Climate Change and Economic Growth
If you can't measure it, you can't manage it, and you can't improve it!

Professor Phoebe Koundouri

Athens University of Economics and Business (AUEB) and Technical University of Denmark (DTU)
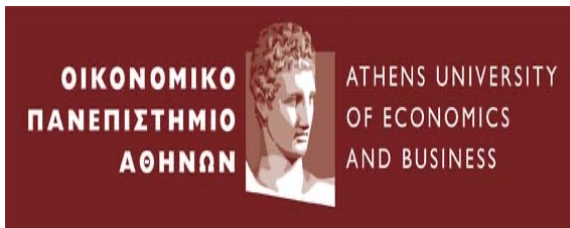
Director ATHENA Information Technologies RC

Chair UN SDSN Global Climate Hub and European Hub, Chair AE4RIA

Member World Academy of Art & Science, European Academy of Science, European Academy of Science Technology

President European Association of Environmental and Resource Economists

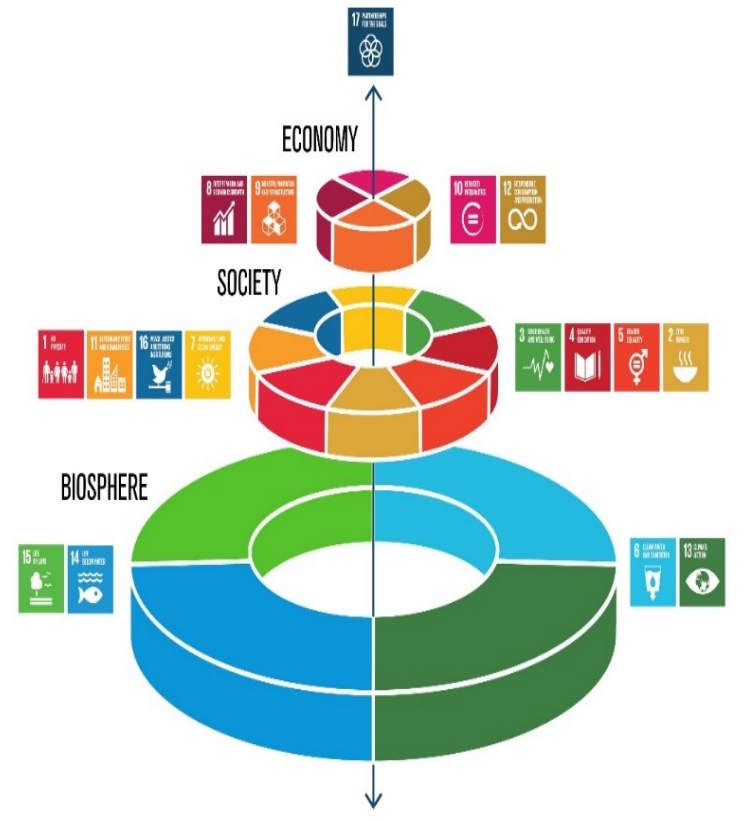*President World Council of Environmental and Resource Economists*

AE4RIA
Alliance of Excellence for Research and Innovation on Aephoria

200 PEOPLE

100 PROJECTS

150 CONFERENCES ORGANIZED

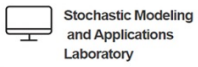**543** PUBLICATIONS

500M FUNDING

Prof. Phoebe Koundouri is the Founder and Scientific Chair of AE4RIA

Research and Innovation Centers

Research laboratory on Socio-Economic and Environmental Sustainability ReSEES — ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS
ReSEES Laboratory

Stochastic Modeling and Applications Laboratory — ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS
Stochastic Modeling and Applications Laboratory

ATHENA Research & Innovation Information Technologies Sustainable Development Unit
Sustainable Development Unit / Athena

DTU Management Department of Technology, Management and Economics
DTU Management Department of Technology, Management and Economics Climate and Energy Policy Division

Innovation Acceleration Hubs

BRIGAID CONNECT
Brigaid Connect

MENA MARITIME Accelerator
MENA Maritime Accelerator

The Black Sea Accelerator — DOORS, BRIDGE-BS
Black Sea Accelerator

SDSN Global Climate Hub
SDSN Global Climate Hub

eit Climate-KIC — Climate-KIC is supported by the EIT, a body of the European Union
Climate-KIC Greece Hub

Science - Policy Networks

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK A GLOBAL INITIATIVE FOR THE UNITED NATIONS
SDSN

SDSN Europe
SDSN Europe

SDSN Greece
SDSN Greece

Water Europe Technology & Innovation
Water Europe

Nexus Cluster
Nexus cluster

Scientific Associations and Academies

EAERE European Association of Environmental and Resource Economists
EAERE

WCERE World Congress of Environmental and Resource Economists
WCEREA

Academia Europaea
Academia Europaea

World Academy of Art and Science
WAAS

iap the interacademy partnership SCIENCE HEALTH POLICY
IAP

European Academy of Sciences and Arts
European Academy of Sciences and Arts

SDGs – ESG measurement
Sustainable Finance

Sustainable Pathways Climate Neutrality & Resilience

Sustainable Pathways for Seas and Oceans

FOOD WATER ENERGY NEXUS
Sustainable Pathways Land Use & WFEB Nexus

Innovation Acceleration Education Upskilling/Reskilling

Summary of the Policy Framework for the transition to sustainability

2015

SUSTAINABLE DEVELOPMENT GOALS

PARIS2015 UN CLIMATE CHANGE CONFERENCE COP21·CMP11

Financing the Joint Implementation of the SDGs and the European Green Deal

2nd report of the SDSN Senior Working Group on the European Green Deal

Report launch
May 3 / 4 pm-6 pm CEST

https://sdsn.eu/european-green-deal-senior-working-group/

Chairs: Phoebe Koundouri and Jeff Sachs

SDSN Europe

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
EAERE European Association of Environmental and Resource Economists
AE4RIA Alliance of Excellence for Research and Innovation on Aephelia
IEA International Energy Agency
ATHENA Research & Innovation Information Technologies Sustainable Development Unit
enel Foundation
ReSEES Research laboratory on Socio-Economic and Environmental Sustainability OIKONOMIKO PANEPISTIMIO ATHINON
eit Climate-KIC Hub GREECE Funded by the European Union
DTU
FORCE FOR GOOD
SAPIENZA Università di Roma
Fondazione Eni Enrico Mattei
UNIVERSITÀ di SIENA 1240
THE CYPRUS INSTITUTE

2018

ipcc INTERGOVERNMENTAL PANEL ON climate change
Global Warming of 1.5°C
An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

2019

EUROPEAN GREEN DEAL DELIVERING ON OUR TARGETS

InvestEU

2020

COVID-19 CORONAVIRUS PANDEMIC

European Green Deal

NEXT GENERATION EU #NextGenerationEU #EUBudget

Σχέδιο Ανάπτυξης για την Ελληνική Οικονομία

ΤΕΛΙΚΗ ΕΚΘΕΣΗ

"Next Generation EU"
Ελλάδα 2.0
ΕΘΝΙΚΟ ΣΧΕΔΙΟ ΑΝΑΚΑΜΨΗΣ ΚΑΙ ΑΝΘΕΚΤΙΚΟΤΗΤΑΣ

2021

BUILDING A CLIMATE-RESILIENT EUROPE
A new EU Strategy on Adaptation to Climate Change

EUROPEAN CLIMATE LAW

THE EU TAXONOMY

Fit for 55

Εθνικό σχέδιο για την Ενέργεια και το Κλίμα

ipcc INTERGOVERNMENTAL PANEL ON climate change
Climate Change 2021 The Physical Science Basis Summary for Policymakers

01-12 NOV 2021 GLASGOW COP26 IN PARTNERSHIP WITH ITALY

2022

EU Taxonomy accelerating sustainable investments
Complementary Climate Delegated Act on certain nuclear and gas activities

The next generation of EU OWN RESOURCES

Climate Delegated Act & Energy Prices

RePowerEU
Independence Russian Fossil Fuels
Supply Chain Security-Interconnectivity
Invest Renewables

Digital Policies

Launch of the Destination Earth Initiative

Industrial Policy

COP27 SHARM EL-SHEIKH EGYPT 2022

UN Biodiversity Conference (COP 15)

2023

New Law to Reduce Methane Emissions

Fit-for-55 Policy updates

European Green Deal updates

Sustainable finance Investing in a sustainable future

In collaboration with national governments and respective SDSN National Hubs (2000 institutions globally) we *co-design national and sub-national pathways* for the transition to a **climate neutral and resilient** world.
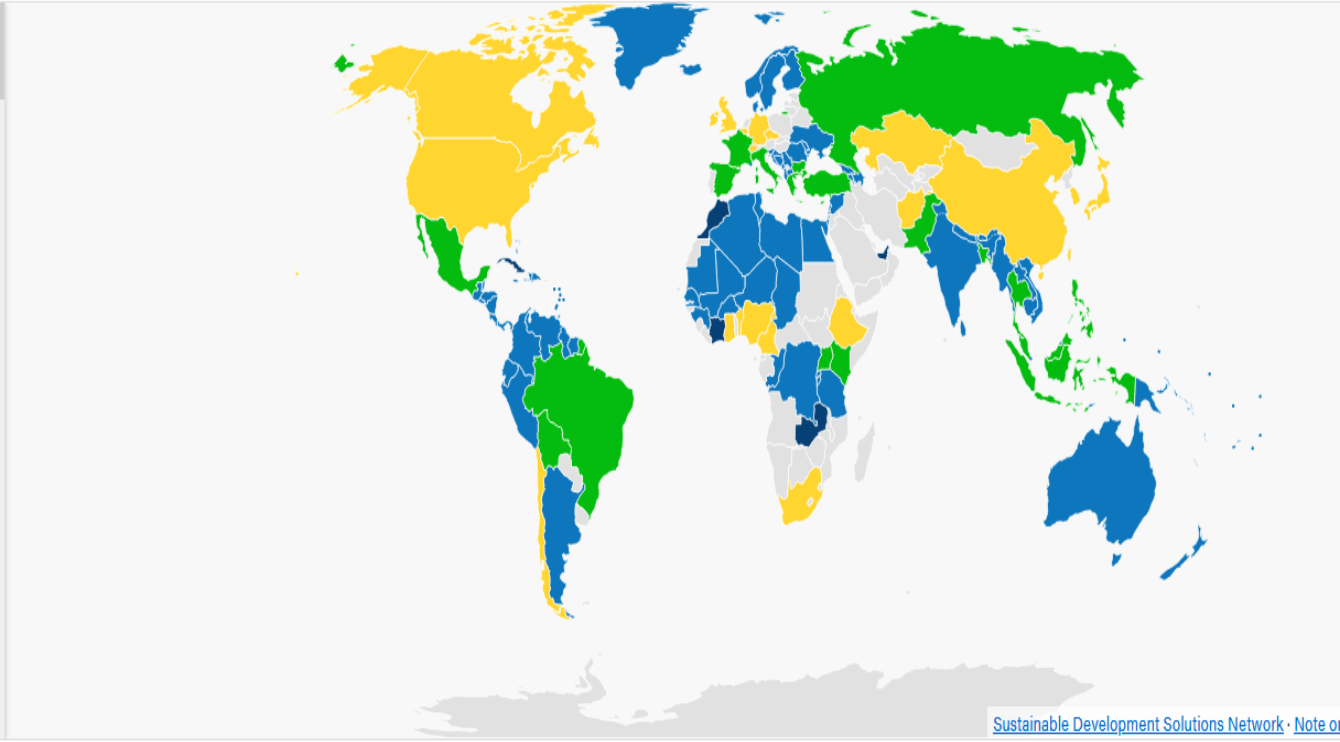
Optimal Dynamic Mixture of

- *Technologies*
- *Policies*
- *Fiscal & Financial Instruments*
- *Socio-Economic Narratives*

It has been clear since [Nicholas Stern's landmark 2006 review of the economics of climate change](#)

that the costs of *not* acting to tackle climate change are much higher than the costs of taking action.

And whilst the costs of projected impacts have only grown since then, the costs of many of the technologies for tackling climate change have fallen considerably.

The [Global Commission on the Economy and Climate](#) concluded that transitioning to a low-carbon, sustainable growth path could deliver a direct economic windfall of $26 trillion and create over 65 million new jobs by 2030 compared with business-as-usual.

2023

2030

Decent Work Sustainable Economic Growth SDG8

Climate Action SDG13

Life on Land SDG15

Life Below Water SDG14

Affordable & Clean Energy SDG7

UN SDSN Global Climate Hub
https://unsdsn.globalclimatehub.org
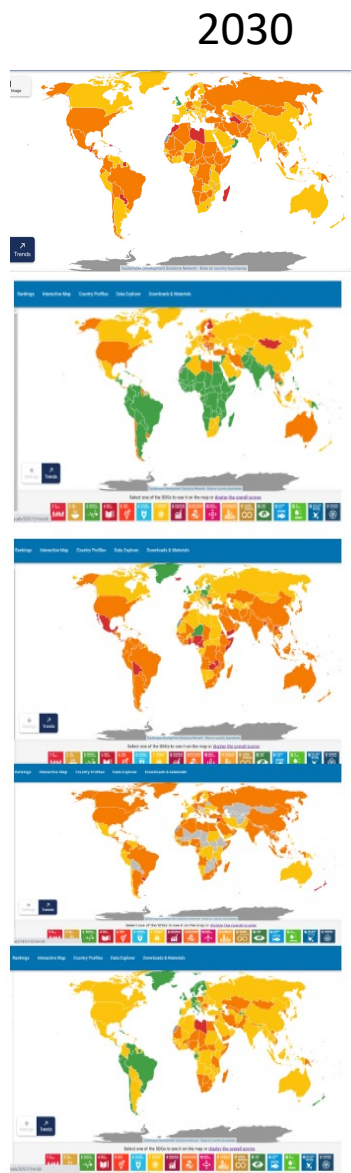
Climate Data Platforms and Digital Applications

Head

Team

Collaborations

Association for Computing Machinery ACM, the world's largest educational and scientific computing society, delivers resources that advance computing as a science and a profession.

TRENDS — Thematic Research Network on Data and Statistics

OpenAIRE

Mission: Collect, Aggregate, Connect and Visualize Data relative to the objectives of the GCH

Supporting Projects

Geospatial Data

GEO — GROUP ON EARTH OBSERVATIONS

GEO is a partnership of more than 100 national governments and in excess of 100 Participating Organizations that envisions a future where decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations.

GEO Member Map for the year 2022

Number of Members (2022)	
Africa:	31
Americas:	20
Asia/Oceania:	22
C.I.S.:	6
Europe:	35
Total:	114
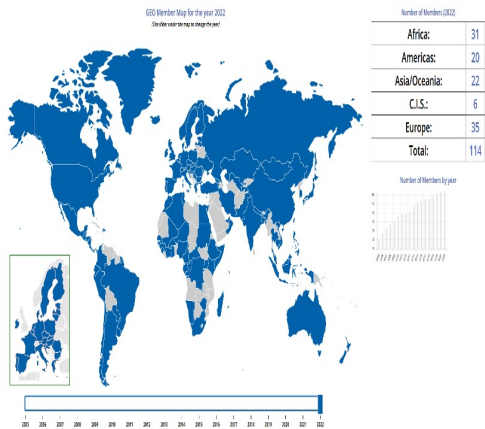
- Biodiversity and Ecosystem Sustainability
- Disaster Resilience
- Energy and Mineral Resource Management
- Food Security and Sustainable Agriculture
- Public Health Surveillance
- Infrastructure and Transport Management
- Sustainable Urban Development
- Water Resources Management

Socio-Economic and General SDGs-related data

OpenAIRE EXPLORE

Science for UN Sustainable Development Goals

Laying the foundation for new approaches and solutions.

SUSTAINABLE DEVELOPMENT GOALS

A collaboration with Athena RC, AURORA European University Alliance, and Swinburne University of Technology, Australia (pending)

SDSN Global Climate Hub Science & Technology Observatory

1 NO POVERTY — 225,293 RESEARCH PRODUCTS	2 ZERO HUNGER — 1,276,418 RESEARCH PRODUCTS	3 GOOD HEALTH — 3,050,175 RESEARCH PRODUCTS	4 EDUCATION — 373,226 RESEARCH PRODUCTS
5 GENDER EQUALITY — 74,203 RESEARCH PRODUCTS	6 CLEAN WATER — 401,258 RESEARCH PRODUCTS	7 CLEAN ENERGY — 625,742 RESEARCH PRODUCTS	8 ECONOMIC GROWTH — 247,637 RESEARCH PRODUCTS
9 INDUSTRY AND INFRASTRUCTURE — 91,537 RESEARCH PRODUCTS	10 NO INEQUALITY — 627,446 RESEARCH PRODUCTS	11 SUSTAINABILITY — 431,248 RESEARCH PRODUCTS	12 RESPONSIBLE CONSUMPTION — 85,947 RESEARCH PRODUCTS
13 CLIMATE ACTION — 1,413,857 RESEARCH PRODUCTS	14 LIFE UNDERWATER — 283,218 RESEARCH PRODUCTS	15 LIFE ON LAND — 221,191 RESEARCH PRODUCTS	16 PEACE & JUSTICE — 969,464 RESEARCH PRODUCTS

HORIZON 2020

A Competitive Intelligence Platform for AI-based

Grant agreement ID: 101004870
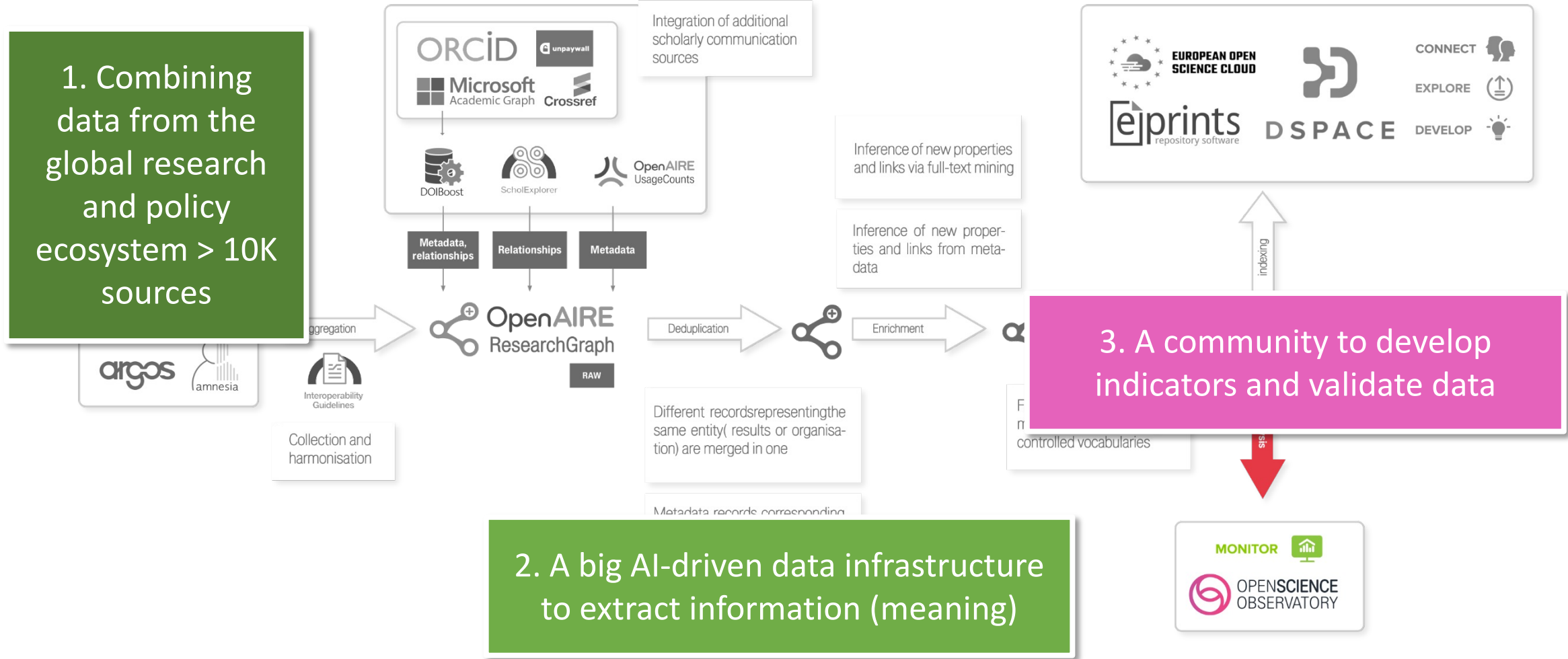
Duration: Start date 1 January 2021 – End date 31

Budget: Total cost € 4 362 935,75 – EU contribution

13 partners

Coordinated by Fundacion Espanola Para L

HORIZON 2020

CONNECTing in support of Op

Grant agreement ID: 7310

Duration: Start date1

Budget: Overall € 1 9

10 partners

Coordinated by CON

HORIZON 2020 — BlueBRIDGE

Building Research environments fostering Innovation, Decision making, Governance and Education to support Blue growth

Grant agreement ID: 675680

Duration: Start date 1 September 2015 End date 28 February 2018

Budget: Overall € 5 295 753,75 EU contribution € 5 295 753,75

13 partners

Coordinated by CONSIGLIO NAZIONALE DELLE RICERCHE, Italy

Funded by: European Commission, RIA – Research and Innovation action, H2020-EINFRA-2015-1

HOW? The power of an operational AI-Driven data infrastructure

1. Combining data from the global research and policy ecosystem > 10K sources

2. A big AI-driven data infrastructure to extract information (meaning)

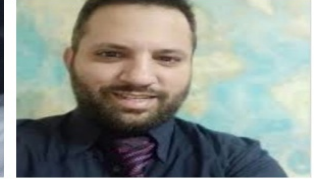3. A community to develop indicators and validate data

Atmospheric Physics and Climatology

Head

Team

Mission

Climate model simulations, analyses, and methods combining multiple lines of evidence focused on improving understanding of **human influence on a wider range of climate variables**, including weather and climate extremes – IPCC reports

Study of climate fluctuations in any period
Study of the observations related to the upper layers of the atmosphere
Collation and processing of observations related to air pollution

Supporting projects

Collaborations

Research Centre for Atmospheric Physics and Climatology
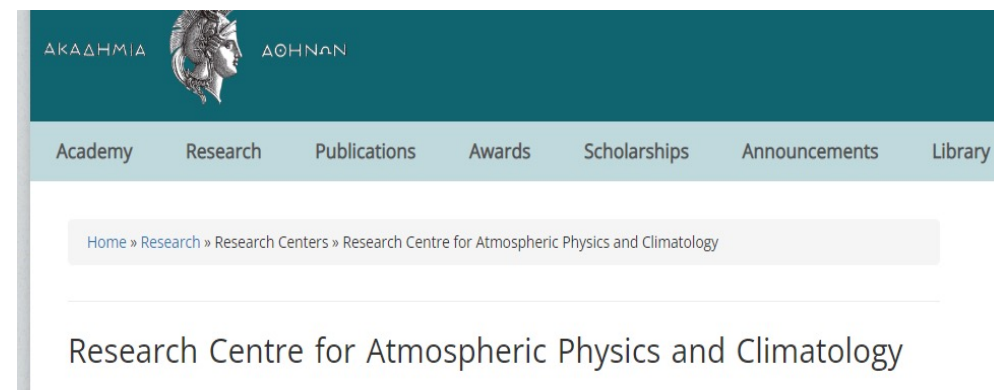
Climate & Energy Systems Modeling
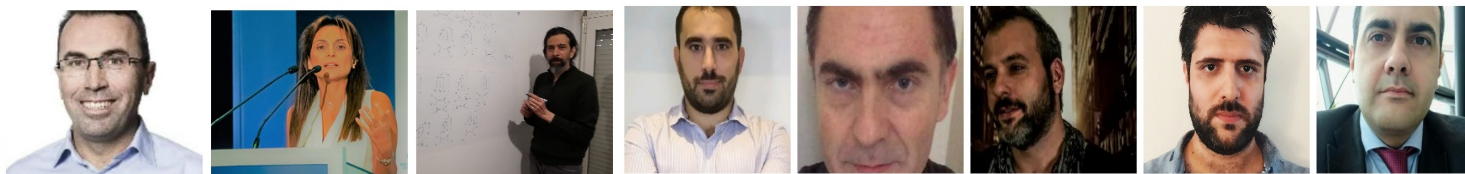
Mission

Climate and Energy Systems modelling will use system dynamics and stochastic modelling techniques to develop decarbonization pathways of the energy system at the national and regional levels.

Energy supply: mapping power generation plants along with their associated fuel, including coal, oil, gas, renewables, bioenergy, nuclear and new zero carbon.

Energy demand by economic sector (transport, households, buildings and industry) recorded along with their associated greenhouse gas (GHG) emissions.

Climate policy, such as carbon pricing, Fit for 55, etc calculate their effect on GHG emissions and temperature

Simulation of the scenarios providing detailed values for all relevant variables, along with the resulting temperature increase.

Model: Balmorel Energy-System model

Collaborations

CLIMATE & ENERGY

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

Balmorel
Energy system model

Supporting Projects

GREECE-JAPAN SUSTAINABILITY SYMPOSIUM

Island sustainability
Identifying c

Funding Body: Japan Society

Duration: Start date: 1 Ja

Budget: Overall € 13,761

Coordinated by the Insti

2 partners (Research Athens University of Econom Japan)

SEVENTH FRAMEWORK PROGRAMME — European Commission

Modular Multi-use Dee Platform Harnessing Mediterranean, Subtro and Maritime Resourc

Grant agreement ID: 288192

Duration: 1 February 2012 – End date31 Janu

Budget: Overall € 6 726 623,82 – EU contribut

20 partners

Coordinator: CONSORCIO PARA EL DISENO, PLATAFORMA OCEANICA DE CANARIAS, Spain.

A pan-Eu Renewab Energy

Prof. P committee me

Duration:

SEVENTH FRAMEWORK PROGRAMME — European Commission

MER MAID

Innovative Multi-purpose offshore platforms: planning, design and operation

Grant agreement ID: 288710

Duration: Start date1 January 2012 – End date31 December 2015

Budget: Overall€ 7 376 567,60 – EU contribution€ 5 483 411

28 partners

Coordinated by: DANMARKS TEKNISKE UNIVERSITET, Denmark

Integrated energy system modelling in Balmorel
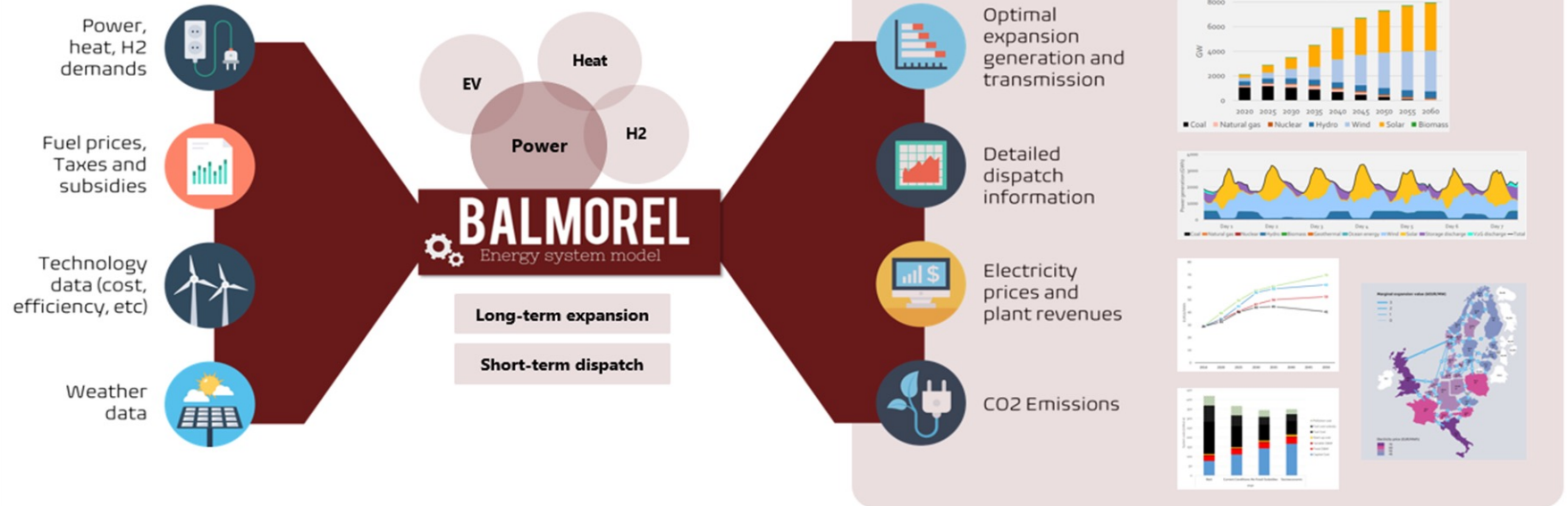
European decarbonization pathways
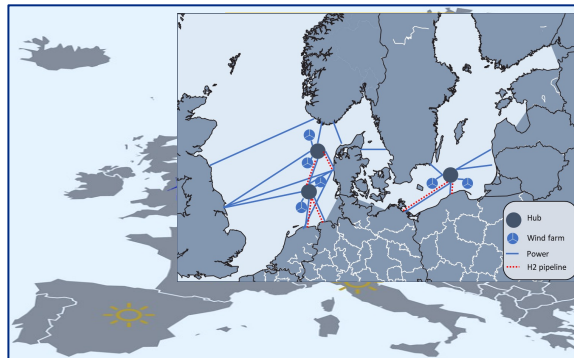
Regional decarbonization pathways
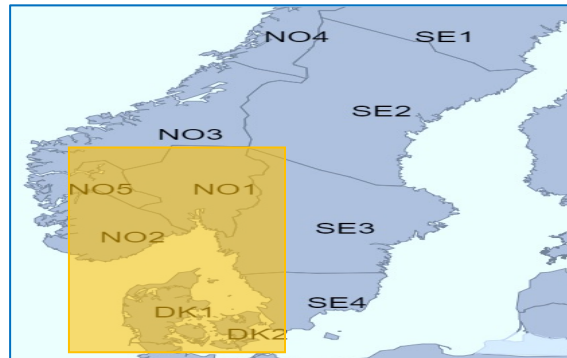
National decarbonization pathways
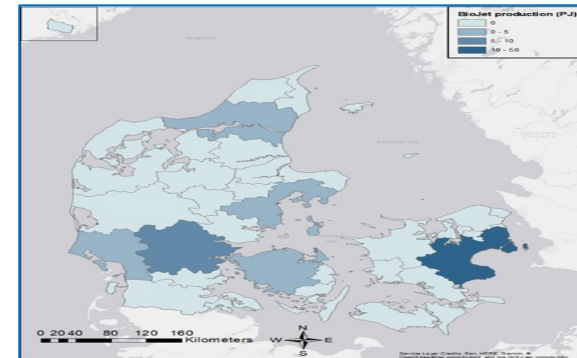
Model renewable fuels and Power-to-X (renewable to electricity) production European scale

North European countries

- Large potentials for offshore wind
- District heating
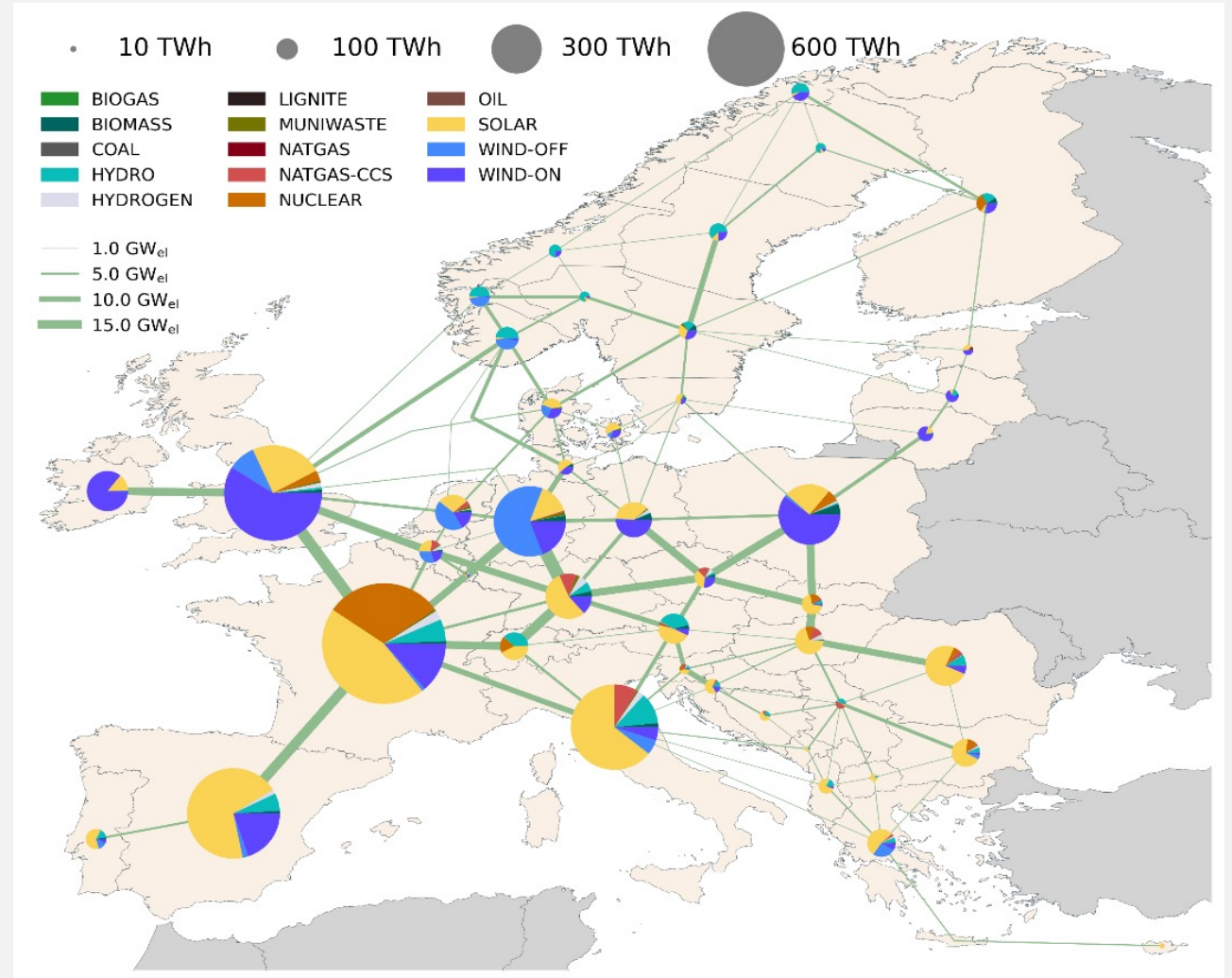- Cheap onshore wind
- Biomass availability

Central and south European countries

- Cheap solar PV
- Hydrogen industry

Hydrogen infrastructure in the future?

Hydrogen import from other regions?

Energy sources and hydrogen infrastructure, spatial distribution at European level by 2050

Legend:
- 10 TWh
- 100 TWh
- 300 TWh
- 600 TWh

- BIOGAS
- BIOMASS
- COAL
- HYDRO
- HYDROGEN
- LIGNITE
- MUNIWASTE
- NATGAS
- NATGAS-CCS
- NUCLEAR
- OIL
- SOLAR
- WIND-OFF
- WIND-ON

- 1.0 GW$_{el}$
- 5.0 GW$_{el}$
- 10.0 GW$_{el}$
- 15.0 GW$_{el}$

TO BE LAUNCHED AT COP28: EU-27, UK, THE BALKANS

Climate, Land Use, Water-Food-Energy-Biodiversity Nexus Modeling

A network for sustainable food systems at national and global scales

The Food, Agriculture, Biodiversity, Land-Use and Energy (FABLE) Consortium

The **FABLE Calculator** is :

an accounting tool used to study the potential evolution of food and land-use systems over the period 2000-2050.

It focuses on agriculture as the main driver of land-use change and tests the impact of different policies and changes in the drivers of these systems through the combination of a large number of scenarios.

Step 1. Targeted human consumption

Step 9. Feasible human consumption

Step 2. Targeted livestock production

Step 7. Feasible livestock production

Step 3. Targeted crop production

Step 8. Feasible crop production

Step 4. Targeted pasture and cropland

Step 6. Feasible pasture and cropland

Step 5. Productive land adjustment

If the targeted productive land is higher than the maximum land available depending on initial stocks and restrictions on forests and other land conversion

Step 10. Computation of indicators
- Food security
- GHG emissions
- Biodiversity

Legend:
→ Sends input to compute targeted variables
→ Sends input to compute feasible variables

Step to compute targeted variables
Step to compute feasible variables

Supporting Projects

SEAwise: Shaping ecosystem based fisheries management (EBFM)

Duration: 2021 - 2025

Budget: € 8,000,000 (Horizon 2020)

Objective:
To provide a fully operational approach for European Ecosystem Based Fisheries Management based on persistent networks and co- designed innovation.

This will be achieved by:

1. Creating a network of stakeholders, advisory bodies, decision-makers, and scientists to co-design EBFM priorities and methodologies;
2. Collecting data on European fisheries connections with social and ecological systems from scientists and stakeholders;
3. Developing predictive models of fisheries interactions with social and ecological systems to assess, select, and execute EBFM policies across Europe;
4. Providing ready-for-uptake advice for EBFM for Mediterranean, western and northern European waters.

Land Use Sustainable Pathway: In Need of an IPFSS Report!

> 1 billion Combination of Scenarios → Pathways

- **Current Trends**

- **National Commitments**

- **Global Targets**

Shifting diets, increasing crop and livestock productivity, and limiting agricultural land expansion, are the strongest drivers of positive change in global biodiversity.

Implementing these reforms in multiple countries would help put us on track to achieve global biodiversity, food security and climate mitigation goals by 2050.

S.1	GDP projections			
SELECTION	GDP_SCEN	DESCRIPTION	GDP variation	2000-2050
x	SSP1	"*Sustainability*" - Medium high speed of economic growth for most advanced countries and high speed of convergence for other countries.		2.4
	SSP2	"*Middle of the Road*" - Medium speed of economic growth for most advanced countries and medium speed of convergence for other countries.		2.2
	SSP3	"*Fragmentation*" - Low speed of economic growth for most advanced countries and low speed of convergence for other countries.		1.1

S.13	Choose the level of activity of the population		
SELECTION	ActivityScen	DESCRIPTION	Value
x	Low	Refers to sedentary lifestyle that includes only the physical activity of independent living.	
	Middle	Moderately active lifestyle that includes physical activity equivalent to walking about 1.5 to 3 miles per day at 3 to 4 miles per hour, in addition to the activities of independent living.	
	High	Active lifestyle that includes physical activity equivalent to walking more than 3 miles per day at 3 to 4 miles per hour, in addition to the activities of independent living.	

S.10	Alternative scenarios on afforestation target		
SELECTION	AFFOR_scen	DESCRIPTION	Value
	NoAffor	No afforestation/reforestation target	Define the afforestation target by 2050 for both scenarios in the green cells of S.10a: AfforTarget
X	BonnChallenge	Afforestation/reforestation target in line with Bonn Challenge commitment	

S.3	Diet		
SELECTION	DIET_SCEN	DESCRIPTION	Value
	SSP1	"*Sustainability*" - future diets are considered to be more sustainable. First, to reflect the better management of domestic waste in developed countries, consumption per capita is in the regions assumed almost constant. Second, animal protein demand is reduced in all regions and increases in developing ones to reflect diversification of diets, but keeping the consumption of red meat relatively low. For developing regions, more nutritious diets also materialize through a reduction of consumption in root and tubers.	Countries converge to 3300 kcal/cap/d. If animal conso > 75 g prot./cap/day, reduction to that level. If anim conso < 25 g prot./cap/day, increase to that level. Red meat decreased or capped at 5 g prot./cap/day for all. Root conso decreases in poor countries to 100 kcal/cap/day and is replaced by other products.
	SSP2	"*Middle of the Road*" - These future diets follow the projections from FAO at the horizon 2050.	
	SSP3	"*Fragmentation*" - as economic growth is much lower in developing region, the income effects alone leads to a significantly lower demand per capita in these regions	
	NoChange	same diet as in 2010	
x	EATLancetAverage	EAT-Lancet recommended diet (average values per food group)	
	FatDiet	Diet high in fat, sugar, and meat	
	MyDiet	Describe your scenario here	If you want to design your own diet scenario enter the targeted kcal/cap/day per food group by 2050 in the green cells in S.3.c: DietTarget

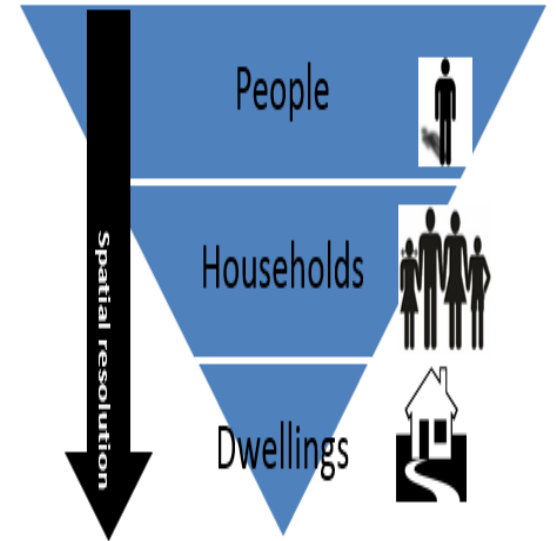# Decline in GHG Emissions by 2050 - GREECE
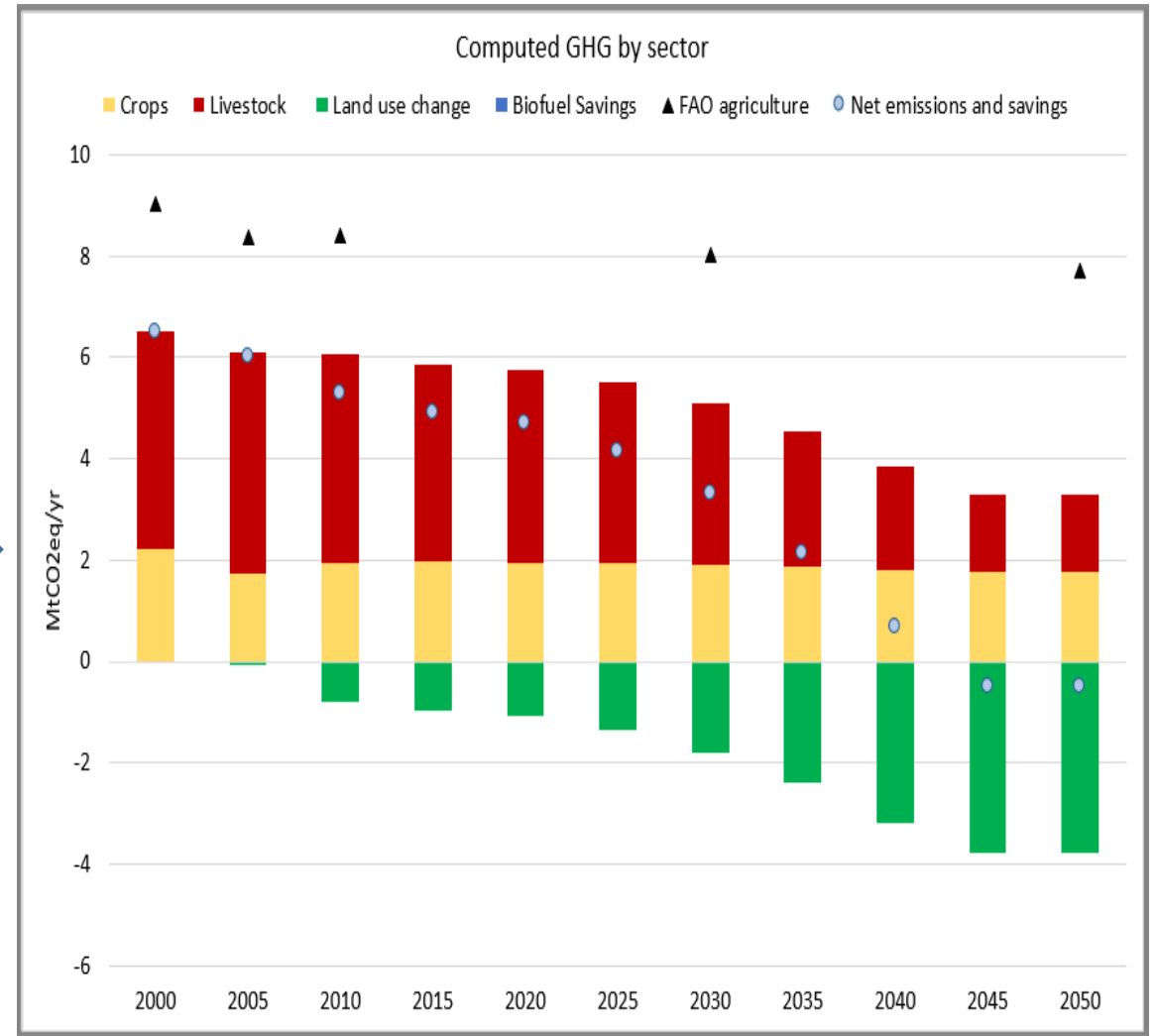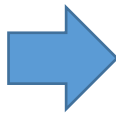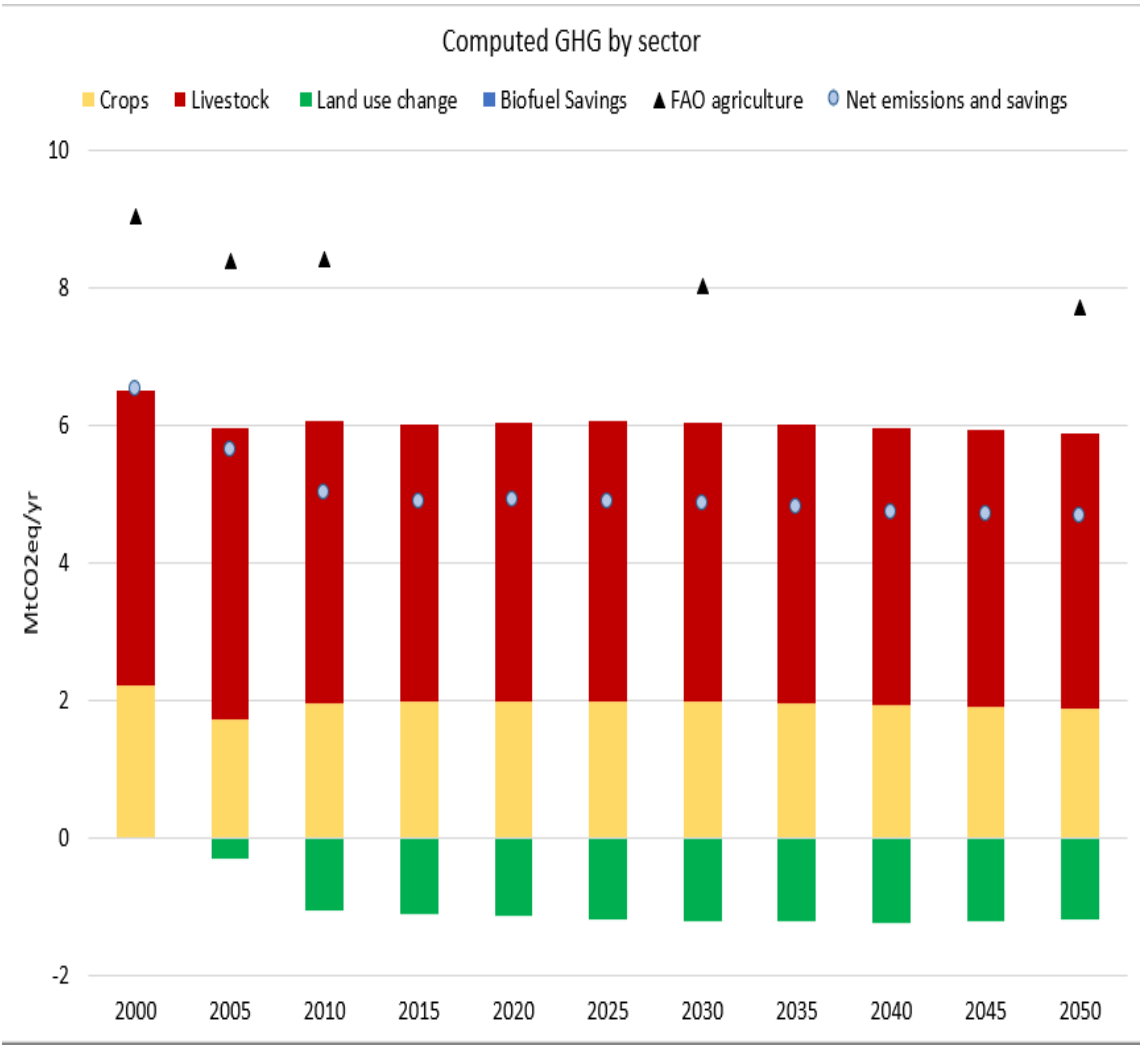
Climate & Health

Mission: Estimate Global economic burden of climate change indicator

Climate change will have a huge impact on population health outcomes wrt morbidity, mortality, and disability for physical and mental conditions.

- Identify climate change risk factors for physical and mental conditions of interest (based on the WHO Environmental Burden of Disease Series)

- Estimate the disease burden resulting from a variety of climate change risk factors by region - Attribute economic cost

Supporting Projects

Innovation Acceleration for Climate Neutrality and Resilience

Head

Team

Collaborations

United Nations Climate Change

Council of Engineers for the Energy Transition (CEET)
An independent advisory council to the United Nations Secretary-General

eit Climate-KIC Hub GREECE

Funded by the European Union
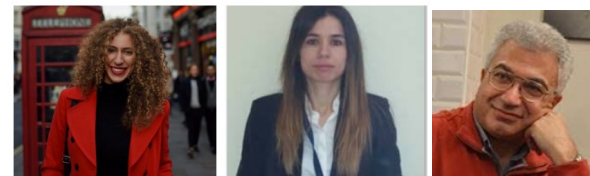
Mission: To meet the EU's 2050 climate neutrality objective, requires **supporting the mass deployment of sustainable innovations – technology, finance, socio-economic, governance**. Incremental innovation, but also disruptive or breakthrough technologies will be needed to accelerate the transition to a green economy and society.

Bring together partners from the business sector, academia, and the public and non-profit sectors to create networks of expertise, through which innovative solutions can be developed, brought to market and scaled-up for impact.
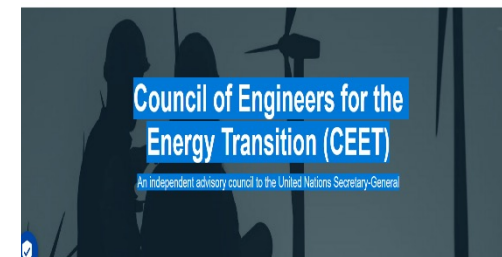
ERASMUS
Holistic e

Erasmus + | CATALYST: European VET Excellence Centre for Leading Sustainable Systems and Business Transformation

SPOROS

TICHE (Academy): Training

Erasmus KA2 project- Coop

The primary goal of Coope
relevance of their activities
through exchanging or dev
ideas. They aim to support
as well as the implemen
exchanges of experience a
and, if possible, have a strong transdisciplinary dimension. Selected projects will be expected to
share the results of their activities at local, regional, national level and transnational level.

CATALYST: European VET Excellence Centre for Leading Sustainable Systems and Business Transformation

The CATALYST project "European VET Excellence Centre for Leading Sustainable Systems and Business Transformation" is designed with strong vision and motivation to contribute to realisation of the European Green Deal and the new Industrial and SME Strategies.

The main goal is with the establishment of united CATALYST Centre of Vocational Excellence in 5 countries to give support, create an educational offer to tackle personal and organisational development, and to embrace transformation in SMEs, enabling and inspiring them to re-think and redesign their business models, co-creating and sharing between educational and business organisations.

Erasmus+

Technological Innovation MENA Maritime ClimAccelerator

PORTS & SHIPPING

30 start-ups

ClimAccelerator

MARITIME

BLACK SEA ACCELERATOR

FOR A SUSTAINABLE BLUE ECONOMY

Facilitated by BRIDGE-BS and DOORS Projects

BRIDGE-BS   APPLY TO MAKE WAVES!   DOORS BLACK-SEA

Deadline: 31 October 2023

Technological Innovation

Climate Innovation Window 130 start ups

The platform to connect innovators, end-users and investors

https://climateinnovationwindow.eu/

Bootcamps   Workshops
Peer-to-Peer. Mentoring
Funding. Demo Days
Demonstration. Networking

CLIMATE INNOVATION WINDOW
European Climate Resilience Innovation Platform

⚙ Filters ⌄   ⊘ Find your match   Discover

🔍 Search

| Hazards ⌄ | Area ⌄ | Solutions ⌄ | Technology ⌄ | Search |

Hazards
- ☐ Coastal floods (43)
- ☑ Droughts (23)
- ☐ Frost (12)
- ☑ Heatwaves (35)
- ☐ Pluvial floods (5)
- ☐ River floods (13)
- ☐ Sea level rise (22)
- ☐ Storms (17)
- ☐ Wildfires (9)
- ☐ Multi-hazardds (40)

Area
- ☐ Agriculture (2)
- ☐ Biodiversity (23)
- ☐ Buildings (6)
- ☑ Coastal areas (5)
- ☐ Disaster risk reduction (16)
- ☐ Ecosystem-based approaches (2)
- ☐ Energy (22)
- ☐ Financial (17)
- ☑ Forestry (40)
- ☐ Health (10)
- ☐ Marine and fisheries (23)
- ☐ Transport (14)
- ☐ Urban areas (29)
- ☐ Water management (29)

RIVER FLOODS

SimuRes

Urban Areas, Water safety

Aquobex

DROUGHTS

The Honey Olive Grove

Agriculture

Javier Domínguez (Freelance landscaper)

RIVER FLOODS

Water retention through
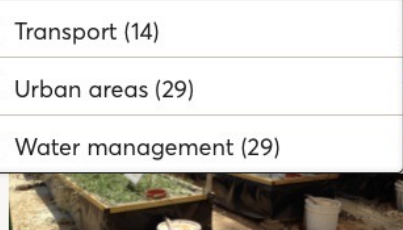
DROUGHTS

Halophyte Zeolite Wetlands

RIVER FLOODS

NOAQ Boxwall
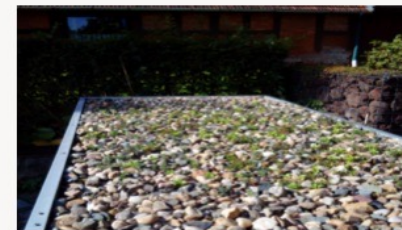
HEAVY PRECIPITATION

Seed blanket for Extensive

Just Transition: Policies, Finance, Labor Market

THE LANCET COVID-19 COMMISSION

Key Sectors for Green Recovery

Energy Sector - shift from fuels-based to minerals-based energy production, storage, and distribution system

Agriculture and Food Sector - directly linked to the environment and the ecosystems

Housing and Urbanization - Urbanization's growth should be managed sustainably

Health Sector - invest COVID-19 recovery packages in strengthening health systems and increase regulation on risk-sources

R&D for Geo-engineering - Removing CO2 from the atmosphere, blocking the sun, etc.

Machine Learning Textual Analysis
Does the EGD support the implementation of the SDGs?
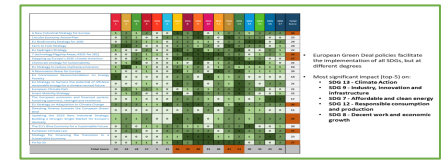
Which of the 6 Sustainable Development Transformations are supported by the EGD?
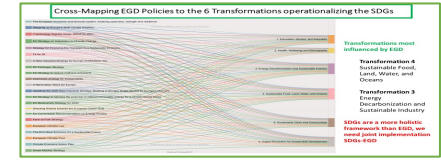
Are the European Recovery and Resilient Plans SDGs-compatible?

Does the European Semester Process facilitate the implementation of the SDGs?

Sustainable Finance: Valuing Natural and Cultural Capital

Fiscal Innovation: What are the distributional effects of Key EU climate policies?

Sustainable Private Sector

Deep Neural Networks ML Approach:
Cross-Mapping EGD Policies to the 6 Transformations that operationalize the SDGs
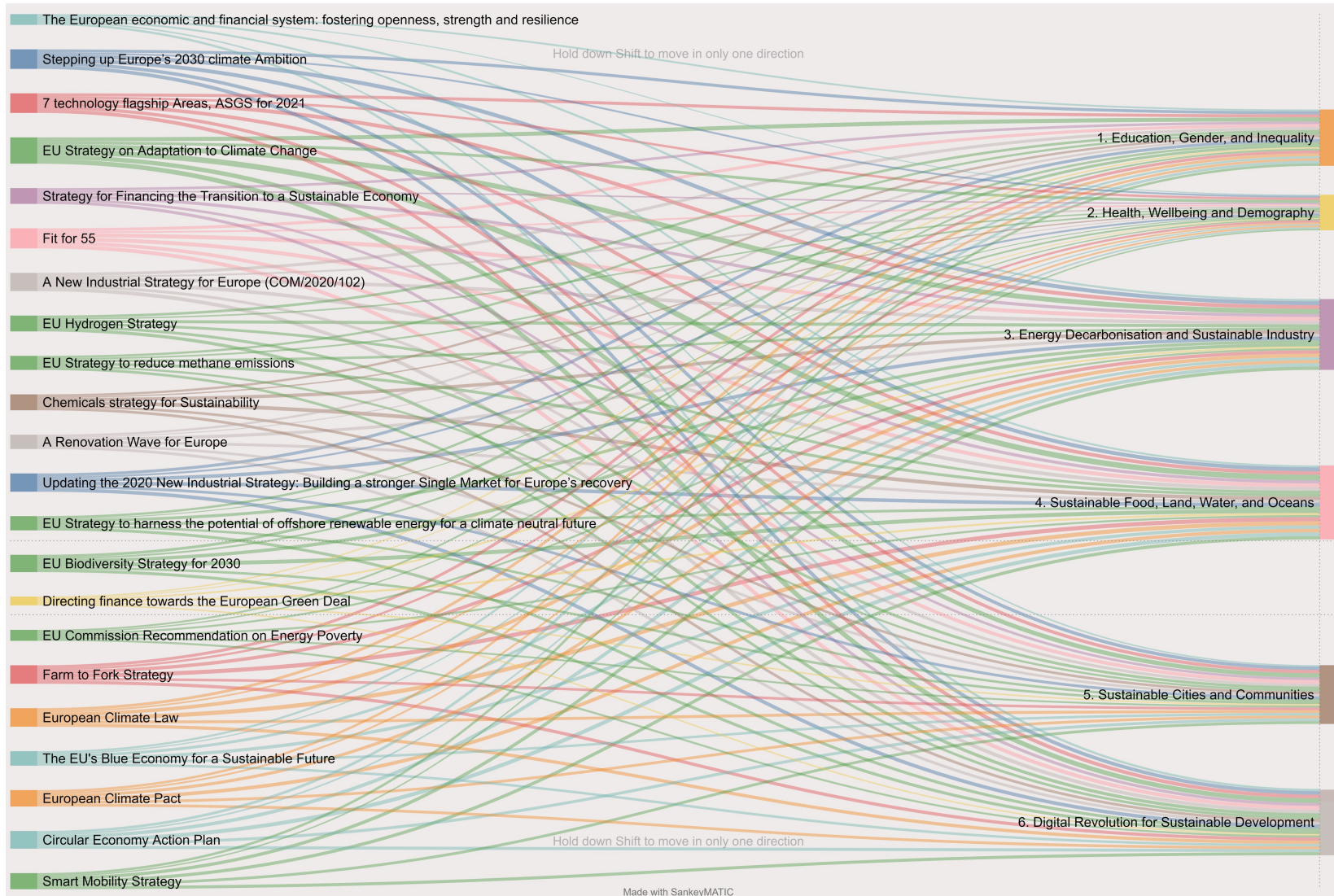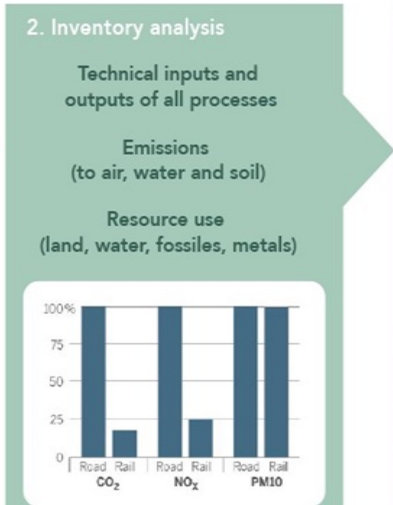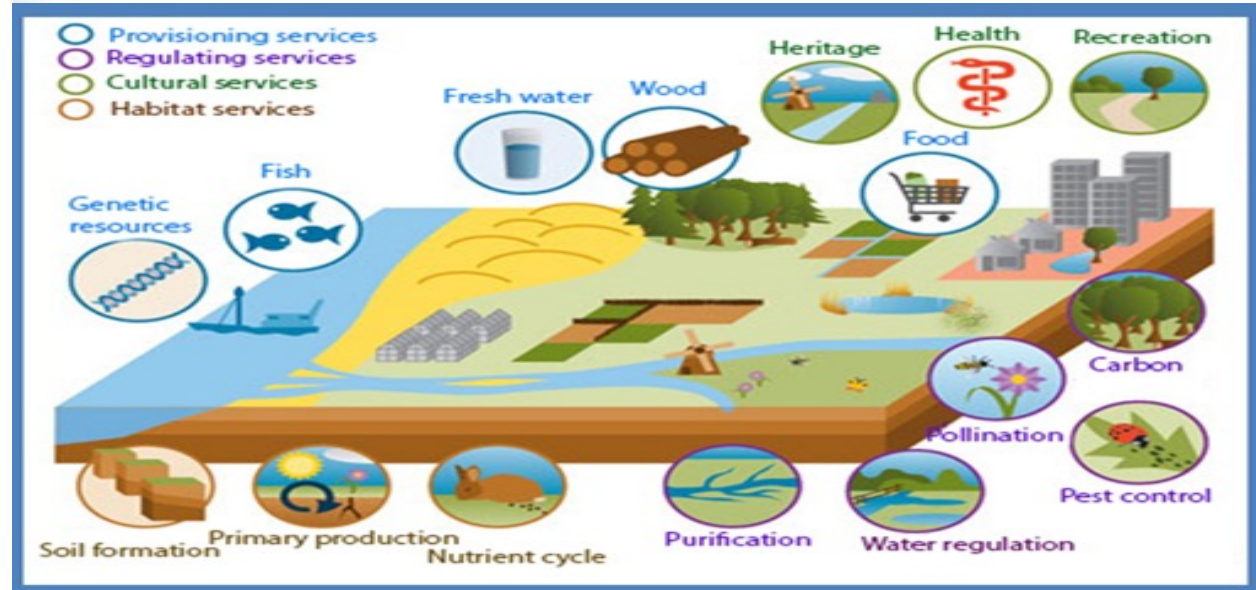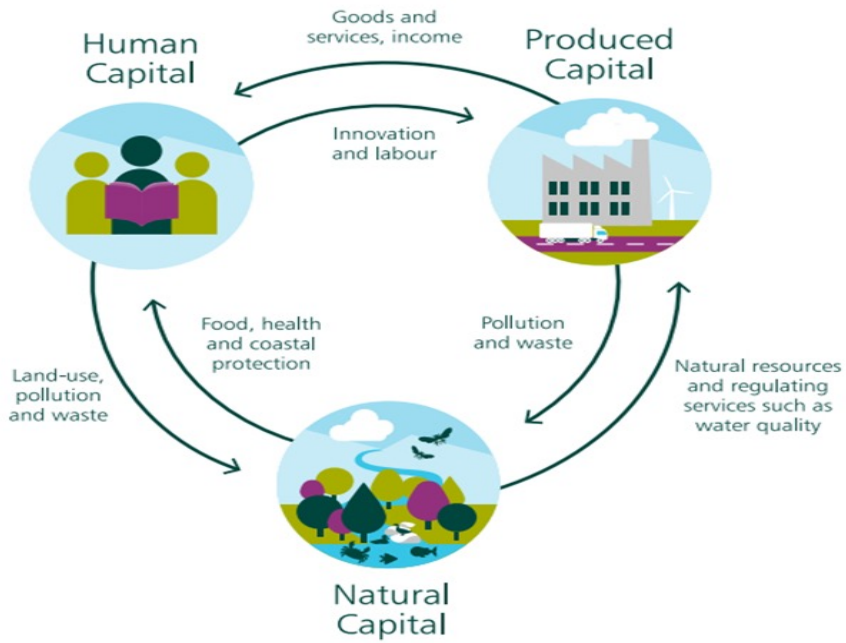

Transformations most influenced by EGD

Transformation 4
Sustainable Food, Land, Water, and Oceans

Transformation 3
Energy Decarbonization and Sustainable Industry

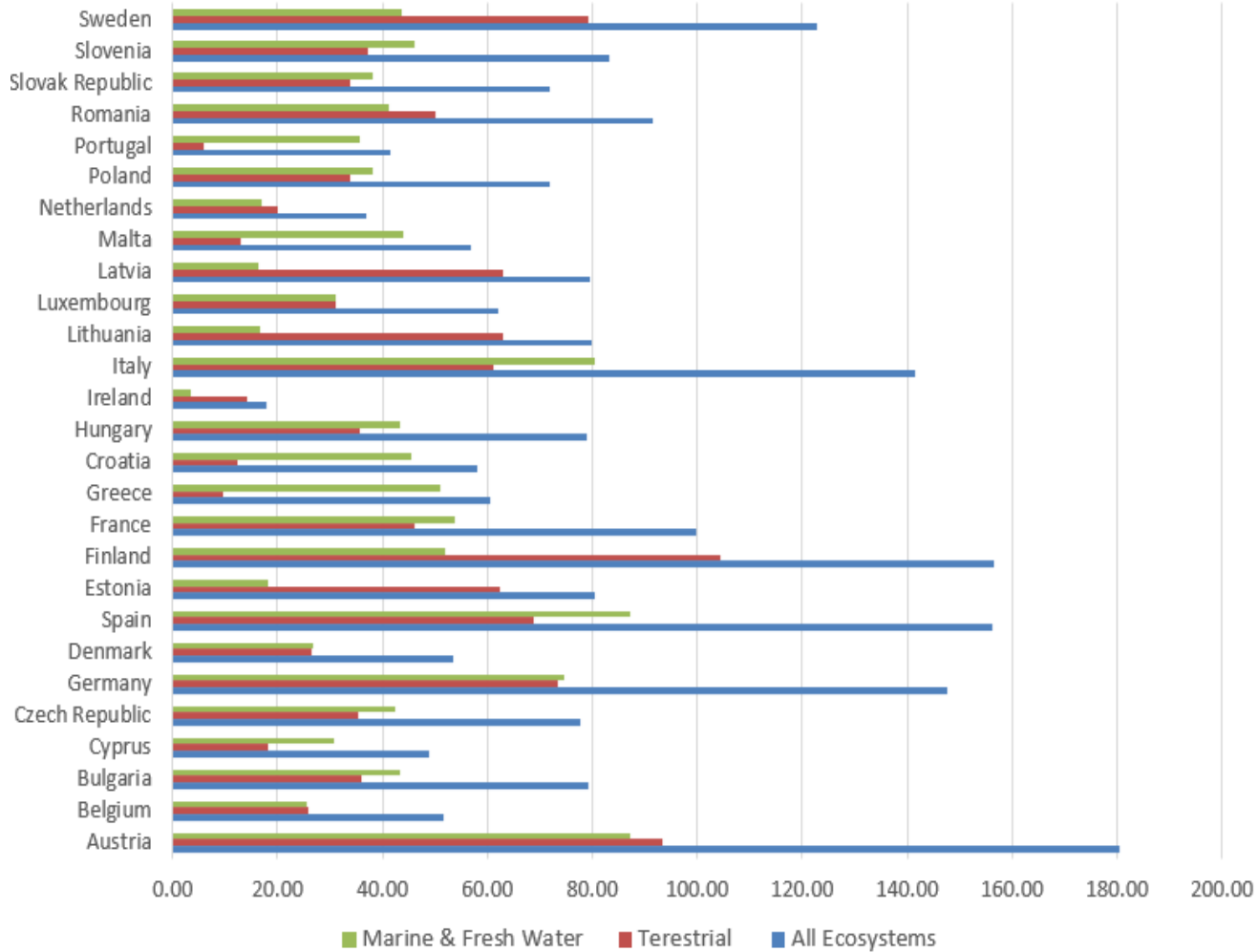SDGs are a more holistic framework than EGD, we need joint implementation SDGs-EGD

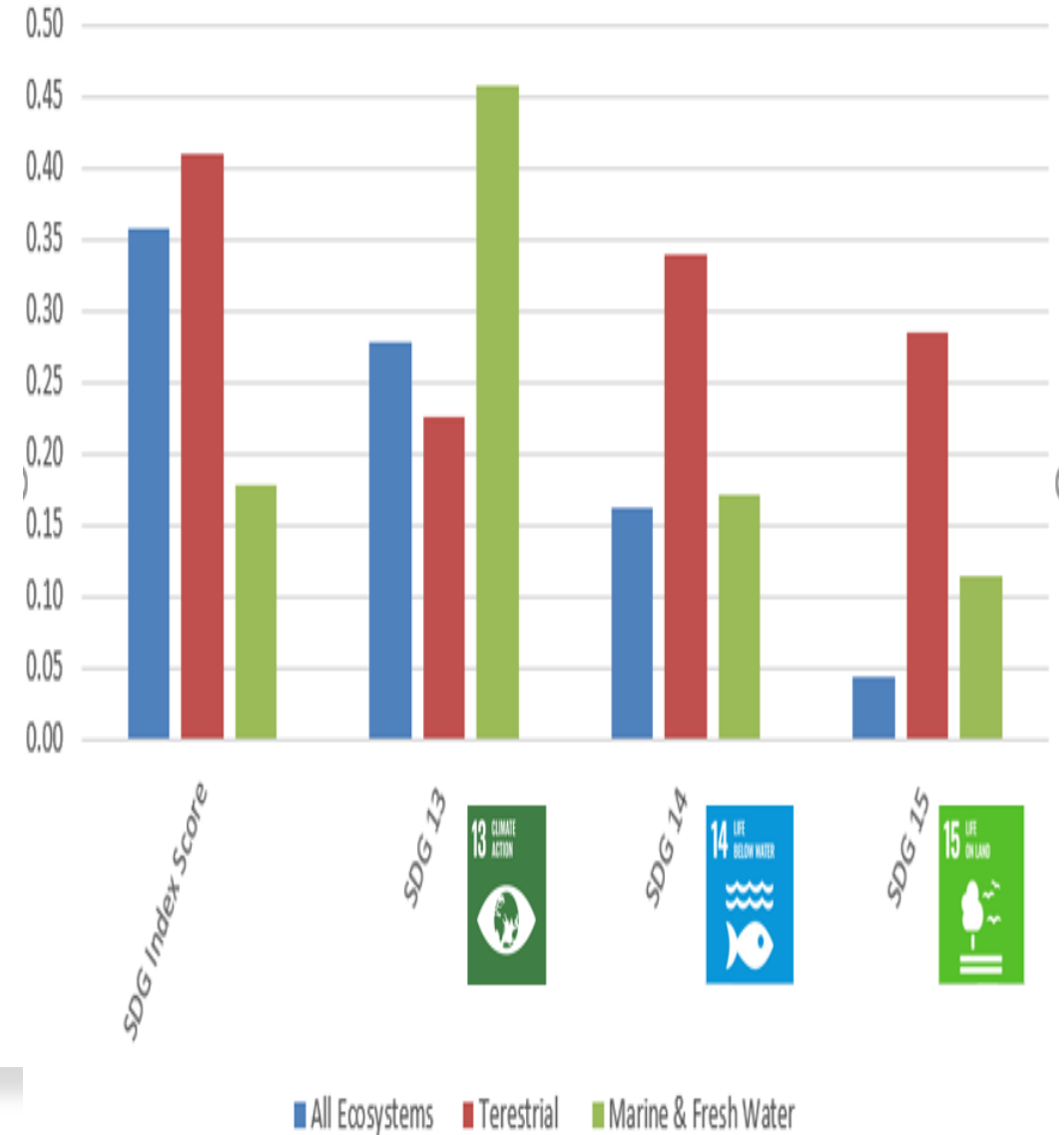# Integrating Natural Capital in the Sustainable Finance Framework

Open-Access, AI-based PLATFORM for Ecosystem and Cultural Services Valuation

Marginal WTP by Ecosystem and Country

Correlation of Country SDG Index Score and Ecosystem MWTP by SDG

Considering their simplicity, effectiveness, and deployability into EU, four key mitigating policy options were selected

Redistributing revenues through **lump-sum transfers** on per-head basis or **lowering VAT / taxes on electricity** to the general public

Implementation of **targeted energy efficiency measures** with no upfront costs, specifically targeting low-income households

Long-term **job retraining programmes** to avoid unemployment in affected industries

Funding of subsidies for new low-carbon technologies via **general taxation** or using carbon revenues to avoid uneven bearing of the costs

Detailed macroeconomic modelling based on the standard E3ME model baseline with an assessment of the existing policy best practices to explore the patterns of inequality in Europe (EU27 and the UK).

Combined mitigation policy options can ensure more equality, increase GDP and employment...

SDSN, EGD SWG report, 2022
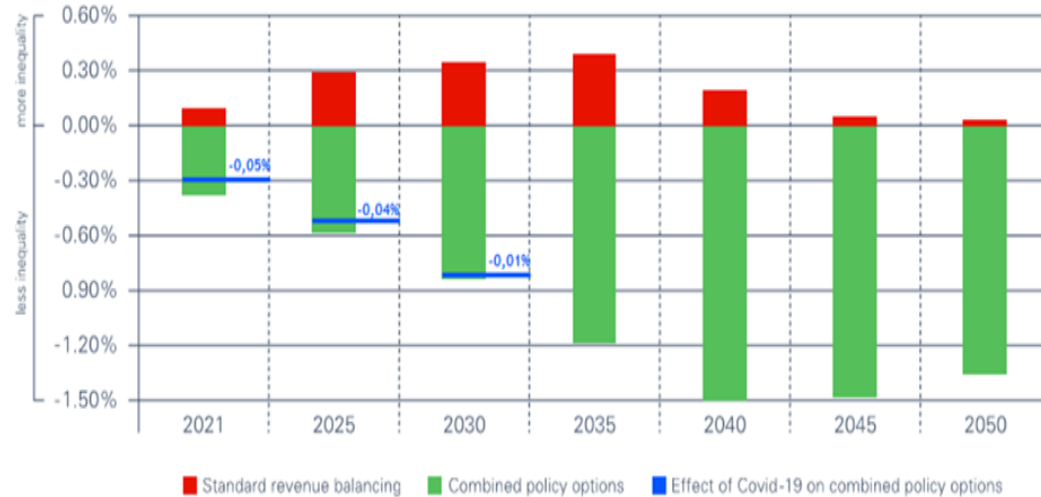
Mitigating the negative social impacts of climate policies is essential to ensure a broad support for the energy transition.
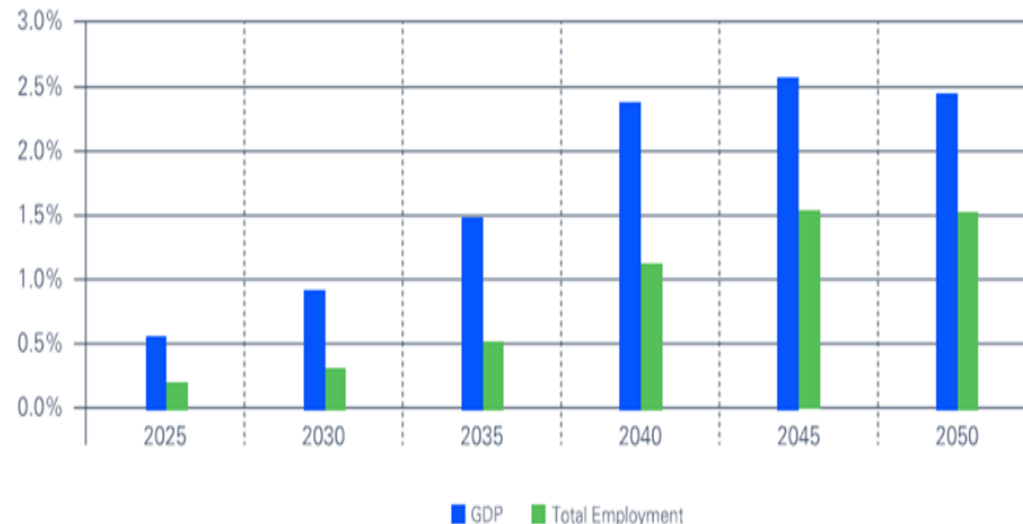
Regressive effects can be fully offset with targeted policies.

The SDG Stimulus puts forward three areas for immediate action:

The global economy is facing multiple shocks that are threatening to further reverse progress on the SDGs: COVID-19 pandemic, war in Ukraine, high inflation and weak economic growth, tightening monetary and financial conditions, and unsustainable debt burdens, escalating climate emergency

The impact of these shocks on developing countries is aggravated by an <u>unfair global financial system that is short-term oriented and crisis-prone, and that further exacerbates inequalities.</u>

UN SDGs Stimulus for Agenda 2030

Reform of the Global Financial Architecture, The Pontifical Academy of Social Sciences

1 Tackle the high cost of debt and rising risks of debt distress, by converting short-term high interest borrowing into long-term (more than 30 year) debt at lower interest rates.

2 Massively scale up affordable long-term financing for development, especially through public development banks (PDBs), multilateral development banks (MDBs), and by aligning all financing flows with the SDGs.

Advanced economies are nearing levels needed to shift trajectories toward net-zero.
Emerging & developing economies only at 20% of the levels
& face narrowing fiscal options
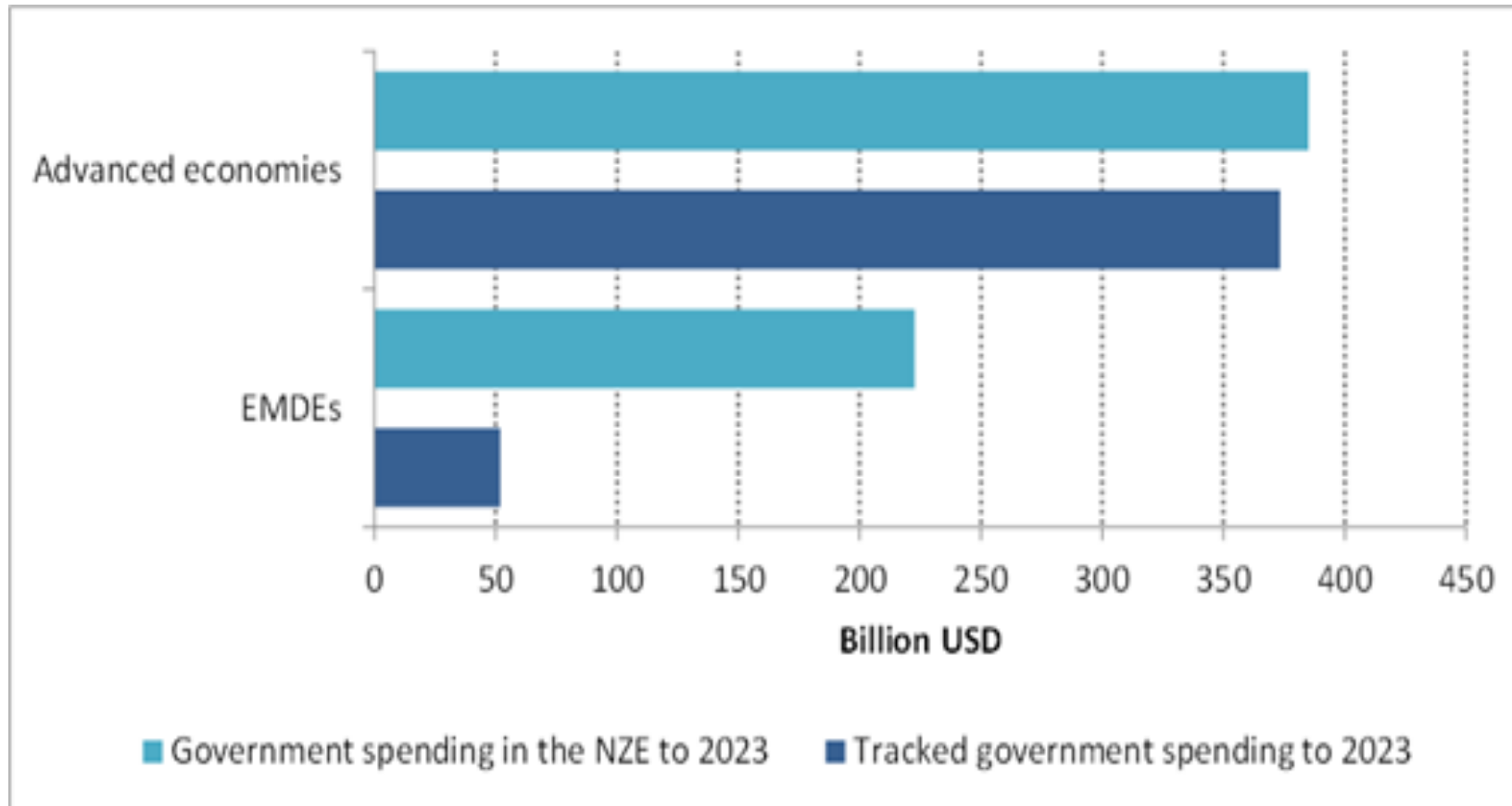
The Role of the Private Sector

- Private sector controls significant part of world's liquid assets: $275 trillion

- Importance of financial investments and strategic investment by private corporations

- Finance industry increased SDG aligned financing by 20% in 2021

Annual SDG Financing Mobilised by Finance Industry Leaders (In US$bn)

392.4, 244.8, 224.4, 217.0, 215.1, 180.4, 162.4, 136.5, 131.9, 129.7, 123.6, 98.8, 83.8, 73.4, 68.0
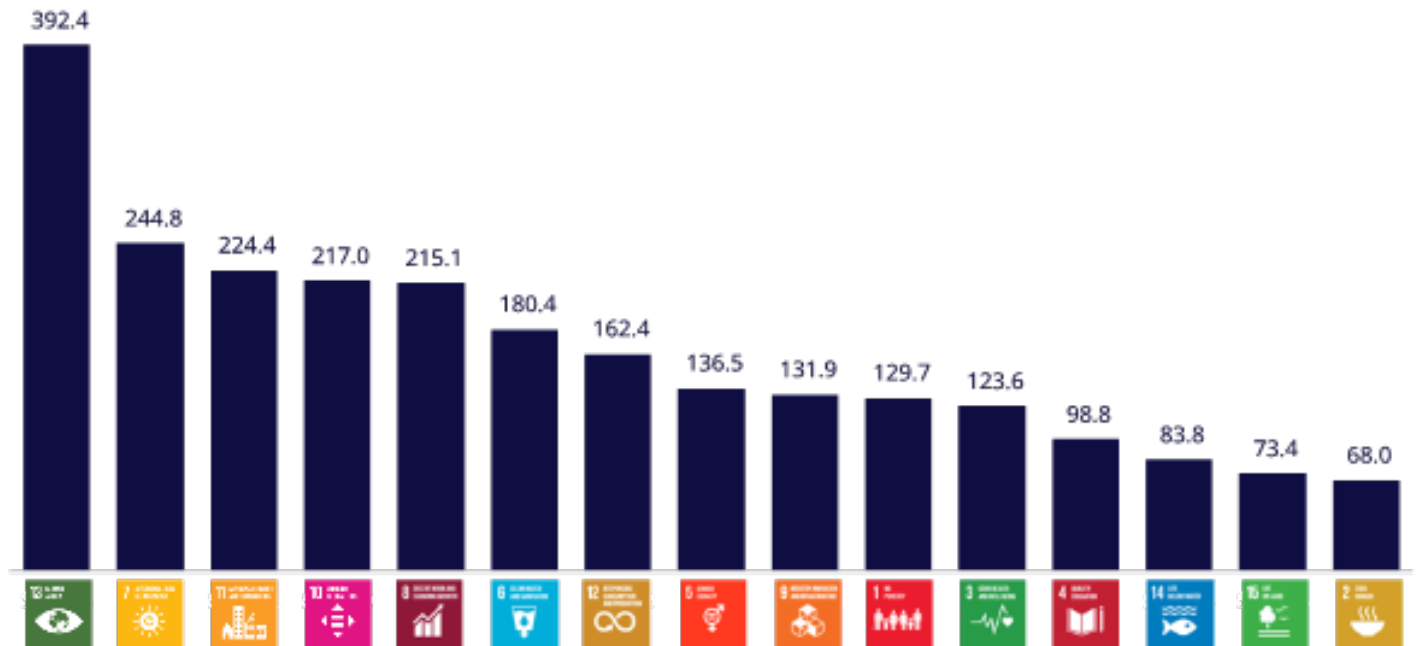
Source: Capital as a Force for Good Initiative

A Holistic Three-Step approach is necessary for <u>Companies</u> to create value and move beyond compliance-based codes

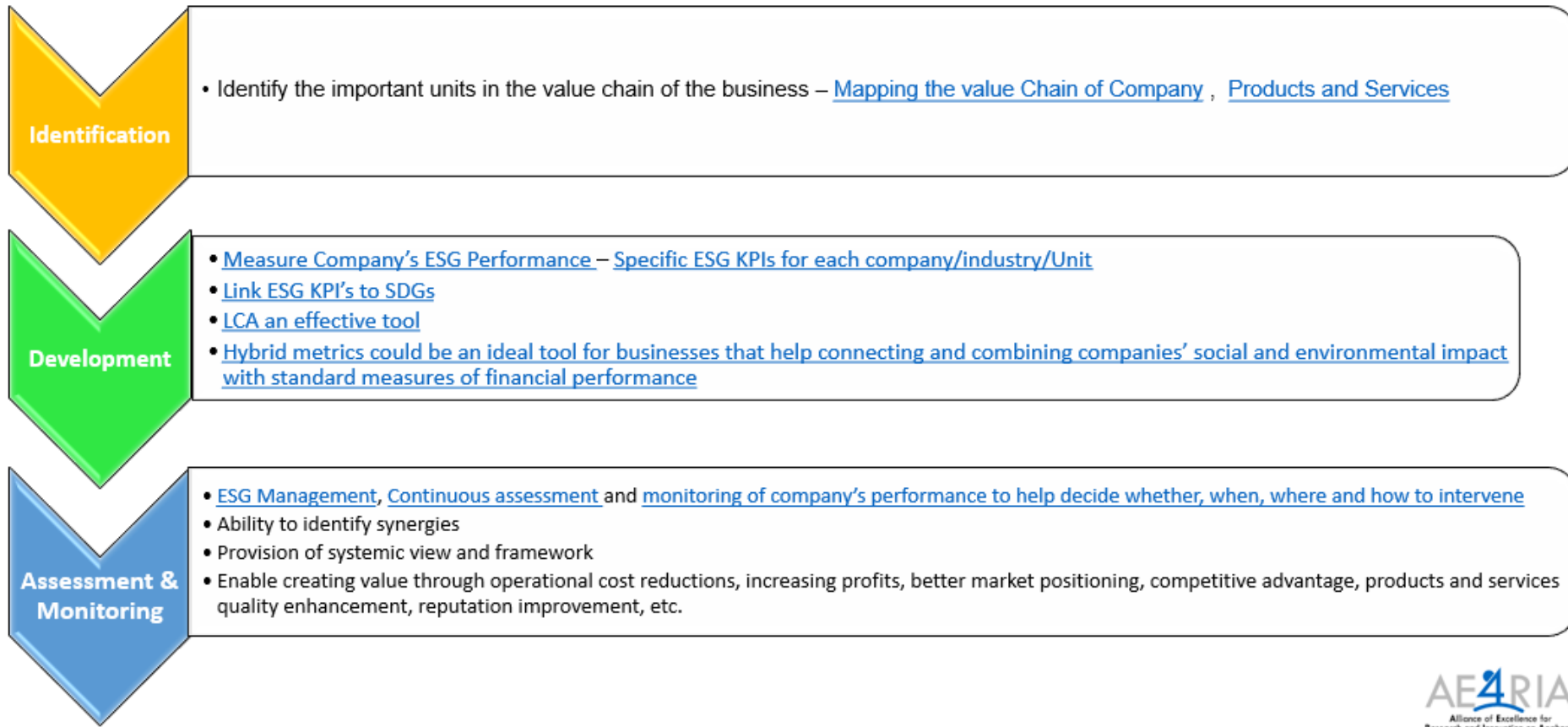**Identification**
- Identify the important units in the value chain of the business – <u>Mapping the value Chain of Company</u> , <u>Products and Services</u>

Development
- <u>Measure Company's ESG Performance</u> – <u>Specific ESG KPIs for each company/industry/Unit</u>
- <u>Link ESG KPI's to SDGs</u>
- <u>LCA an effective tool</u>
- <u>Hybrid metrics could be an ideal tool for businesses that help connecting and combining companies' social and environmental impact with standard measures of financial performance</u>

Assessment & Monitoring
- <u>ESG Management</u>, <u>Continuous assessment</u> and <u>monitoring of company's performance to help decide whether, when, where and how to intervene</u>
- Ability to identify synergies
- Provision of systemic view and framework
- Enable creating value through operational cost reductions, increasing profits, better market positioning, competitive advantage, products and services quality enhancement, reputation improvement, etc.

AE4RIA
Alliance of Excellence for
Research and Innovation on Aephoria

Corporate Sustainability Reporting: Mapping ESG to SDG Goals and Targets

- ***ESG KPI**s are mapped to SDGs Indexes.*

- ***Experts** Classification & **Machine/Deep learning** approaches to map ESG KPIs to the 232 Indicators of 17 SDGs.*

- **Targets** are set for SDG Indicators following the common **UN SDSN** methodology.
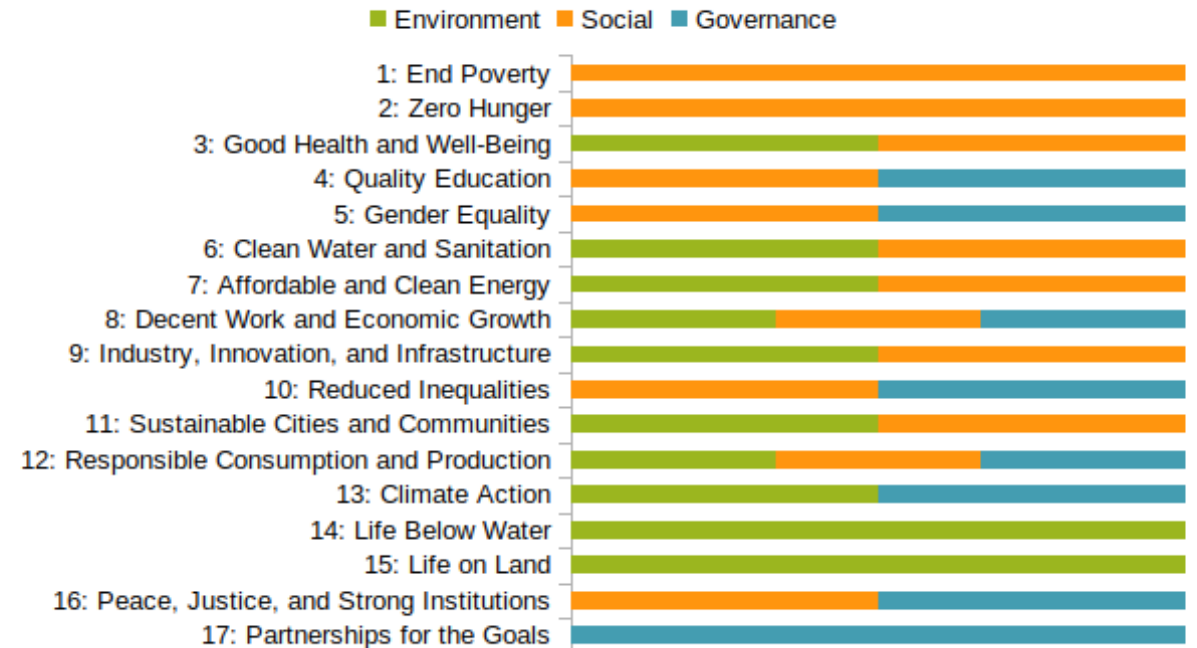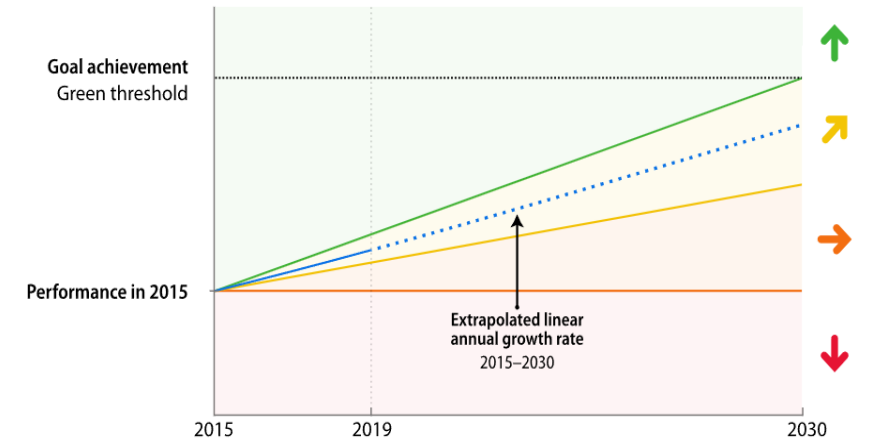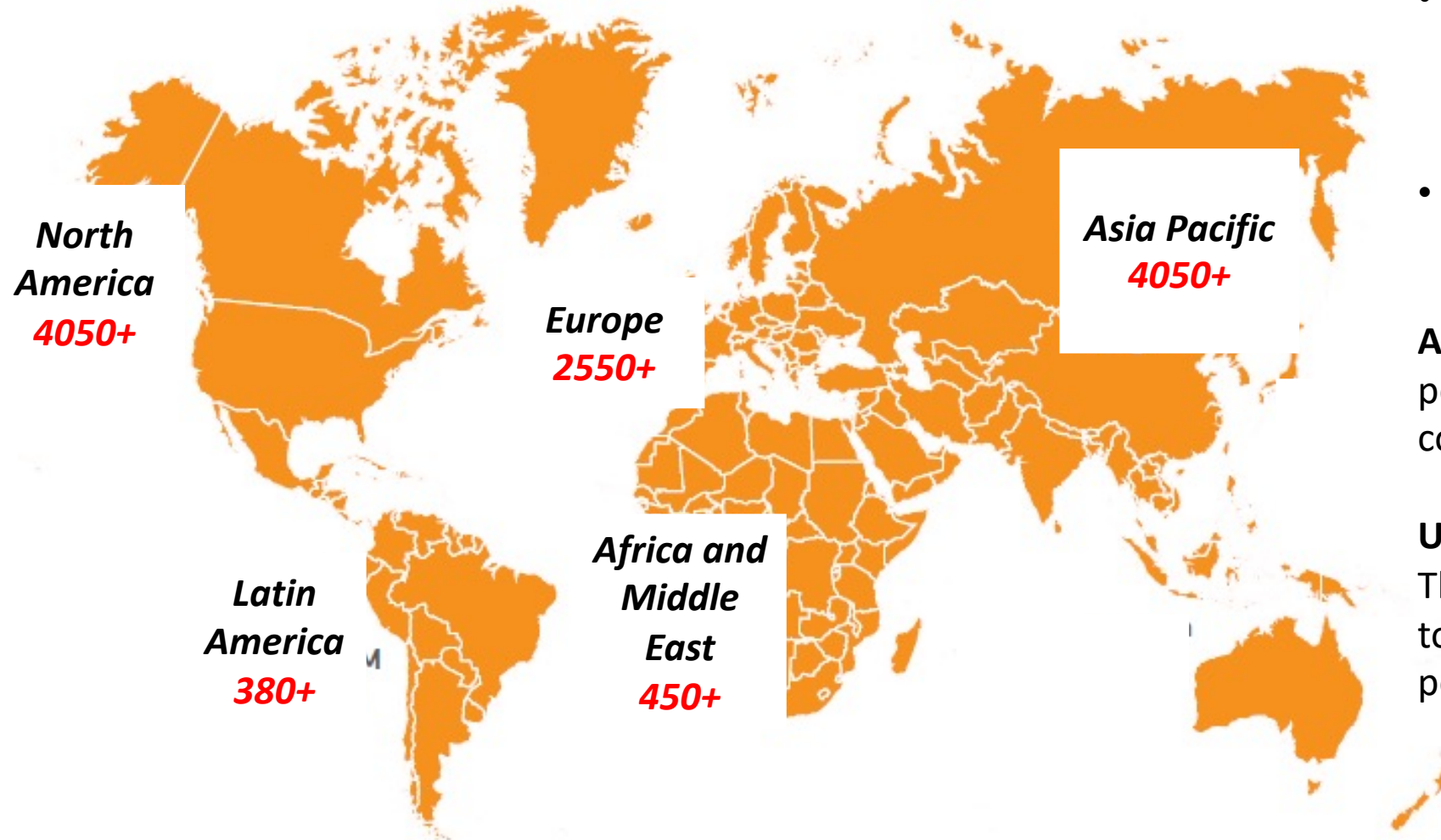
Dashboards:
- 🟢 SDG achieved
- 🟡 Challenges remain
- 🟠 Significant challenges remain
- 🔴 Major challenges

- Calculate Scores at any Level (Transformations/ ESGs / SDGs).

- Calculate the Company's **SDG Footprint** at a company/Unit/Product level.

- Calculate SDG **Trends/ Pathways** to 2030/2050.

Goal achievement
Green threshold

Performance in 2015

Extrapolated linear
annual growth rate
2015–2030

2015   2019   2030

SDG and ESG consistent Asset Pricing

AE4RIA
Alliance of Excellence for
Research and Innovation on Aephoria

North America
4050+

Europe
2550+

Asia Pacific
4050+

Latin America
380+

Africa and Middle East
450+

- 11.400+ Companies In International Markets (**99% Of Global Market Capitalization**).

- > 600 ESG KPIs (reported by Thompsons Rauters)

**AIM:** Calculate ESG/SDG holistic performance indicator per company

USING: Arbitrage Asset Pricing Theory extend Fama & French to create ESG/SDG mimicking portofolios

SDG Factor Mimicking Portfolia

Value of 1 dollar invested in an SDG-specific factor-miking portfolios, hedging against SDG related risk

AE4RIA's ESG Pricing Factors

ESG Factor Mimicking Portfolio vs Fama-French Factors

Value of 1 dollar invested in an ESG factor-mimicking portfolios - Hedging against ESG related risk
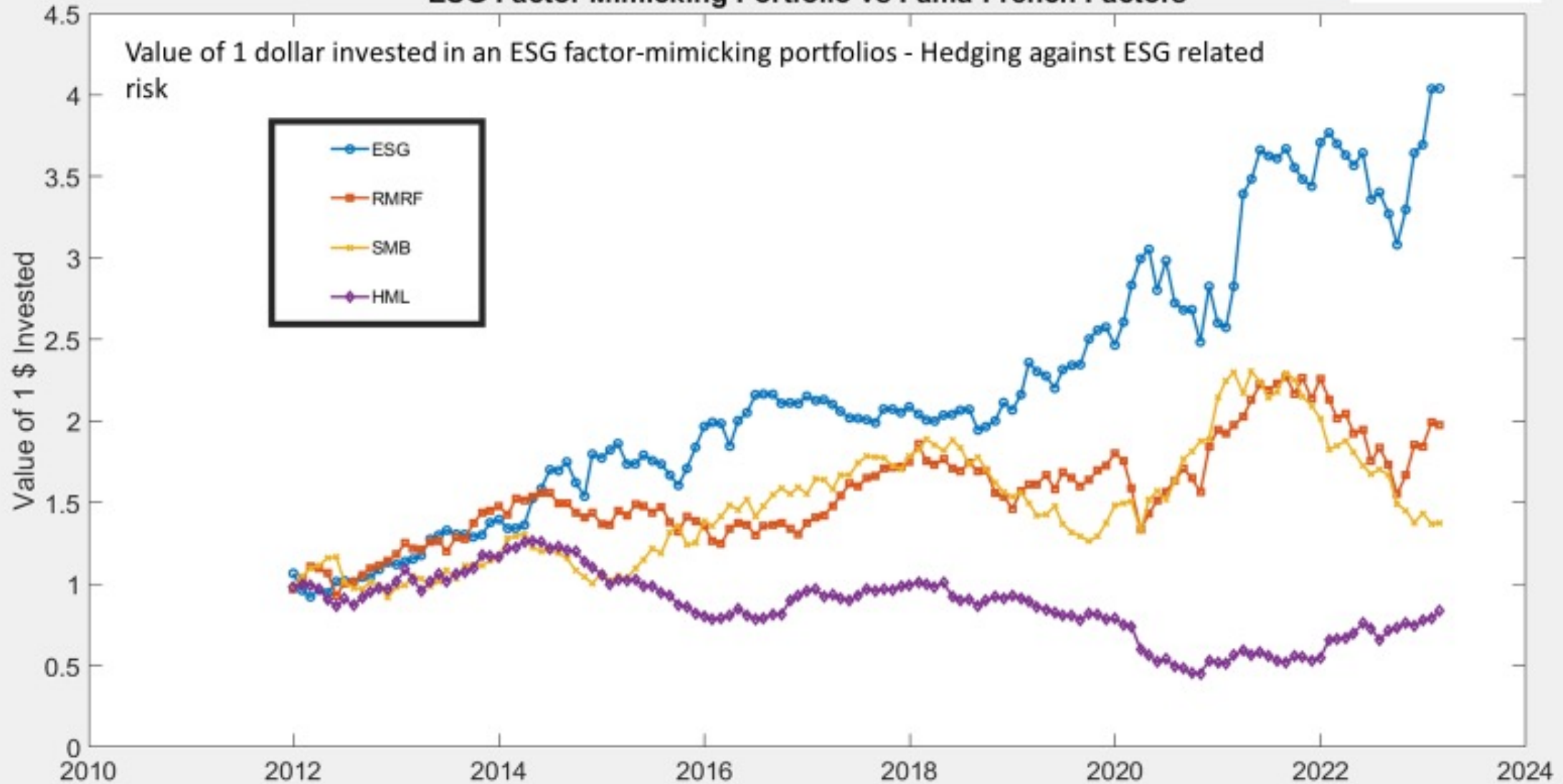
Transformative Participatory Approaches: National Living Labs and Systems Innovation

Head

Team

Models can provide the evidence, but people must make the decisions...

Our transformative and participatory approaches seek to bridge the gap between science, policy and society, by supporting key actors to utilize model outputs to make sustainable decisions.

Supporting Projects

SUSTAINIS: Sustainable islands: conditions, obs

SUSTAINIS
Grant agreement ID: EVK1-CT-2002-60
Duration: Start date 1 February 20
Budget: Overall € 120 054 EU con
Coordinated by WESTFAELISC

System Mapping as a Ser

It seeks to
- activate communities spread across
  recovery phase,
- set system mapping as a strategic kn
- provide new indicators and understa
- support local authorities in the neede
  planning challenges.

Deep Demon

- decarbonization of the Po
  - the second maritime
  - and a particular hots
    shipping industry em
- identify **cause and effect**
  dependencies and oppo
  breakthrough possibilities
- Creats **innovation cluste**

Challenge owners: Piraeus Port A
Port, Ministry of Shipping, Cyprus
Implementation period: 2020
Budget: € 264,000
Find more at: https://www.athenar
demonstration-projects-sustainab
european-ports

Erasmus + | CATALYST: European VET Excellence Centre for Leading Sustainable Systems and Business Transformation

CATALYST: European VET Excellence Centre for Leading Sustainable Systems and Business Transformation

The CATALYST project "European VET Excellence Centre for Leading Sustainable Systems and Business Transformation" is designed with strong vision and motivation to contribute to realisation of the European Green Deal and the new Industrial and SME Strategies.

The main goal is with the establishment of united CATALYST Centre of Vocational Excellence in 5 countries to give support, create an educational offer to tackle personal and organisational development, and to embrace transformation in SMEs, enabling and inspiring them to re-think and redesign their business models, co-creating and sharing between educational and business organisations.
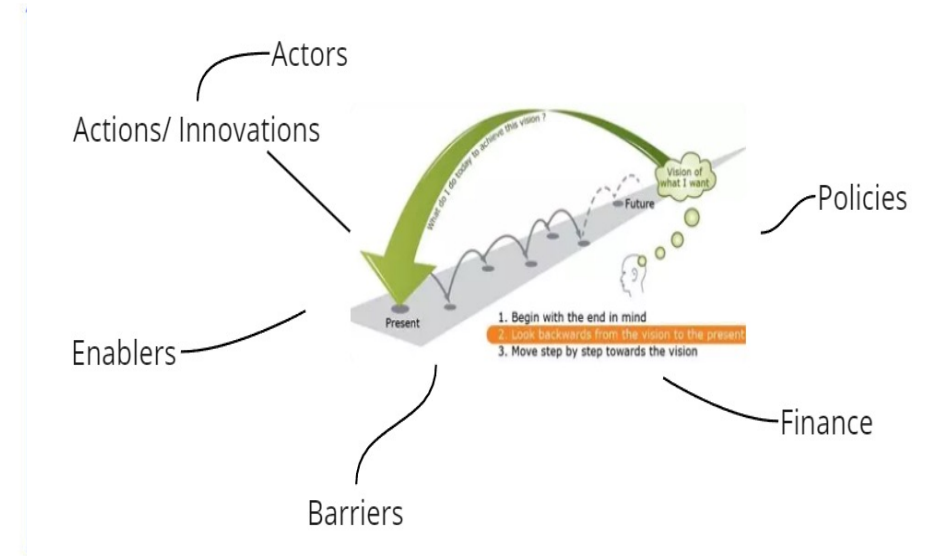
Challenge owners: Bulgaria, Serbia, Greece, Italy, Spa
Implementation period: 2019-2022

Erasmus+

Methodologies

- Transformative Living Labs
- System Innovation and Transition Management
- Innovation Pathways
- Foresight methods such as Backcasting
- key actions and policy recommendations
- Living Lab Modeler Tool

Education, Training, Upskilling and Reskilling

Collaborations

SDGs Academy

Mission

To support the green and digital transition by educating and training people, building skills ecosystems, which will also be aligned with national, regional, local and sectoral green strategies. The educational programs will be delivered under six themes corresponding to the Six SDG Transformations namely:

Supporting Projects

SDGs measu...

SDSN Greece in collaboration with R...
University of Economics and Busine...
Education, Research, Infrastructure a...

The Study will compile the results f...
participate in the project which is coo...

The report is expected to be complete...

Duration: Start date: 10 May 202...

CI... EC... INTER... ECO...

- an **awareness-intention** intervention
- fostering problem-owner... (firms, investors, citizens, regulators, universities, a... to a deeper understandin... in the **circular thinking.**
- testing on a defined grou... entrepreneurs a **multi-s...** **virtual experiment**

Countries: Italy, Greece, Bu...
Implementation period: 2019...
Find more at: https://www.athenarc...
hub-learning-hub-engagement-and-ecosyst...

EIT HEI INITIAT... Innovation Cap... for Higher Edu...

Accelerating Innovati... Startup Developmen...

EUAcceL.

Climate-KIC

Clima...

Single...

BL.EU Climate

- CO2 emissions reductions
- plastic **marine littering** in s... waters through **innovation...**
- addressing the issue at the... life cycle, on the **preventio...** production of plastic materi...
- deliver a **roadmap** for plast... European seas for the next...

Countries: Portugal, Greece, Croati...
Implementation period: 2019
Find more at: https://www.athenarc...
innovation-southern-european-wate...

ERASMUS+ | TICHE Academy: T... Holistic economies

TICHE (Academy): Training Innovation for Circularity and Holistic economies

Erasmus KA2 project- Cooperation Partnership for innovation in VET

The primary goal of Cooperation Partnerships is to allow organizations to increase the qu... relevance of their activities, to develop and reinforce their networks of partners, to increas... capacity to operate jointly at transnational level, boosting internationalization of their activ... through exchanging or developing new practices and methods as well as sharing and con... ideas. They aim to support the development, transfer and/or implementation of innovative p... as well as the implementation of joint initiatives promoting cooperation, peer learn... exchanges of experience at European level. Results should be re-usable, transferable, up... and, if possible, have a strong transdisciplinary dimension. Selected projects will be exp... share the results of their activities at local, regional, national level and transnational level.

HORIZON 2020

Evaluation Study on the implementation of Cross Cutting Issues in Horizon 2020

Tender: DG RTD

Duration: 10 months (November 2021 – August 2022)

Budget: 249.850euro

Prof. Phoebe Koundouri, ATHENA RC is a senior expert in Sustainable Development, Climate Change and Biodiversity Case Study.

Xaris Papageorgiou, ATHENA RC is a senior expert in Social Sciences and Humanities and Interdisciplinarity Case Studies.

Dr. Conrad Landis, Senior Researcher, Adjunct Lecturer, AUEB

White Paper:
Green Digital Skills
to boost the twin transition

2023 European Year of Skills

Green & Digital Occupations – top 6

Green Occupations	Score
energy assessor	90.909
natural resources consultant	78.788
energy conservation officer	75.000
environmental policy officer	75.000
energy analyst	70.833
environmental expert	70.588

Digital Occupations	
webmaster	98.837
software tester	96.154
user interface developer	93.878
ICT network administrator	93.684
database integrator	93.548
system configurator	93.478

Green and Digital Occupations	
smart home engineer	6.818
smart home installer	6.667
geothermal technician	4.878
green ICT consultant	4.762
irrigation technician	4.348
environmental education officer	4.000

Green & Digital Skills – top 6

Green Skills	Score
handling and disposing of waste and hazardous materials	100.000
environmental sciences	90.000
environmental protection technology	86.667
complying with environmental protection laws and standards	84.444
natural environments and wildlife	80.000
advising on environmental issues	65.517

Digital Skills	Score
browsing, searching and filtering digital data	100.000
resolving computer problems	100.000
setting up computer systems	100.000
using word processing, publishing and presentation software	100.000
using computer aided design and drawing tools	100.000
using digital tools for collaboration, content creation and problem solving	100.000

Green and Digital Skills	
environmental protection technology	6.667
complying with environmental protection laws and standards	4.444
operating agricultural or forestry equipment	3.846
using precision measuring equipment	3.333
designing electrical or electronic systems or equipment	2.500
monitoring environmental conditions	2.381

White Paper: Green Digital Skills to boost the twin transition

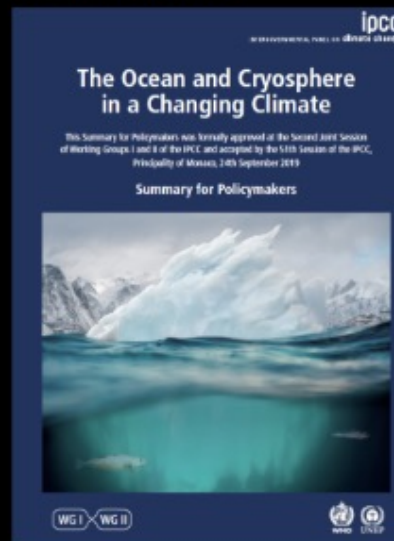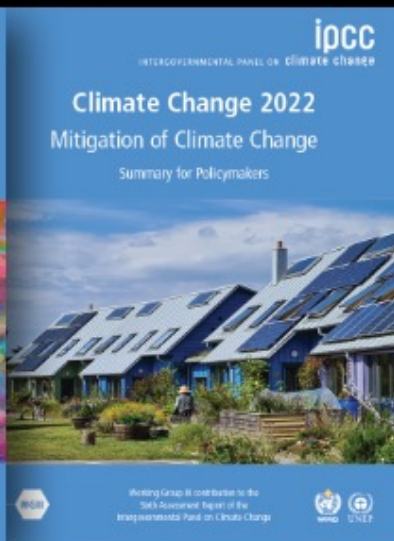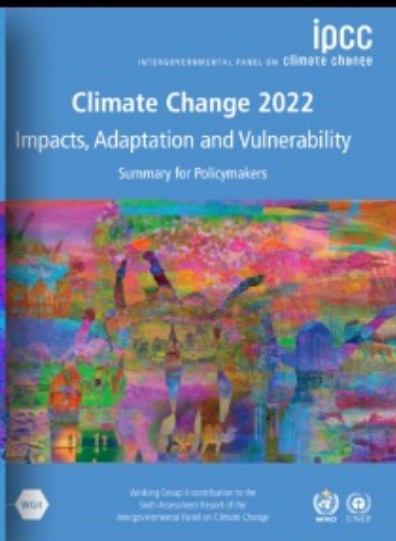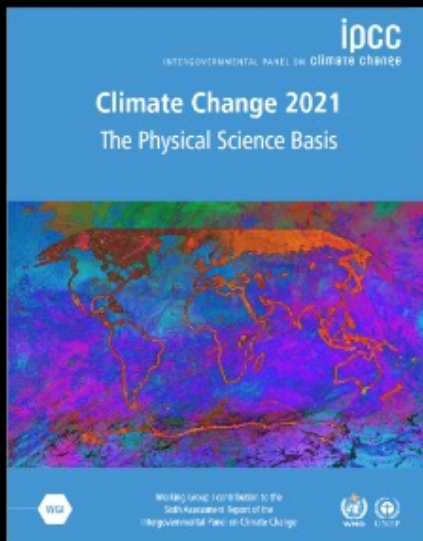# The State of Knowledge about Climate Change

Explore avenues of collaboration in the run-up to COP 28, **towards developing the socio-economic narrative towards climate neutrality.**

WGI

Climate Change 2021
The Physical Science Basis

WGII

Climate Change 2022
Impacts, Adaptation and Vulnerability
Summary for Policymakers

WGIII

Climate Change 2022
Mitigation of Climate Change
Summary for Policymakers

Special Report

The Ocean and Cryosphere in a Changing Climate
Summary for Policymakers

Climate Change and Land

Global Warming of 1.5°C
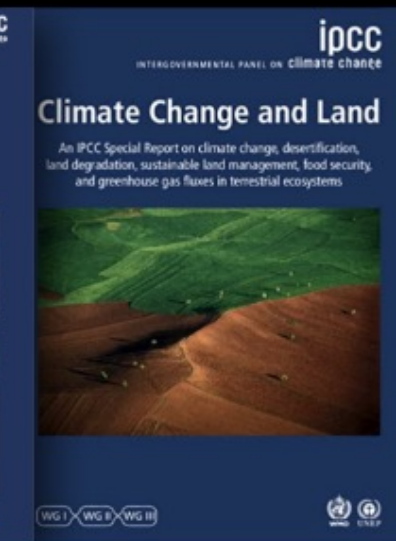
AR6 Climate Change 2021: The Physical Science Basis

Climate Change 2022: Impacts, Adaptation and Vulnerability

Climate Change 2022: Mitigation of Climate Change

Ocean and Cryosphere in a Changing Climate

Climate Change and Land

Global Warming of 1.5 °C

Sixth Assessment Report | Synthesis Report

ipcc
INTERGOVERNMENTAL PANEL ON climate change