on climate action (SDG13)

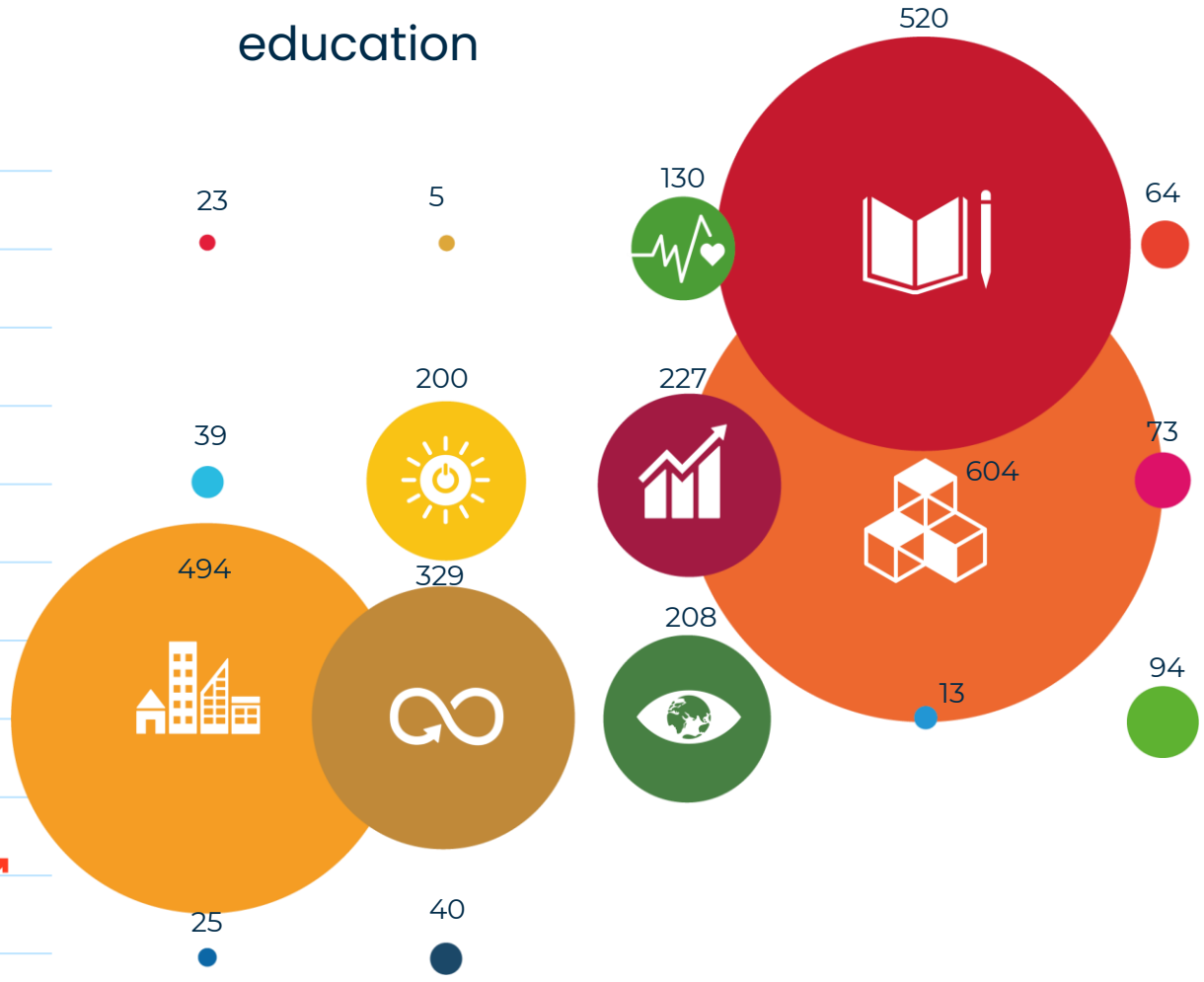


# SDG mapping

## research




## education



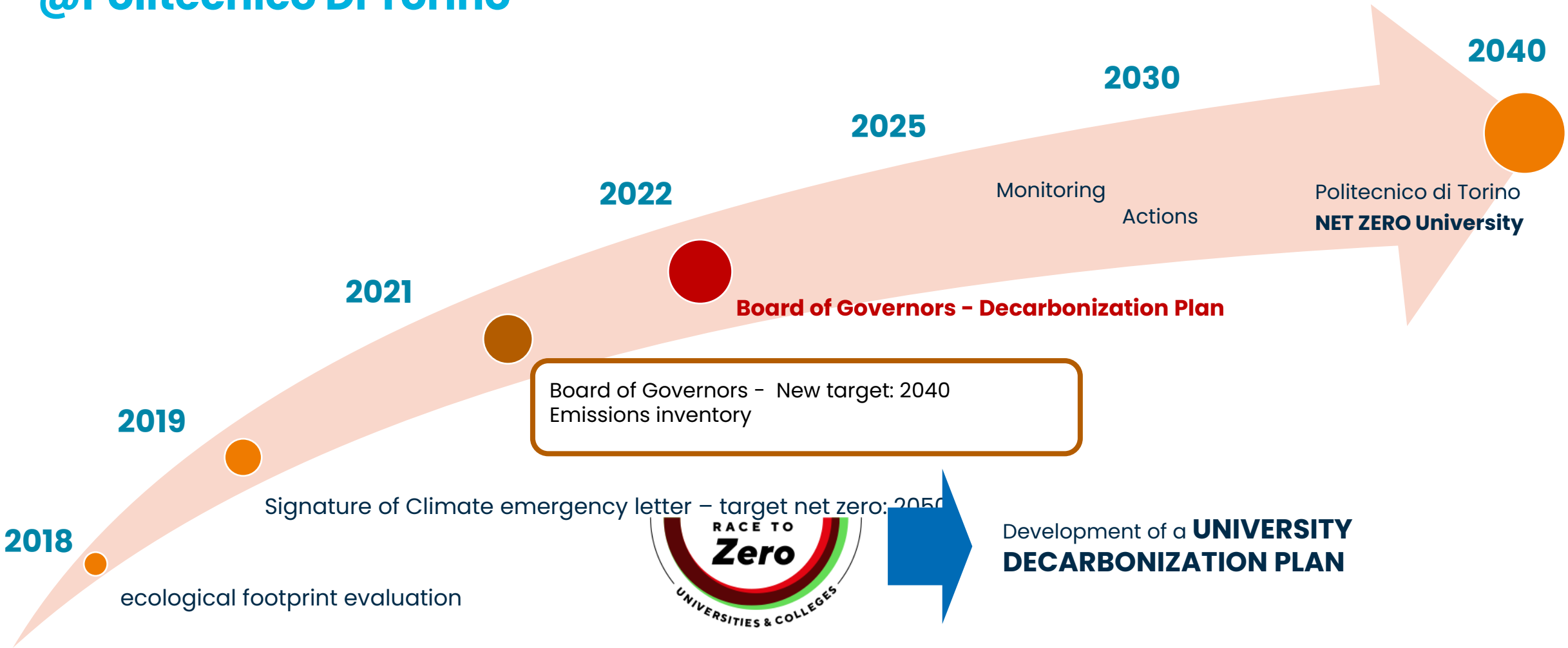
# SDG awareness

*According to you, which SDGs are more important for PoliTo?*

*Which SDGs are more important for you?*

# PATH TOWARD CARBON NEUTRALITY

## @Politecnico Di Torino

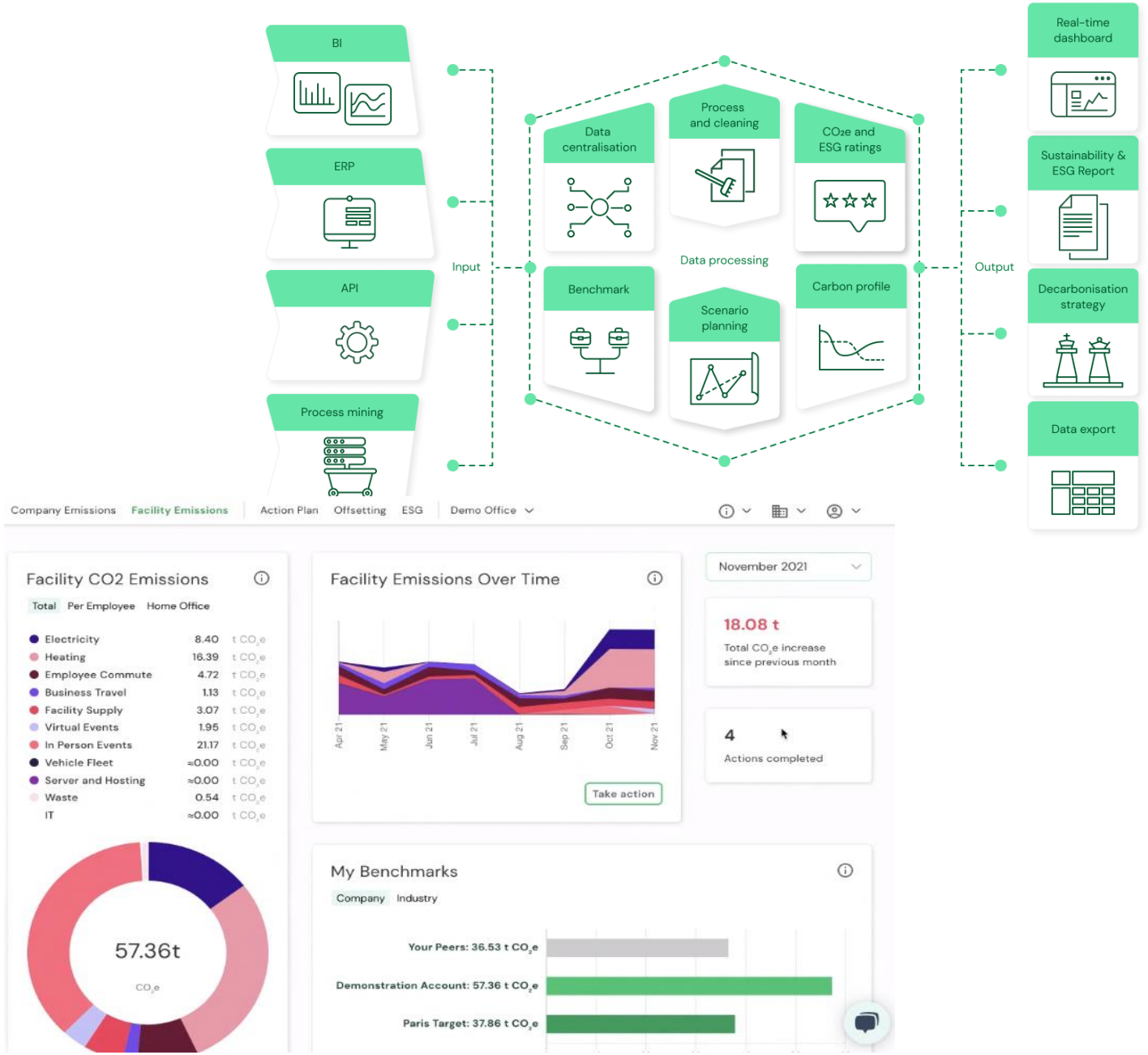


# *Monitoring dashboard*

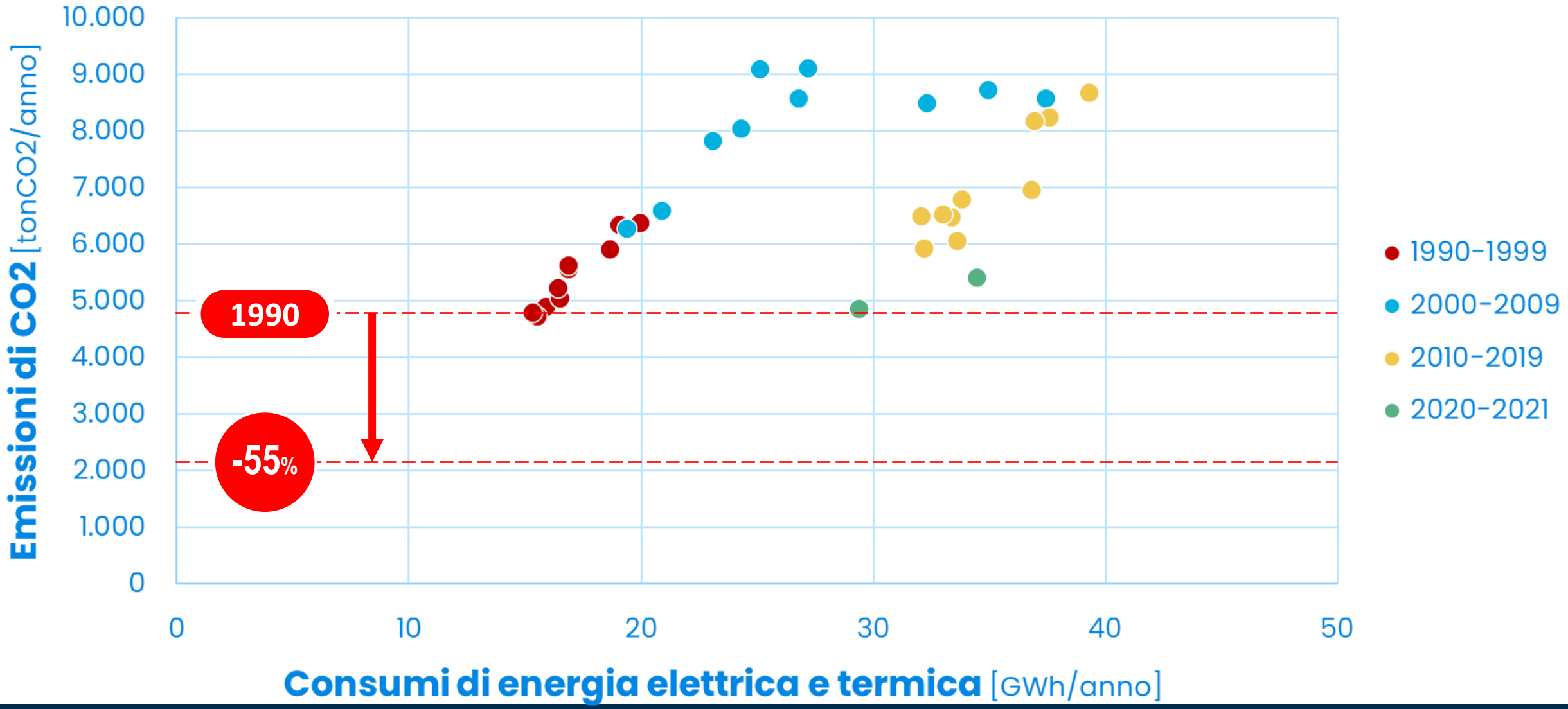
For the general framework of the inventory the tool offered by the startup PlanA was implemented in order to:

- **Include all the scopes** and emission sectors
- Use of a sound, **scientifically-based** and agreed methodology
- Possibility to have a **general overview** of PoliTO emissions (with a degree of uncertainty)

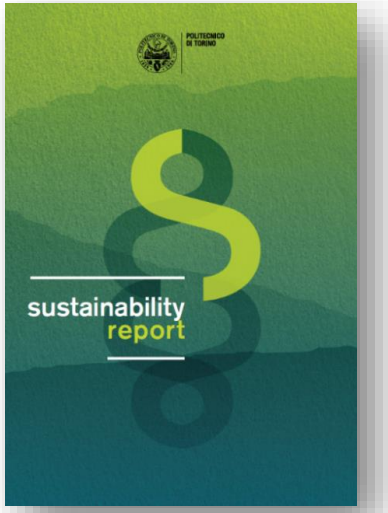
Then a focus on energy was done using real consumption data



# EMISSIONS vs CONSUMPTIONS



# Find more

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, 2017

**SUSTAINABILITY REPORT RUS**
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**SUSTAINABILITY REPORT**
2019

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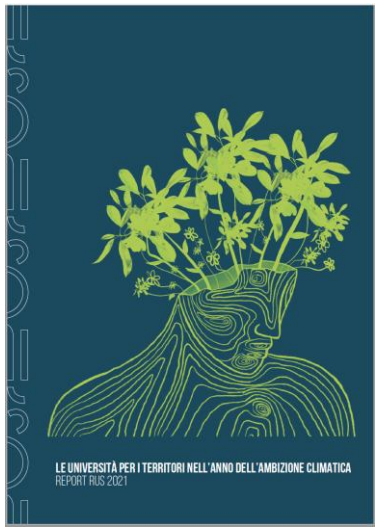


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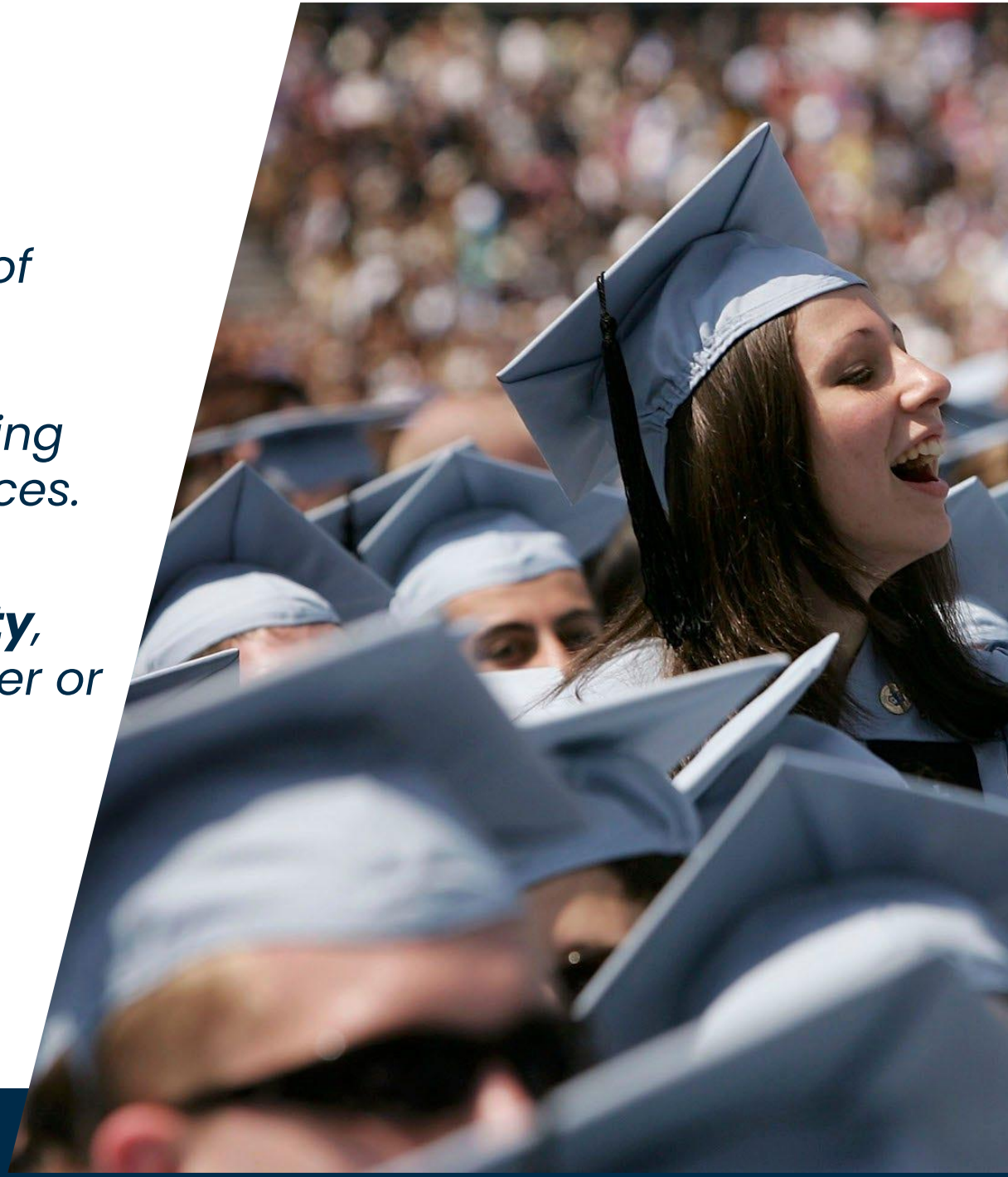
# Food for thought

*Nowadays, one of the fundamental tasks of universities is to provide an* ***integrated reflection on where science is going****, the various disciplines that comprise it, including of course the humanities and social sciences.*

*We need* ***to reflect on the reciprocal relationships between science and society****, how scientific progress influences, for better or for worse, our lives, and how* ***the needs of society affect the development of technologies and ultimately scientific research****.*

**Giorgio Parisi**
Nobel prize 2021



Politecnico di Torino

# Thanks for your attention!

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