



POLITÉCNICA

UNIVERSIDAD
POLITÉCNICA
DE MADRID

CESAER

Annual Meetings 2023

Contributions of Universities of S&T to Sustainability

Madrid, 18-20 October [#CAM2023](#)



High-level conference 'Contributions of Universities of Science and Technology to Sustainability'

Thursday 19 October at 14:30
Salón de Actos, Técnica Superior de
Ingenieros Industriales

Madrid, 18-20 October [#CAM2023](#)



Welcome speech

Moderated by **Alberto Garrido**
Vice Rector of Quality and Efficiency at UPM

Guillermo Cisneros Pérez

Rector of Universidad Politécnica de Madrid

Madrid, 18-20 October

#CAM2023



Welcome speech

Moderated by **Alberto Garrido**
Vice Rector of Quality and Efficiency at UPM

Óscar García Suárez

Escuela Técnica Superior Ingenieros
Industriales

Madrid, 18-20 October

#CAM2023



Keynote address

Moderated by **Alberto Garrido**
Vice Rector of Quality and Efficiency at UPM

António Guterres

Secretary General of United Nations,
alumnus of Instituto Superior Técnico

Written address

Madrid, 18-20 October [#CAM2023](#)



Keynote address

Moderated by **Alberto Garrido**
Vice Rector of Quality and Efficiency at UPM

Ana Iglesias

Professor of Environmental Economics
and Policy at UPM

Madrid, 18-20 October [#CAM2023](#)



Chi ama la vita non spreca l'acqua



Con l'acqua
abbiamo
ridato
il sorriso
ai siciliani.

Listening to many voices:
some thoughts on climate
change from the academic side

 Regione
Siciliana
www.regione.sicilia.it
LA SICILIA CHE CRESCE. LA SICILIA CHE LAVORA

 Chi ama la vita
non spreca l'acqua



1 Perception of damage, perception of societal response



“A person hears only what they understand”

Goethe (1749 – 1832)





Focus on local realities

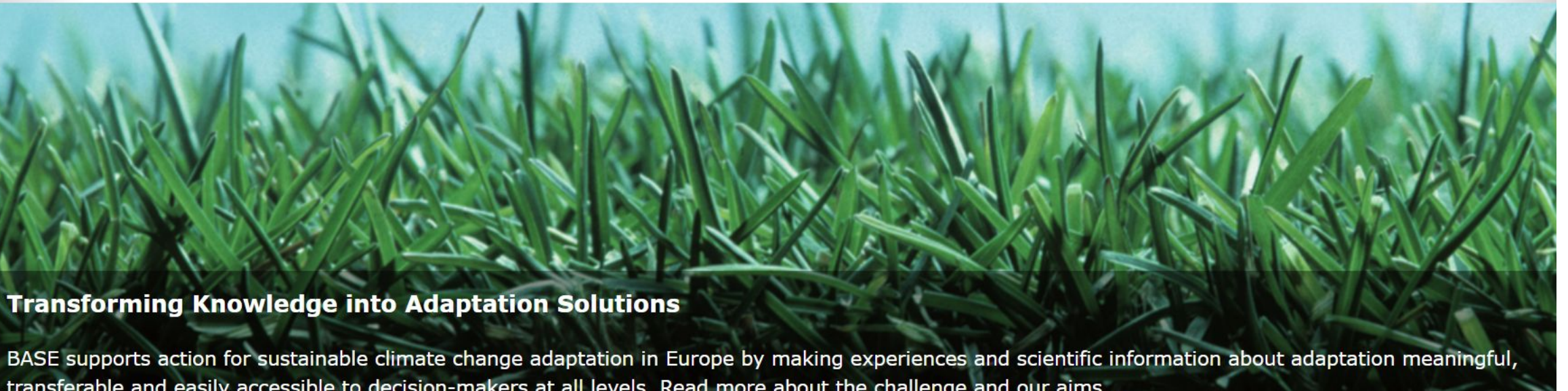
Does adaptation mean the same in every region?



**BOTTOM-UP CLIMATE ADAPTATION STRATEGIES
TOWARDS A SUSTAINABLE EUROPE**



[ABOUT](#) | [OUR RESEARCH](#) | [GET INVOLVED](#) | [EXTERNAL RESOURCES](#)



Transforming Knowledge into Adaptation Solutions

BASE supports action for sustainable climate change adaptation in Europe by making experiences and scientific information about adaptation meaningful, transferable and easily accessible to decision-makers at all levels. [Read more about the challenge and our aims...](#)





ELSEVIER

Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.elsevier.com/locate/envsci



Exploring public support for climate change adaptation policies in the Mediterranean region: A case study in Southern Spain

S. García de Jalón^a, A. Iglesias^{a,*}, S. Quiroga^b, I. Bardají^a

^a Department of Agricultural Economics and Social Sciences, Universidad Politécnica de Madrid, Spain

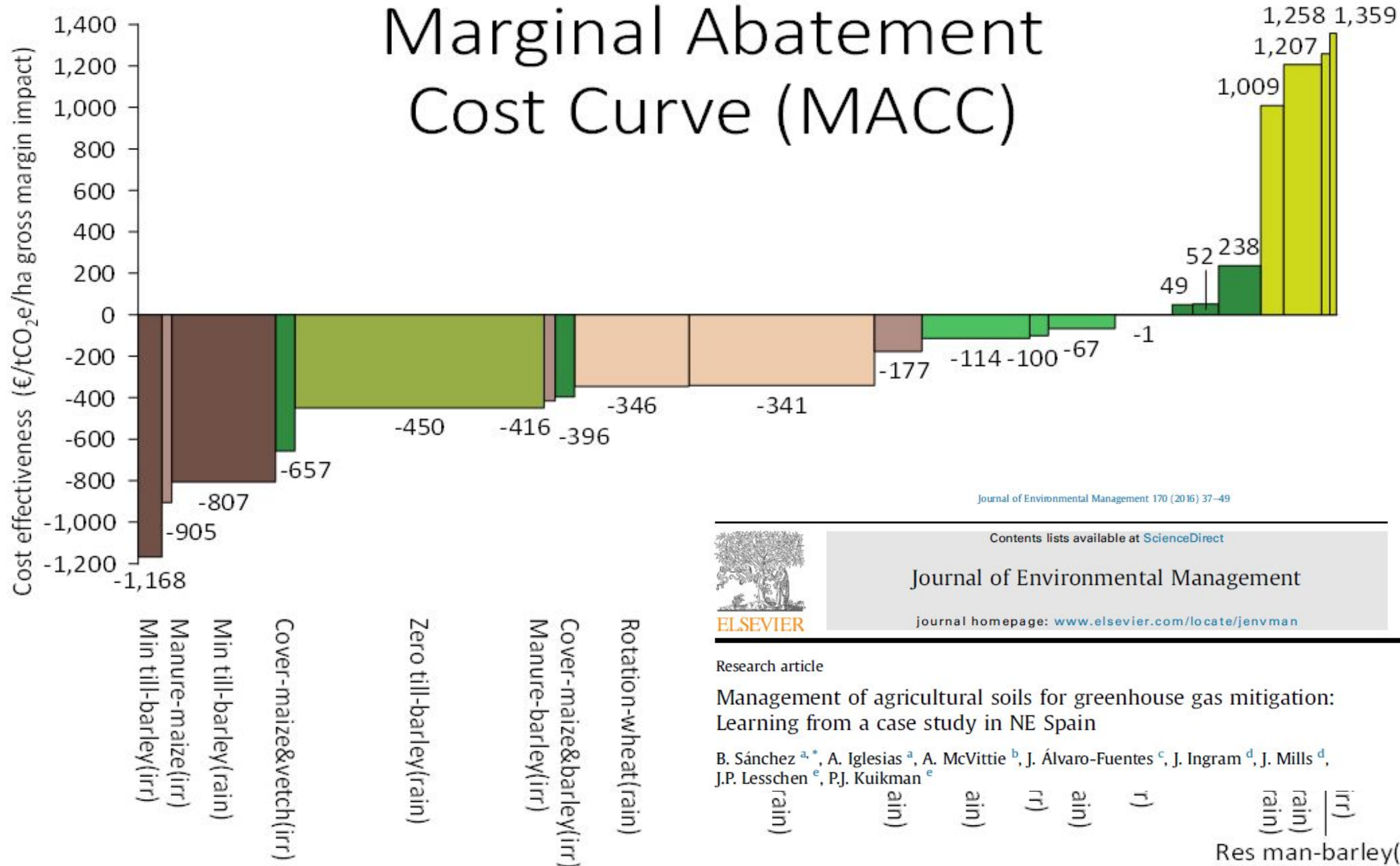
^b Department of Economic Structure, Universidad de Alcalá, Spain



2 How do we measure something that is not there?



Marginal Abatement Cost Curve (MACC)



Journal of Environmental Management 170 (2016) 37–49



ELSEVIER

Contents lists available at ScienceDirect

Journal of Environmental Management

journal homepage: www.elsevier.com/locate/jenvman



Research article

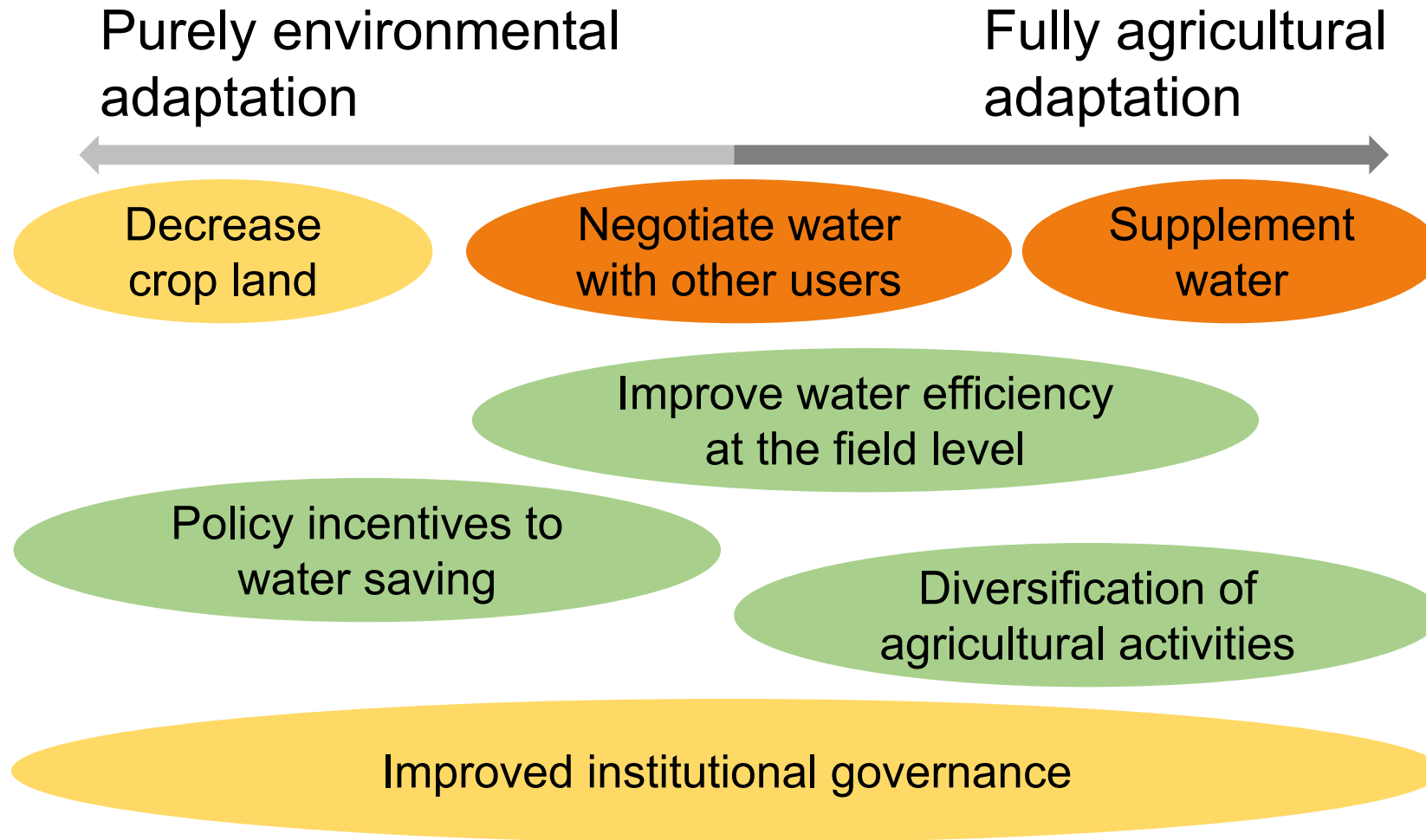
Management of agricultural soils for greenhouse gas mitigation: Learning from a case study in NE Spain

B. Sánchez^{a,*}, A. Iglesias^a, A. McVittie^b, J. Álvaro-Fuentes^c, J. Ingram^d, J. Mills^d, J.P. Lesschen^e, P.J. Kuikman^e



POLITÉ

Screening options for adaptation and mitigation: agricultural water management



Mitigation potential  Low  Med  High





Fuente de la imagen:
<https://radio.guijuelo.es>



Fuente de la imagen:
<https://www.eldigitaldealbacete.com>

Secanos Vivos con SEO
(2022-2025): Un
catálogo de medidas
para poner en práctica

3 Citizen science and artificial intelligence







Demonstrators

Upscaling and out-scaling

Supporting
transitions

4 The industry is
responding to the
challenge

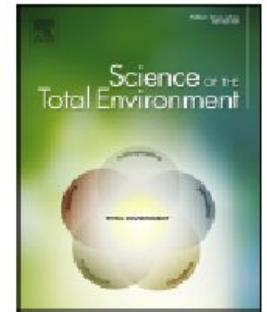




Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv



Vineyards in transition: A global assessment of the adaptation needs of grape producing regions under climate change



David Santillán ^{a,*}, Ana Iglesias ^b, Isabelle La Jeunesse ^c, Luis Garrote ^a, Vicente Sotes ^d

^a Departamento de Ingeniería Civil: Hidráulica, Energía y Medio Ambiente, Universidad Politécnica de Madrid (UPM), Spain

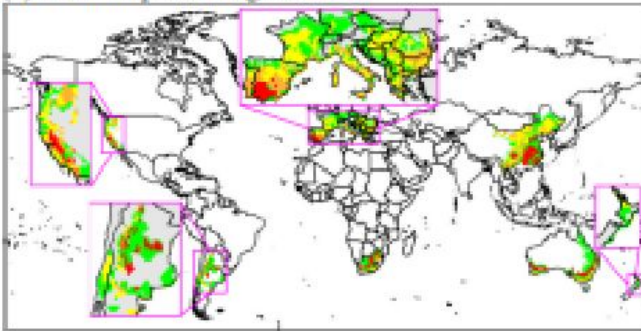
^b Departamento de Economía Agraria, Estadística y Gestión de Empresas, Universidad Politécnica de Madrid (UPM), Spain

^c Laboratory CNRS 7324 Citeres, University of Tours, France

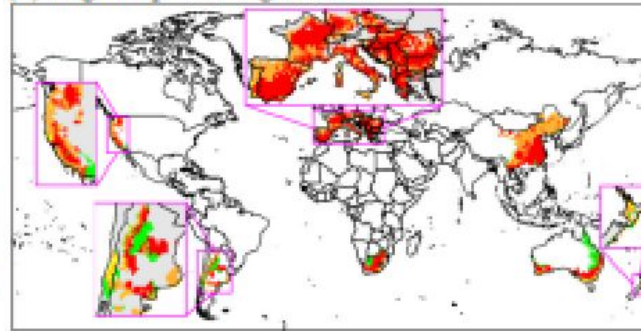
^d Departamento de Producción Agraria, Universidad Politécnica de Madrid (UPM), Spain



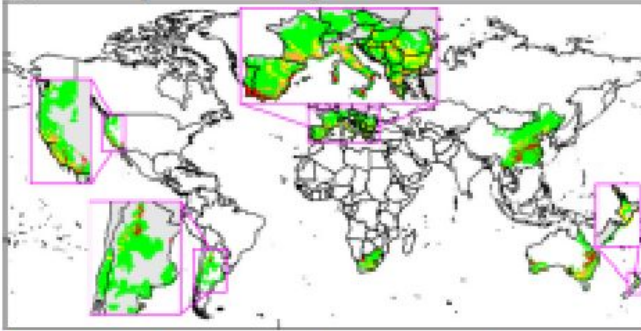
(a) Low impact. Hugin Index



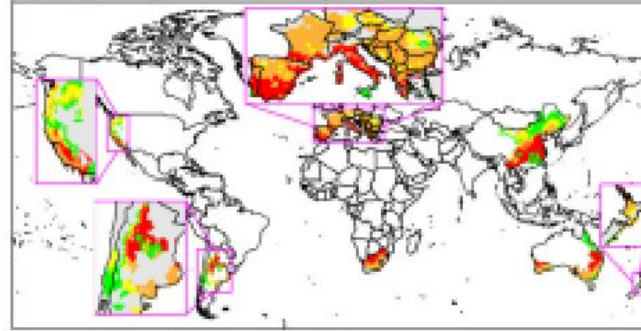
(b) High impact. Hugin Index



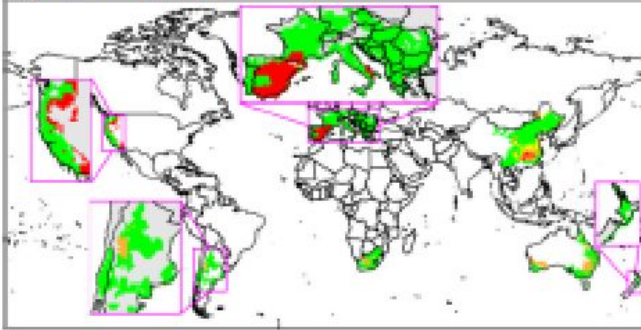
(c) Low impact. Cool Night Index



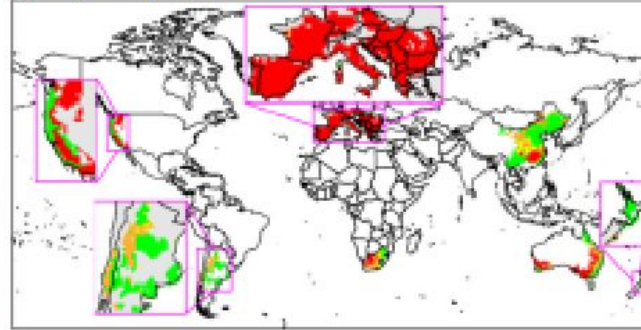
(d) High impact. Cool Night Index



(e) Low impact. SPE Index



(f) High impact. SPE Index



too hot,
too wet,
too dry

E 1858 

NUESTROS VINOS

TIENDA ONLINE

HEREDEROS DEL
MARQUÉS DE RISCAL



[Inicio](#) / [Denominaciones](#) / [D.O. Rueda](#)

D.O. Rueda



5 A view of the challenge from the academic side





ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Environmental Science and Policy

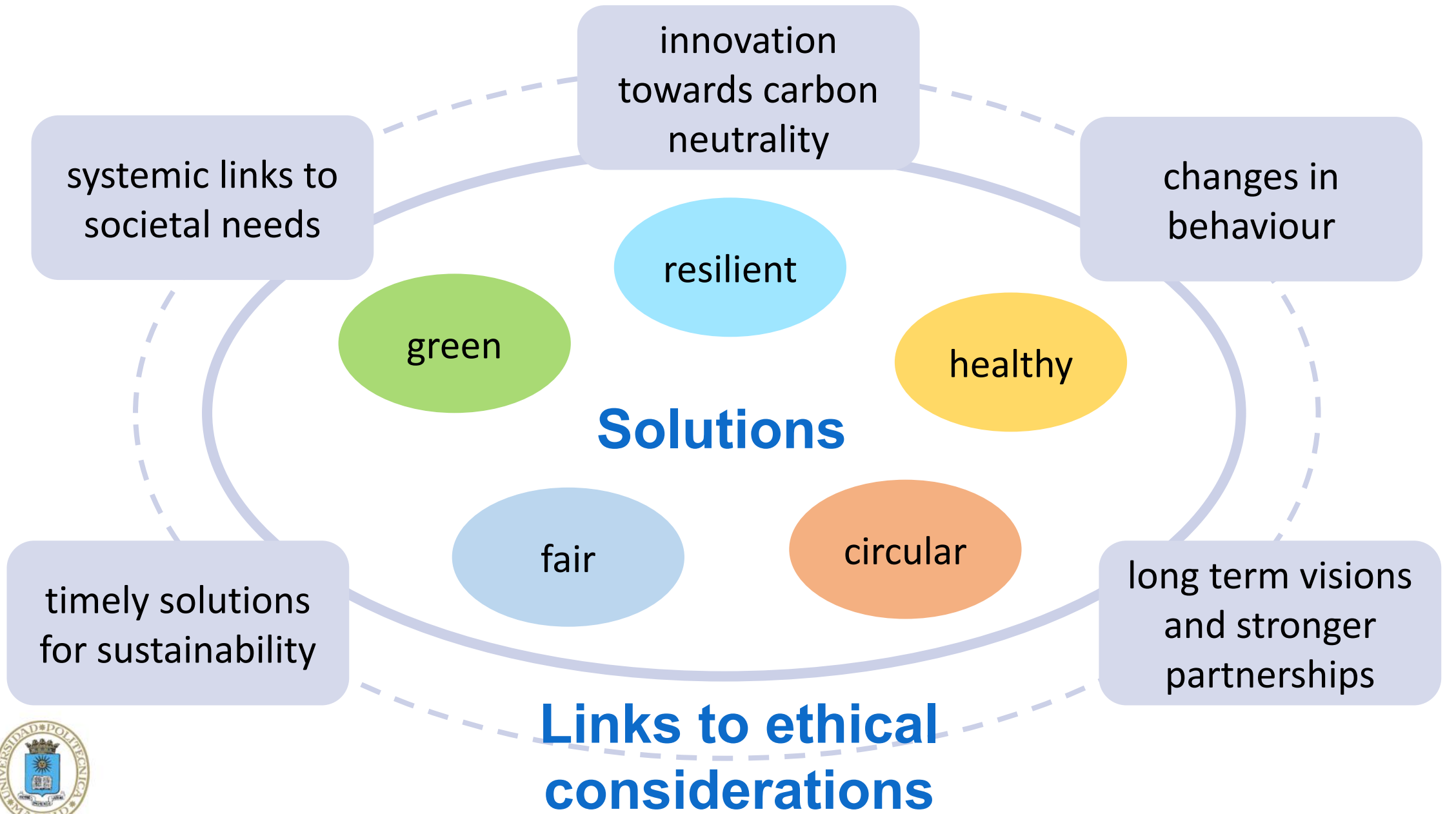
journal homepage: www.elsevier.com/locate/envsci



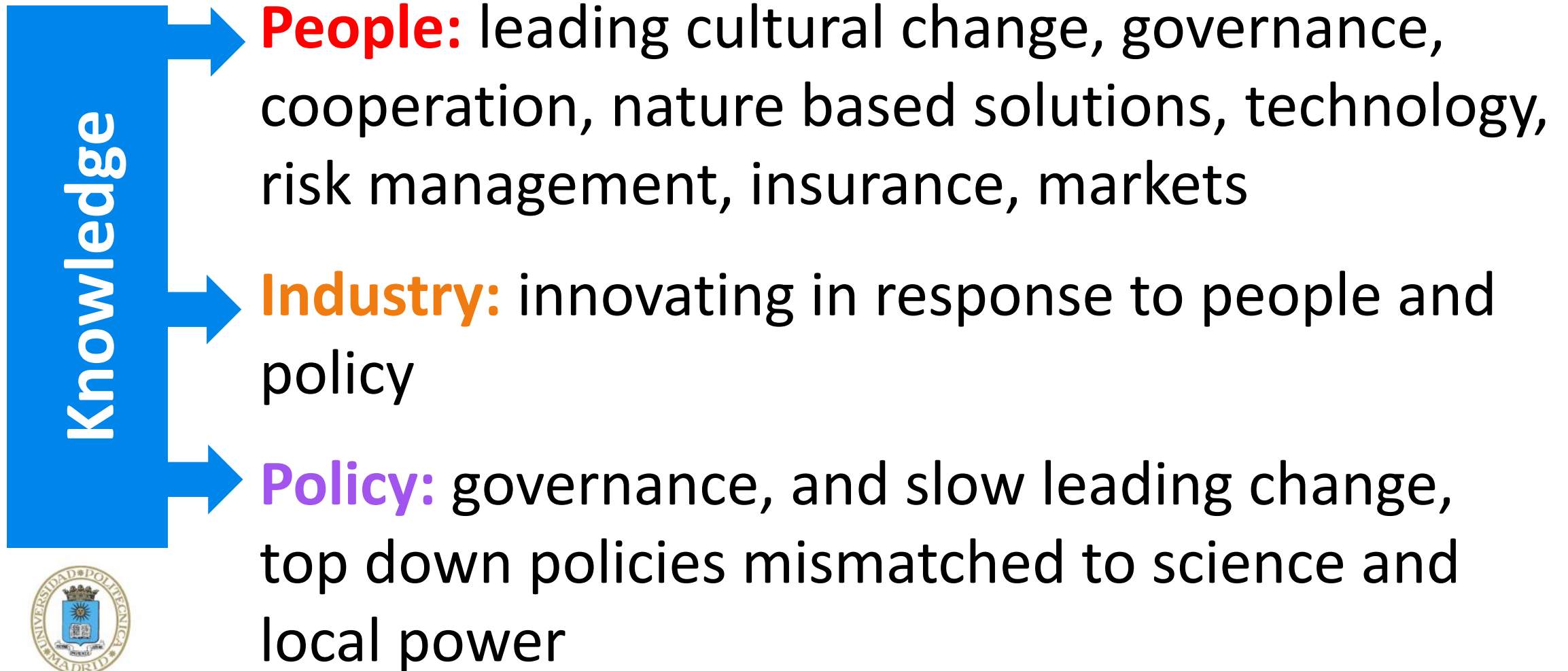
Knowledge architecture for the wise governance of sustainability transitions

Tom H. Oliver^{a,b,*}, Lorenzo Benini^c, Angel Borja^{d,e}, Claire Dupont^f, Bob Doherty^{b,g},
Małgorzata Grodzińska-Jurczak^h, Ana Iglesiasⁱ, Andrew Jordan^j, Gary Kass^{k,l}, Tobias Lung^c,
Cathy Maguire^c, Dan McGonigle^b, Per Mickwitz^m, Joachim H. Spangenbergⁿ, Leonor Tarrason^o





Can we be optimistic?






Thank you



Muchas
gracias



Merci
beaucoup



Molte
grazie



Keynote address

Moderated by **Alberto Garrido**
Vice Rector of Quality and Efficiency at UPM

Sarah Springman

Principal of St Hilda's College at
University of Oxford

Madrid, 18-20 October [#CAM2023](#)



PERSPECTIVES AND EXPECTATIONS ON THE ROLE OF UNIVERSITY LEADERSHIP IN CONTRIBUTING TO SUSTAINABILITY

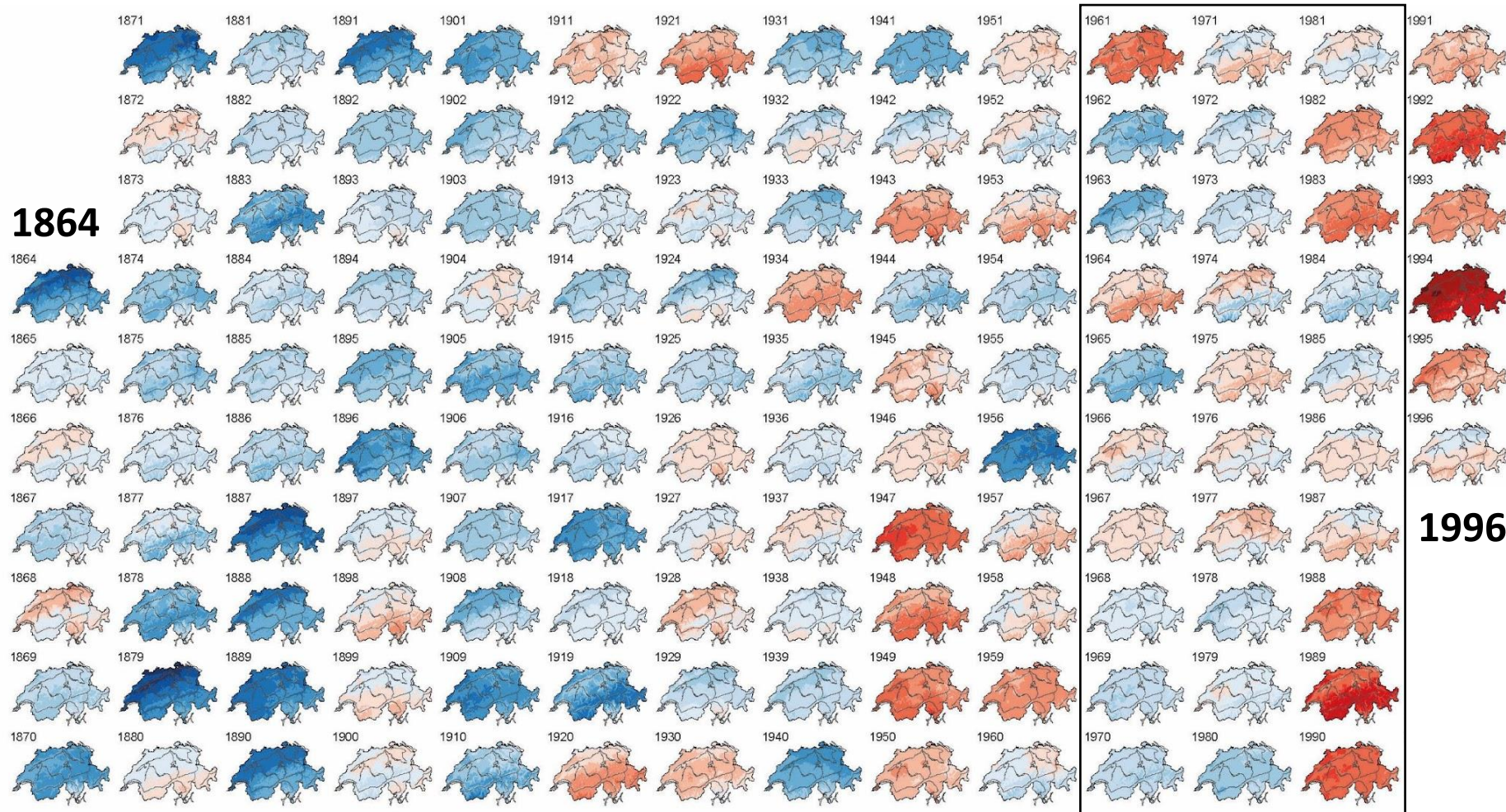
GET ON WITH IT!

SARAH SPRINGMAN
FORMERLY RECTOR, ETH ZURICH
CURRENTLY PRINCIPAL, ST HILDA'S COLLEGE,
OXFORD

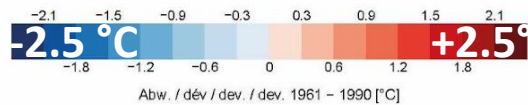
UNIVERSITY



ANNUAL TEMPERATURE DEVIATIONS (°C) FROM 1961-1990 MEAN IN CH

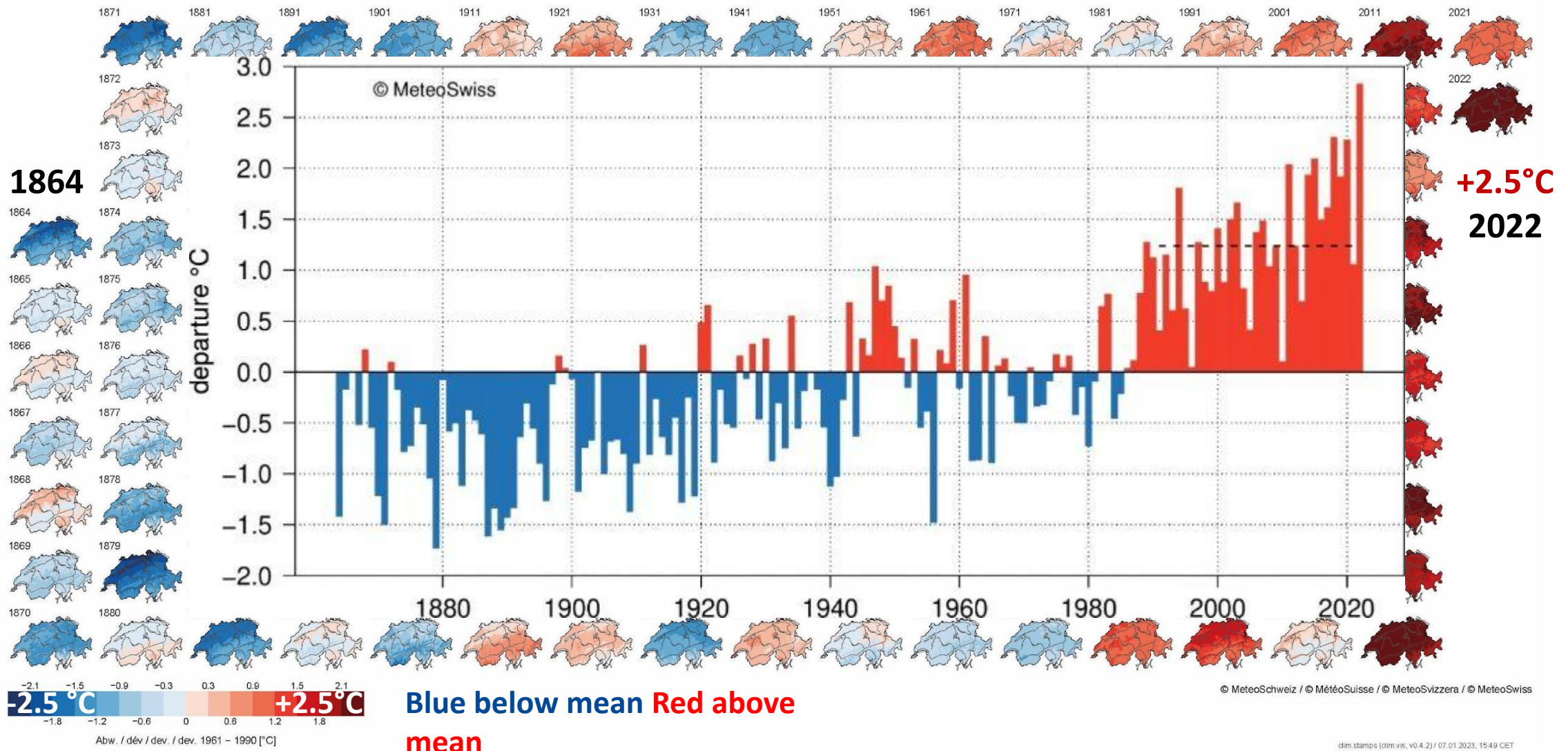


+2.5°C
2022



Blue below mean Red above mean

ANNUAL TEMPERATURE DEVIATIONS (°C) FROM 1961-1990 MEAN IN CH





Research

- Zero-carbon energy transformation
- Health and society
- Resources and production
- Resilient futures
- Transport, cities and infrastructure
- Carbon drawdown and climate repair

Education

- Sustainability in the curriculum
- Graduate study
- Living lab
- Doctoral training
- Primary education
- Executive education/courses
- Policy challenges collaboration

2038

Engagement

- Sustainability in business
- Sustainable industry
- Evidence-based policy
- Entrepreneurship
- Economic resilience
- Public engagement

Decarbonisation

- Reducing direct emissions
- Renewable energy
- Building for success
- Addressing indirect emissions
- Involving staff and students





2035



The world has a goal to reach net zero emissions
This platform, informed by leading climate researchers, brings together principles, policies, practical tools and progress tracking to help businesses and policy makers achieve that goal



PRINCIPLES & POLICIES

PRACTICAL TOOLS

PROGRESS TRACKING



INTEGRITY MATTERS:
NET ZERO COMMITMENTS
BY BUSINESSES,
FINANCIAL INSTITUTIONS,
CITIES AND REGIONS

REPORT FROM THE UNITED NATIONS
HIGH-LEVEL REPORT GROUP ON THE
NET ZERO EMISSIONS COMMITMENTS
OF NON-STATE ENTITIES



Net Zero Guidelines
Accelerating the transition to net zero



- A comprehensive approach to emission reductions
- An equitable transition to net zero
- Cautious use of carbon dioxide removal and storage
- Effective regulation of carbon offsets
- Alignment with broader socio-ecological objectives
- Front-loaded emission reductions
- Pursuit of new economic opportunities



ETH ZURICH

- using scientific expertise in areas of societal relevance
- intensifying activities in research, technology & knowledge transfer
- fostering talent recruitment
- addressing management of combined crises – including climate, biodiversity, energy & food
- training students to reach Net Zero by 2030



ETH zürich

Office of the President



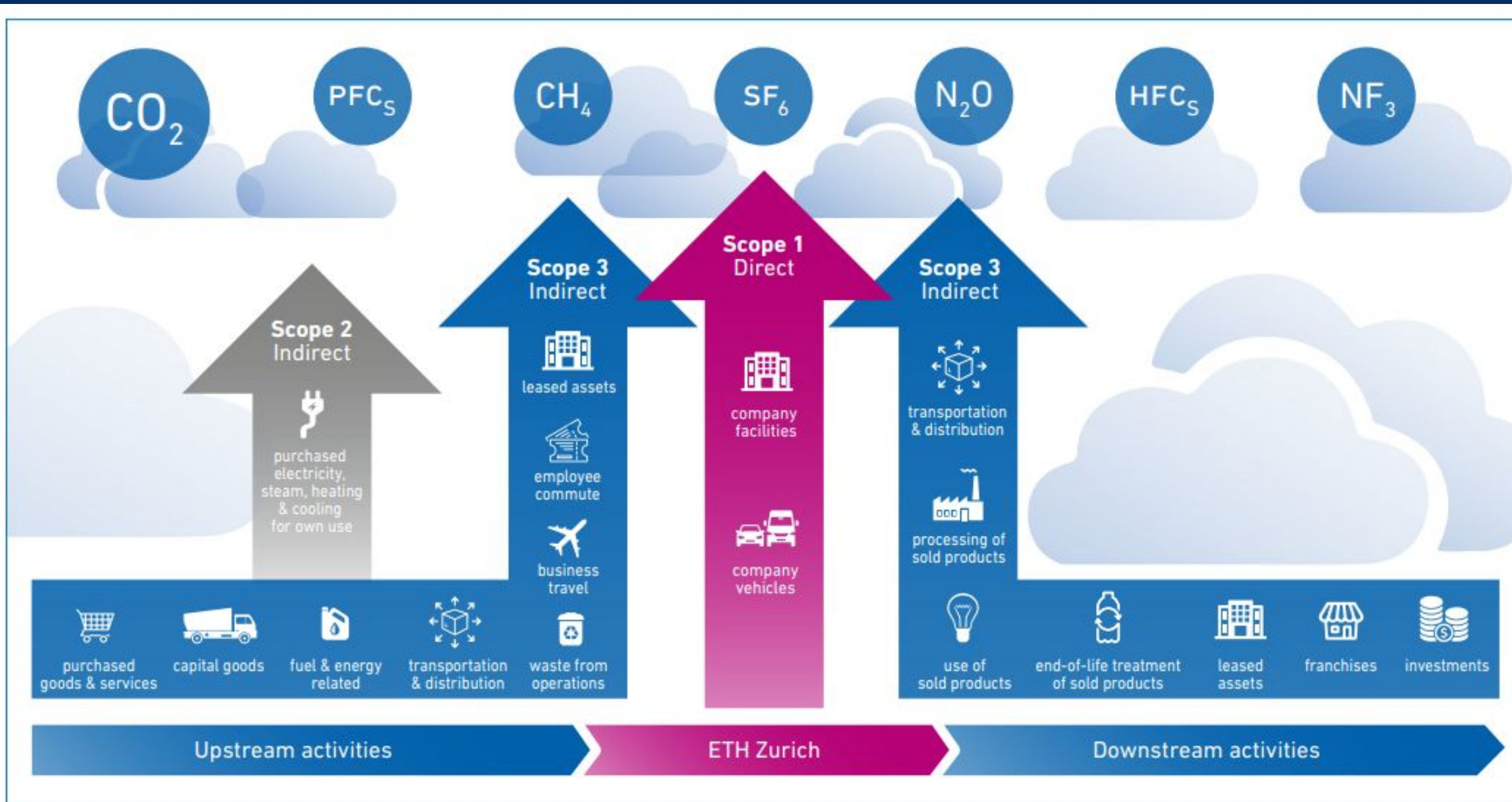
ETH Zurich strives for Net Zero by 2030

Climate change requires rapid and determined action.

ETH Zurich set the goal to reduce its greenhouse gas emissions to Net Zero by 2030. This document lays out what climate neutrality means for the University and how it aims to achieve that goal. The ETH Community is invited to help determine the path and the speed of this task as a joint responsibility.

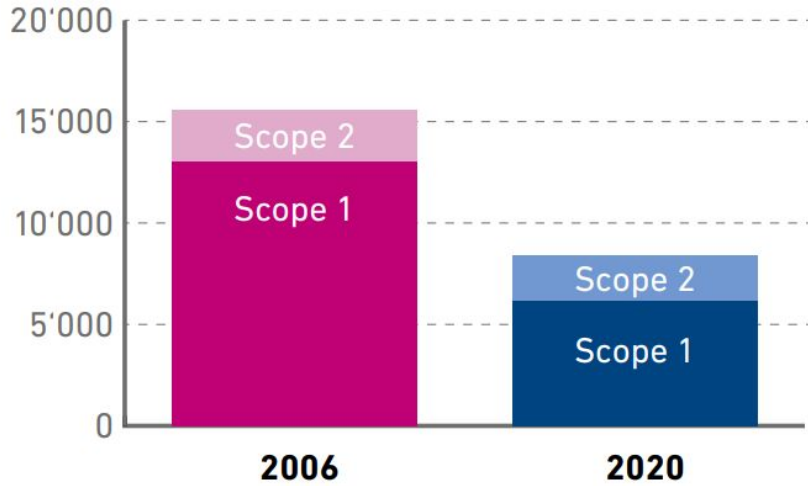
White Paper, September 2022

GHG EMISSIONS: SCOPES 1, 2 & 3



GHG EMISSIONS: SCOPES 1, 2 & 3

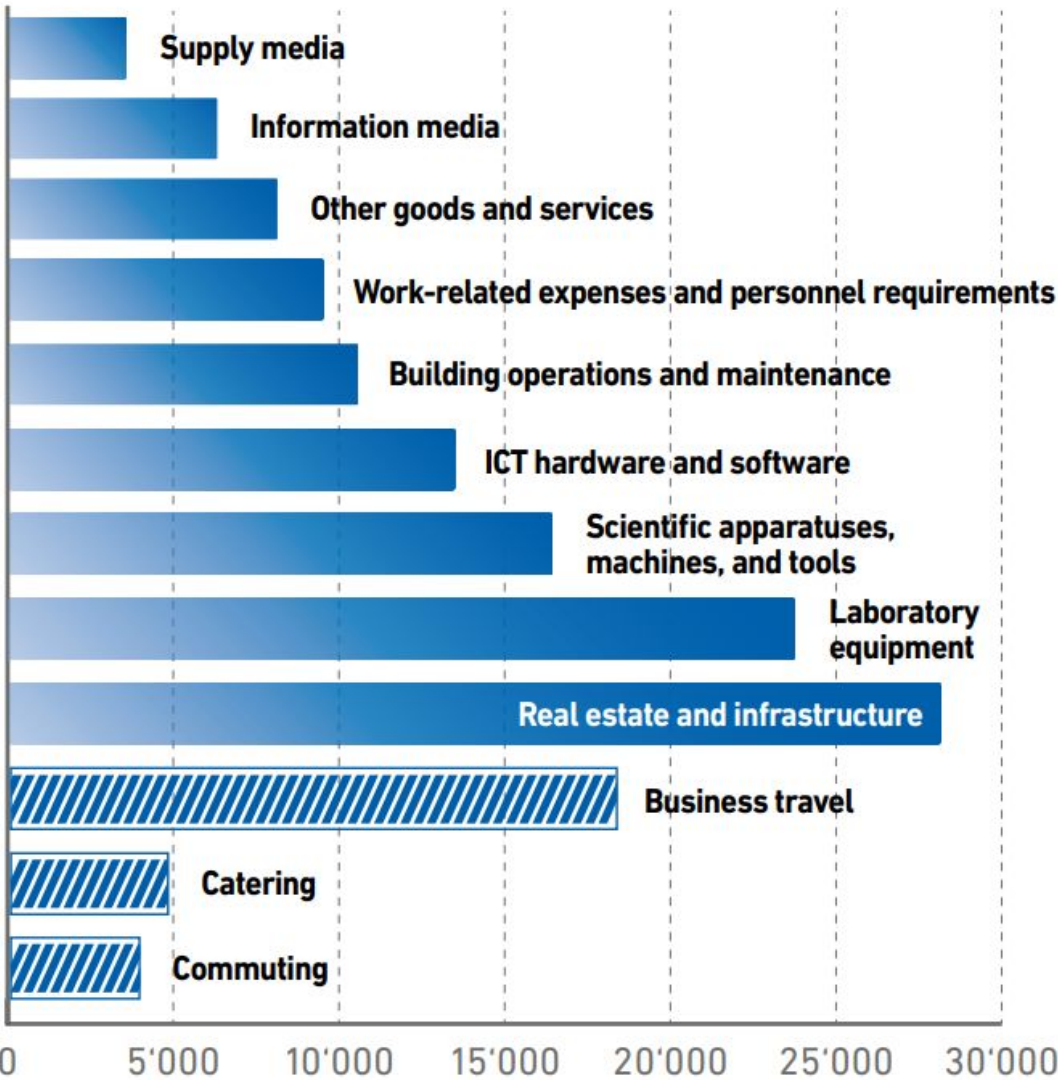
Scope 1 and 2 emissions 2006 and 2020 (tCO₂eq)



Scope 2 tCO ₂ eq	2'550	2'237
Scope 1 tCO ₂ eq	13'025	6'194

Total number of students **13'000** **23'000**

Scope 3 emissions in 2017 (tCO₂eq)



SO WHAT CAN WE BRING?

- **Education**

- Own students – curricular & extra-curricular
- Continuing education
- Schools e.g. ETH Academy

- Research – Technology

- Innovation – Knowledge Transfer

- Influencing Policy & Actions



SO WHAT CAN WE BRING?

- Education
- **Research – Technology**
 - Blue-sky research
 - Applied research
 - Collaborative research & technology
- Innovation – Knowledge Transfer
- Influencing Policy & Actions



The image shows a screenshot of the UK Atomic Energy Authority website. At the top, there is a dark blue navigation bar with the UK Atomic Energy Authority logo and the text "UK Atomic Energy Authority". To the right of the logo are several menu items: "FUSION", "ROBOTICS", "MATERIALS", "SKILLS", and "PROTOTYPE". Below the navigation bar is a large orange banner with the text "Culham has been a major international fusion research centre since the 1960s." Below the banner is the CCFE logo and a navigation menu with items: "About CCFE", "Fusion energy", "Research", "Divisions", "Programmes", "Careers", "News & events", and "Resources". Below the navigation menu is a photograph of a fusion reactor. To the right of the photograph is a text block that is partially obscured by a yellow diagonal banner. The text in the block includes "Fusion research in the UK started in the later 1940s / 1950s" and "Aldermaston". The yellow banner contains the text "Oxford, Imperial College & Atomic Energy Authority".

**LONG-TERM COLLABORATION:
NATIONAL (RESEARCH) BODIES**



SO WHAT CAN WE BRING?

- Education
- Research – Technology
- **Innovation – Knowledge Transfer (e.g.)**
 - Energy creation (Synhelion)
 - Negative emission (carbon storage) (Climeworks)
 - Systems Engineering approaches
- Influencing Policy & Actions

- **Synhelion**
- **Climeworks**
- **Carbon dioxide removal technology**

The image shows a screenshot of the Synhelion website. At the top, the Synhelion logo is on the left, and navigation links for Technology, Solar Fuels and Plants, Solar Heat, News, and About are on the right. Below this is a large blue banner for Climeworks. The banner features the Climeworks logo, the headline "Lead the race toward net zero", and a sub-headline: "High-quality carbon removal for your climate strategy via Climeworks' direct air capture and storage (DAC+S) technology." There are two buttons: "Businesses" and "Individuals". On the right side of the banner is an aerial photograph of a large industrial facility with a white roof. In the bottom right corner of the banner, the URL "climeworks.com" is displayed.



SO WHAT CAN WE BRING?

- Education
- Research – Technology
- Innovation – Knowledge Transfer
- **Influencing Policy & Actions**
 - University, local, regional, national, international
 - Climate justice
 - Human behaviour
 - **Reduce** waste, **transport**
 - **Remake, Repair, Renovate**
 - **Reuse** existing... , **Recycle**... materials
 - Compensate?
 - Ethical Investments
 - Biodiversity Net Gain




climeworks.com



ETHICAL INVESTMENTS

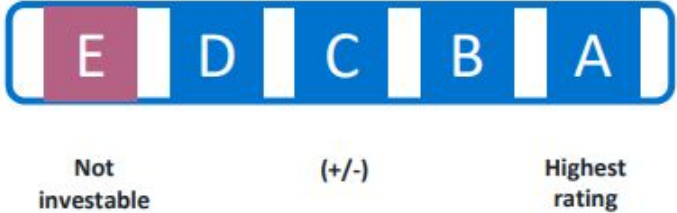
Sustainability Impact Matrix


 • c180 data points are assessed to assign each ESG theme a red, amber or green 'traffic light'



Overall ESG assessment

- Illustrates materiality assessment of ESG factors
- Absolute, not sector- or country-relative score
- Sarasin & Partners proprietary analysis



ESG Transition

Since 2018 at St Hilda's College
 Key Initiator of Concept for Sarasin
 with Oxford Martin School



BIODIVERSITY NET GAIN

St Hilda's bought 55 acre ancient woodland

Register with Darwin Tree of Life Insect Genome satellite

Measure existing e-DNA of tree canopy

Mobilise & motivate students & staff

Photo competitions,

Bluebell walks,

Carry out BioBlitz,

Engage in birdwatching,

Conduct (monthly)

surveys/recordings:

30 birds species,

(3 red-listed)

82 arthropod species

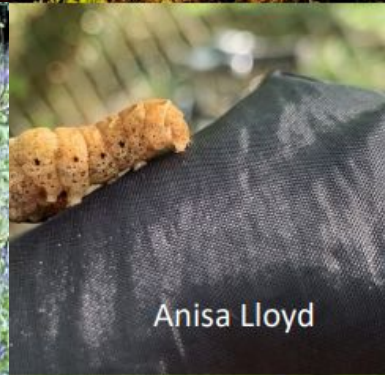
Interact with local schoolkids..



Radley Large Wood



Ayushi Agarwal



Anisa Lloyd



Clara Graham



CLOSING THOUGHTS

- Joint Initiatives
 - role model CESAER universities
 - can and must
 - signatory to the global «Race to Zero campaign»
- Green Campus
 - Sustainable Campus Charter
 - living labs on campus
- Trust & Transparency
- Eliminating Inequalities
 - social justice

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The strong and united voice of universities
of science and technology in Europe

Leading by example

Boosting sustainability through good governance
adopted by universities of science & technology

White paper

19 October 2023

climeworks.com



Keynote address

Moderated by **Alberto Garrido**
Vice Rector of Quality and Efficiency at UPM

Teresa Ribera

Vice President of Government of Spain
and Minister for Ecological Transition and
Demographic Challenge

Madrid, 18-20 October [#CAM2023](#)





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Announcement winner CESAER Student Challenge 2023

Presented by **Justyna Szostak**

Chair of the Internationalisation Committee of Gdańsk Tech
Director and Co-Chair of Task Force Learning & Teaching

Madrid, 18-20 October

#CAM2023



Submissions

13 teams

12 countries

8 Sustainable Development Goals
addressed

Criteria

Novelty

Scientific and Technological
Excellence

Sustainability and Impact

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Independent experts of the evaluation panel

Sarah Springman

Principal of St Hilda's College at
University of Oxford

Chair of the evaluation panel

Ana Benavent

Technical Director at Valoriza

Luke Sheehy

Executive Director of the Australian
Technology Network (ATN)

Madrid, 18-20 October

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Compilation video

https://audiovisuales.upm.es/flash/?src=mp4:2324/etsii/20231004_video_CESAER



Project submitted but not in the compilation video:
IRF-PO project from Gdańsk University of Technology

Compilation video, featuring

HealthyPA

Brno University of Technology

TEDPIC

University of Belgrade

Wast-E

Sapienza University of Rome

Waste Warrior Academy

Kaunas University of Technology

OZONE

University College Dublin

Digitaliza Tu Pueblo

Universidad Politécnica de Madrid

PECHERA KPI

National Technical University of Ukraine

FLÅWLESS

ParisTech

Network of Interconnected Bins

(NIB)

Politecnico di Torino

Syrian Turkish Architecture

Recovery Team (START)

TU Delft



Finalist

Pier Giuseppe Rivano

Master student at ETH Zürich

presenting

Unbound Potential

Madrid, 18-20 October

#CAM2023



Unbound potential video

https://audiovisuales.upm.es/flash/?src=mp4:2324/etsii/ETH_UnboundPotential



Finalist

Elias Broeckhoven

PhD candidate at KU Leuven

presenting

MIDAS

Madrid, 18-20 October

#CAM2023



MIDAS video

[https://audiovisuales.upm.es/flash/?src=mp4:2324/etsii/KU_Leuven MIDAS](https://audiovisuales.upm.es/flash/?src=mp4:2324/etsii/KU_Leuven_MIDAS)





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Annual Meetings 2023

Contributions
of Universities of S&T
to Sustainability

Announcement winning team CESAER Student Challenge 2023



Madrid, 18-20 October

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Contributions
of Universities of S&T
to Sustainability

Coffee break

Madrid, 18-20 October [#CAM2023](#)



Launch white paper ‘Leading by example: Boosting sustainability through good governance adopted by universities of S&T’

Moderated by **Alberto Garrido**
Vice Rector of Quality and Efficiency at UPM

Madrid, 18-20 October **#CAM2023**



Launch of the White Paper

Moderated by **Alberto Garrido**
Vice Rector of Quality and Efficiency at UPM

Guillermo Cisneros Pérez

Rector of Universidad Politécnica de Madrid



Madrid, 18-20 October

#CAM2023

“The grave nature of the challenges facing our society, and the urgency for action, is clearer than ever.”

“The knowledge triangle - i.e. research, education and innovation - play crucial roles to help tackle these challenges with universities of S&T as key generators of scientific knowledge, technology and talent at their core.”

Madrid, 18-20 October

#CAM2023



Action-oriented approach for universities of S&T as powerful engines and living labs for transformational sustainability aiming towards delivering the SDG

Work and efforts led by the Task Force Sustainability for the past two years

Three parts on (i) setting the scene, (ii) the knowledge triangle and (iii) 3 cross-cutting themes

CESAER

The strong and united voice of universities
of science and technology in Europe

Leading by example

Boosting sustainability through good governance
adopted by universities of science & technology

White paper

19 October 2023

Madrid, 18-20 October

#CAM2023



Key messages

Part 1: Setting the scene

- 1- Our societies are facing grave challenges and it is urgent and imperative to act now
- 2- Universities of S&T play a crucial role and have a responsibility in helping to tackle the local and global challenges.
- 3- The rapid and vast developments in science and technology raise myriad ethical issues related for example to privacy, safety and democracy.
- 4- It is not enough for leaders to only talk about values, principles and responsibilities, they must lead by example.
- 5- Universities are autonomous societal players with unique societal roles and responsibilities.
- 6- They contribute to sustainability on 3 different levels: (i) global, (ii) local, (iii) internal.

Key messages

Part 2: The knowledge triangle (1/2)

- 1- Universities of S&T must ensure and promote openness of research, education and innovation
- 2- But they should also acknowledge increased global political and financial competition, and the reality of interference by some governments and businesses.
- 3- Transparency and trust are key enablers for creating a shared understanding of the challenges we face
- 4- Universities of S&T have a responsibility to ensure key technologies are developed and used for the common good
- 5- There is a clear need for inter- and transdisciplinary approaches to understand the interconnectedness of the environment, the economy and society and the interdependencies between local, regional, national and global communities

Key messages

Part 2: The knowledge triangle (2/2)

- 6- Increasing the content on sustainability within curricula enables students to understand the challenges of our times, communicate them, and apply sustainability in one's field of expertise
- 7- There is a growing necessity not only to encourage more partnerships between industry and academia, but also to create new and more inclusive innovation ecosystems.
- 8- Disruptive innovation is a crucial element to deliver on the SDG and contribute to sustainability and we must therefore foster and promote it from cultivating innovators and entrepreneurs to shaping markets.

Key messages

Part 3: Cross-cutting themes

- 1- While metrics, benchmarking and rankings can support the good governance of universities of S&T, acknowledging and rewarding contributions towards achieving (specific) UN SDG and targets through such approaches remains a challenge. Less focus on reputation and performance (quantitative and competitive) to the benefit of more focus on development strategies and impact (qualitative and collaborative) is recommended.
- 2- Universities of S&T have the responsibility and ability to lead by example and invest in activities and measures to reduce the emissions of their own institutions
- 3- Inequalities between people, and between regions are a threat to social, economic and environmental goals. Sustainability can only be achieved by leaving no one behind

Launch of the White Paper

Moderated by **Alberto Garrido**
Vice Rector of Quality and Efficiency at UPM

Rik Van de Walle

Rector of Ghent University
President of CESAER

Madrid, 18-20 October

#CAM2023



Panel discussion

Moderated by **Louise Drogoul**
Advisor for Innovation & Sustainability at CESAER

Mari Sundli Tveit

Chief Executive at Research
Council of Norway &
Governing Board Member at
Science Europe

Ruth Carrasco

Associate Professor and
Associate Director for
Sustainable Development Goals
at ETSI Industriales, UPM

Luke Sheehy

Executive Director of the Australian
Technology Network (ATN)

Madrid, 18-20 October

#CAM2023



Closing words

Moderated by **Alberto Garrido**
Vice Rector of Quality and Efficiency at UPM

Rik Van de Walle

Rector of Ghent University
President of CESAER

Madrid, 18-20 October

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Contributions
of Universities of S&T
to Sustainability

Photo moment

**Travel together to conference dinner at Hotel
Intercontinental**

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