The world is only as resilient as the least resilient country and person in it!

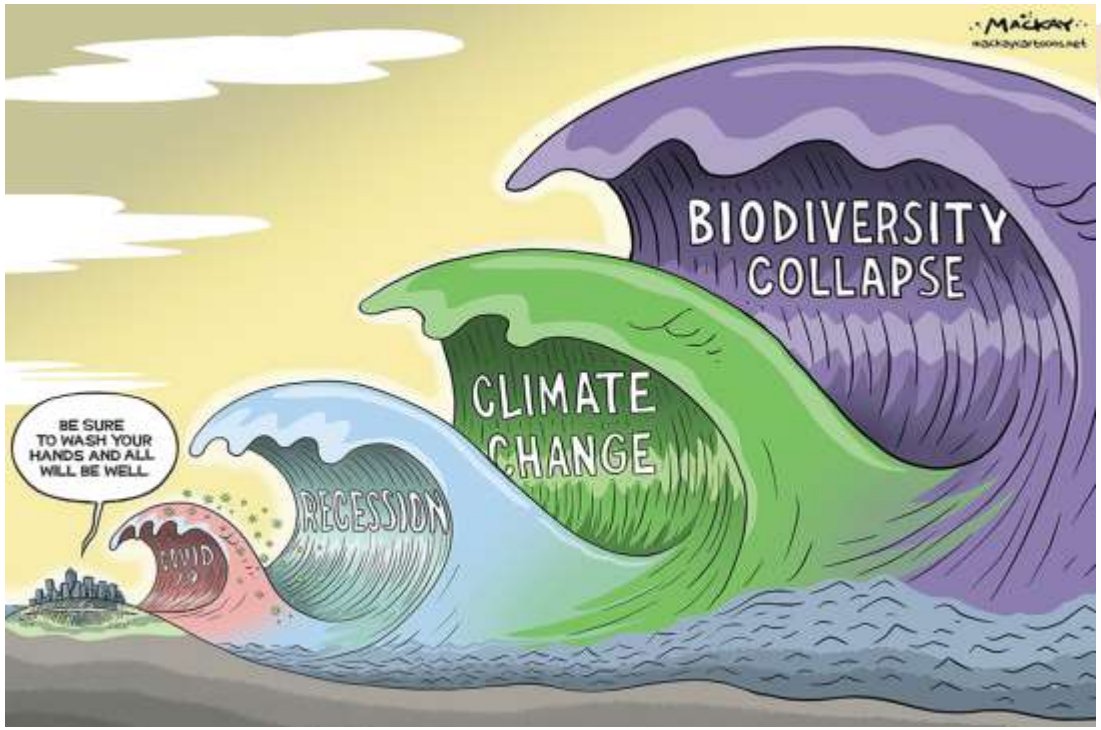
Prof. Phoebe Koundouri www.phoebekoundouri.org

Athens University of Economics and Business (AUEB)

Technical University of Denmark (DTU)

ATHENA RC Information Technologies (ATHENA RC)

Chair UN SDSN Global Climate Hub and UN SDSN-Europe



SUSTAINABLE DEVELOPMENT REPORT

Chapters | Rankings | Interactive Map | Country Profiles | Data Explorer | Downloads & Materials

SDR 2022

Overall score

Legend

Click on a country to see its performance.

- > 80
- 70 - 80
- 60 - 70
- 50 - 60
- < 50
- Information unavailable

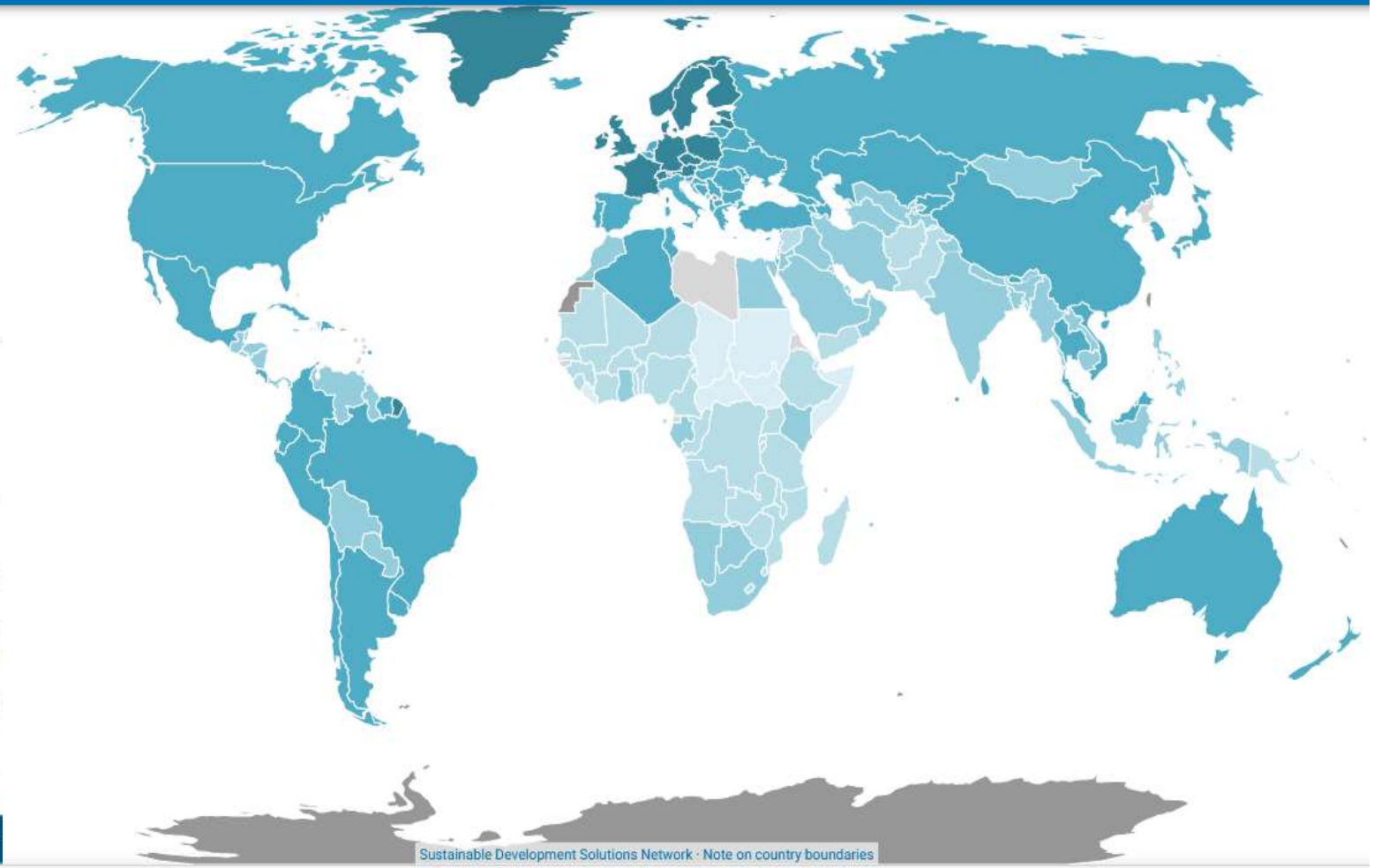
Description

The overall score measures the total progress towards achieving all 17 SDGs. The score can be interpreted as a percentage of SDG achievement. A score of 100 indicates that all SDGs have been achieved.

Spillover Index

Display countries' transboundary impacts.

VIEW SPILLOVERS



Select one of the SDGs to see it on the map

https://dashboards.sdgindex.org/downloads

Alliance of Excellence for Research and Innovation on Aephoria (AE4RIA)

www.ae4ria.org

Professor Dr. Phoebe Koundouri

Founder & Scientific Chair AE4RIA

President, European Association of Environmental and Resource Economist

AE4RIA Alliance of Excellence for Research and Innovation on Aephoria

Research Institutions

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

ATHENA Research & Innovation Information Technologies
Sustainable Development Unit

ICRE8
International Centre for Research on the Environment & the Economy

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

DTU
DTU Management
Department of Technology, Management and Economics

Accelerators

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS
Global Climate Hub
ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS
ATHENA Research & Innovation Information Technologies

eit Climate-KIC Hub GREECE
Funded by the European Union

ClimAccelerator MARITIME
eit Climate-KIC Co-funded by the European Union

BRIGAID CONNECT
Innovation for Resilience

Academies,Networks, Associations

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

Academia Europaea ~19 88~

SDSN Europe

SDSN Greece

World Academy of Art and Science

EAERE
European Association of Environmental and Resource Economists

Water Europe
Technology & Innovation

Nexus Cluster

iap SCIENCE HEALTH POLICY
the interacademy partnership

Alliance of Excellence for Research and Innovation on Aephoria (AE4RIA) www.ae4ria.org

AE4RIA
Alliance of Excellence for Research and Innovation on Aephoria

200 researchers and 500 million (25 year) funding

Research and Innovation Projects
Global Initiatives

erc
European Research Council
Supporting top researchers from anywhere in the world

HORIZON 2020

eit European Institute of Innovation & Technology
A body of the European Union

Innovation Acceleration
Deep Demonstration

Education & Training
Science-Policy Interface

AE4RIA
Alliance of Excellence for Research and Innovation on Aephoria

CREATING A COMMON VISION: climate neutrality adaptation mitigation sustainable economic growth clean tech leadership social inclusion

geospatial analysis & planning

time uncertainty ambiguity

CHALLENGES

unsustainable economic growth
climate crisis biodiversity loss
social inequality

POLICY FRAMEWORK

SDGs EGD Climate Agreement

science & innovation driven implementation

dynamic systemic equilibrium inter & intra generational

SUPPLY SIDE

production analysis & econometrics

green-digital technological solutions

renewables
circular economy
nature based solutions
digital twins
smart solutions
AI/ML
sensors

bio-physical modeling

geo-spatial models projections

system solutions

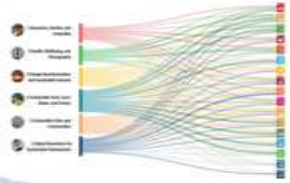
simulation of solutions complexity science

institutions & governance

co-designing technological policy & financial pathways

& stakeholder engagement

education & awareness
research innovation commercialization
taxation regulation certification
financial instruments



preferences, behavioral economics, stakeholders analysis

Virtual Reality-aided choice experiments willingness to pay

DEMAND SIDE

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

Policy Framework for the "Transition to Sustainability"

2015

2018

2019

2020

Drafting

European Green Deal Policies & Strategies

National Energy and Climate Plan (NECP)

10-Year Development and Recovery Plan for Greece (Pissarides Report)

2021

EU Adaptation Strategy

The EU Taxonomy

The Fit-for-55 Package

2022

Climate Delegated Act & Energy Prices

RePowerEU

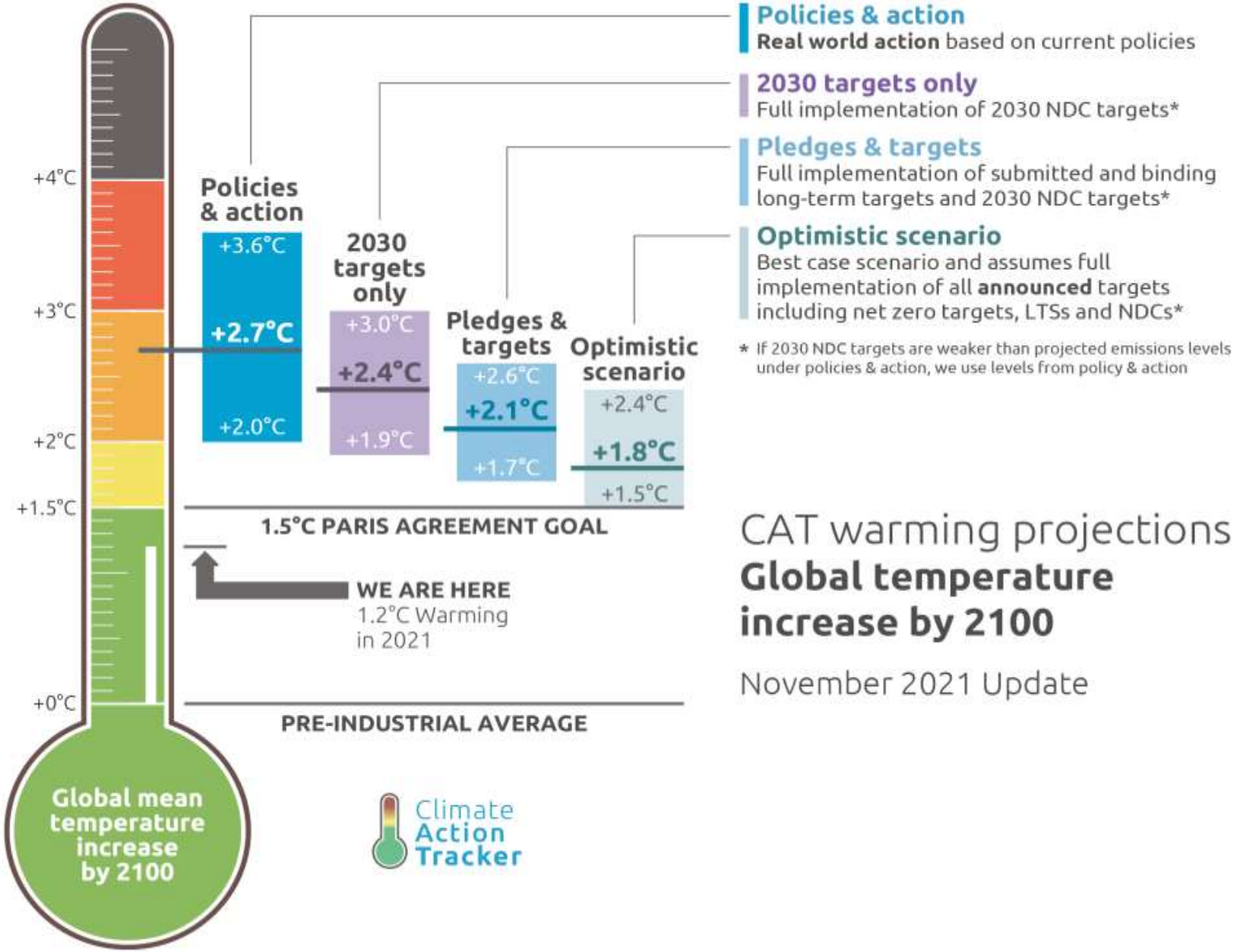
Independence Russian Fossil Fuels

Supply Chain Security-Interconnectivity

Invest Renewables

EGD Policy Area	Name of Policy/Strategy (21 + 13 policies)
1. Biodiversity 2. Sustainable Food Systems	• Biodiversity Strategy for 2030 • Circular economy action plan • Blue economy strategy
3. Building and renovating	• A Renovation Wave for Europe – Greening our buildings, creating jobs, improving lives
4. Clean energy	• Hydrogen Strategy • Offshore Renewable Energy Strategy • Methane Strategy • Energy poverty recommendation
5. Climate action	• European Climate Law • European Climate Pact • Adaptation Strategy • Stepping up Europe's 2030 climate Ambition
6. Eliminating pollution	• Chemicals strategy for Sustainability
7. From Farm to Fork	• Farm to Fork' strategy
8. Sustainable industry	• Industrial strategy • Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery
9. Sustainable mobility	• Smart Mobility Strategy
Overarching	• Fit-for-55 • Strategy for Financing the Transition to a Sustainable Economy • Annual Sustainable Growth Strategy (ASGS) 2021 - 7 flagship areas • The European economic and financial system: fostering openness, strength and resilience • Directing finance towards the European Green Deal


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS



CAT warming projections
Global temperature increase by 2100

November 2021 Update

European Commission

What is the European Green Deal?

December 2019
#EUGreenDeal

The European Green Deal is about **improving the well-being of people**. Making Europe climate-neutral and protecting our natural habitat will be good for people, planet and economy. No one will be left behind.

The EU will:

- Become climate-neutral by 2050
- Protect human life, animals and plants, by cutting pollution
- Help companies become world leaders in clean products and technologies
- Help ensure a just and inclusive transition

"The European Green Deal is our new growth strategy. It will help us cut emissions while creating jobs."

Ursula von der Leyen, President of the European Commission

"We propose a green and inclusive transition to help improve people's well-being and secure a healthy planet for generations to come."

Frans Timmermans, Executive Vice-President of the European Commission

93% of Europeans see **climate change** as a **serious problem**

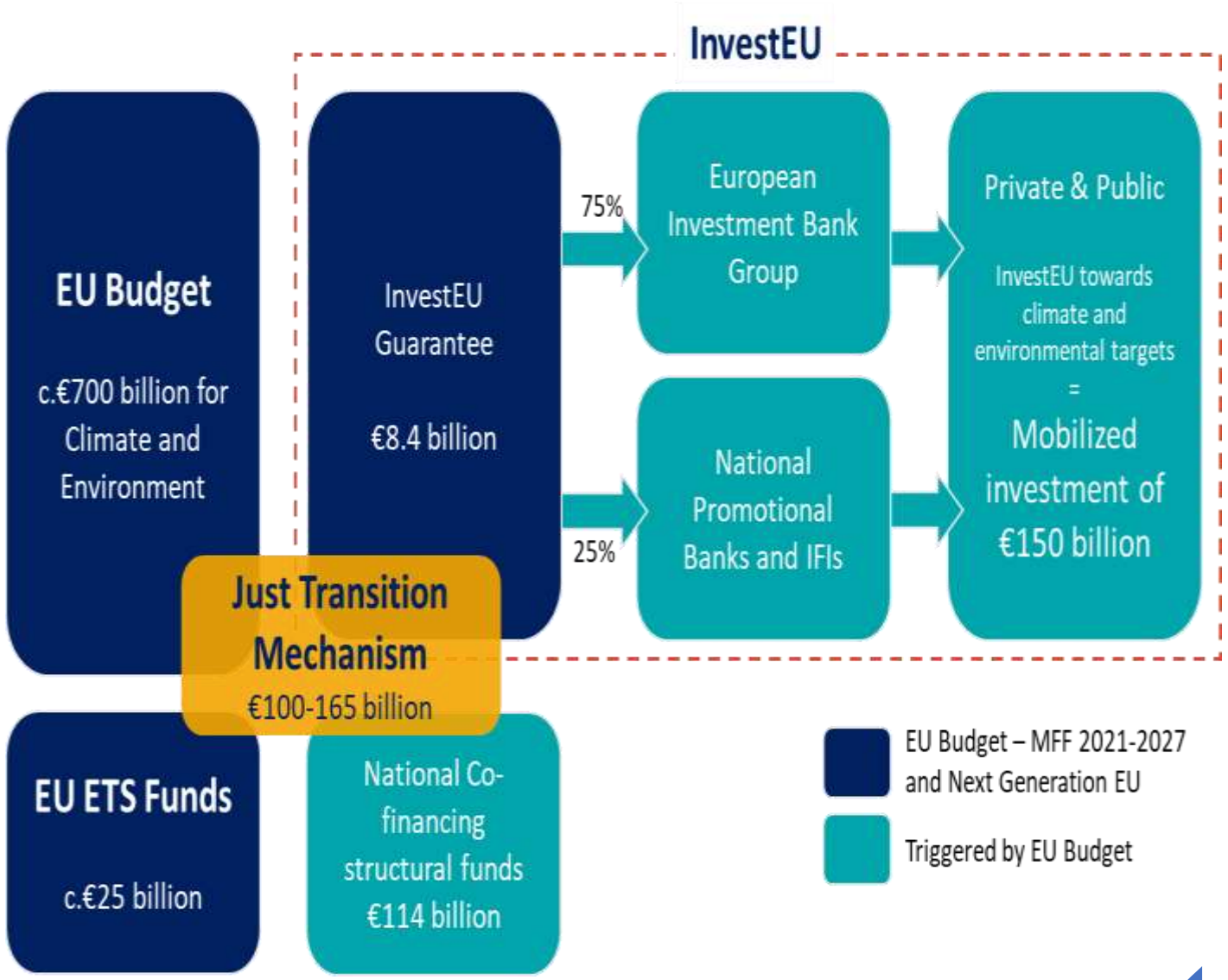
93% of Europeans have **taken** at least one **action** to tackle climate change

79% agree that taking action on climate change will **lead to innovation**

The Sustainable Europe Investment Plan

Mobilising €1 trillion over the period 2021-2030 requires a combination of funds:

- **EU budget (MFF & NGEU combined)** will provide about €547 billion for the years 2021-2027, extrapolated to 10 years, €700 billion
- **InvestEU Fund** leverage **€108 billion from 2021 until 2027**, **€150 billion over a decade** of private-public climate and environmentally-related investments
- The **Just Transition Mechanism** will reach **€140 billion** to ensure a just transition
- The **Innovation and Modernisation funds** will provide at least some **€25 billion** for EU transition to climate neutrality.



1 Education, Gender, and Inequality

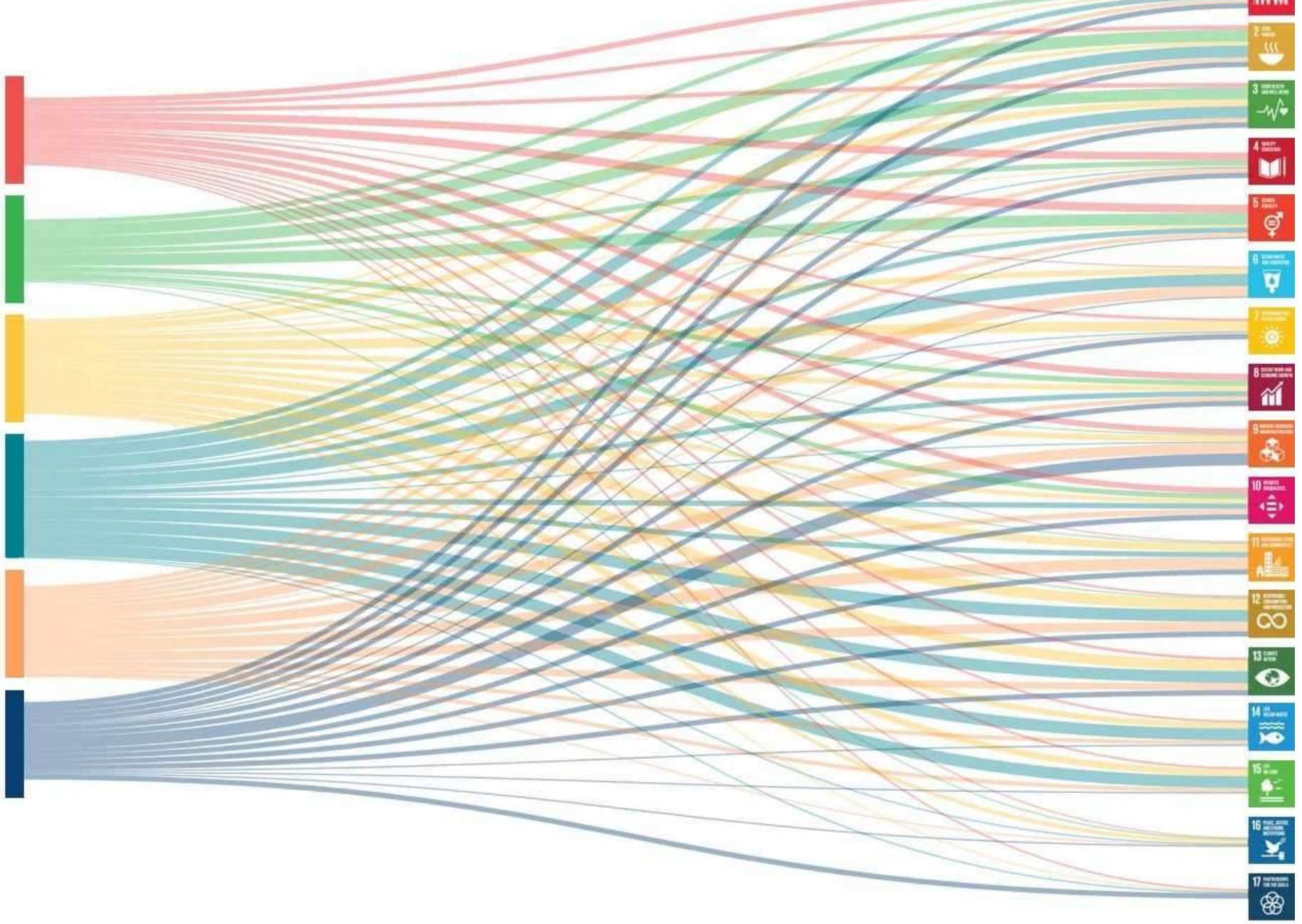
2 Health, Wellbeing, and Demography

3 Energy Decarbonisation and Sustainable Industry

4 Sustainable Food, Land, Water, and Oceans

5 Sustainable Cities and Communities

6 Digital Revolution for Sustainable Development



European Green Deal Policies

Biodiversity strategy for 2030

20-5-2020


EUROPEAN COMMISSION

Brussels, 20.5.2020
COM(2020) 380 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

EU Biodiversity Strategy for 2030

Bringing nature back into our lives

A comprehensive, ambitious and long-term plan to protect nature and reverse the degradation of ecosystems by:

- Establishing a larger EU-wide network of protected areas on land and at sea
- Launching an EU nature restoration plan
- Introducing measures to enable the necessary transformative change
- Introducing measures to tackle the global biodiversity challenge

Farm to Fork Strategy

20-5-2020


EUROPEAN COMMISSION

Brussels, 20.5.2020
COM(2020) 381 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

A Farm to Fork Strategy
for a fair, healthy and environmentally-friendly food system

The Farm to Fork Strategy aims to accelerate our transition to a sustainable food system that should:

- Ensure sustainable food production and security
- Stimulate sustainable food processing, wholesale, retail, hospitality and food services practices
- Promote sustainable food consumption and facilitate the shift to healthy, sustainable diets
- Reduce food loss and waste
- Combat food fraud along the food supply chain

A Renovation Wave for Europe

14-10-2020


EUROPEAN COMMISSION

Brussels, 14.10.2020
COM(2020) 662 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives

{SWD(2020) 550 final}

The EU must adopt an encompassing and integrated strategy involving a wide range of sectors and actors on the basis of the following key principles:

- 'Energy efficiency first' as a horizontal guiding principle
- Affordability, making energy-performing and sustainable buildings widely available
- Decarbonisation and integration of renewables
- Life-cycle thinking and circularity
- High health and environmental standards
- Tackling the twin challenges of the green and digital transitions together
- Respect for aesthetics and architectural quality

Energy Policies

Modernisation Fund to improve energy systems

9-7-2020

10.7.2020 EN Official Journal of the European Union L 221/107

COMMISSION IMPLEMENTING REGULATION (EU) 2020/1001

of 9 July 2020

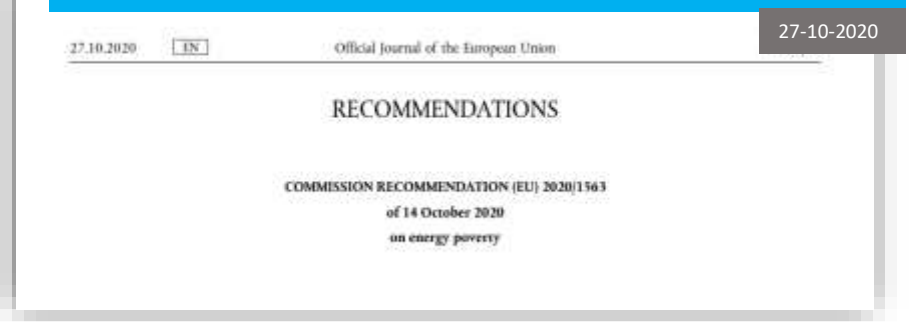
laying down detailed rules for the application of Directive 2003/87/EC of the European Parliament and of the Council as regards the operation of the Modernisation Fund supporting investments to modernise the energy systems and to improve energy efficiency of certain Member States

This Regulation lays down detailed rules on the operation of the Modernisation Fund as regards the following:

- Submission of proposals for financing of investments;
- Assessment of priority investments and non-priority investments;
- Management, disbursement and payment of the resources from the Modernisation Fund;
- Composition and operation of the Investment Committee for the Modernisation Fund;
- Monitoring, reporting, evaluation, and auditing;
- Information and transparency.

EU Commission Recommendation on Energy Poverty

27-10-2020



27.10.2020 EN Official Journal of the European Union

RECOMMENDATIONS

COMMISSION RECOMMENDATION (EU) 2020/1563

of 14 October 2020

on energy poverty

The Commission provides guidance on the interpretation of such indicators developed at EU level to better quantify the concept of significant number of energy poor households identified by national definitions of energy poverty

An EU-wide assessment of National Energy and Climate Plans

17-9-2020

EUROPEAN COMMISSION

Brussels, 17.9.2020
COM(2020) 564 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

An EU-wide assessment of National Energy and Climate Plans

Driving forward the green transition and promoting economic recovery through integrated energy and climate planning

This Communication is a first step in a process that will involve other stages.

The Commission will publish an in-depth assessment of each individual NECP in October together with the State of the Energy Union report, including country-specific guidance on how Member States can make further progress in implementing the plans.

EU Strategy to harness the potential of offshore renewable energy for a climate neutral future

19-11-2020

EUROPEAN COMMISSION

Brussels, 19.11.2020
COM(2020) 741 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future

{SWD(2020) 273 final}

This Communication proposes an EU strategy to make offshore renewable energy a core component of Europe's energy system by 2050.

Circular economy Action Plan

A new Circular Economy Action Plan

11-3-2020

This Circular Economy Action Plan provides a future-oriented agenda for achieving a cleaner and more competitive Europe in co-creation with economic actors, consumers, citizens and civil society organisations.

It aims at accelerating the transformational change required by the European Green Deal, while building on circular economy actions implemented since 2015.

This plan will ensure that the regulatory framework is streamlined and made fit for a sustainable future, that the new opportunities from the transition are maximised, while minimising burdens on people and businesses.

Climate action Policies

Stepping up Europe's 2030 climate Ambition

17-9-2020


EUROPEAN COMMISSION

Brussels, 17.9.2020
COM(2020) 562 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Stepping up Europe's 2030 climate ambition

Investing in a climate-neutral future for the benefit of our people

The present Communication:

- Emissions reduction target of at least 55% by 2030
- Previews a set of actions required across all sectors of the economy and the launch of revisions of the key legislative instruments to achieve this increased ambition
- Set the stage for the Commission to make detailed legislative proposals by June 2021

Chemicals strategy for Sustainability

14-10-2020


EUROPEAN COMMISSION

Brussels, 14.10.2020
COM(2020) 667 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Chemicals Strategy for Sustainability
Towards a Toxic-Free Environment

EU Strategy to reduce methane emissions

14-10-2020


EUROPEAN COMMISSION

Brussels, 14.10.2020
COM(2020) 663 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

on an EU strategy to reduce methane emissions

EU Climate Action Progress Report

30-11-2020

The Report is produced annually and details recent developments in EU climate policy and progress made by the EU and its Member States.

The EC's Directorate-General for Climate Action compiles the Report based on data provided by Member States under the Climate Monitoring Mechanism Regulation

National Energy and Climate Plan (NECP)

- The national energy and climate plans (NECPs) were introduced by the Regulation on the governance of the energy union and climate action (EU)2018/1999.
- Agreed as part of the Clean energy for all Europeans package which was adopted in 2019.
- Each member state outline its 10-year plans on sustainability issues aligned with the 2050 climate neutrality objectives.

Plan to further cut emissions by **at least 55%** (compared to 1990 levels) to become the world's first climate-neutral continent by 2050.

	GREENHOUSE GAS EMISSIONS	RENEWABLE ENERGY	ENERGY EFFICIENCY	INTER-CONNECTION	CLIMATE IN EU-FUNDED PROGRAMMES	CO2 FROM:
2020	-20%	20%	20%	10%	2014-2020 20%	
2030	≤ -40%	≥ 32%	≥ 32.5%	15%	2021-2027 25%	CARS -37.5% Vans -31% Lorries -30%

Upwards revision clause by 2023

EU Targets	2020	2030
Emissions reduction	20%	40%
Share of renewables	20%	32%
Energy efficiency	20%	32.5%

- Energy Efficiency
- Renewables
- Greenhouse Gas Emissions Reductions
- Interconnections
- Research and Innovation

Greek NECP

Energy efficiency/renewables/greenhouse gas reductions

- 2030 greenhouse gas emission reduction target of 42% compared to 1990 levels.
- Reach climate neutrality by 2050.
- Non-ETS sectors: reduction of 36% in GHG emissions by 2030 compared to 2005.
- 35% renewables share in gross final energy consumption.
- RES share in electricity consumption about to exceed 60% in 2030, utilizing the most cost-effective manner Greece's high potential especially for wind and photovoltaic plants

Revised to greenhouse gas emissions cut by at least 55% by 2030

Buildings

- Implementation of the circular economy
- Energy efficiency of budlings through renovation and modernization – total number of building units to be renovated by 2030 expected to reach 600,000

Transport sector

- 30% share of electric passenger vehicles in new registrations in 2030
- reduce the use of private vehicles

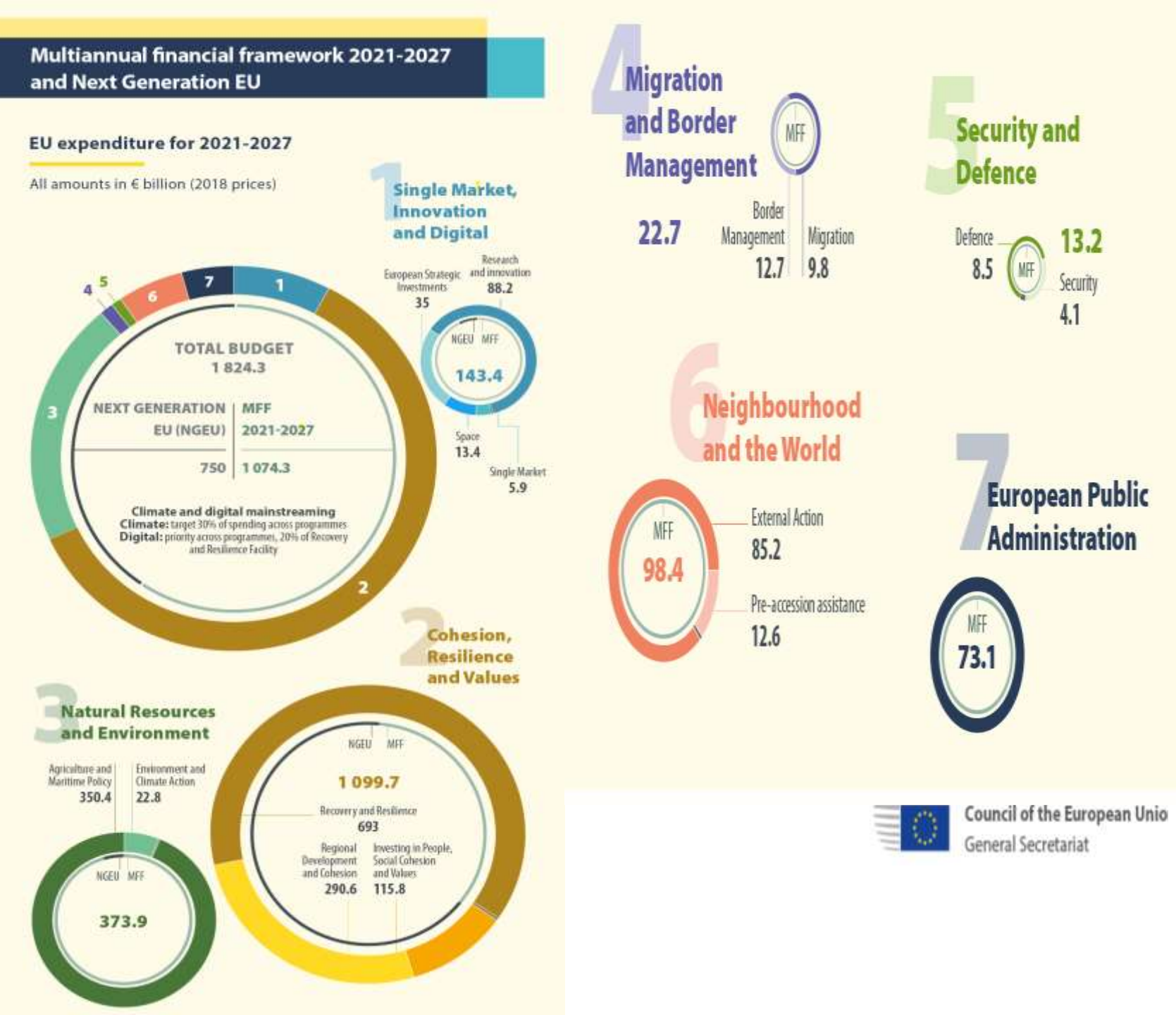
Lignite-coal plants

- ✓ Shut down existing lignite coal plants by 2023 and phase-out lignite by 2028.
- ✓ Adoption of integrated programmes for supporting lignite-producing areas in Greece (the regions of Western Macedonia and Megalopoli).
- ✓ Creation of over 60.000 jobs.

Interconnection

- ➢ Speed up the electrical interconnection of the islands with the mainland transmission system.
- ➢ Electricity interconnectivity target of 21% by 2030.

Total investment plan of EUR 43.8 billion over 10 years



NextGenerationEU breakdown

Recovery and Resilience Facility (RRF)	€672.5 billion
of which, loans	*€360 billion*
of which, grants	*€312.5 billion*
ReactEU	€47.5 billion
Horizon Europe	€5 billion
InvestEU	€5.6 billion
Rural Development	€7.5 billion
Just Transition Funds (JTF)	€10 billion
RescEU	€1.9 billion
TOTAL	**€750 billion**

Source: Conclusions of the European Council of 21 July 2020

Pissarides Report: 10-Year Development and Recovery Plan for Greece

MAJOR PROBLEMS

- Low productivity and introversion;
- Inefficient functioning of public administration and institutions;
- Significant lag in achieving environmental goals on climate change and circular economy;
- Exports have increased in recent years but systematically lag behind imports;
- Vulnerable households (at the brink of poverty) due to the unsatisfactory access to the labor market and low wages (due to low productivity);

PRIORITIES - Consistent with Greek RRP

- RRF created short-term fiscal space for Greece, which is crucial to be used effectively in order to have a high growth multiplier.
- Production and investment:
  - Dramatic reduction in the cost of employment.
  - Favorable tax treatment for investments
- Innovation
  - Energy upgrade of buildings
  - Infrastructure Strengthening Export Sectors of Manufacturing
  - Waste management and circular economy.
- Human capital:
  - New training programs and structures for the employed and unemployed
  - Adaptation of the institutional framework to enhance cutting-edge research in universities and research centers that will support production.
- Public sector and administration:
  - Accelerate the digitization of public sector services
  - Strengthening primary health care and hospital units
  - Legal System increased efficiency

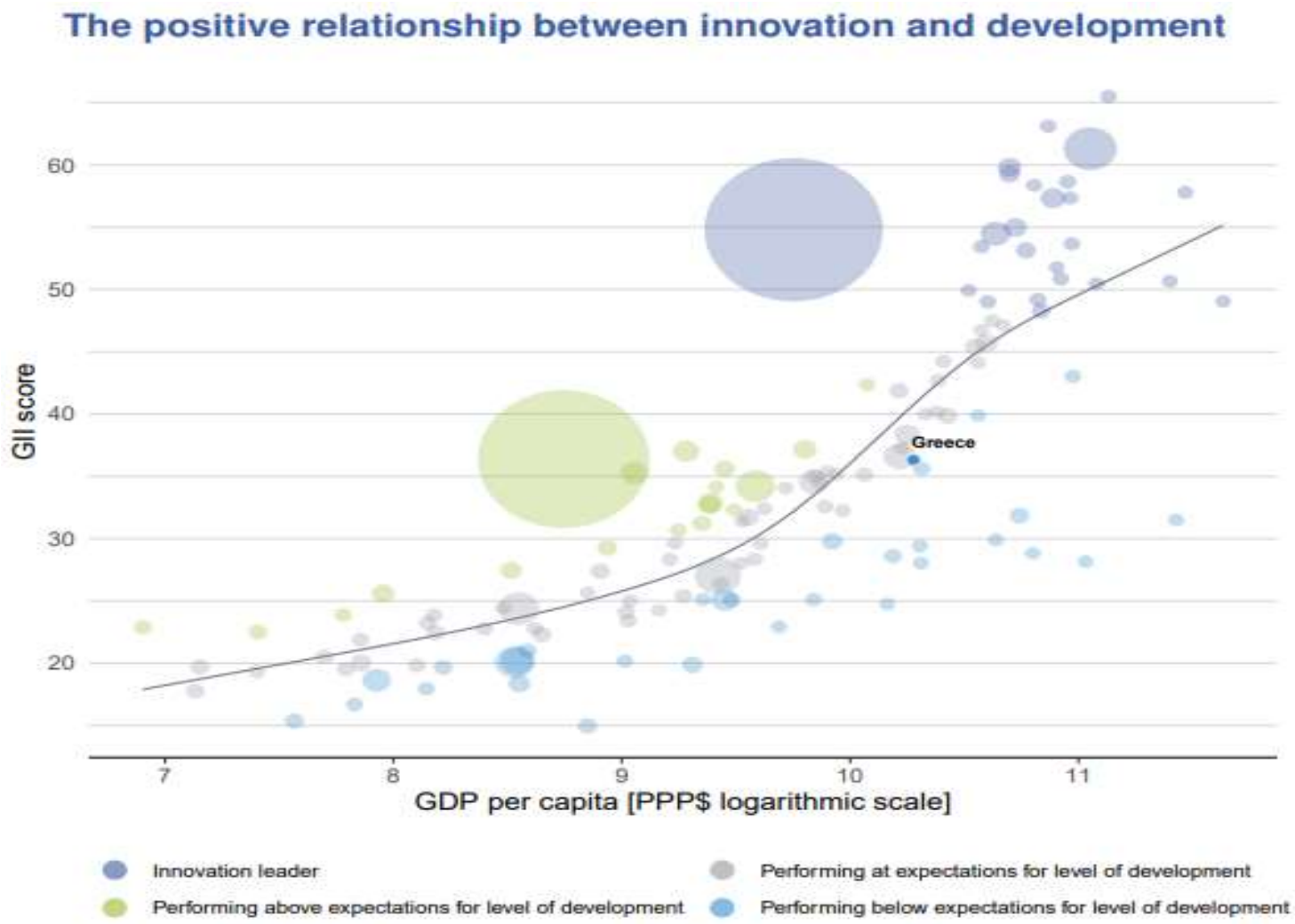
Innovation in Greece:

Greece and innovation – current status

According to the Global Innovation Index (GII) 2021, Greece:

- ranks 47th among 132 economies
- ranks 39th among the 51 high-income group economies
- ranks 30th among the 39 economies in Europe

The bubble chart depicts the link between income (GDP per capita) and innovation (GII score).
The trend line shows the projected innovation performance by income level. Economies above the trend line outperform expectations, while those below underperform.



Greek Resilience and Recovery plan

Pillars and Components		RRF Budget	Mobilised Investment Resources
1. Green Transition		(mil. €)	(mil. €)
1.1 Power Up		1,200	2,348
1.2 Renovate		2,689	5,203
1.3 Recharge and refuel		520	1,305
1.4 Sustainable use of resources, climate resilience and environmental protection		1,763	2,726
	Pillar 1	**6,172**	**11,582**
2. Digital Transformation			
2.1 Connect		522	582
2.2 Modernise		1,303	1,303
2.3 Digitalisation of businesses		375	475
	Pillar 2	**2,200**	**2,360**
3. Employment, skills, and social cohesion			
3.1 Increasing job creation and participation in the labour market		776	776
3.2 Education, vocational education, training, and skills		2,311	2,395
3.3 Improve resilience, accessibility and sustainability of healthcare		1,486	1,486
3.4 Increase access to effective and inclusive social policies		611	611
	Pillar 3	**5,184**	**5,268**
4. Private investment and transformation of the economy			
4.1 Making taxes more growth friendly, and improving tax administration and tax collection		187	215
4.2 Modernise the public administration		189	189
4.3 Improve the efficiency of the justice system		251	464
4.4 Strengthen the financial sector and capital markets		20	20
4.5 Promote research and innovation		444	612
4.6 Modernise and improve resilience of key economic sectors		3,743	7,233
4.7 Improve competitiveness and promote private investment and exports		5	5
Technical Assistance		40	40
	Pillar 4	**4,879**	**8,778**
Sum of Grants		**18,436**	**27,988**
Loans		**12,728**	**31,819**
Total Investment Resources		**31,164**	**59,807**

Top-addressed SDGs according to the Budget Allocation

- €17.7Bn to **SDG 9** “Industry, Innovation & Infrastructure”
- €13.0Bn to **SDG 8** “Decent Work & Economic Growth”
- €12.0Bn to **SDG 10** “Reduced Inequalities”
- €8.73Bn to **SDG 3** “Health and Wellbeing”
- €6.17Bn to **SDG 16** “Peace Justice & Strong Institutions”
- €3.43Bn to **SDG 1** “No Poverty”
- €3.24Bn to **SDG 2** “Zero Hunger”
- €0.3Bn to **SDG 17** “Partnerships for the goals”

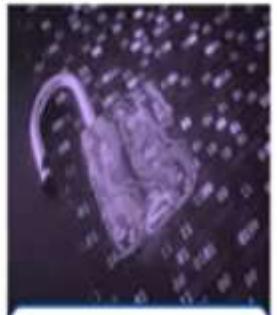
The Green Digital Transition

Supporting the digital transition

Improve connectivity

Help citizens develop digital skills

Deploy cutting edge technologies



Improve cyber security

- Min. 20% of digital-related expenditure

Supporting the green transition = implementation of EU Green Deal

Decarbonise power generation and industry

Promote a more circular economy

Protect and restore biodiversity

Strengthen sustainable mobility

- Min. 37% of climate-related expenditure
- Each measure to respect "do no significant harm" principle

EU Strategy for adaptation to Climate Change

EU Strategy for adaptation to Climate Change

24-2-2021


EUROPEAN COMMISSION

Brussels, 24.2.2021
COM(2021) 82 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change

{SEC(2021) 89 final} - {SWD(2021) 25 final} - {SWD(2021) 26 final}

The strategy aims to realise the 2050 vision of a climate-resilient Union by making adaptation smarter, more systemic, swifter, and by stepping up international action.

Climate law


EUROPEAN COMMISSION

Brussels, 4.3.2020
COM(2020) 80 final

2020/0036 (COD)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law)

4 March 2020: the Commission established the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law)

With the European Climate Law the Commission proposes a legally binding target of net zero greenhouse gas emissions by 2050

It forms part of a broader package of ambitious actions announced in the Commission's European Green Deal Communication


EUROPEAN COMMISSION

Brussels, 17.9.2020
COM(2020) 563 final

2020/0036 (COD)

Amended proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law)

17 September 2020: Proposal for modifying the initial Commission proposal (COM(2020) 80 final) to include the revised target in the European Climate Law.

With a view to achieving climate neutrality in the Union by 2050, it is proposed that the EU's greenhouse gas emission reduction target for 2030 is increased to at least 55% compared with 1990 levels, including emissions and removals.

European Climate Law – 21 April 2021

European Council and European Parliament negotiators reached a provisional political agreement setting into law the objective of a climate-neutral EU by 2050, 55% reduction of GHG emissions by 2030 (compared to 1990).

- Priority to emissions reductions over removals
- Establishment of a European Scientific Advisory Committee on Climate Change
- Land Use, Land Use Change and Forestry (LULUCF) policy should contribute more to reducing EU emissions
- Intermediate climate target for 2040 to be published by the Commission
- Commitment to negative emissions after 2050
- Stricter provisions on adaptation to climate change
- Stronger coherence between common European policies aimed at climate neutrality
- Commitment to cooperate with different sectors of the economy to create sector-specific roadmaps towards climate neutrality

Ελληνικός Κλιματικός Νόμος. Νοεμβριος 2021

- Μείωση εκπομπών αερίων θερμοκηπίου 55% το 2030 σε σχέση με το 1990, 80% το 2040, κλιματική ουδετερότητα το 2050
- Τομεακοί «προϋπολογισμοί άνθρακα»: Παραγωγή Ηλεκτρικής Ενέργειας, Μεταφορές, Βιομηχανία, Κτίρια, Γεωργία και Κτηνοτροφία, Απόβλητα, Χρήσεις Γης, αλλαγές χρήσεων γης και Δασοπονία.
- Απαγόρευση χρήσης καυστήρων πετρελαίου θέρμανσης & πώλησης αυτοκινήτων με κινητήρες βενζίνης ή πετρελαίου από το 2030
- Κατάργηση της χρήσης μαζούτ για παραγωγή ρεύματος
- Υποχρεωτική ασφάλιση κτιρίων σε περιοχές υψηλού κλιματικού κινδύνου
- Κλιματικές Επιπτώσεις στην Μελέτη Περιβαλοντικών Επιπτώσεων

EU Taxonomy - Finance

Report of the Technical Expert Group on Sustainable Finance

9-3-2020

This report contains recommendations relating to the overarching design of the Taxonomy, as well as guidance on how users of the Taxonomy can develop Taxonomy disclosures. It contains a summary of the economic activities covered by the technical screening criteria

Framework for sustainable investments

22-6-2020


22.6.2020 EN Official Journal of the European Union

REGULATION (EU) 2020/852 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 18 June 2020

on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088

(Text with EEA relevance)

This Regulation establishes the criteria for determining whether an economic activity qualifies as environmentally sustainable for the purposes of establishing the degree to which an investment is environmentally sustainable.

Supplement for the EU Taxonomy Regulation

20-11-2020


EUROPEAN COMMISSION

Brussels, XXX
[...](2020) XXX draft

COMMISSION DELEGATED REGULATION (EU) .../...

of XXX

supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives

This Delegated Regulation specifies the technical screening criteria under which specific economic activities qualify as contributing substantially to climate change mitigation and climate change adaptation and for determining whether those economic activities cause significant harm to any of the other relevant environmental objectives.

Expected to be final by June 2021

21st April: EU Taxonomy Package of Measures
EU global leader in sustainable finance

- **Improve the flow of money towards sustainable activities** by enabling investors to re-orient investments towards more sustainable technologies and businesses. To qualify as 'green':

Climate change mitigation/ Climate change adaptation/ Sustainable use and protection of water and marine resources/ Circular economy/ Pollution prevention and control/ Biodiversity

- **Proposal for a Corporate Sustainability Reporting Directive (CSRD)**

Extends scope to all large companies and all companies listed on regulated markets/ requires the audit (assurance) of reported information/ introduces more detailed reporting requirements/ requires companies to digitally 'tag' the reported information, so it is machine readable and feeds into the European single access point as per capital markets union action plan

- **Six amending Delegated Acts on fiduciary duties, investment and insurance advice**, to ensure that financial firms include sustainability in their procedures and their investment advice to clients.

The EU Taxonomy across various Economic and Energy activities

Nuclear Energy

Nuclear projects permitted until 2045 will be classified as green, on the condition that countries can safely dispose of the toxic waste and do not create significant harm to the environment

Natural Gas

Transitional - It will be phased out of the taxonomy as more sustainable alternatives become available.

The last date for the construction of gas projects to be taxonomy compliant is 31 December 2030

Bioenergy and forestry

Both are covered by the Taxonomy Delegated Law

Agricultural

Plays a central role in mitigating the effects of climate change

Reverses biodiversity loss and promotes other SDG's

Ongoing negotiations between institutions on the Common Agricultural Policy

Decided to postpone the inclusion of the agricultural sector until the next delegated act

Hydropower

The criteria became more specific

"Run-of-river" units (i.e. without a tank) or units with a power of more than 5 watt per square meter will not need to carry out the Life Cycle Assessment

Hydrogen

The current criteria are in line with the EU hydrogen strategy

The criteria for hydrogen production are set at an ambitious level to ensure a substantial contribution to climate change mitigation

Europe's 'Fit for 55': A climate package with 13 legislative proposals

Revision of the EU ETS	•The current scheme covers around 40% of the EU's total greenhouse gas emissions, the remaining 60% being covered by the effort sharing regulation, which addresses emissions from transport, industry and agriculture
Climate action social facility	•To tackle the potential social impact of the new ETS, the European Commission is planning to introduce a climate action social fund. Under the leaked ETS draft, "at least 50%" of revenues generated by the ETS will be earmarked to the new fund
Revision of the effort sharing regulation	•Working in tandem with the ETS is the effort sharing regulation, which covers agriculture, transport, buildings and waste. The regulation covers the sectors left out by the ETS, and sets binding targets for each EU country, depending on their GDP.
Revision of LULUCF regulation	•More pressure is likely to be put on LULUCF now because of the inclusion of carbon sinks in the EU's 2030 greenhouse gas reduction target. During the negotiations on Europe's climate law, the Commission said it would consider proposing a target of sequestering 300 million tonnes of carbon – up from the current aim of 225 million.
Proposal for a carbon border adjustment mechanism	•Aims to protect European businesses from environmental dumping and prevent "carbon leakage" whereby industries relocate production or new factories abroad in search of lower production costs.
Revision of the renewable energy directive	•The EU's aim for net zero emissions require a huge increase in Europe's renewable energy generation capacity. In 2018, the EU set a 32% target for renewable energy in Europe's mix by 2030, up from around 20% currently. This will need to roughly double to 38-40% in order to reach the bloc's updated climate ambition, according to the European Commission.
Revision of the energy efficiency directive	•Last revised in 2018, the energy efficiency directive aims to achieve savings of at least 32.5% by 2030. The target is currently non-binding but the European Commission now plans to make it a legal obligation.

Race to Net Zero: Carbon Neutral Goals by Country

Figure 1: Net zero targets – 126 countries have set goals to decarbonize their economies

Source: BNEF (Bloomberg New Energy Finance), Climate Action Tracker, Climate Change News, and PIMCO as of October 2020

- Stronger commitments to reduce emissions and to keep global temperature rise to 1.5°C.

40 countries 2050/China 2060/India 2070

US and China to continue Climate Negotiations

- From the projected 4 °C faced before Paris, and the 2.7 degrees before Glasgow, we have now edged towards 2-1.8°C
- 450 Business and Financial Institutions coalition worth $130 trillion vows to put climate at heart of finance
- Global standards body takes aim at company 'greenwashing' claims
- 100 countries make new pledges to cut methane and 133 save forests
- Ensuring carbon market integrity
- Developed countries confirm commitment $100 billion goal a year for Climate Mitigation and Adaptation in developing countries

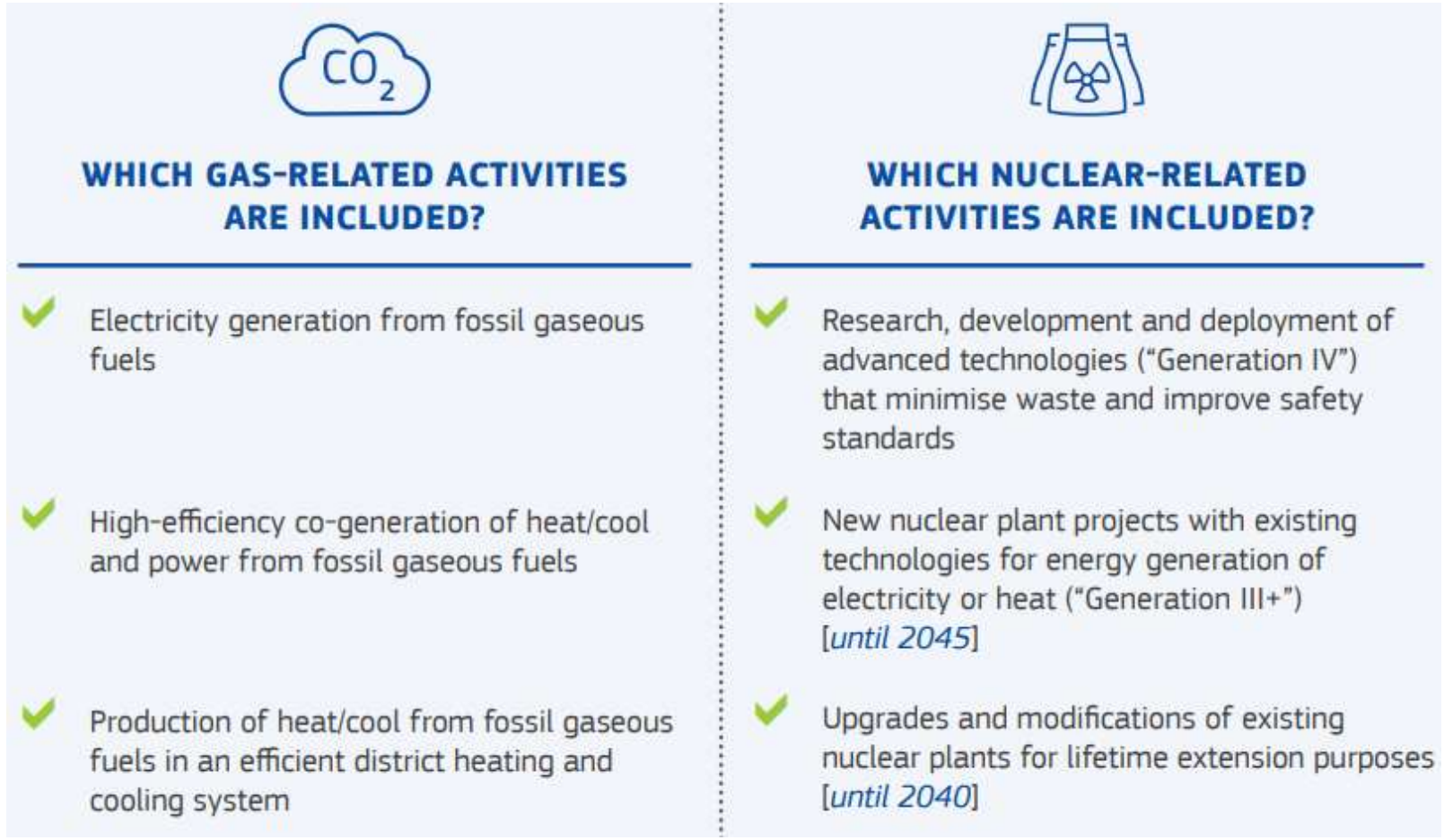
6th Assessment Report

Stressing the need for international efforts to limit the global temperature well below 1.5 degrees Celsius, a target that would, according to IPCC scientists, be exceeded by 2040 if no action is taken.

1. The global surface warming is projected to 1.5oC - 1.6oC in the next two decades under all emission scenarios;
2. Human activity undoubtedly influences the climate, oceans, and land warming;
3. With enhanced climate models, scientists can now analyze present and forecast temperature and hydrological extremes at a regional level, and see how global climate impacts will affect individual regions;
4. We are closer to irreversible tipping points, including strong Antarctic ice sheet melt and forest dieback;
5. Methane emissions are now higher than at any point in the past 800,000 years and it is responsible for almost a quarter of global warming;

Complementary Climate Delegated Act

- In this Complementary Climate Delegated Act, the Commission includes certain nuclear and gas activities in the second category of activities, i.e. transitional, those covered by Article 10(2) of the Taxonomy Regulation
- It also provides for specific disclosure requirements associated with natural gas and nuclear energy activities included in the act, by amending the Delegated Act on disclosures under Article 8 of the Taxonomy Regulation.



Natural Gas

- Public consultation suggested Natural Gas was as a transition fuel in decarbonization
- According to the scenarios in the energy system modelling (fit-for-55), natural gas will continue to play an important role in terms of consumption and generation until 2030, after which we expect a decline to 2050
- Throughout the transition of our energy system, the function of natural gas-fired electricity generation will change and will increasingly be a facilitator for the spread of renewable electricity and stable supply
- In the Commission's modelling for Paris-aligned pathways, natural gas is projected to represent 22% of gross inland energy consumption in 2030, and 9% in 2050. Any natural gas in 2050 will have to be abated

Nuclear Energy

- The Technical Expert Group on Sustainable Finance, advising the Commission on Taxonomy, acknowledged that nuclear represents a low-carbon energy source.
- However, expert opinion has been less conclusive on the other environmental impacts of nuclear power and its compatibility with the “do no significant harm (DNSH)” criterion.
- Technical assessment Report by JRC: conclude that compliance with the safety standards and waste management requirements under the regulatory framework in EU Member States ensures a high level of protection for the environment and for people.
- Nuclear waste: The Taxonomy Regulation requires that the long-term disposal of waste does not cause significant or long-term harm to the environment.
- Nuclear energy generates a relatively low amount of waste in comparison to the large amount of generated heat and/or electricity.
- The EU regulatory framework establishes the legal requirement for national policies to keep the generation of radioactive waste to a minimum.

Background

- Commission introduces three new sources of revenue:
  1. Emissions trading (ETS)-based Revenues
  2. Resources generated by the proposed EU Carbon Border Adjustment Mechanism
  3. Share of residual profits from multinational companies (distribution among EU Member States)
- Expected to generate up to €17 billion (on average) every year from 2026-2030
- Assist in the repayment of the funds raised by the EU to finance the grant component of NextGenerationEU
- Finance the Social Climate Fund to ensure that the net-zero transition will leave no one behind

EU Emissions Trading System (ETS)

Source: European Commission

- EU carbon market through which companies buy or receive emission allowances
- Fit-for-55 package (July 2021) the Commission has proposed to strengthen the existing Emissions Trading System, extending it to maritime transport, and gradually to full auctioning of aviation allowances
- A proposal to introduce a new emissions trading system for buildings and road transport is also under consideration
- Under the current EU Emissions Trading System, most revenues from the auctioning of emission allowances are transferred to **national budgets**
- With the "Own Resources" proposal, 25% of the revenues from emissions trading in the EU should go to the **EU budget;** Estimated to generate about €12 billion on average in 2026-30 for the EU budget, or €9 billion on average between 2023-2030.
- In addition to the repayment of NextGenerationEU funds, these new revenues would finance the Social Climate Fund
- Social Climate Fund will ensure:
  - Socially fair transition and support to vulnerable households
  - Micro-enterprises to finance investments in energy efficiency
  - New heating and cooling systems
  - Cleaner mobility
  - Temporary direct income support (when appropriate)

Carbon Border Adjustment Mechanism

- An innovative tool to reduce the risk of carbon leakage by encouraging producers in non-EU countries to green their production processes
- A carbon price on imports, corresponding to what would have been paid, had the goods been produced in the EU
- This mechanism will apply to a targeted selection of sectors and is fully consistent with World Trade Organization (WTO) rules
- “Own Resources” proposal, 75% of the revenues collected by Member States under CBAM will go to the EU budget
- Estimated to generate about €1 billion on average in 2026-30 for the EU budget

Source: European Commission

Own Resource based on the reallocated profits of very large multinational companies

Source: European Commission

- October 2021, a reform of the international tax framework was agreed by more than 130 members of the OECD/G20 *Inclusive Framework on Base Erosion and Profit Shifting*
- A two-pillar solution to tackle tax avoidance was shaped to ensure that profits are taxed where economic activity and value creation occur
- Pillar One of this agreement will reallocate the right to tax a share of profits from the world's largest multinational enterprises to participating countries
- "Own Resources" proposal, an own resource equivalent to 15% of the share of the taxable profits of multinational enterprises that are reallocated to EU Member States
- Estimated Revenues for the EU budget between €2.5 and €4 billion per year

Complementary Climate Delegated Act and Energy Prices

- The Complementary Delegated Act supports a clean energy transition, which would allow not just to avert the disastrous impacts of climate change but also to reduce the EU's vulnerability to fossil fuel price volatility.

- Including Nuclear and Natural Gas Activities in the EU Taxonomy has specific conditions accompanied by technical difficulties and high costs (compliance with specific technical standards, waste management, etc.)

- ***SDSN SENIOR WORKING GROUP ON EGD - OPINION***
- ***Europe, instead of considering those activities as "sustainable", should rather accelerate the promotion of Renewables (RES), because:***

  1. With the existing technology, the cost of energy production from RES is comparatively lower. In the long-run high initial installation costs will be offset

  2. RES contribute to achieving the climate neutrality needed to tackle the effects of climate change

  3. RES would make Europe energy autonomous and independent of any geopolitical pressures

Do European Green Deal policies facilitate the implementation of the SDGs?

Cross-mapping the EU Policies to the 17 SDGs using textual analysis - Approach

- *Integrating SDGs into the European policy framework helps ensure Europe's pathway to achieving climate neutrality within a comprehensive economic framework that gives equal opportunities to everyone.*

- The process we follow for the assessment of EGD Policies – SDG linkage, consists of the following steps:

1. Identification of policies to be analyzed;
2. Collection of relevant Policy documents;
3. Reading of each Policy text and identification of phrases (or sentences) conceptually related to the different SDGs;
4. Listing of text passages under each SDG they are linked to;
5. Scoring of the strength of connection based on the number of text passages under each SDG on a *pro-rata** basis, using a 4-point scale:
    - 3, the Policy document directly affects the SDG outcomes;
    - 2, the Policy document reinforces the SDG outcomes;
    - 1, the Policy document enables the SDG outcomes;
    - 0, the Policy document does not interact with the specific SDG.

** We assume that the greater the number of relevant references, the greater the influence of the Policy on each SDG. So, using the two extremes as an example, we assign a score of 3 to the SDG with the greatest number of text passages under it, and 0 to the SDG with no text passage under it.*

Cross-mapping EGD Policies to 17 SDGs : Human Textual Mining Analysis

	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 17	Total Score
A New Industrial Strategy for Europe	1	2	1	2	0	0	3	2	3	0	1	2	2	1	2	2	2	26
Circular Economy Action Plan	0	2	1	0	0	2	2	2	3	2	0	3	2	2	2	0	0	23
EU Biodiversity Strategy for 2030	0	2	2	1	1	0	2	2	1	1	0	2	2	3	3	0	2	24
Farm to Fork Strategy	2	3	2	0	0	0	2	2	1	2	0	3	2	2	2	0	1	24
EU Hydrogen Strategy	1	0	0	2	0	0	3	2	3	1	2	2	3	0	0	2	1	22
7 technology flagship Areas, ASGS for 2021	0	0	2	1	1	0	2	3	3	3	3	2	2	0	1	2	1	26
Stepping up Europe's 2030 climate Ambition	0	0	2	1	0	0	3	2	3	3	2	3	3	1	2	0	0	25
Chemicals strategy for Sustainability	0	1	3	0	0	0	1	0	3	0	1	2	3	3	3	1	0	21
EU Strategy to reduce methane emissions	1	3	1	1	0	0	2	1	2	0	1	2	1	1	1	1	1	19
A Renovation Wave for Europe	1	0	0	1	0	0	3	1	2	0	3	2	3	1	1	1	1	20
EU Commission Recommendation on Energy Poverty	3	0	0	0	0	0	2	2	0	3	1	1	2	0	0	0	0	14
EU Strategy to harness the potential of offshore renewable energy for a climate neutral future	0	0	0	1	0	0	3	2	3	0	2	1	3	2	0	2	2	21
European Climate Pact	0	2	1	2	1	0	0	1	2	1	2	2	3	2	2	0	0	21
Smart Mobility Strategy	0	1	2	0	0	0	3	0	3	2	2	2	3	2	0	0	1	21
The European economic and financial system: fostering openness, strength and resilience	0	0	1	0	0	0	2	2	2	1	0	1	1	0	1	3	3	17
EU Strategy on Adaptation to Climate Change	2	2	2	1	1	3	2	3	3	2	3	1	3	2	2	2	2	36
Directing finance towards the European Green Deal	0	0	0	0	0	0	0	2	0	2	0	2	3	1	1	0	0	11
Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery	1	2	1	2	0	0	3	2	3	0	1	2	2	1	2	2	2	26
The EU's Blue Economy for a Sustainable Future	0	2	0	1	1	2	2	1	1	0	2	2	2	3	0	0	1	20
European Climate Law	0	2	2	0	0	2	2	2	2	2	0	2	3	2	2	0	2	25
Strategy for Financing the Transition to a Sustainable Economy	0	0	0	0	0	1	1	3	3	3	1	1	2	1	2	3	2	23
Fit for 55	0	0	1	1	0	1	3	2	3	3	3	3	3	0	2	0	2	27
Total Score	**12**	**24**	**24**	**17**	**5**	**11**	**46**	**39**	**49**	**31**	**30**	**43**	**53**	**30**	**31**	**21**	**26**	

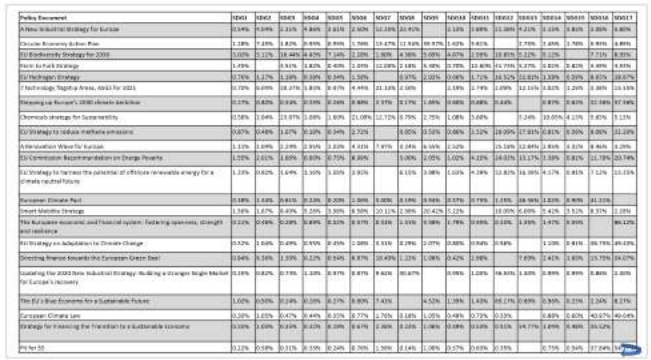
- European Green Deal policies facilitate the implementation of all SDGs, but at different degrees

- Most significant impact (top-5) on:
  - **SDG 13 - Climate Action**
  - **SDG 9 - Industry, innovation and infrastructure**
  - **SDG 7 - Affordable and clean energy**
  - **SDG 12 - Responsible consumption and production**
  - **SDG 8 - Decent work and economic growth**

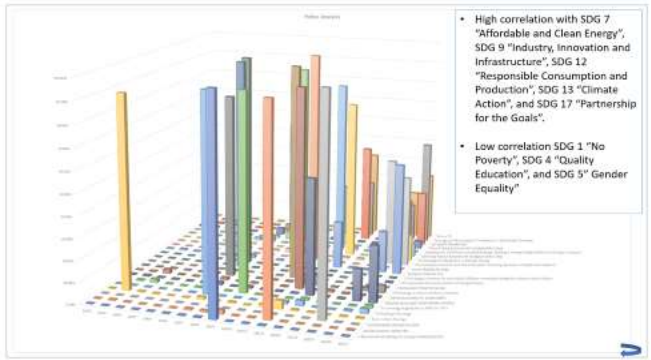
Cross Mapping EGD Policies with SDGs: Machine Learning - Deep Learning Approach

Deep learning refers to very large neural networks with many layers (deep), that allow computational models that are composed of multiple processing layers to learn representations of data with multiple levels of abstraction.

Similarity scores calculated by the Deep Learning model:



Graphical representation of the similarity scores calculated by the Deep Learning model



Results:

- Deep learning model provides improved results compared to other ML approaches we used, via more detailed assessment of the relevance between the EGD policy documents and the SDGs
- High correlation with SDG 7 "Affordable and Clean Energy", SDG 9 "Industry, Innovation and Infrastructure", SDG 12 "Responsible Consumption and Production", SDG 13 "Climate Action", and SDG 17 "Partnership for the Goals".
- Low correlation SDG 1 "No Poverty", SDG 4 "Quality Education", and SDG 5" Gender Equality", which are important for social cohesion.
- Results line with the HTMA approach
- *Global multiple crisis calls for transformative public investments that will shape a sustainable and fair, green and digital transition, and leverage private sector investment. We need holistic transformations, jointly implementing the EGD and SDGs*

SDSN EGD SWG – Deep Learning

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
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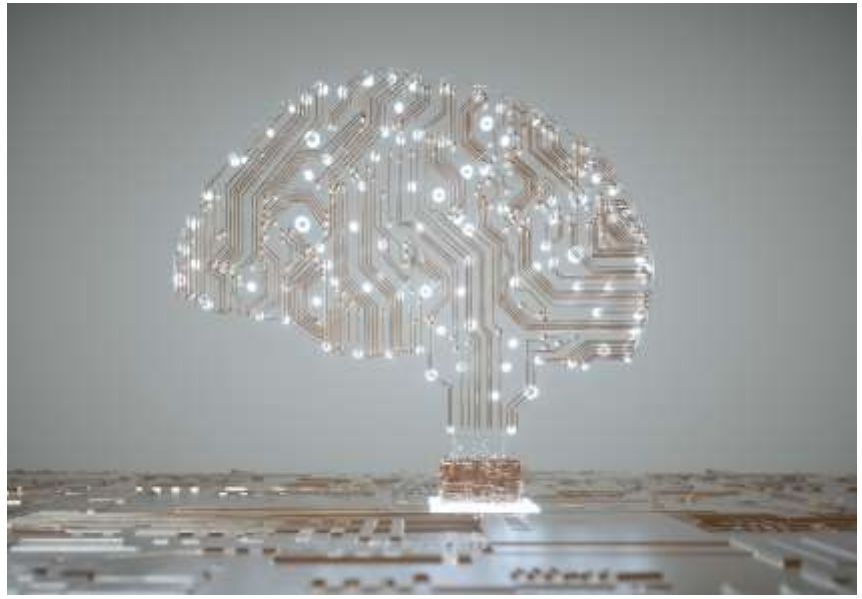
- To validate the linkages identified by the human mapping, to create a fast classifier, and to discover new possible connections between the SDGs and the policy documents, we have used Deep Learning.
- Deep Learning refers to extensive neural networks with many layers that allow computational models (composed of multiple processing layers) to “learn” representations of data with multiple levels of abstractions.



SDSN EGD SWG – Deep Learning

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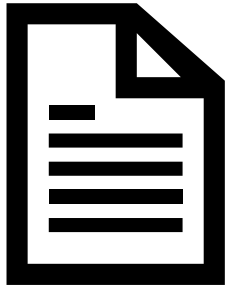
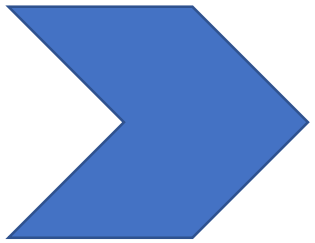
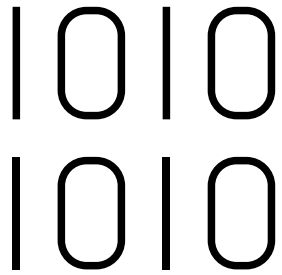


Policy Documents were imported in html form

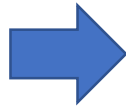




They were transformed into Tokens (in a machine-readable form)

The trained model calculates the probability of the relation of X policy document to the Y SDG.

- We have fine-tuned a pretrained BERT model using more than 15,000 text excerpts from the OSDG Database, each describing 1 of the 17 SDGs.
- OSDG is an open-source initiative that aims to integrate various existing attempts to classify research according to Sustainable Development Goals, and to make this process open, transparent and user-friendly.



SDSN EGD SWG – Deep Learning

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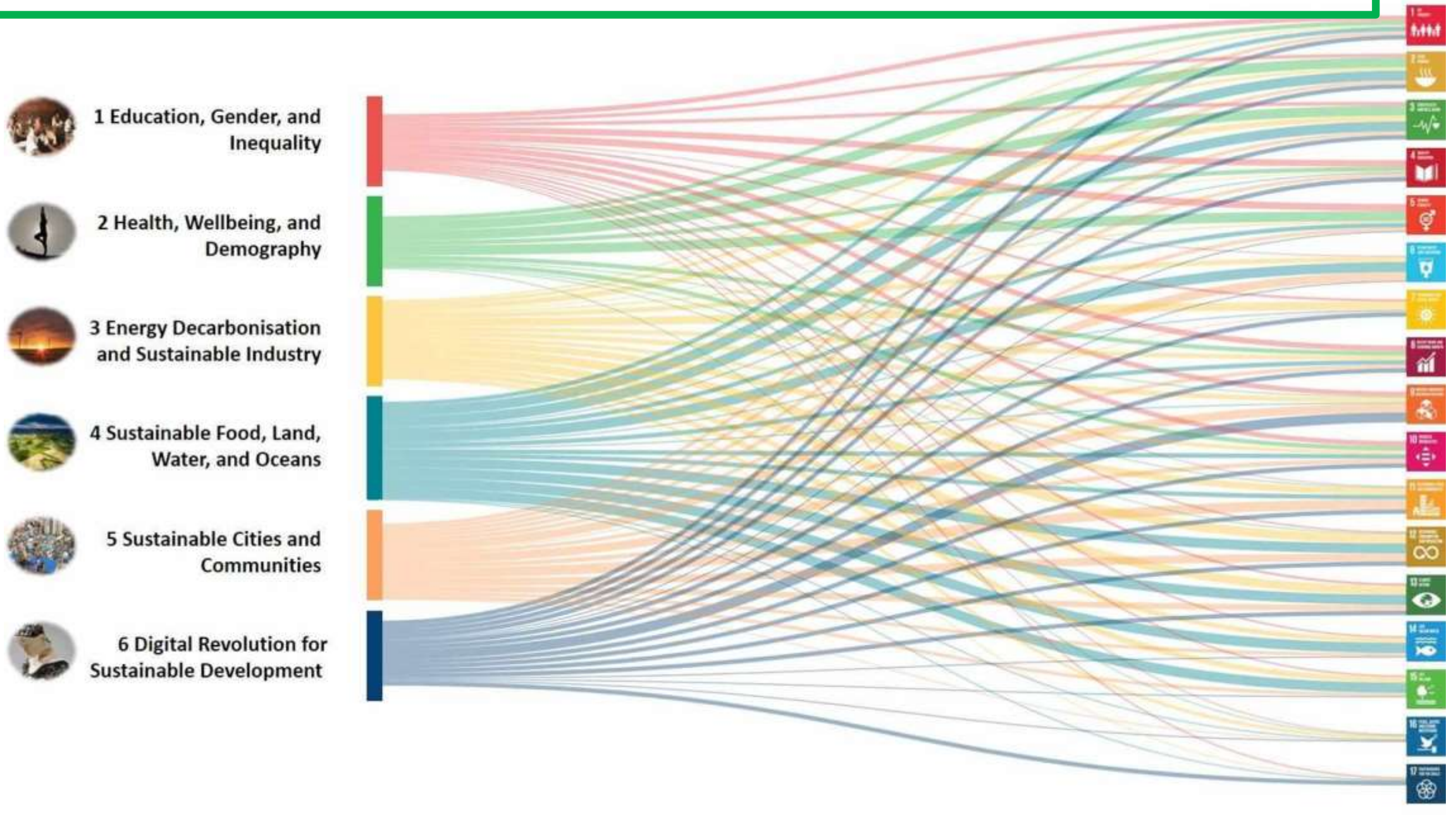
RESULTS

- Strong policy connections to SDG 7, SDG 9, SDG 12, SDG 13 and SDG 13
- Weak policy connections to SDG 1, SDG 4 and SDG 5
- All policies are strongly connected to SDG 16 and SDG 17, showing that without **“Peace. Justice and Strong Institutions”** and without building **“Partnerships for the Goals” little can be achieved.**

Cross-Mapping EGD Policies to the 6 Transformations operationalizing the SDGs



Cross-Mapping EGD Policies to the 6 Transformations operationalizing the SDGs

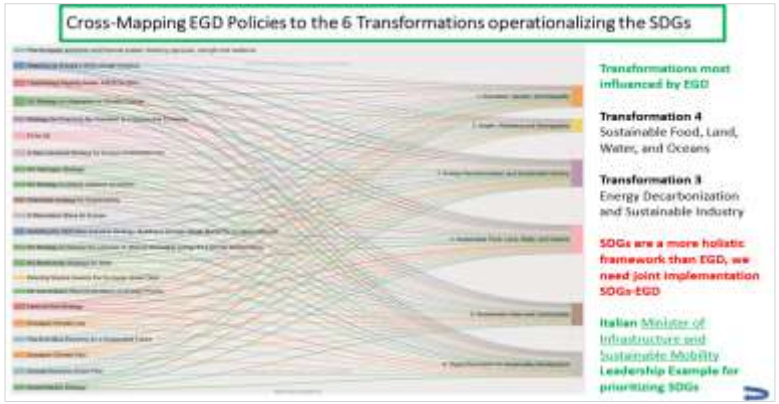
Step 1: Calculation of average contribution of each SDG to each Transformation

	1. Education, Gender, and Inequality	2. Health, Wellbeing and Demography	3. Energy Decarbonisation and Sustainable Industry	4. Sustainable Food, Land, Water, and Oceans	5. Sustainable Cities and Communities	6. Digital Revolution for Sustainable Development
SDG 1-No poverty	2,00	2,00	1,33	2,00	1,50	2,00
SDG 2-Zero hunger	2,00	3,00	1,33	3,00	1,50	2,00
SDG 3-Good health and well-being	1,67	3,00	2,33	3,00	1,50	2,00
SDG 4-Quality education	1,67	2,00	1,00	1,00	1,50	2,00
SDG 5-Gender equality	2,00	3,00	1,33	2,00	1,50	1,00
SDG 6-Clean water and sanitation	1,00	0,00	2,00	3,00	1,50	1,00
SDG 7-Affordable and clean energy	1,67	0,00	2,33	1,00	1,00	2,00
SDG 8-Decent work and economic growth	2,33	2,00	2,00	2,00	1,50	2,00
SDG 9-Industry, innovation and infrastructure	2,00	1,00	2,00	1,00	2,50	3,00
SDG 10-Reduced inequalities	2,00	2,00	1,67	2,00	2,00	2,00
SDG 11-Sustainable cities and communities	1,00	1,00	2,67	2,00	3,00	2,00
SDG 12-Responsible consumption and production	1,33	1,00	2,67	3,00	2,00	2,00
SDG 13-Climate action	1,67	0,00	2,67	3,00	2,50	2,00
SDG 14-Life below water	1,33	0,00	2,00	3,00	1,00	1,00
SDG 15-Life on land	1,33	0,00	2,33	3,00	1,00	1,00
SDG 16-Peace, justice and strong institutions	1,00	1,00	1,33	1,00	0,50	1,00
SDG 17-Partnerships for the goals	1,00	0,00	0,67	1,00	0,00	2,00

Step 2: Calculation of average contribution of each EGD Policy Document to each Transformation

	1. Education, Gender, and Inequality	2. Health, Wellbeing and Demography	3. Energy Decarbonisation and Sustainable Industry	4. Sustainable Food, Land, Water, and Oceans	5. Sustainable Cities and Communities	6. Digital Revolution for Sustainable Development
A New Industrial Strategy for Europe	42	27	49	50	39	50
Circular Economy Action Plan	38	23	49	55	41	43
EU Biodiversity Strategy for 2030	39	26	47	56	34	42
Farm to Fork Strategy	41	31	48	58	37	45
EU Hydrogen Strategy	36	21	44	38	39	45
7 technology flagship Areas, ASGS for 2021	43	33	53	50	46	51
Stepping up Europe's 2030 climate Ambition	42	26	56	54	47	50
Chemicals strategy for Sustainability	32	19	47	52	36	38
EU Strategy to reduce methane emissions	31	24	38	40	30	37
A Renovation Wave for Europe	30	14	43	39	36	39
EU Commission Recommendation on Energy Poverty	26	18	28	29	26	28
EU Strategy to harness the potential of offshore renewable energy for a climate neutral future	32	14	42	37	34	41
European Climate Pact	34	26	43	50	39	39
Smart Mobility Strategy	34	20	46	45	39	43
The European economic and financial system: fostering openness, strength and resilience	26	15	30	28	21	32
EU Strategy on Adaptation to Climate Change	57	40	70	77	61	65
Directing finance towards the European Green Deal	19	10	25	29	21	20
Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery	42	27	49	50	39	50
The EU's Blue Economy for a Sustainable Future	30	18	40	46	35	35
European Climate Law	40	24	51	59	41	46
Strategy for Financing the Transition to a Sustainable Economy	36	20	44	44	36	42
Fit for 55	43	24	57	55	50	54

Step 3: Visual representation on how EGD policies facilitate each Transformation



Transformation	Principal line ministries involved in Transformations	SDG interventions	intermediate outputs	Relationship with specific SDGs															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Education, Science and technology and Family and social affairs	Early childhood development	Education and human capital	2	1	2	3	3	1	1	2	2	2	1	1	1	1	1	1	1
		Primary and secondary education																		
		Vocational training and higher education																		
		Social protection system and labour standards	Decent work and income support to vulnerable groups	3	3	2	1	2	1	2	3	1	3	1	1	2	2	2	1	0
		Research and development	Innovation	1	2	1	1	1	1	2	2	3	1	1	2	2	1	1	1	2
2	Health	Universal health coverage	Public health services	2	3	3	2	3	0	0	2	1	2	1	1	0	0	0	1	0
		Healthy behaviours and social determinants of health and well-being																		
3	Buildings/construction Energy Environment Transport	Access to clean energy	Energy access for all	2	1	2	2	2	1	3	2	3	2	3	2	3	1	2	1	0
		Zero-carbon electricity generation	Energy decarbonization	1	2	2	0	1	2	3	2	2	2	2	3	3	2	2	2	1
		Energy efficiency																		
		Electrification and zero-carbon fuels																		
		Curbing pollution	Clean air and water	1	1	3	1	1	3	1	2	1	1	3	3	2	3	3	1	1
4	Agriculture Environment Fisheries and marine resources Forestry Health Water and natural resources	Efficient and resilient agricultural systems and fisheries that support healthy diets and farm livelihoods	Sustainable land use, oceans, and food systems	2	3	3	1	2	3	1	2	1	2	2	3	3	3	3	1	1
		Protection of terrestrial and marine biodiversity, including forests																		
		Healthy food promotion and regulation																		
		Trade and supply chains consistent with sustainable development development																		
		Integrated land-use and water management																		
5	Transport Urban development Water and sanitation	Urban access to water, sanitation and waste management	Transport, water and sanitation infrastructure services	2	2	2	2	2	3	1	2	3	2	3	3	2	2	2	0	0
		Sustainable mobility and transport networks																		
		More compact settlements																		
		Urban adaptation and resilience	Urban resilience	1	1	1	1	1	2	1	1	2	2	3	1	3	0	0	1	0
6	Science and technology Telecommunications	Universal broadband and IT infrastructure	Digital technologies and infrastructure	2	2	2	2	1	1	2	2	3	2	2	2	2	1	1	1	2
		Digital inclusion, skills, privacy protection, and universal identity																		
		Mobilizing digital technologies to achieve all SDGs																		

	1. Education, Gender, and Inequality	2. Health, Wellbeing and Demography	3. Energy Decarbonisation and Sustainable Industry	4. Sustainable Food, Land, Water, and Oceans	5. Sustainable Cities and Communities	6. Digital Revolution for Sustainable Development
SDG 1-No poverty	2,00	2,00	1,33	2,00	1,50	2,00
SDG 2-Zero hunger	2,00	3,00	1,33	3,00	1,50	2,00
SDG 3-Good health and well-being	1,67	3,00	2,33	3,00	1,50	2,00
SDG 4-Quality education	1,67	2,00	1,00	1,00	1,50	2,00
SDG 5-Gender equality	2,00	3,00	1,33	2,00	1,50	1,00
SDG 6-Clean water and sanitation	1,00	0,00	2,00	3,00	2,50	1,00
SDG 7-Affordable and clean energy	1,67	0,00	2,33	1,00	1,00	2,00
SDG 8-Decent work and economic growth	2,33	2,00	2,00	2,00	1,50	2,00
SDG 9-Industry, innovation and infrastructure	2,00	1,00	2,00	1,00	2,50	3,00
SDG 10-Reduced inequalities	2,00	2,00	1,67	2,00	2,00	2,00
SDG 11-Sustainable cities and communities	1,00	1,00	2,67	2,00	3,00	2,00
SDG 12-Responsible consumption and production	1,33	1,00	2,67	3,00	2,00	2,00
SDG 13-Climate action	1,67	0,00	2,67	3,00	2,50	2,00
SDG 14-Life below water	1,33	0,00	2,00	3,00	1,00	1,00
SDG 15-Life on land	1,33	0,00	2,33	3,00	1,00	1,00
SDG 16-Peace, justice and strong institutions	1,00	1,00	1,33	1,00	0,50	1,00
SDG 17-Partnerships for the goals	1,00	0,00	0,67	1,00	0,00	2,00

	1. Education, Gender, and Inequality	2. Health, Wellbeing and Demography	3. Energy Decarbonisation and Sustainable Industry	4. Sustainable Food, Land, Water, and Oceans	5. Sustainable Cities and Communities	6. Digital Revolution for Sustainable Development
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Smart Mobility Strategy	34	20	46	45	39	43
The European economic and financial system: fostering openness, strength and resilience	26	15	30	28	21	32
EU Strategy on Adaptation to Climate Change	57	40	70	77	61	65
Directing finance towards the European Green Deal	19	10	25	29	21	20
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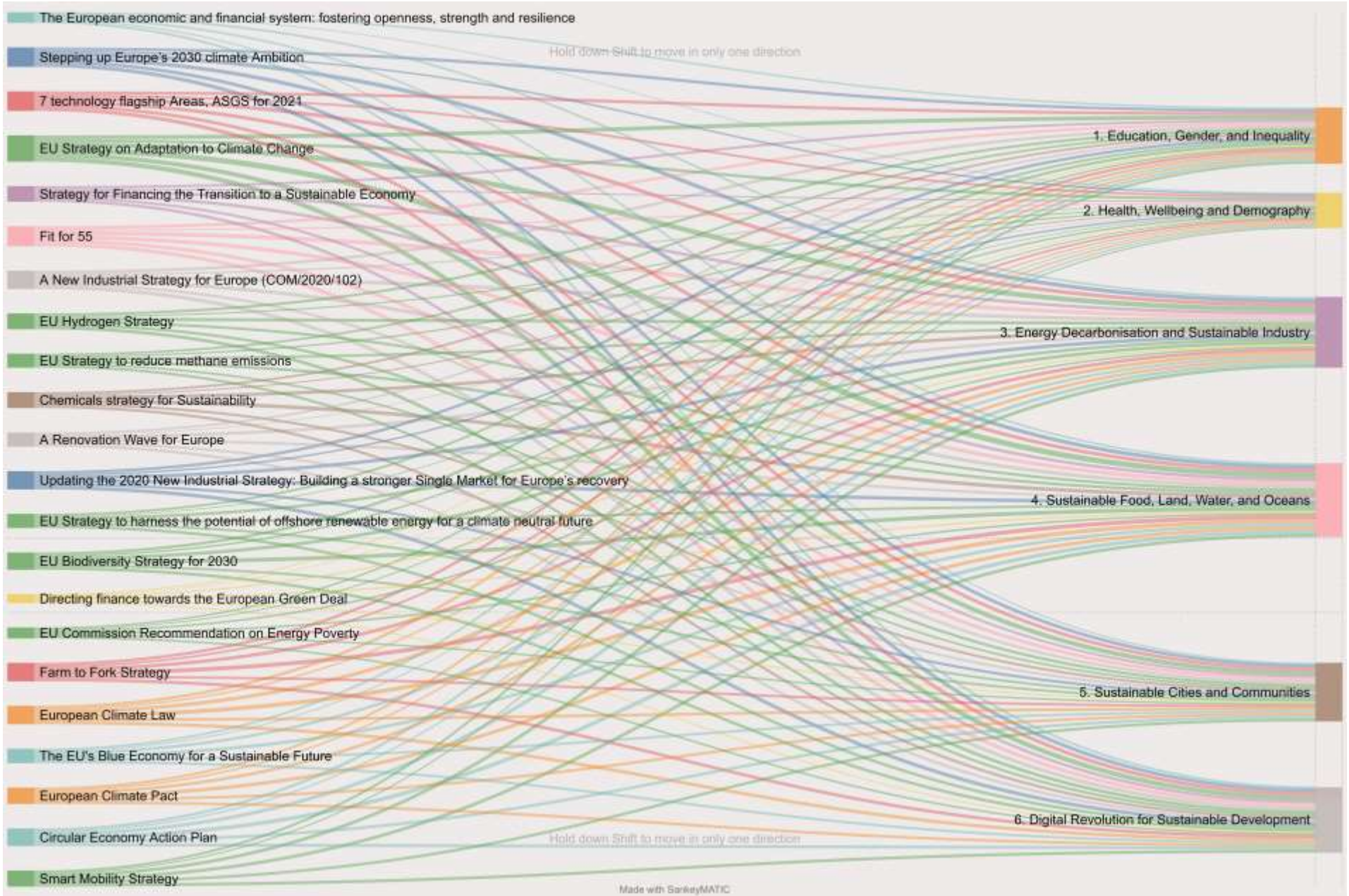
The EU's Blue Economy for a Sustainable Future	30	18	40	46	35	35
European Climate Law	40	24	51	59	41	46
Strategy for Financing the Transition to a Sustainable Economy	36	20	44	44	36	42
Fit for 55	43	24	57	55	50	54

Cross-Mapping EGD Policies to the 6 Transformations operationalizing 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

Italian Minister of Infrastructure and Sustainable Mobility **Leadership Example for prioritizing SDGs**

Cross Mapping EGD Policies to SDGs - Machine Learning - Information Retrieval Approach

Information Retrieval (IR) searches and retrieves information from a “Bag-of-words”

Correlation Matrix between scanned Policy Documents and the each SDG:

Correlation between Policy Documents and the SDGs using Information Retrieval

Policy Short Name	SDG1	SDG2	SDG3	SDG4	SDG5	SDG6	SDG7	SDG8	SDG9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 17
A New Industrial Strategy for Europe (COM/2020/102)	2	1	1	2	0	1	3	3	3	2	2	3	1	2	1	2	3
Circular Economy Action Plan	3	1	1	2	1	2	3	3	3	2	3	3	2	2	2	2	3
EU Biodiversity Strategy for 2030	3	3	2	2	1	3	3	3	3	3	3	3	3	3	3	3	3
Farm to Fork Strategy	3	3	2	2	1	2	3	3	3	3	3	3	3	3	2	2	3
EU Hydrogen Strategy	2	2	1	1	0	2	3	3	3	2	2	3	3	2	1	1	3
7 technology flagship areas, A565 for 2021	3	1	2	2	1	2	3	3	3	2	3	3	2	1	1	2	3
Stepping up Europe's 2030 climate Ambition	3	2	2	2	1	2	3	3	3	3	3	3	3	2	2	2	3
Chemicals strategy for Sustainability	2	2	2	2	1	2	3	2	3	2	2	3	2	2	2	2	3
EU Strategy to reduce methane emissions	3	2	2	1	0	2	3	2	3	2	3	3	3	1	2	2	2
A Renovation Wave for Europe	3	2	2	2	1	2	3	3	3	3	3	3	3	2	2	2	3
EU Commission Recommendation on Energy Poverty	2	0	0	0	0	0	2	2	2	2	2	2	2	2	0	2	2
EU Strategy to harness the potential of offshore renewable energy for a climate neutral future	3	2	1	2	1	2	3	3	3	2	2	3	2	3	1	2	3
European Climate Pact	3	2	2	2	1	2	3	3	3	2	3	2	3	2	1	2	2
Smart Mobility Strategy	3	3	3	3	1	3	3	3	3	3	3	3	3	2	1	3	3
The European economic and financial system: fostering openness, strength and resilience	2	1	1	1	1	1	3	2	3	3	2	2	2	1	1	2	3
EU Strategy on Adaptation to Climate Change	3	3	2	2	1	3	3	3	3	3	3	3	3	3	3	2	3
Directing finance towards the European Green Deal	2	1	1	1	0	1	2	2	2	2	1	2	2	1	1	1	2
Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery	2	1	1	1	1	1	3	3	3	2	2	3	1	2	1	2	3
The EU's Blue Economy for a Sustainable Future	3	2	2	2	1	2	3	3	3	3	3	3	3	3	3	2	3
European Climate Law	3	1	1	1	1	1	3	2	3	2	2	2	3	2	2	2	3
Strategy for Financing the Transition to a Sustainable Economy	3	1	1	2	1	2	3	2	3	3	2	2	3	2	2	2	3
Fit for 55	2	2	1	1	0	1	3	2	3	2	2	3	3	2	2	1	2

Results:

- Most EGD policies are closely related to:
  - SDG1 “No Poverty”
  - SDG7 “Affordable and Clean Energy”
  - SDG8 “Decent Work and Economic Growth”
  - SDG9 “Industry, Innovation and Infrastructure”
  - SDG12 “Responsible Consumption and Production”
  - SDG17 “Partnership for the Goals”
- And least related to:
  - SDG5 “Gender Equality”
  - SDG3 “Good Health and Well-being”
  - SDG4 “Quality Education”

- The algorithm finds a high correlation with SDGs7, SDG8 and SDG9 (consistent with Human Textual Mining Approach - HTMA)

- Correlations with EGD policies higher than those identified by HTMA: SDG 1 “No Poverty”, SDG 6 “Clean Water and Sanitation”, SDG 16 “Peace, Justice and Strong Institutions”, and SDG 17 “Partnership for the Goals”

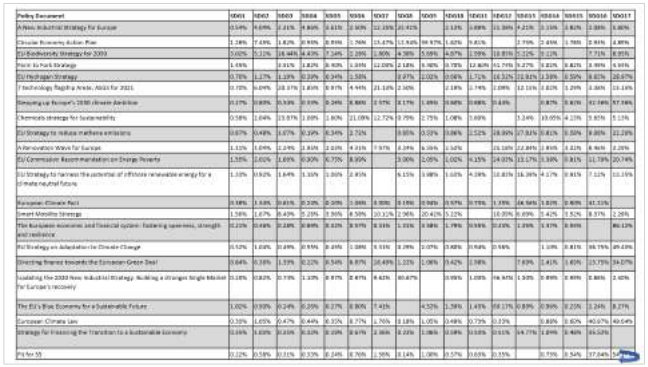
Correlation between Policy Documents and the SDGs using Information Retrieval

Policy Short Name	SDG1	SDG2	SDG3	SDG4	SDG5	SDG6	SDG7	SDG8	SDG9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 17
A New Industrial Strategy for Europe (COM/2020/102)	2	1	1	2	0	1	3	3	3	2	2	3	1	2	1	2	3
Circular Economy Action Plan	2	1	1	2	1	2	3	3	3	2	3	3	2	2	2	2	3
EU Biodiversity Strategy for 2030	3	3	2	2	1	3	2	2	3	3	3	3	3	3	3	3	3
Farm to Fork Strategy	3	3	2	2	1	2	3	3	3	3	3	3	3	3	2	2	3
EU Hydrogen Strategy	2	2	1	1	0	2	3	2	3	2	2	3	3	2	1	1	3
7 technology flagship Areas, ASGS for 2021	3	1	2	2	1	2	3	3	3	2	3	3	2	1	1	2	3
Stepping up Europe's 2030 climate Ambition	3	2	2	2	1	2	3	3	3	3	3	3	3	2	2	2	3
Chemicals strategy for Sustainability	2	2	2	2	1	2	3	2	3	2	2	3	2	2	2	2	3
EU Strategy to reduce methane emissions	2	2	2	1	0	2	3	2	3	2	3	3	3	1	2	2	2
A Renovation Wave for Europe	3	2	2	2	1	2	3	3	3	3	3	3	3	2	2	2	3
EU Commission Recommendation on Energy Poverty	2	0	0	0	0	0	2	1	1	1	1	1	1	1	0	1	1
EU Strategy to harness the potential of offshore renewable energy for a climate neutral future	3	2	1	2	1	2	3	3	3	2	2	3	2	3	1	1	3
European Climate Pact	3	1	1	2	1	1	3	2	3	2	3	2	3	2	1	2	2
Smart Mobility Strategy	3	2	2	2	1	2	3	3	3	3	3	3	3	2	1	2	3
The European economic and financial system: fostering openness, strength and resilience	2	1	1	1	1	1	3	2	3	3	2	2	2	1	1	2	3
EU Strategy on Adaptation to Climate Change	3	3	2	2	1	3	3	3	3	3	3	3	3	3	3	2	3
Directing finance towards the European Green Deal	2	1	1	1	0	1	2	2	2	2	1	2	2	1	1	1	2
Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery	2	1	1	1	1	1	3	3	3	2	2	3	1	2	1	2	3
The EU's Blue Economy for a Sustainable Future	3	2	2	2	1	2	3	3	3	3	3	3	3	3	3	2	3
European Climate Law	3	1	1	1	1	1	3	2	3	2	2	2	3	2	2	2	3
Strategy for Financing the Transition to a Sustainable Economy	3	1	1	2	1	2	3	2	3	3	2	2	3	2	2	2	3
Fit for 55	2	2	1	1	0	1	3	2	3	2	2	3	3	2	2	1	2

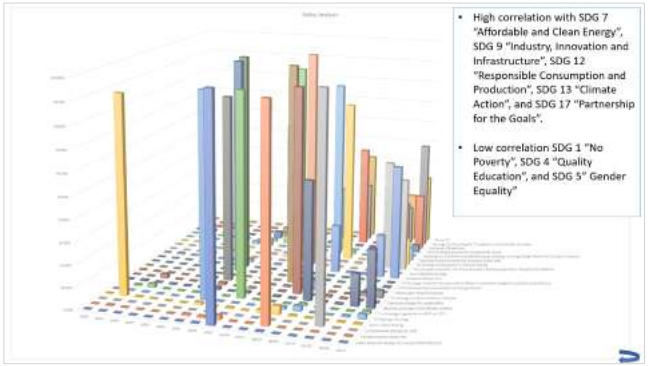
Cross Mapping EGD Policies with SDGs: Machine Learning - Deep Learning Approach

Deep learning refers to very large neural networks with many layers (deep), that allow computational models that are composed of multiple processing layers to learn representations of data with multiple levels of abstraction.

Similarity scores calculated by the Deep Learning model:



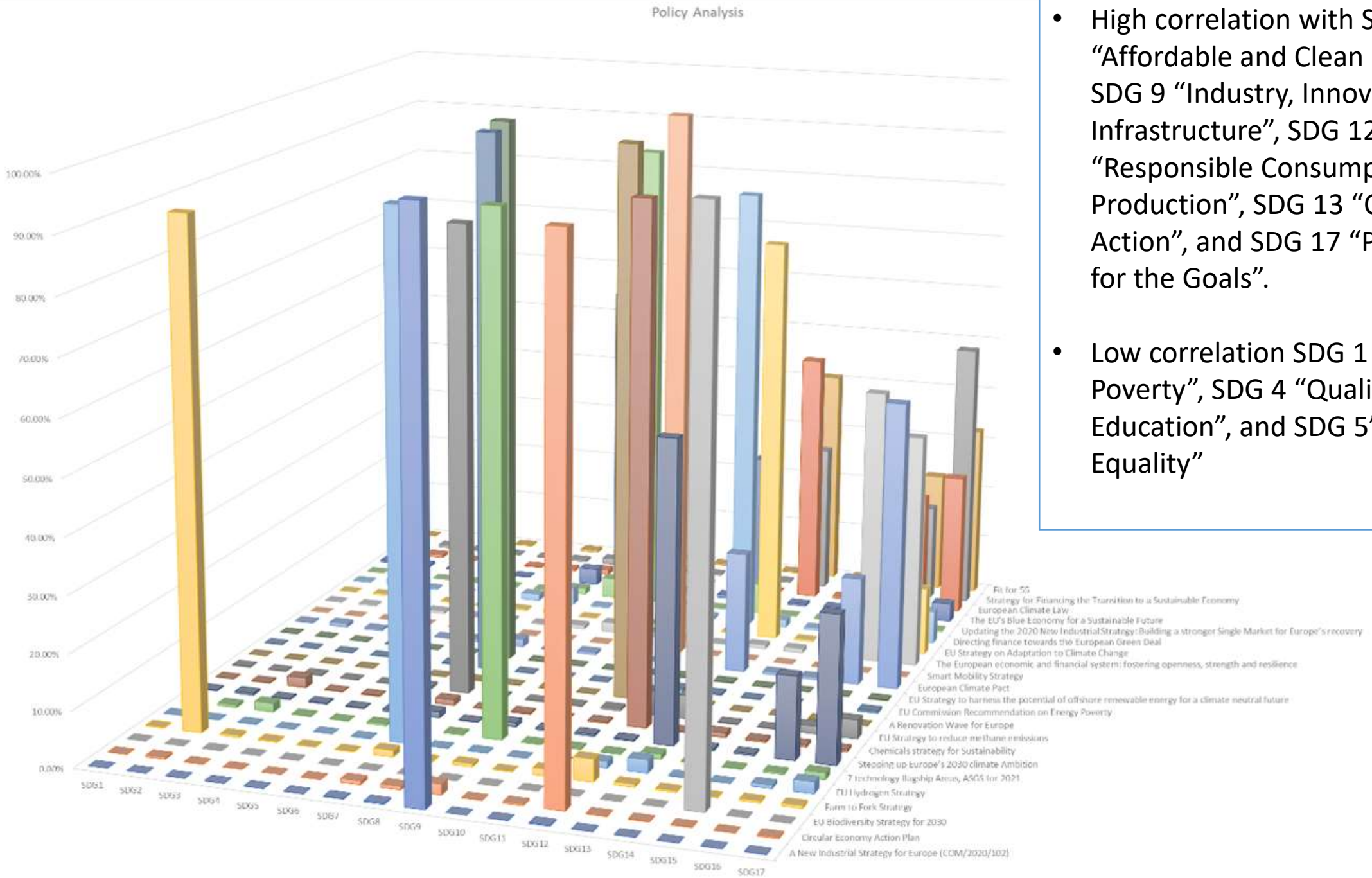
Graphical representation of the similarity scores calculated by the Deep Learning model



Results:

- Deep learning model provides improved results compared to other ML approaches we used, via more detailed assessment of the relevance between the EGD policy documents and the SDGs
- High correlation with SDG 7 "Affordable and Clean Energy", SDG 9 "Industry, Innovation and Infrastructure", SDG 12 "Responsible Consumption and Production", SDG 13 "Climate Action", and SDG 17 "Partnership for the Goals".
- Low correlation SDG 1 "No Poverty", SDG 4 "Quality Education", and SDG 5" Gender Equality", which are important for social cohesion.
- Results line with the HTMA approach
- *Global multiple crisis calls for transformative public investments that will shape a sustainable and fair, green and digital transition, and leverage private sector investment. We need holistic transformations, jointly implementing the EGD and SDGs*

Policy Document	SDG1	SDG2	SDG3	SDG4	SDG5	SDG6	SDG7	SDG8	SDG9	SDG10	SDG11	SDG12	SDG13	SDG14	SDG15	SDG16	SDG17
A New Industrial Strategy for Europe	0.54%	4.04%	2.31%	4.86%	3.61%	2.50%	12.25%	23.41%		2.13%	3.89%	21.38%	4.21%	3.15%	3.83%	2.08%	5.80%
Circular Economy Action Plan	1.28%	7.45%	1.82%	0.95%	0.95%	1.76%	13.47%	12.54%	39.57%	1.62%	5.81%		2.73%	2.45%	1.78%	0.93%	4.89%
EU Biodiversity Strategy for 2030	3.02%	5.11%	16.44%	4.43%	7.14%	2.28%	1.80%	4.38%	5.69%	4.87%	2.99%	10.85%	5.22%	9.12%		7.71%	8.95%
Farm to Fork Strategy	1.45%		3.51%	1.82%	0.40%	1.04%	12.03%	2.18%	5.40%	0.70%	12.60%	41.74%	5.27%	3.02%	0.82%	3.49%	4.54%
EU Hydrogen Strategy	0.76%	1.27%	1.19%	0.39%	0.34%	1.58%		0.97%	2.02%	0.66%	1.71%	16.52%	32.81%	1.58%	0.59%	8.65%	28.97%
7 technology flagship Areas, ASGS for 2021	0.70%	6.04%	20.37%	1.85%	0.97%	4.44%	21.13%	2.50%		2.19%	2.74%	2.09%	12.15%	3.02%	1.29%	3.38%	15.15%
Stepping up Europe's 2030 climate Ambition	0.27%	0.80%	0.34%	0.33%	0.26%	0.88%	2.37%	0.17%	1.65%	0.60%	0.68%	0.44%		0.87%	0.62%	32.36%	57.36%
Chemicals strategy for Sustainability	0.58%	2.04%	23.87%	1.08%	1.60%	21.09%	12.72%	0.79%	2.75%	1.08%	3.60%		3.24%	10.65%	4.13%	5.65%	5.13%
EU Strategy to reduce methane emissions	0.87%	0.48%	1.07%	0.19%	0.34%	2.72%		0.85%	0.53%	0.86%	2.52%	29.09%	27.81%	0.81%	0.58%	9.08%	22.20%
A Renovation Wave for Europe	1.11%	1.04%	2.24%	2.95%	2.03%	4.31%	7.97%	3.24%	6.55%	2.52%		25.18%	22.84%	2.95%	3.32%	8.46%	3.29%
EU Commission Recommendation on Energy Poverty	1.55%	2.01%	1.66%	0.90%	0.75%	8.99%		3.00%	2.05%	1.02%	4.15%	24.03%	13.17%	3.38%	0.81%	11.79%	20.74%
EU Strategy to harness the potential of offshore renewable energy for a climate neutral future	1.33%	0.92%	1.64%	1.16%	1.06%	2.95%		6.15%	3.98%	1.63%	4.39%	32.83%	16.39%	4.17%	0.91%	7.12%	13.35%
European Climate Pact	0.38%	1.34%	0.61%	0.24%	0.20%	1.06%	3.00%	0.19%	0.94%	0.57%	0.73%	1.25%	46.36%	1.02%	0.90%	41.21%	
Smart Mobility Strategy	1.56%	1.67%	8.49%	5.26%	3.96%	6.58%	10.11%	2.96%	20.42%	3.22%		10.09%	6.09%	5.42%	3.52%	8.37%	2.28%
The European economic and financial system: fostering openness, strength and resilience	0.21%	0.46%	0.28%	0.89%	0.32%	0.57%	0.31%	1.31%	3.58%	1.79%	0.55%	0.23%	1.35%	1.47%	0.55%		86.12%
EU Strategy on Adaptation to Climate Change	0.32%	1.04%	0.49%	0.55%	0.45%	1.08%	3.31%	0.29%	2.07%	0.80%	0.94%	0.56%		1.10%	0.81%	36.75%	49.43%
Directing finance towards the European Green Deal	0.84%	6.36%	1.39%	0.22%	0.54%	6.87%	18.49%	1.22%	1.06%	0.42%	2.98%		7.69%	2.41%	1.69%	13.75%	34.07%
Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery	0.25%	0.82%	0.74%	1.10%	0.97%	0.87%	9.62%	30.67%		0.95%	1.03%	46.54%	1.30%	0.99%	0.99%	0.86%	2.30%
The EU's Blue Economy for a Sustainable Future	1.02%	0.90%	0.24%	0.26%	0.27%	0.80%	7.41%		4.52%	1.39%	1.43%	69.17%	0.89%	0.96%	0.23%	2.24%	8.27%
European Climate Law	0.30%	1.05%	0.47%	0.44%	0.35%	0.77%	1.76%	0.18%	1.05%	0.49%	0.73%	0.33%		0.88%	0.60%	40.97%	49.64%
Strategy for Financing the Transition to a Sustainable Economy	0.35%	1.03%	0.35%	0.32%	0.19%	0.67%	2.36%	0.23%	1.06%	0.59%	0.53%	0.51%	54.77%	1.04%	0.48%	35.52%	
Fit for 55	0.22%	0.58%	0.31%	0.33%	0.24%	0.76%	1.56%	0.14%	1.00%	0.57%	0.63%	0.35%		0.75%	0.54%	37.84%	54.17%



- High correlation with SDG 7 “Affordable and Clean Energy”, SDG 9 “Industry, Innovation and Infrastructure”, SDG 12 “Responsible Consumption and Production”, SDG 13 “Climate Action”, and SDG 17 “Partnership for the Goals”.

- Low correlation SDG 1 “No Poverty”, SDG 4 “Quality Education”, and SDG 5” Gender Equality”

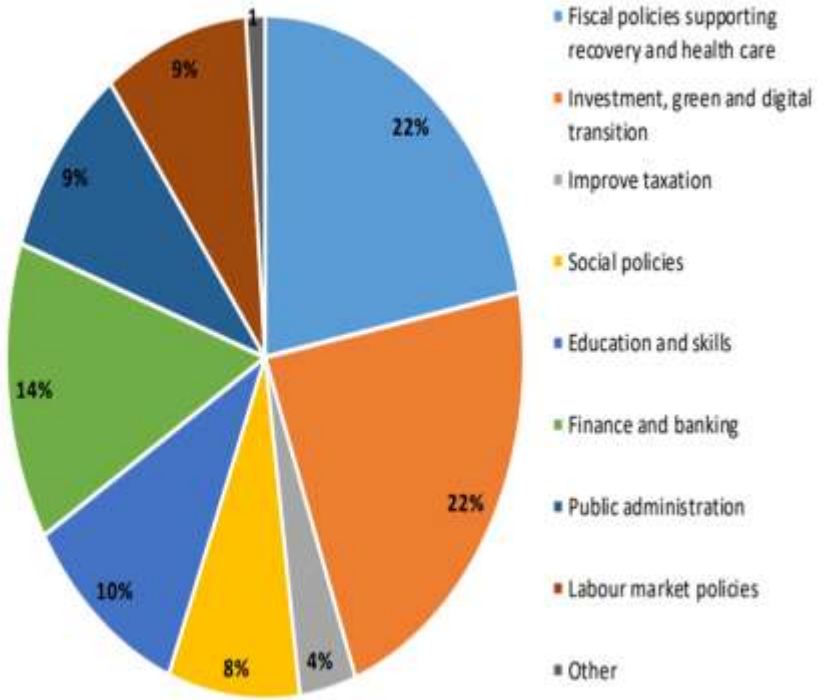
Does the European Semester Process facilitate the implementation of the SDGs?

SDGs – EGD

	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 17	Total Score
A New Industrial Strategy for Europe	1	2	1	2	0	0	3	2	3	0	1	2	2	1	2	2	2	26
Circular Economy Action Plan	0	2	1	0	0	2	2	2	3	2	0	3	2	2	2	0	0	23
EU Biodiversity Strategy for 2030	0	2	2	1	1	0	2	2	1	1	0	2	2	3	3	0	2	24
Farm to Fork Strategy	2	3	2	0	0	0	2	2	1	2	0	3	2	2	2	0	1	24
EU Hydrogen Strategy	1	0	0	2	0	0	3	2	3	1	2	2	3	0	0	2	1	22
7 technology flagship Areas, ASGS for 2021	0	0	2	1	1	0	2	3	3	3	3	2	2	0	1	2	1	26
Stepping up Europe's 2030 climate Ambition	0	0	2	1	0	0	3	2	3	3	2	3	3	1	2	0	0	25
Chemicals strategy for Sustainability	0	1	3	0	0	0	1	0	3	0	1	2	3	3	3	1	0	21
EU Strategy to reduce methane emissions	1	3	1	1	0	0	2	1	2	0	1	2	1	1	1	1	1	19
A Renovation Wave for Europe	1	0	0	1	0	0	3	1	2	0	3	2	3	1	1	1	1	20
EU Commission Recommendation on Energy Poverty	3	0	0	0	0	0	2	2	0	3	1	1	2	0	0	0	0	14
EU Strategy to harness the potential of offshore renewable energy for a climate neutral future	0	0	0	1	0	0	3	2	3	0	2	1	3	2	0	2	2	21
European Climate Pact	0	2	1	2	1	0	0	1	2	1	2	2	3	2	2	0	0	21
Smart Mobility Strategy	0	1	2	0	0	0	3	0	3	2	2	2	3	2	0	0	1	21
The European economic and financial system: fostering openness, strength and resilience	0	0	1	0	0	0	2	2	2	1	0	1	1	0	1	3	3	17
EU Strategy on Adaptation to Climate Change	2	2	2	1	1	3	2	3	3	2	3	1	3	2	2	2	2	36
Directing finance towards the European Green Deal	0	0	0	0	0	0	0	2	0	2	0	2	3	1	1	0	0	11
Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery	1	2	1	2	0	0	3	2	3	0	1	2	2	1	2	2	2	26
The EU's Blue Economy for a Sustainable Future	0	2	0	1	1	2	2	1	1	0	2	2	2	3	0	0	1	20
European Climate Law	0	2	2	0	0	2	2	2	2	2	0	2	3	2	2	0	2	25
Strategy for Financing the Transition to a Sustainable Economy	0	0	0	0	0	1	1	3	3	3	1	1	2	1	2	3	2	23
Fit for 55	0	0	1	1	0	1	3	2	3	3	3	3	3	0	2	0	2	27
Total Score	12	24	24	17	5	11	46	39	49	31	30	43	53	30	31	21	26	

European Semester Process

Figure: Policy categories addressed in the 2020 Country Specific Recommendations



Source: EGOV based on CSRs as proposed by the Commission for 2020-2021. See below a definition of the categories.

Sweden

OECD

OVERVIEW INDICATORS

Overall

Click on an assessment to view more information.

OVERALL SCORE	OVERALL RANK	SPILLOVER SCORE
84.7	1	67.5

Current Assessment

Click on a goal to view more information.

Legend: SDG achieved · Challenges remain · Significant challenges remain · Major challenges remain · Information unavailable

Trends

Click on a trend to view more information.

Legend: On track or maintaining SDG achievement · Moderately improving · Stagnating · Decreasing · Trend information unavailable

Goal	CSR_1 Address Pandemic - Health System	CSR_2 Employment-Decent Work-Reskill	CSR_3 Energy-Environment-Digital Transition	CSR_4 Improvement to Structural Characteristics	Total	SDSN Dashboard Assessment	SDSN Dashboard Trend	Addressed By CSRs
Goal 1-No Poverty					0	Achieved	↑ On track	Not required
Goal 2-Zero Hunger			2		2	Significant Challenges	↗ Moderately improvement	YES
Goal 3-Good Health & Well Being	3	1			4	Achieved	↑ On track	Not required
Goal 4-Quality Education		3			3	Challenges Remain	↗ Moderately improvement	YES
Goal 5-Gender Equality					0	Achieved	↑ On track	Not required
Goal 6-Clean Water & Sanitation					0	Challenges Remain	↗ Moderately improvement	NO
Goal 7-Affordable & Clean Energy			4		4	Achieved	↑ On track	Not required
Goal 8-Decent Work & Economic Growth		4			4	Challenges Remain	↑ On track	YES
Goal 9-Industry, Innovation & Infrastructure		1	8		9	Challenges Remain	↑ On track	YES
Goal 10-Reduced Inequalities		3			3	Challenges Remain	→ Stagnating	YES
Goal 11-Sustainable Cities & Communities			3		3	Challenges Remain	↗ Moderately improvement	YES
Goal 12-Responsible Consumption & Production					0	Major Challenges	Information Unavailable	NO
Goal 13-Climate Action			4		4	Major Challenges	→ Stagnating	YES
Goal 14-Life Below Water					0	Significant Challenges	→ Stagnating	NO
Goal 15-Life On Land					0	Challenges Remain	↑ On track	NO
Goal 16-Peace Justice & Strong Institutions				2	2	Challenges Remain	↑ On track	YES
Goal 17-Partnerships for the Goals	1			4	5	Challenges Remain	↑ On track	YES
Total Number of relevant SDG indicators	4	12	21	6	43			

CSRs addressing the SDG challenges of Sweden: 50%

Germany

OECD

OVERVIEW INDICATORS

Overall

Click on an assessment to view more information.

OVERALL SCORE	OVERALL RANK	SPILLOVER SCORE
80.8	5	57.0

Current Assessment

Click on a goal to view more information.

Legend: SDG achieved · Challenges remain · Significant challenges remain · Major challenges remain · Information unavailable

Trends

Click on a trend to view more information.

Legend: On track or maintaining SDG achievement · Moderately improving · Stagnating · Decreasing · Trend information unavailable

Goal	CSR_1 Address Pandemic - Health System	CSR_2 Employment- Decent Work- Reskill	CSR_3 Energy- Environment- Digital Transition	CSR_4 Improvement to Structural Characteristics	Total	SDSN Dashboard Assessment	SDSN Dashboard Trend	Addressed By CSRs
Goal 1-No Poverty					0	Challenges Remain	↗ Moderately improvemnet	NO
Goal 2-Zero Hunger					0	Significant Challenges	↗ Moderately improvemnet	NO
Goal 3-Good Health & Well Being	5				5	Challenges Remain	↗ Moderately improvemnet	YES
Goal 4-Quality Education		9			9	Significant Challenges	↗ Moderately improvemnet	YES
Goal 5-Gender Equality					0	Significant Challenges	→ Stagnating	NO
Goal 6-Clean Water & Sanitation					0	Significant Challenges	↗ Moderately improvemnet	NO
Goal 7-Affordable & Clean Energy		4			4	Challenges Remain	↑ On track	YES
Goal 8-Decent Work & Economic Growth	1				1	Challenges Remain	↑ On track	YES
Goal 9-Industry, Innovation & Infrastructure		10			10	Significant Challenges	↑ On track	YES
Goal 10-Reduced Inequalities					0	Challenges Remain	→ Stagnating	NO
Goal 11-Sustainable Cities & Communities		4			4	Challenges Remain	↗ Moderately improvemnet	YES
Goal 12-Responsible Consumption & Production		7			7	Major Challenges	Information Unavailable	YES
Goal 13-Climate Action		4			4	Major Challenges	→ Stagnating	YES
Goal 14-Life Below Water		2			2	Major Challenges	↗ Moderately improvemnet	YES
Goal 15-Life On Land					0	Challenges Remain	↑ On track	NO
Goal 16-Peace Justice & Strong Institutions	1				1	Challenges Remain	↑ On track	YES
Goal 17-Partnerships for the Goals	1	4			5	Challenges Remain	↑ On track	YES
Total Number of relevant SDG indicators	8	44	0	0	52			

CSRs addressing the SDG challenges of Germany: 63%

SUSTAINABLE DEVELOPMENT REPORT | Rankings | Interactive Map | Key Messages | Country Profiles | Data Explorer | Download Report & Materials

Greece

OECD

OVERVIEW | INDICATORS

Overall

Click on an assessment to view more information.

+ OVERALL SCORE	+ OVERALL RANK	+ SPILLOVER SCORE
74.3	43	69.3

Current Assessment

Click on a goal to view more information.

Legend: SDG achieved | Challenges remain | Significant challenges remain | Major challenges remain | Information unavailable

Trends

Click on a trend to view more information.

Legend: On track or maintaining SDG achievement | Moderately improving | Stagnating | Decreasing | Trend information unavailable

Goal	CSR_1 Address Pandemic - Health System	CSR_2 Employment- Decent Work- Reskill	CSR_3 Energy- Environment- Digital Transition	CSR_4 Improvement to Structural Characteristics	Total	SDSN Dashboard Assessment	SDSN Dashboard Trend	Addressed By CSRs
Goal 1-No Poverty		3			3	Challenges Remain	↑ On track	YES
Goal 2-Zero Hunger			2		2	Significant Challenges	→ Stagnating	YES
Goal 3-Good Health & Well Being	3	1		1	5	Significant Challenges	↗ Moderately improvement	YES
Goal 4-Quality Education					0	Major Challenges	↗ Moderately improvement	NO
Goal 5-Gender Equality					0	Significant Challenges	↗ Moderately improvement	NO
Goal 6-Clean Water & Sanitation			5		5	Challenges Remain	↑ On track	YES
Goal 7-Affordable & Clean Energy			4		4	Significant Challenges	↑ On track	YES
Goal 8-Decent Work & Economic Growth		1			1	Significant Challenges	↑ On track	YES
Goal 9-Industry, Innovation & Infrastructure		1	4		5	Significant Challenges	↗ Moderately improvement	YES
Goal 10-Reduced Inequalities		3			3	Significant Challenges	↗ Moderately improvement	YES
Goal 11-Sustainable Cities & Communities		1	3		4	Significant Challenges	↗ Moderately improvement	YES
Goal 12-Responsible Consumption & Production			7		7	Major Challenges	Informartion Unavailable	YES
Goal 13-Climate Action			4		4	Major Challenges	→ Stagnating	YES
Goal 14-Life Below Water			2		2	Significant Challenges	→ Stagnating	YES
Goal 15-Life On Land					0	Significant Challenges	↗ Moderately improvement	NO
Goal 16-Peace Justice & Strong Institutions				1	1	Significant Challenges	↗ Moderately improvement	YES
Goal 17-Partnerships for the Goals	1			5	6	Significant Challenges	→ Stagnating	YES
Total Number of relevant SDG indicators	4	10	31	7	52			

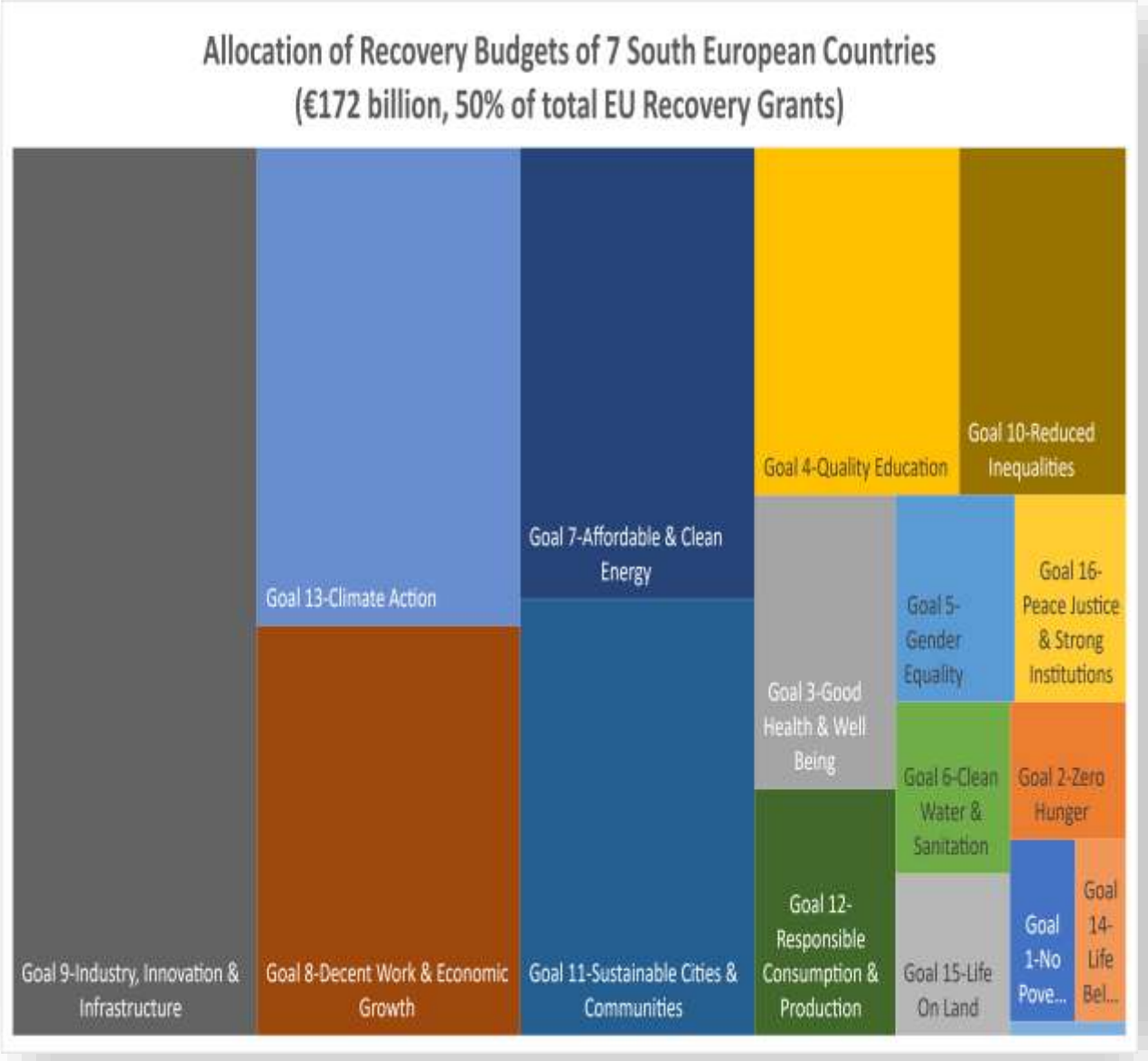
CSRs addressing the SDG challenges of Greece: 80%

SDGs Achieved			45
SDG's Assessment	**Addressed by CSR**	**NOT addressed by CSR**	**Total**
Challenges Remain	120	46	**166**
Significant Challenges	115	44	**159**
Major Challenges	64	20	**84**
Grey (not available info)	1	4	**5**
Total SGDs to be addressed	**300**	**114**	**414**
Grand Total	**17 SDGs for 27 EU countries**		**459**
Efficiency Ratio	**72%**	**28%**	

- ✓ Country Specific Recommendations (CSRs) by ESP efficiently address the challenges identified by SDR.
- ✓ There is still space for further alignment between CSRs and SDGs.

Do the National Recovery and Resilience Plans facilitate the implementation of the SDGs?

Sustainability Assessment of the National Recovery & Resilience Plans 7 South European Member States Bulgaria, Croatia, Cyprus, Greece, Italy, Slovenia and Spain



- All SDGs are addressed by most EU countries, albeit to different degrees.
- SDGs mostly covered, in terms of the number of stimulus measures and budget allocated, **are not always those on which countries face the biggest sustainability challenges** (according to UN SDSN SDR 2021).
- Although several European nations demonstrate relatively poor performance on transforming **food systems and diets** and **biodiversity** goals, these challenges have received lower attention in national RRPs than those of other SDGs like green energy, electrification of transport, and energy efficiency measures.
- Call for increased attention of EU nations to these topics through other post-pandemic public and private investments.

Global Birds Eye View: Qualitative Summary of Resilience Indicators: Major Nations

- The coronavirus pandemic has swept across most of the world, leaving a trail of human and economic destruction

- The pandemic has revealed many cracks in the world's existing political, economic and governance systems, including public health, international cooperation, monetary flexibility and government effectiveness

High Vulnerability
Moderate Vulnerability
Grey: Low Vulnerability
White: No available data

Recovery Spending and the Employment Effects of the Green and Digital Transition

Employment in **clean energy sectors** is set to become an increasingly important part of labour markets, with growth more than offsetting a decline in traditional fossil fuel supply sectors.

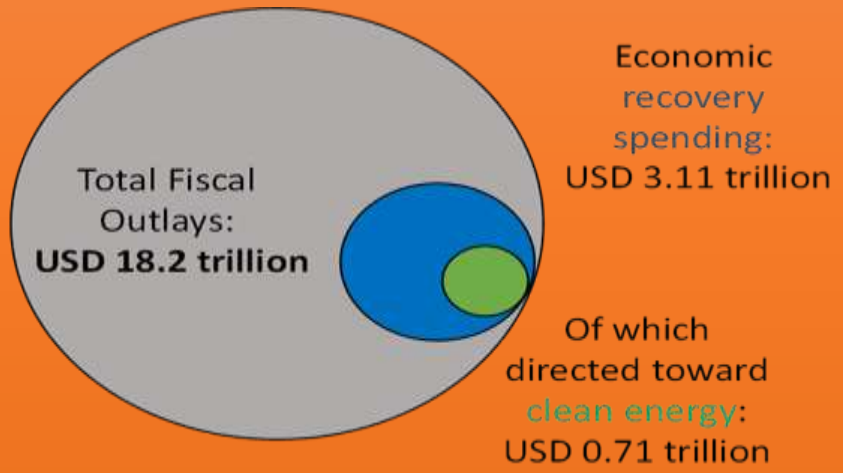
13 million workers employed in clean energy and related sectors by 2030 in the APS, doubles in the NZE by 2050 scenario

New growth:

- Most clean energy jobs are created close to the project's location
- A quarter of energy employment is tied to supply chains that may be located in other countries, particularly for solar, wind, batteries, grid components, and vehicle components
- Spending on these technologies grows 1.6-fold over the next decade in the APS, requiring new manufacturing capacity to be built in each sector.

Global Recovery spending and its impact on a green recovery:

- End of March 2022, governments had spent USD 710 billion on clean energy measures (around 4% of the total fiscal response)

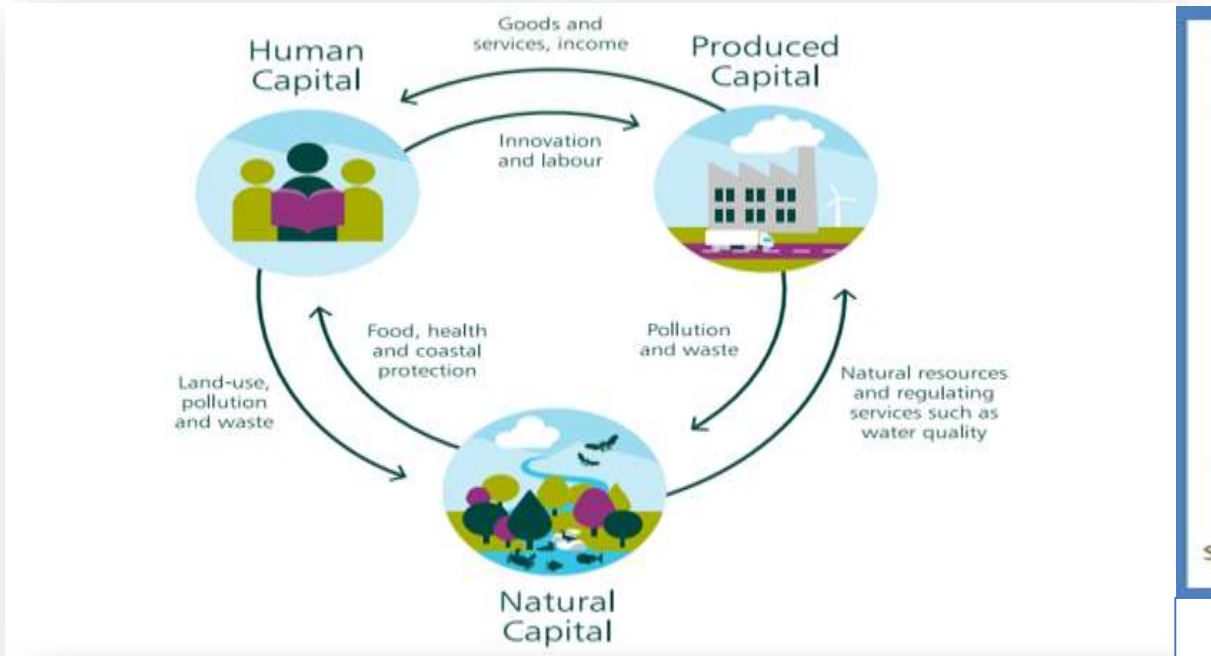


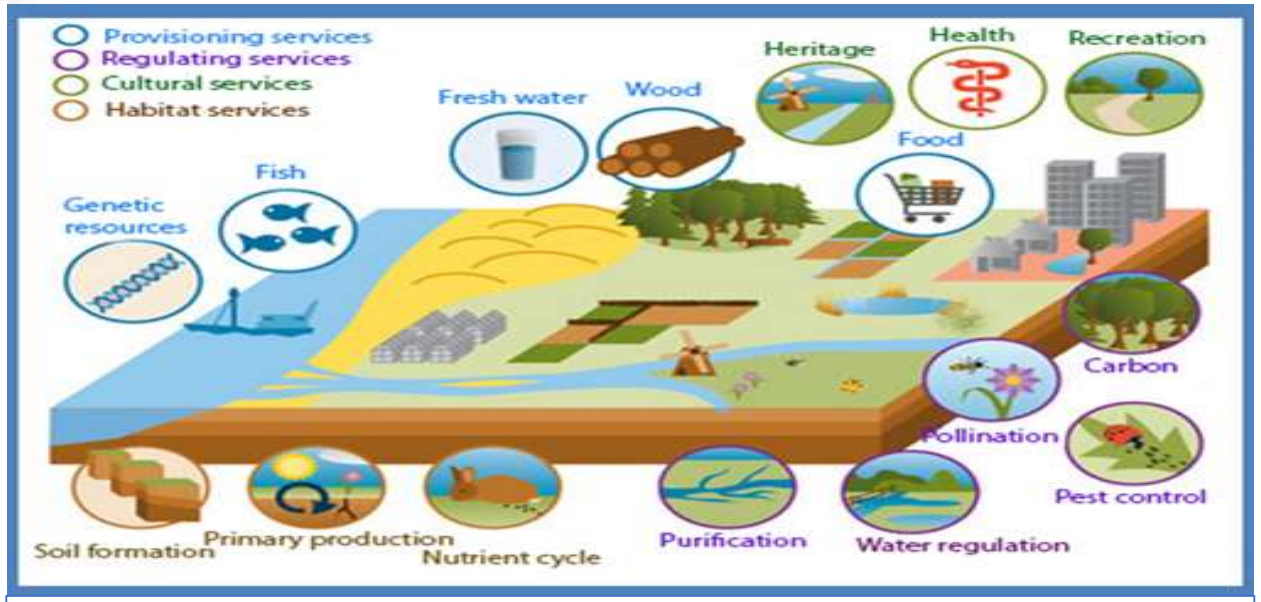
- Advanced economies are nearing levels needed to shift trajectories toward net-zero, but emerging and developing economies are only at 20% of the levels and face narrowing fiscal options as the pandemic wears on

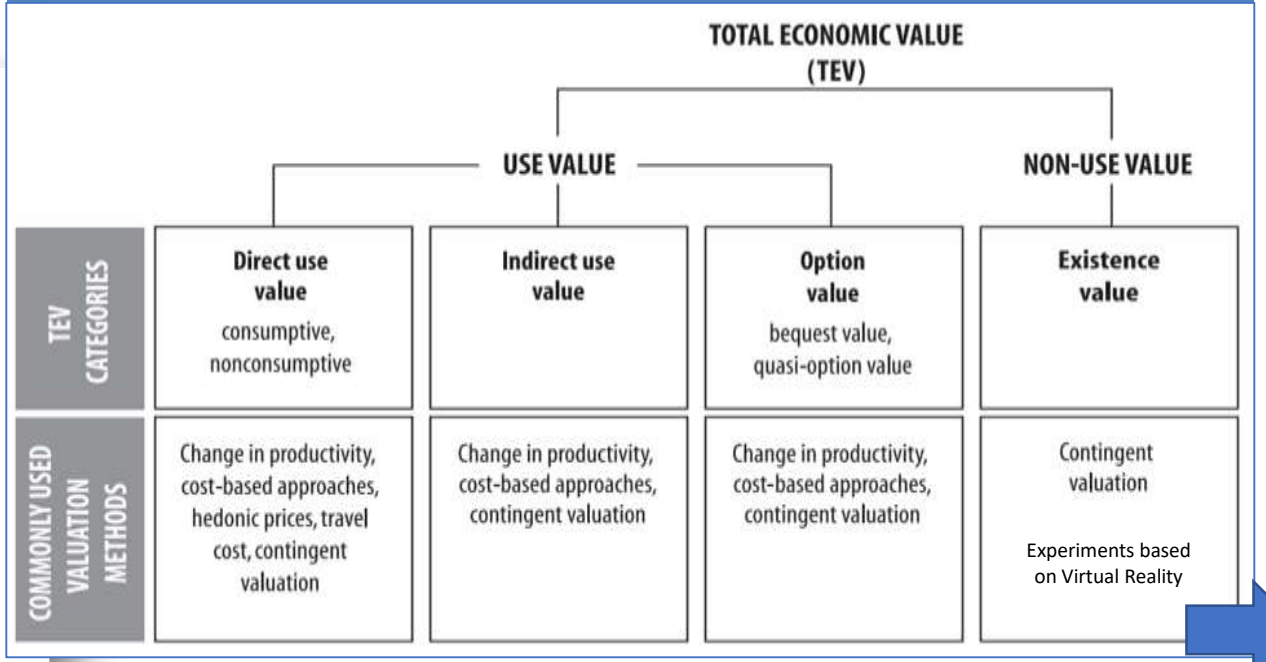
Sustainable Finance

Integrating the Value of Natural Capital

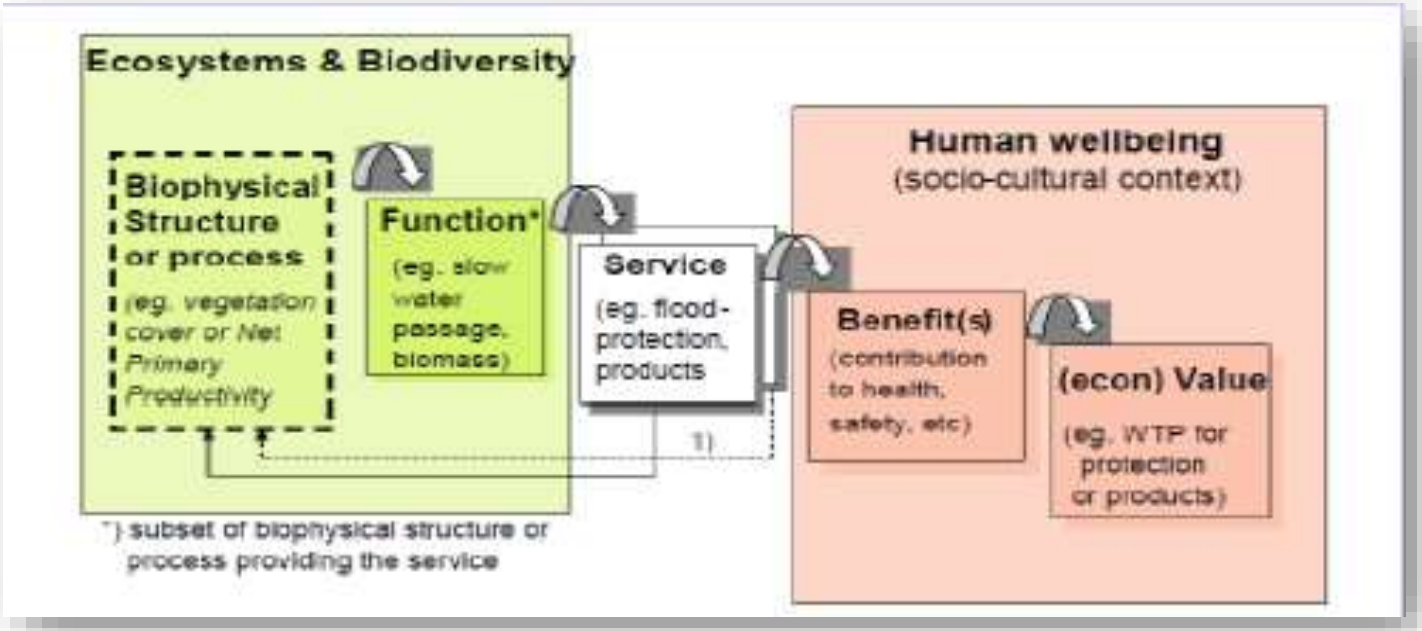
Integrating Natural Capital in the Sustainable Finance Framework







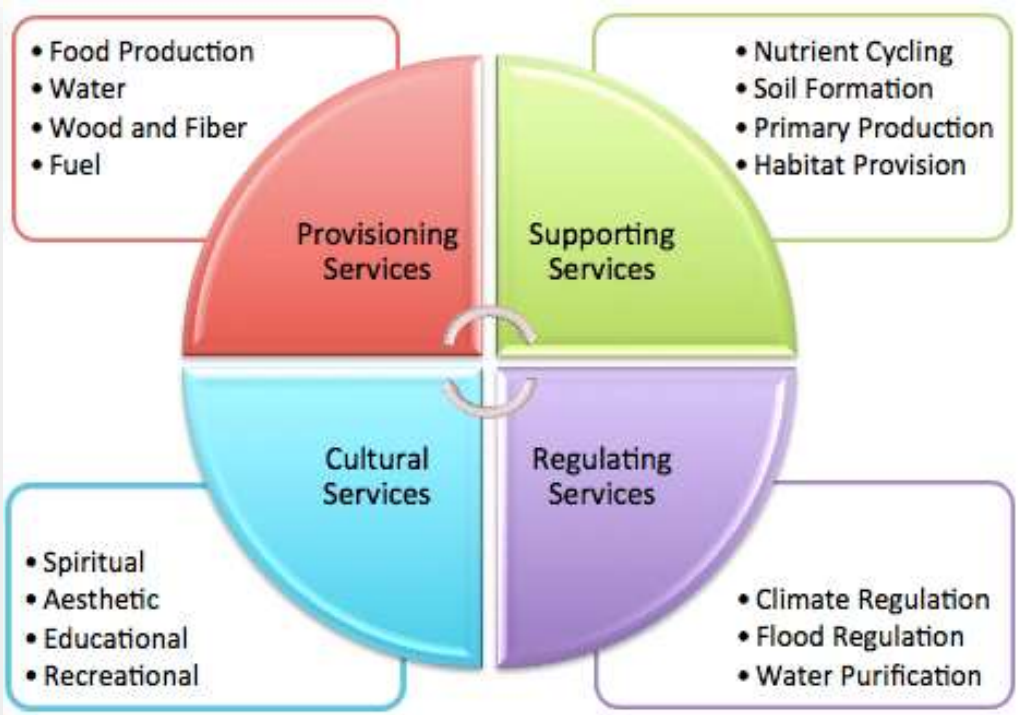
Ecosystem services (Millennium Ecosystem Assessment)



*Ecosystem services are the **conditions** and **processes** through which natural ecosystems, and the species that make them up, **sustain and fulfill human life**.*

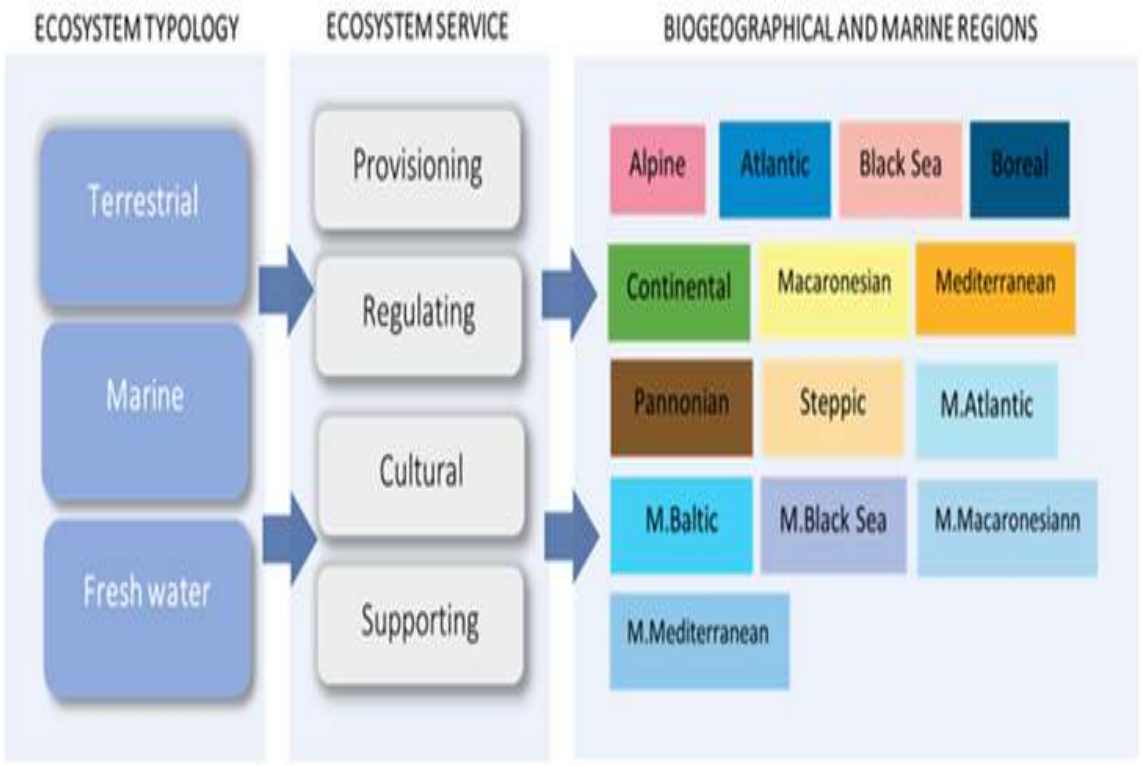
Daily 1997

Provisioning Services: The products obtained from ecosystems
Regulating Services: The benefits obtained from the regulation of ecosystem processes (e.g. flood control)
Cultural Services: The nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences
Supporting services: Services that are necessary for the production of all other ecosystem services



Estimating the Economic Value of Nature

Step 1: Data from literature databases (EVRI, ESVD) for identification of full range of ecosystem services in each biogeographical region of Europe



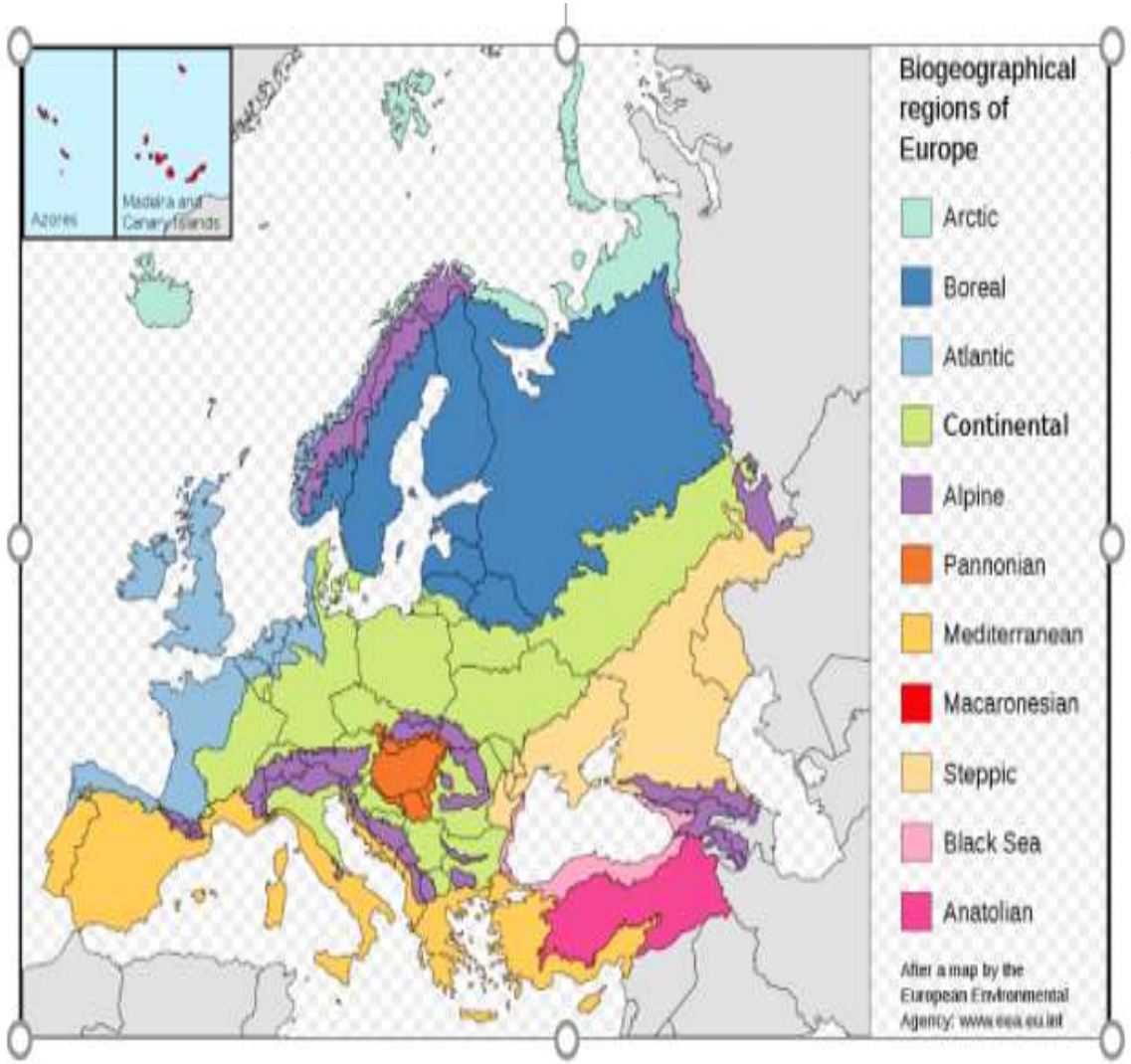


Figure 20 European Bio Geographical Regions

Estimating the Economic Value of Nature

Step 2: Meta-Regression Estimation of the value of ecosystem services using **Benefit Transfer Method** -Estimates economic values by transferring and adjusting existing benefit estimates, from studies already completed for another location.

	All Ecosystems	Terrestrial	Marine & Fresh Water
ALPINE	**148.94**	**105.93**	43.01
	[0.020]	[0.041]	[0.279]
ATLANTIC	**-86.23**	-21.91	**-64.32**
	[0.084]	[0.487]	[0.091]
BOREAL	-82.96	19.39	**-102.34**
	[0.286]	[0.748]	[0.040]
CONTINENTAL	-48.36	-7.07	-41.29
	[0.162]	[0.817]	[0.269]
MEDITERRANEAN.	**-91.73**	**-54.37**	-37.36
	[0.057]	[0.069]	[0.344]
MARINE_ATLANTIC	**-74.40**	**-62.46**	-11.95
	[0.106]	[0.059]	[0.779]
PROVISIONING	**59.32**	25.77	33.55
	[0.075]	[0.292]	[0.259]
REGULATING	**53.19**	12.98	**40.21**
	[0.224]	[0.541]	[0.214]
SUPPORTING	**42.70**	13.46	29.24
	[0.117]	[0.599]	[0.312]
SD_QUESTIONNAIRE	-42.09	**-50.20**	8.11
	[0.351]	[0.118]	[0.803]
AGE	**3.77**	**1.14**	**2.64**
	[0.007]	[0.127]	[0.023]
EDUCATION	**-5.20**	-0.60	-4.60
	[0.187]	[0.853]	[0.387]
CHOICE_EXPERIMENT	**-79.15**	-0.52	**-78.63**
	[0.157]	[0.983]	[0.126]
CONTINGENT_VALUATION	-60.07	10.78	**-70.84**
	[0.297]	[0.704]	[0.161]
R-squared	0.32	0.27	0.18
Adjusted R-squared	0.20	0.15	0.04
F-statistic	**87.90**	**75.71**	**1.96**
	[0.000]	[0.000]	[0.0229]
MWTP	**80.53**	**38.42**	**42.10**

- Higher Marginal WTP/Welfare Benefits in Regulating Ecosystem Service for Marine Ecosystems .
- Mediterranean and Marine Atlantic Regions Higher MWTP for Marine Ecosystems, Boreal and Alpine for Terrestrial.

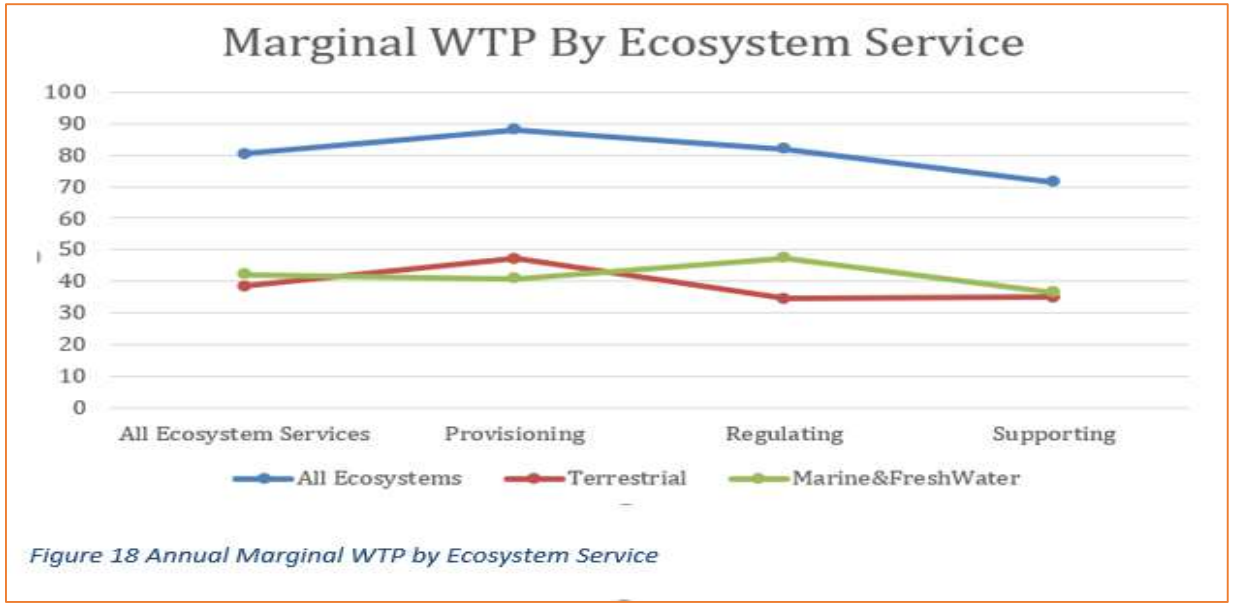


Figure 18 Annual Marginal WTP by Ecosystem Service

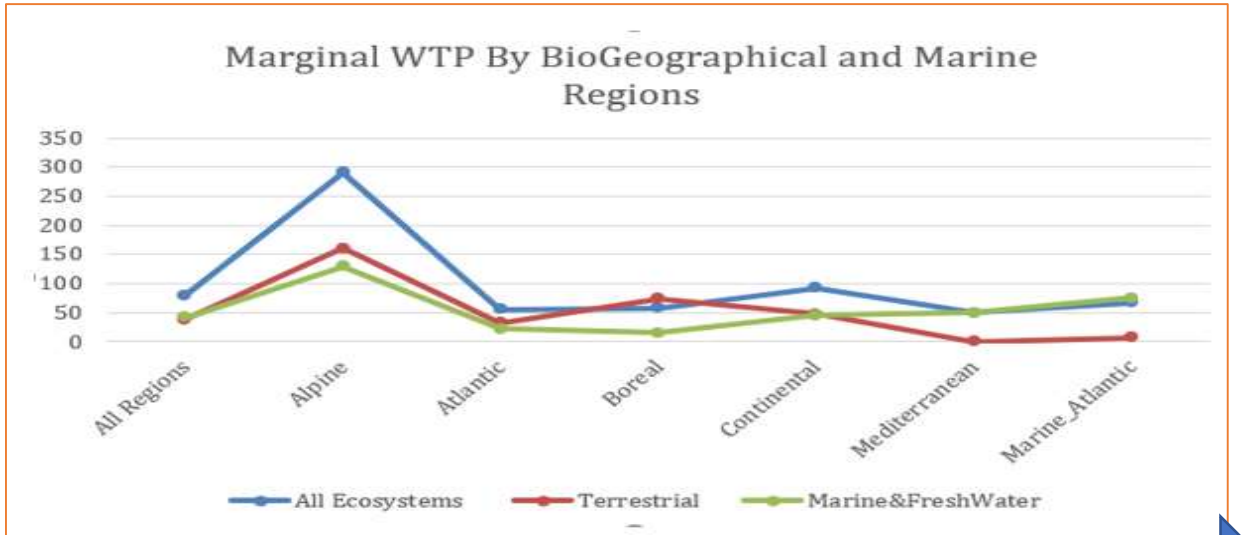
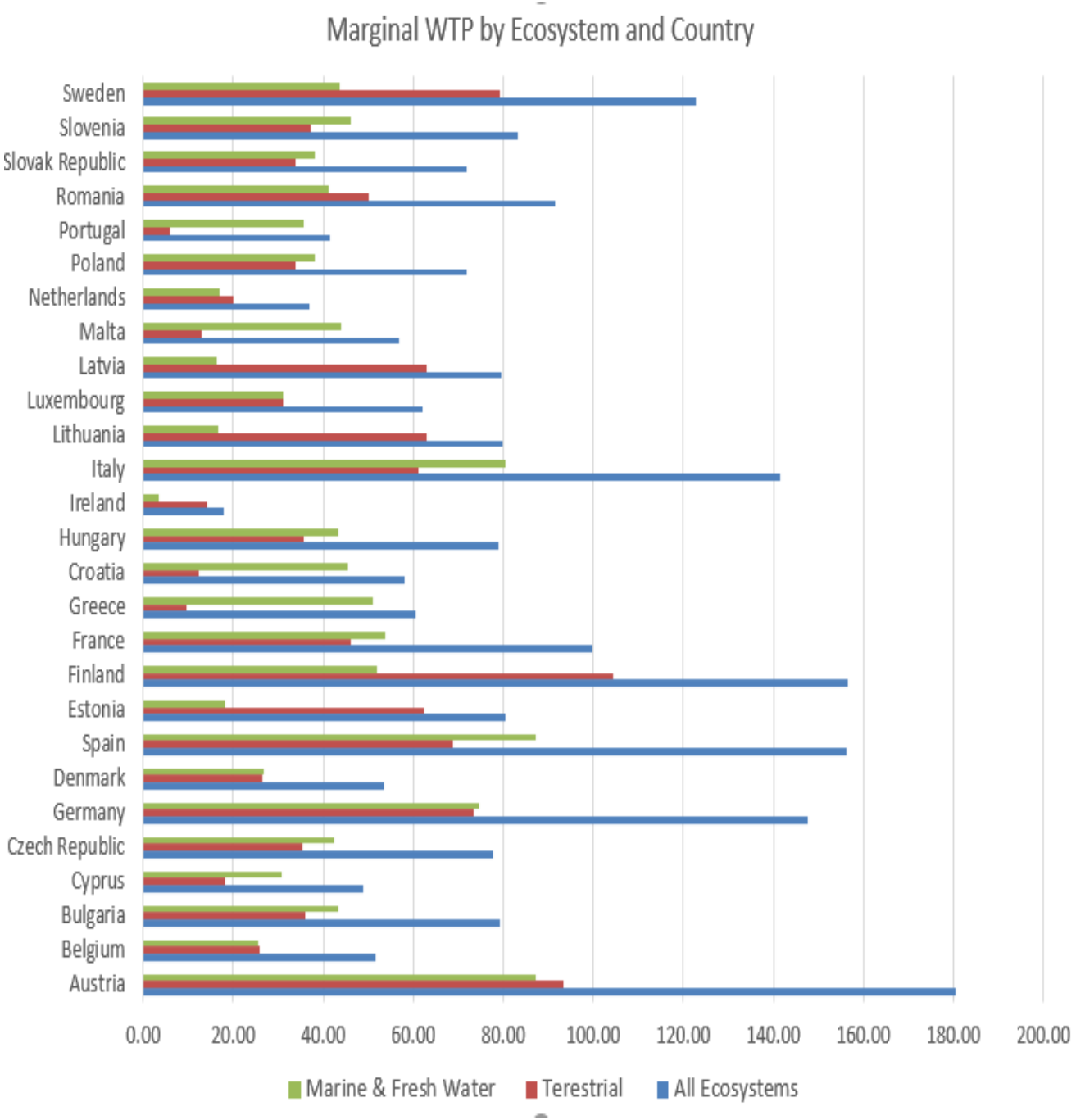
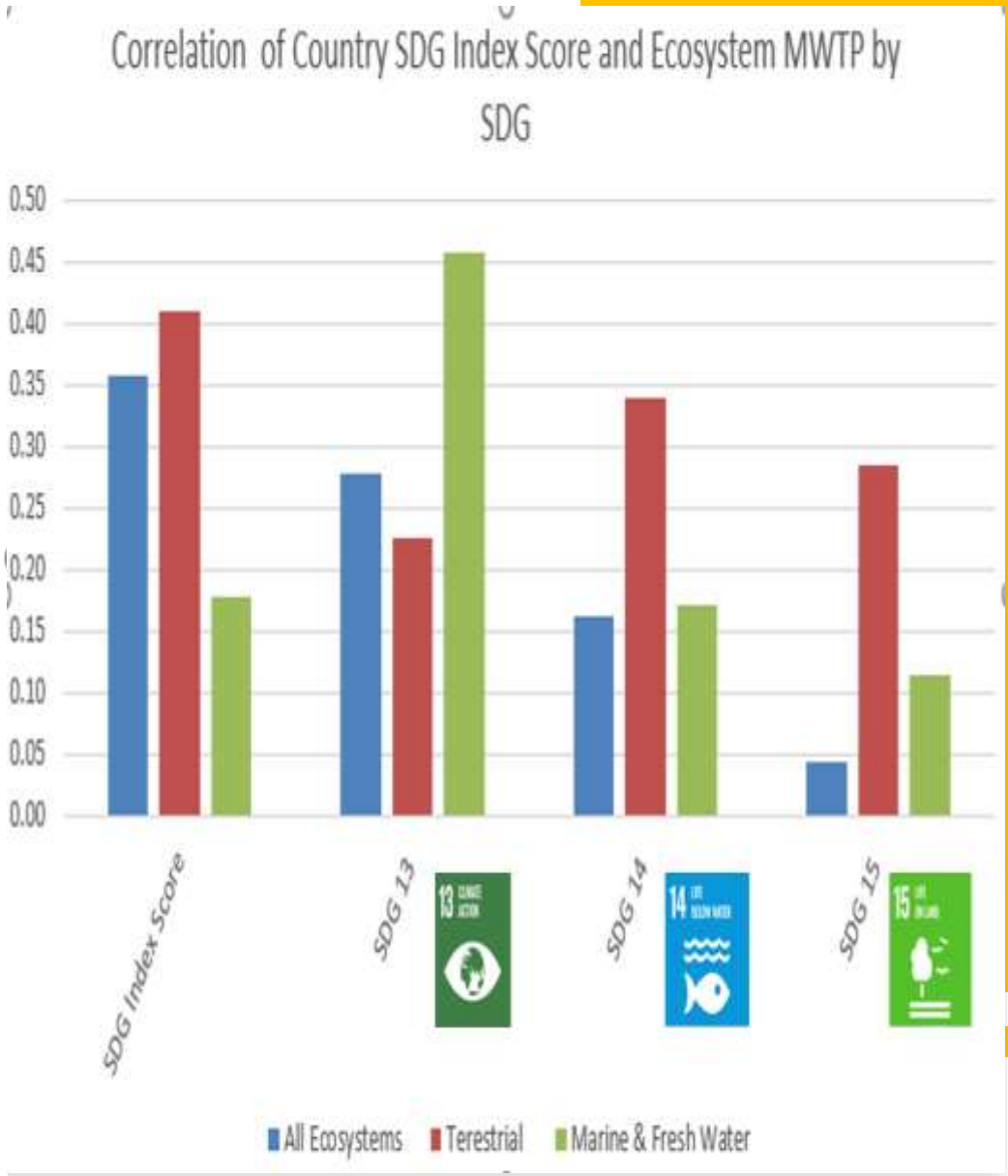


Figure 19 Annual Marginal WTP by Biogeographical Region


Marginal WTP by Ecosystem and Country
Sweden
Slovenia
Slovak Republic
Romania
Portugal
Poland
Netherlands
Malta
Latvia
Luxembourg
Lithuania
Italy
Ireland
Hungary
Croatia
Greece
France
Finland
Estonia
Spain
Denmark
Germany
Czech Republic
Cyprus
Bulgaria
Belgium
Austria
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
200.00
Marine & Fresh Water
Terestrial
All Ecosystems


Correlation of Country SDG Index Score and Ecosystem MWTP by SDG
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
SDG Index Score
SDG 13
SDG 14
SDG 15
All Ecosystems
Terestrial
Marine & Fresh Water

Humanity has the ability to make development sustainable: to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. WCED, 1987

There is something awkward about discounting benefits that arise a century hence.. For even at a modest discount rate, no investment will look worthwhile. The Economist, 1991

FUTURE GENERATIONS:

Value of Distant Benefits & Long-Term Discount Rates

- In an Uncertain Environment persistent shocks on:
  - ✓ the growth rate of consumption
  - ✓ short-term interest rates

→ DDR

Estimate Theory Consistent DDR trajectory

- *Using Historical Data*
- *Without Structural Model*
- *Using univariate time series regime switching models*

DDR for higher PV of Long-Run effects!

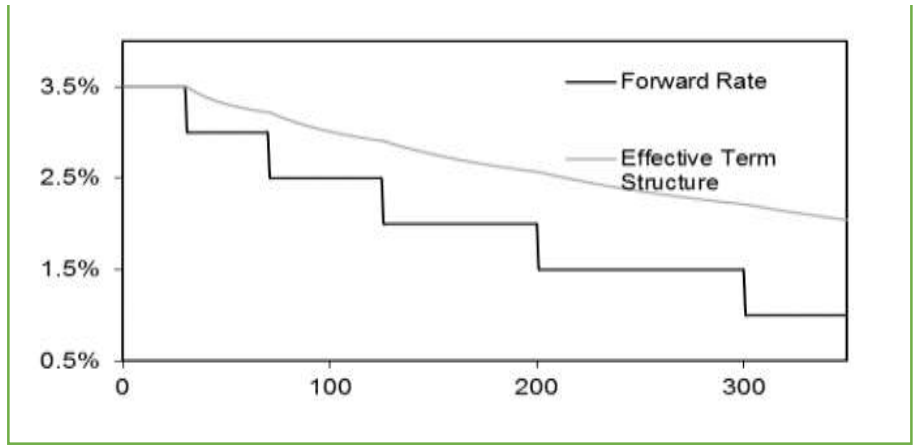
Example: *Climate Change Mitigation*

DDR implies double social cost of CO2 emissions

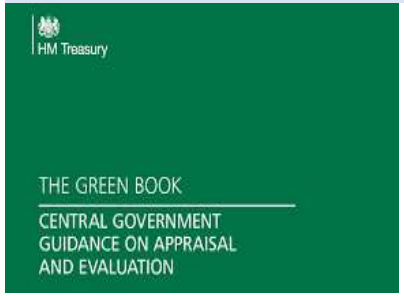
SOCIAL RATE OF TIME PREFERENCE (SRTP): THE RAMSEY FORMULA

$$\rho_t = \delta + \eta g_t$$

- ρ_t: The rate at which society discounts future benefits in year t.
- g_t: The growth rate of per capita consumption between the present and time t.
- δ: The rate at which society discounts the utility of future generations. A value of zero means we judge the utility of future generations to count as much as our utility.
- η: The absolute value of the elasticity of marginal utility of consumption. How valuable is an extra dollar to you as you grow wealthier? Wealth effect.



Recommended Time Declining Schedule



Distributional effects of key EU climate policies until 2050: Identifying measures to Mitigate Regressive Effects

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

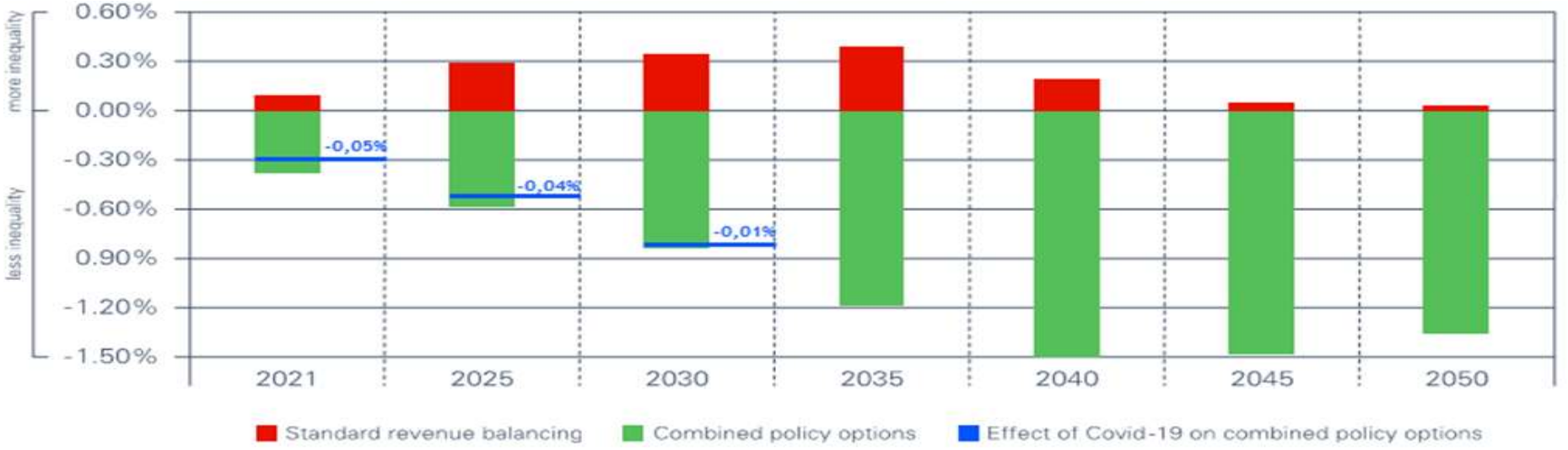
Implementation of **targeted energy efficiency measures** with no upfront costs, specifically targeting low-income households

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

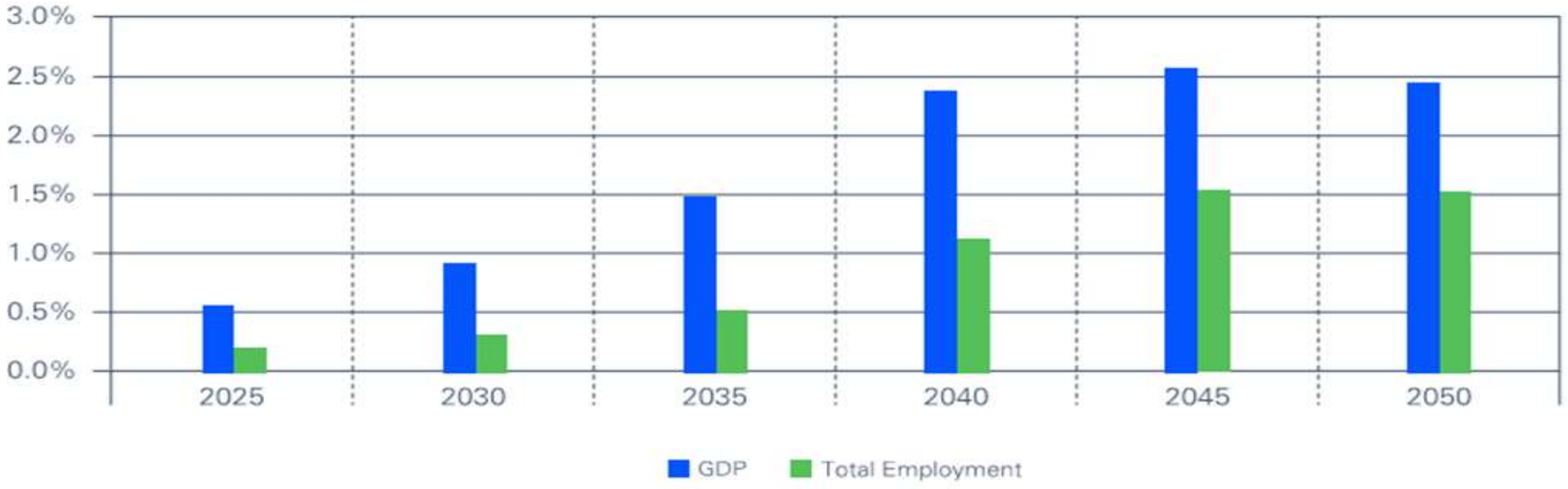
Funding of subsidies for new low-carbon technologies via general taxation or using carbon revenues to avoid uneven bearing of the costs

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…



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.

“Progressonomy ” - a simple dynamic policy approach to address ecological transition

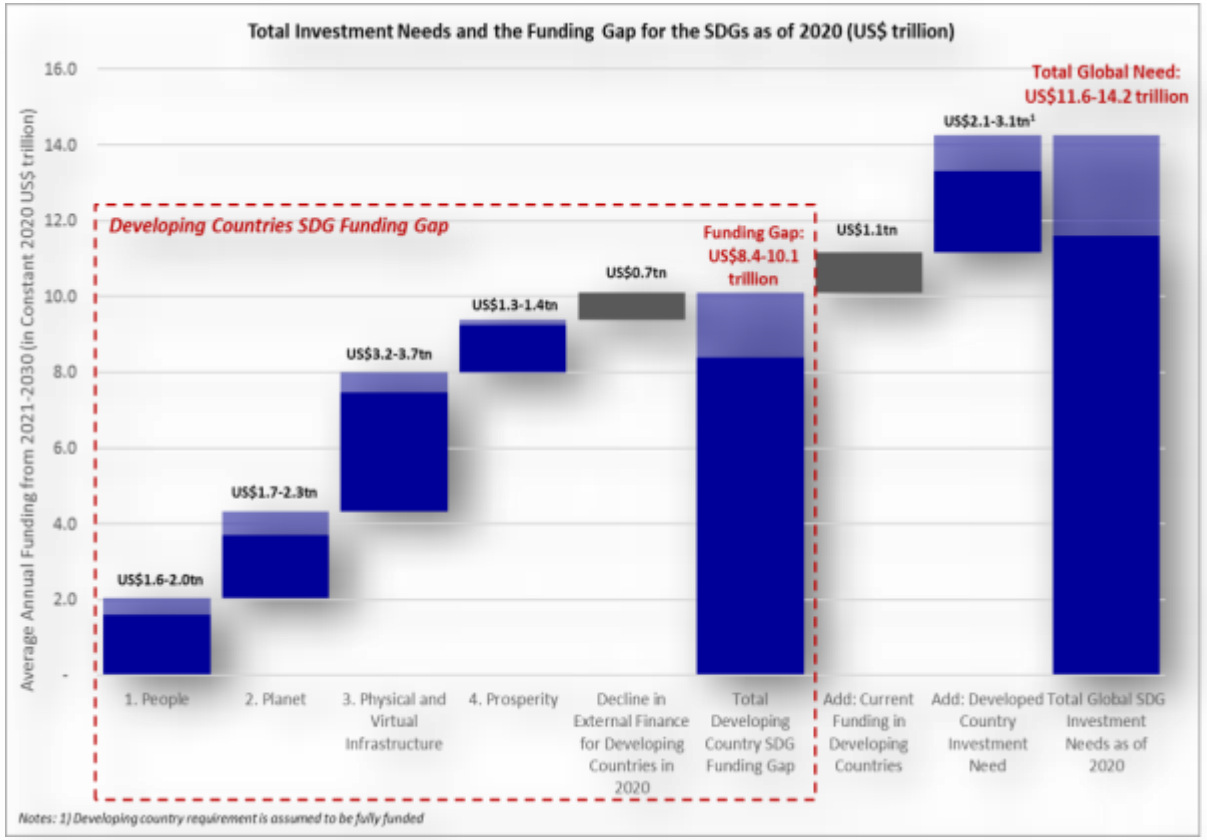
A practical approach to activate a guarantee or a subsidy, based on minimum admissible thresholds of **progress in CO2 abatement** and **adherence to the “Do Not Significant Harm” (DNSH) principle**

Public funds (either in the forms of guarantees or subsidized loans) should be spent on new investments in proportion to their capacity to reduce carbon dioxide emissions.

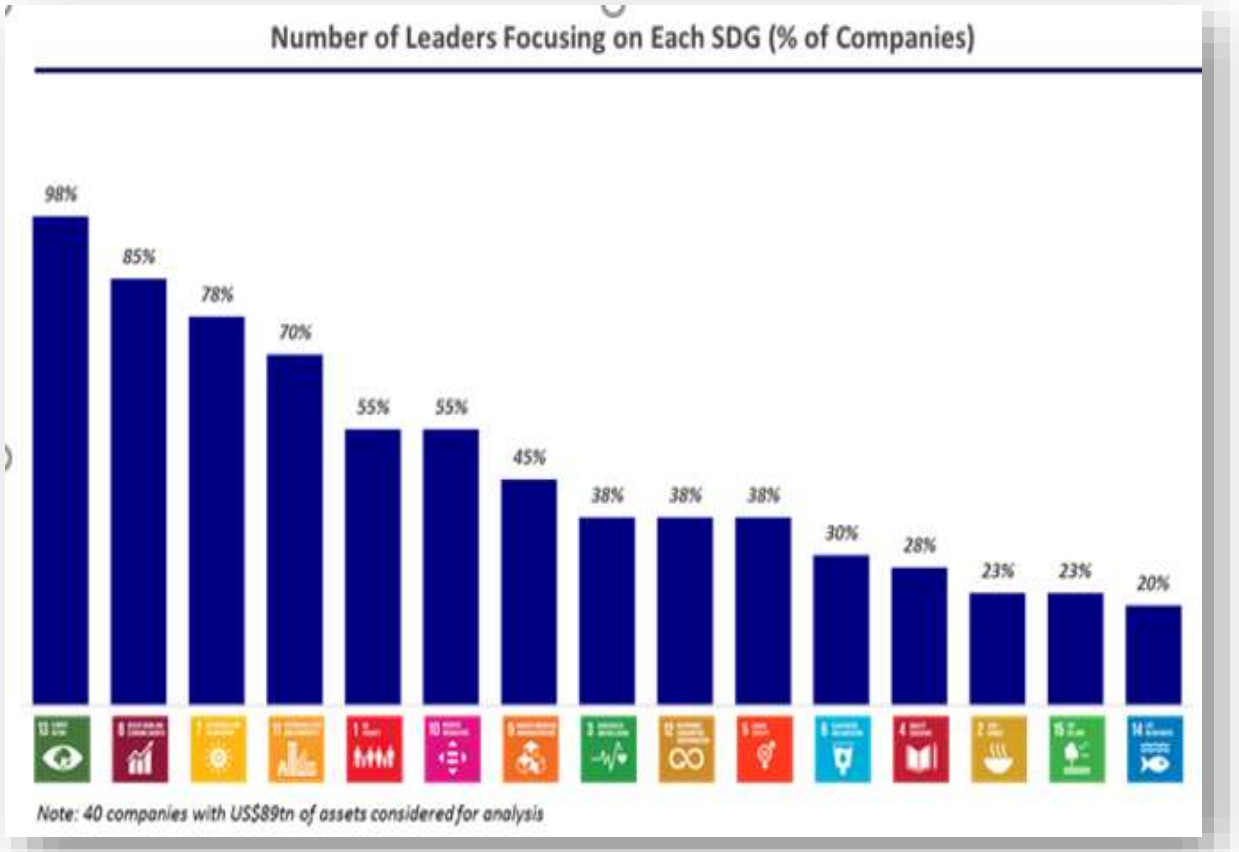
Objective	*KPI (unit)*
1. Climate change mitigation	I1. Net emission of GHGs (kg $CO_{2,\,eq}$)
2. Climate change adaptation	I2. Climate change vulnerability proxy (dimensionless)
3. Sustainable use and protection of water and marine resources	I3. Water scarcity footprint ($m^3_{eq.}$)
4. Transition to a circular economy	I4a. Consumption of fossil fuels and non-regenerative biomass (MJ) I4b: Consumption of primary minerals (kg) I4c: Production of non-recyclable waste (kg)
5. Pollution prevention and control	I5a. Emission of particulate matter (disease incidence) I5b. Photochemical ozone formation (kg NMVOCeq.) I5c. Acidification (mol H+eq.) I5d. Freshwater eutrophication (kg Peq.)
6. Protection and restoration of biodiversity and ecosystems	I6a. Direct land use for anthropic activities (m^2a) I6b. Net deforestation balance (m^2)

Sustainability of Assets under Management - Financing the Green Recovery

The Annual Sustainable Development Goal Funding Gap



SDG Focus and Spending By Finance Industry Leaders



Funding the Future – Key Themes for Execution and Investment:

- The vast majority of the world's capital requires investment themes where profits are made at sufficient levels to reward bold action and risk-taking, allowing for reinvestment in the future, while providing for employment, taxes, social security, and pensions today
- Taking a lesson from the business case for climate change, SDGs need to be more accessible via serious investment in upskilling and reskilling.

Business: ESG criteria and Financial performance

environmental sciences proceedings

ICSD 2021

MDPI

Proceedings

The Impact of ESG performance on the Financial Performance of European Area Companies: An empirical examination †

Prof. Dr Phoebe Koundouri [1], Prof. Dr Nikitas Pittis [2] and Angelos Plataniotis [3]

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[3] Insurance Supervisor at Bank of Greece, Ph.D. candidate in Economics (NKUA), ACCA (UK), M.Sc. in Economics and Finance, M.Sc. in Bioinformatics and Neuroinformatics, angplat@yahoo.gr

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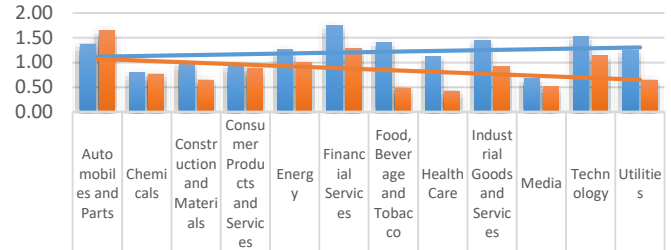
† Presented at the ICSD 2021: 9th International Conference on Sustainable Development, Virtual, 20-21 September 2021.

A Sound ESG performance implies:

- A good financial performance;
- Lower systemic risk (lower Beta);
- Improved profit margins (depending on the business sector);
- Better Returns ('Return-on-Assets (RoA)' and Return-on-Equity (RoE))

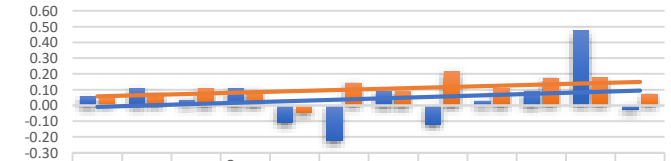
STOXX Europe ESG Leaders 50 (**Blue**) seem to **perform better** than the EURO STOXX 50 (**Significant Challenges**) index:

Average of Beta (5Y Monthly) per sector



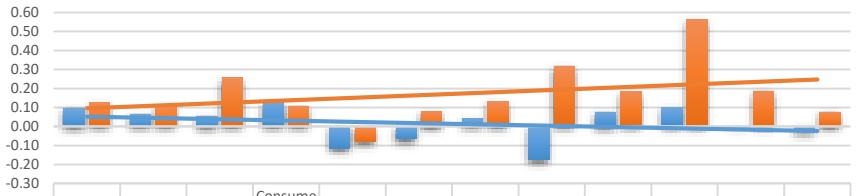
	Automobiles and Parts	Chemicals	Construction and Materials	Consumer Products and Services	Energy	Financial Services	Food, Beverage and Tobacco	Health Care	Industrial Goods and Services	Media	Technology	Utilities
EURO STOXX 50	1.37	0.79	0.99	0.96	1.26	1.75	1.40	1.12	1.44	0.68	1.52	1.25
STOXX Europe ESG Leaders 50	1.64	0.77	0.64	0.89	1.00	1.28	0.48	0.42	0.91	0.51	1.14	0.64

Average of Profit Margin per sector



	Automobiles and Parts	Chemicals	Construction and Materials	Consumer Products and Services	Energy	Financial Services	Food, Beverage and Tobacco	Health Care	Industrial Goods and Services	Media	Technology	Utilities
EURO STOXX 50	0.05	0.10	0.03	0.11	-0.11	-0.23	0.09	-0.12	0.03	0.09	0.47	-0.03
STOXX Europe ESG Leaders 50	0.05	0.08	0.10	0.09	-0.05	0.14	0.09	0.21	0.11	0.17	0.17	0.07

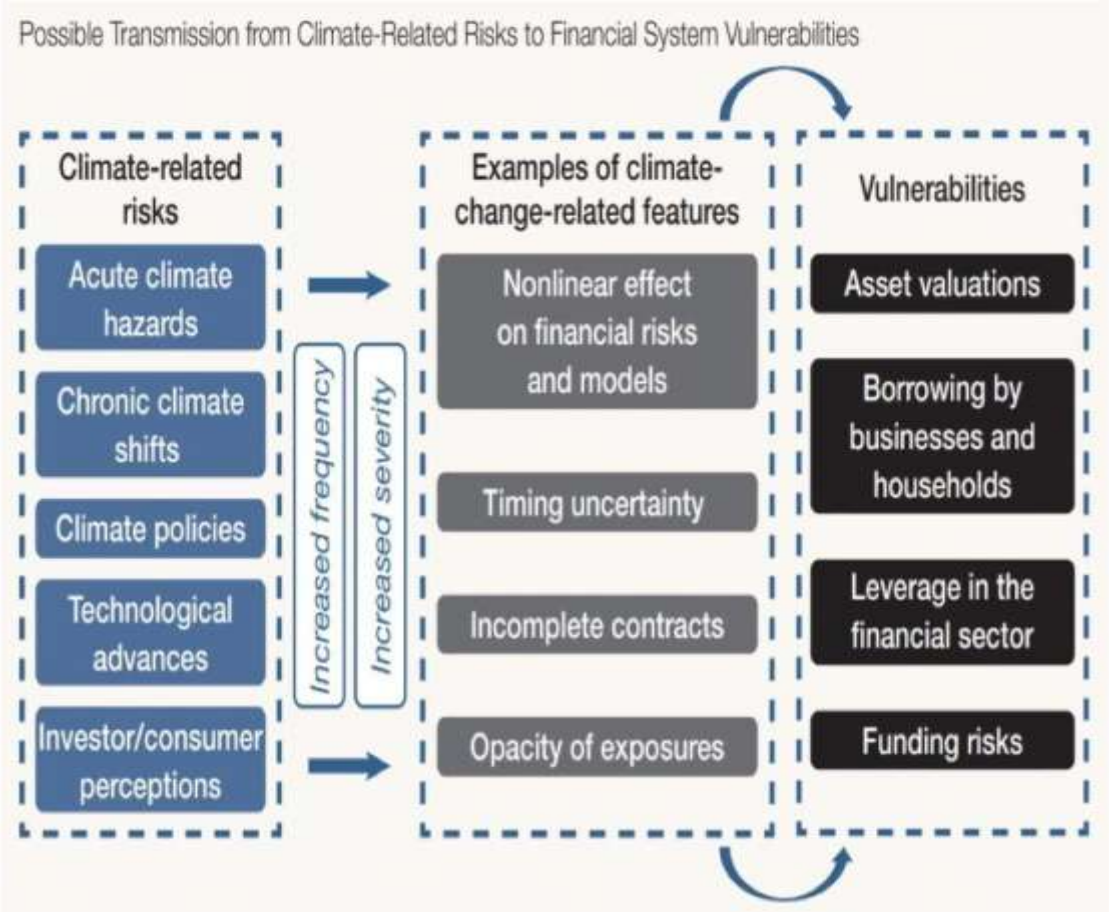
Average of Return on Equity per sector



	Automobiles and Parts	Chemicals	Construction and Materials	Consumer Products and Services	Energy	Financial Services	Food, Beverage and Tobacco	Health Care	Industrial Goods and Services	Media	Technology	Utilities
EURO STOXX 50	0.09	0.06	0.05	0.13	-0.11	-0.06	0.04	-0.18	0.07	0.10	-0.01	-0.02
STOXX Europe ESG Leaders 50	0.13	0.11	0.26	0.11	-0.08	0.08	0.13	0.32	0.18	0.56	0.19	0.08

Impact of Climate Policy on Financial Performance

- Climate-related risks could severely impact business activities, as well as financial institutions
- Corporates expect an improvement in their financial performance following investments in “sustainability”
- Positive relationship between corporate environmental performance (CEP) and corporate financial performance (CFP)



- In the past, the most sustainable firms were affected negatively by policy announcements
- Now, they are the **only ones** to perform positively in the market when the European Commission adopts a policy action
- As Climate-related policies became more refined over time, sustainable firms do benefit from them
- For a certain level of environmental performance, firms may perform positively in the markets, but below this level, they might not, even though they are more sustainable than other firms which perform better

Linking Financial Performance to ESGs/SDGs: HYBRID METRICS

Energy
EBITDA / CO_2 Intensity

Crop Nutrition
EBITDA / Yield per Hectare

Retail
Cost of Goods Sold / Value of Waste Avoided

Pulp and Paper
Revenue / Tons of CO_2 Sequestered

Pharma & Medical Devices
EBITDA / Contributions to Daily Adjusted Life Years

Service Industries
EBITDA / % of Workforce Above Living Wage

Chemicals and Industrial Production
Cost of Raw Materials / Tons of Recycled Plastics Used

Financial Services
Revenue per Customer / Financial Well-being

- Hybrid Metrics
  - Combine Financial KPI's with ESG KPI's
  - Calculate Climate related Risks in Investment Portfolios
- Hybrid metric of "EBITDA/CO2 intensity" adjusts profits for the decarbonization rate. Optimize for value (ESG and market)

METRIC	FORMULA
Weighted Average Carbon Intensity	$\sum_n^i \left(\frac{\text{current value of investment}_i}{\text{current portfolio value}} \times \frac{\text{company's GHG emissions}_i}{\text{company's mUSD revenue}_i} \right)$
Carbon Footprint	$\frac{\sum_n^i \left(\frac{\text{current value of investment}_i}{\text{company's market capitalisation}_i} \times \text{company's GHG emissions}_i \right)}{\text{current portfolio value in mUSD}}$
Carbon Intensity	$\frac{\sum_n^i \left(\frac{\text{current value of investment}_i}{\text{company's market capitalisation}_i} \times \text{company's GHG emissions}_i \right)}{\sum_n^i \left(\frac{\text{current value of investment}_i}{\text{company's market capitalisation}_i} \times \text{company's mUSD revenue}_i \right)}$

DEFINITIONS:
Current value of investment$_i$: Market value of an amount of equity of a company i held in an investment portfolio
Current portfolio value: Market value of all the equities (or other financial instruments) held in an investment portfolio

A Holistic Three-Step approach is necessary for businesses to create value and move beyond compliance-based codes

Identification

- Identify the important units in the value chain of the business – Mapping the value Chain of Company , Products and Services

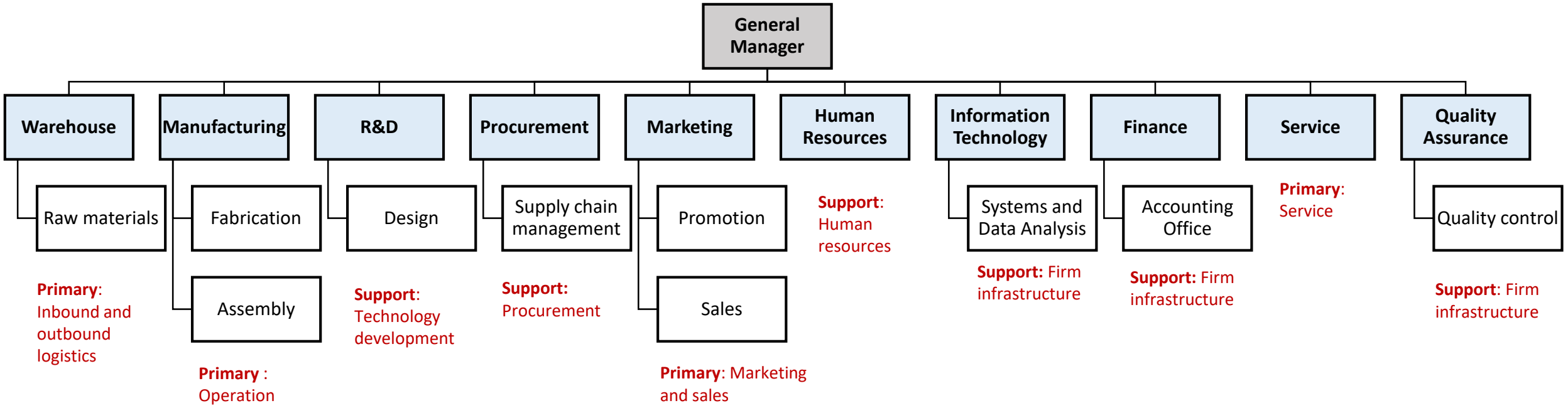
Development

- Measure Company's ESG Performance – Specific ESG KPIs for each company/industry/Unit
- Link ESG KPI's to SDGs
- LCA an effective tool
- 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

Assessment & Monitoring

- ESG Management, Continuous assessment and monitoring of company's performance to help decide whether, when, where and how to intervene
- 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.

Mapping the value chain of company



- Typical organization chart based on core business functions.
- Add additional layers depending on the company segmentation (e.g., product, geographical, customer).
- First-step in the three-step approach that adapts to each company's specific needs and business units.

Co-design and co-creation of the value chain mapping together with the company

Mapping of value chain for products or services

Manufacturing Company

Primary activities

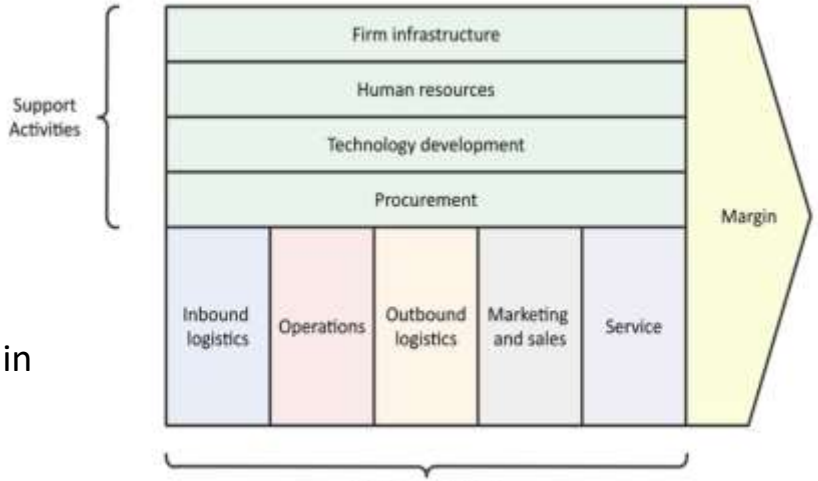
- Inbound logistics (raw materials and supporting supplies)
- Operations – highly relevant here
- Outbound logistics - warehousing and distribution of goods
- Marketing and Sales – really important in manufacturing
- Service – provided to support product purchase

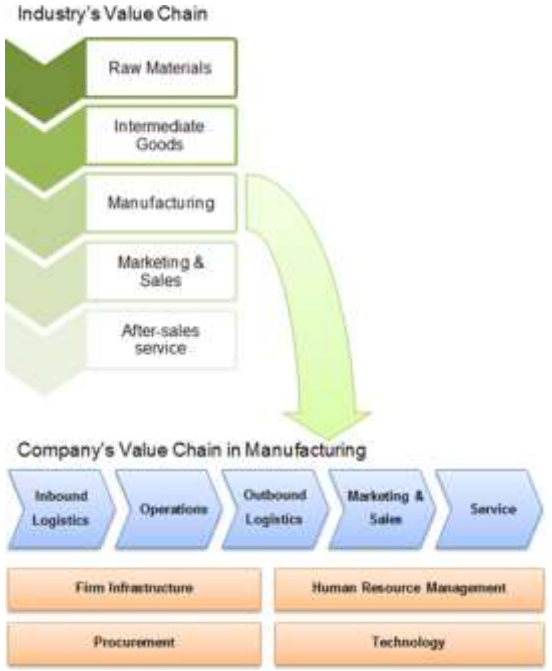
Support activities

Important Parts of the Business

- Infrastructure
- Human Resources
- Technology development
- Procurement

- ✓ **All activities exist in the value chain of both a product or services company**
- ✓ **However, there is different weighting with regards to each of them**
- ✓ **Identify the different sector/company specific activities**
- ✓ **Assign different weighting in terms of importance**





Service provider company

Primary activities

- Inbound logistics (raw materials and supporting supplies)
- Operations – experience delivery to the customer
- Outbound logistics – direct service delivery to the client
- Marketing and Sales - really important in services
- Service – based on experience of other customers

Support activities

- Infrastructure – depending on the business – also includes finance, accounting, legal department
- Human Resources - important part of the business
- Technology development - important part of the business especially if we consider the kind of the business
- Procurement - important part of the business depending on the kind of the business

ESG Key Performance Indicators (KPI's)

Economic Rating	Environmental Rating	Social Rating	Corp. Governance Rating
• Client Loyalty	• Resource Reduction	• Employment Quality	• Board structure
• Performance	• Emission Reduction	• Health & Safety	• Compensation Policy
• Shareholders Loyalty	• Product Innovation	• Training & Development	• Board Functions
		• Diversity & Opportunities	• Shareholders Rights
		• Human Rights	• Vision and Strategy
		• Community	
		• Product Responsibility	

- More than 600 Generic or Sector/Segment Specific KPI's – following Standards SASB (Sustainability Accounting Standards Board), GRI (Global Reporting Initiative), Thompson Reuters, and other standards.

Generic ESG KPI's

	E Environmental	S Social	G Governance	V Longterm Viability
General: ESGs which apply to all industry-groups	ESG 1 Energy efficiency ESG 2 GHG emissions	ESG 3 Staff turnover ESG 4 Training & qualification ESG 5 Maturity of Workforce ESG 6 Absenteeism rate	ESG 7 Litigation risks ESG 8 Corruption	ESG 9 Revenues from new products

- Environmental Indicators should not be focused only to Energy, but to cover a broader set of activities with impact to the Environment. For example, additional relevant indicators can include:
  - Ecological limits assessed in terms of sustainable production and consumption;
  - Trends in Ecological Footprint and/or related concepts;
  - Trends in extent to which biodiversity and ecosystem service values are incorporated into organizational accounting and reporting;
- Generic KPI's which applies to all Companies / Sectors. Next slide presents some examples.

Generic KPIs Examples

ESG	KPI
ESG 1 Energy efficiency	ESG 1-1 Energy consumption, total
	ESG 1-2 Energy consumption, specific (intensity); Options: per unit of revenue, per employee, per unit of production volume (tons of steel, for example)
ESG 2 GHG emissions	ESG 2-1 GHG emissions, total
	ESG 2-2 GHG emissions, specific; Options: per unit of revenue, per employee, per unit of production volume (tons of steel, for example)
ESG 3 Staff turnover	ESG 3-1 Percentage of employees leaving p.a./total employees (FTE?)
ESG 4 Training & qualification	ESG 4-1 Percentage of trained employees p.a./total employees (FTE?)
	ESG 4-2 Average expenses on training per employee p.a
ESG 5 Maturity of workforce	ESG 5-1 Age structure/distribution (number of employees per age group, 10 year intervals)
	ESG 5-2 Percentage of workforce to retire in next 5 years
ESG 6 Absenteeism rate	ESG 6-1 Number of mandays lost per employee p.a.
ESG 7 Litigation risks	ESG 7-1 Expenses and fines on filings, law suits related to anti-competitive behavior, anti-trust and monopoly practices
	ESG 7-2 Reserves on preventive measurements against anti-competitive behaviour, anti-tust and monopoly practices
	ESG 7-3 (other) litigation payments, total
	ESG 7-4 (other) litigation payments, reserves
ESG 8 Corruption	ESG 8-1 Percentage of revenues in regions with TI corruption index below 6.0
ESG 9 Revenues from new products	ESG 9-1 Percentage of revenues from products at end of life-cycle
	ESG 9-2 Percentage of new products or modified products introduced less than 12 months ago

Set of Sector/Unit Specific KPIs

Sector Banks [8350]

A. Overview of sector-specific ESGs

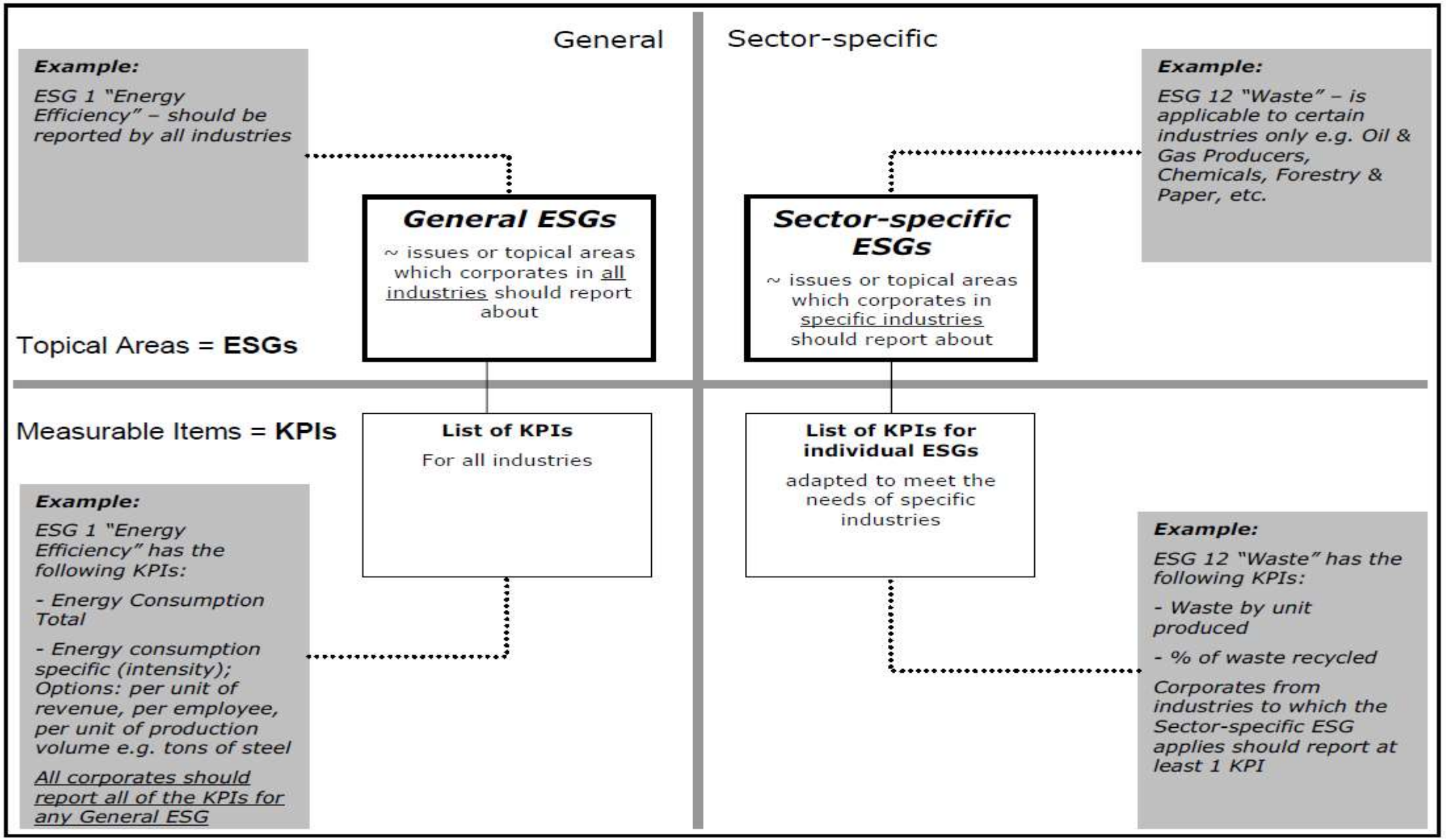
- Sector Specific KPI's which applies to Sector/Unit of Company. Next Slide Lists some examples.

E Environmental	S Social	G Governance	V Longterm Viability
ESG 10 Deployment of renewable energy ESG 12 Waste	ESG 15 Diversity ESG 16 % of Credit loans, undergone ESG screening ESG 17 % of funds managed in accordance to ESG criteria ESG 18 Financial instruments held in accordance to ESG criteria ESG 22 Restructuring-related relocation of jobs	ESG 24 Contributions to political parties	ESG 28 Customer retention ESG 29 Customer satisfaction

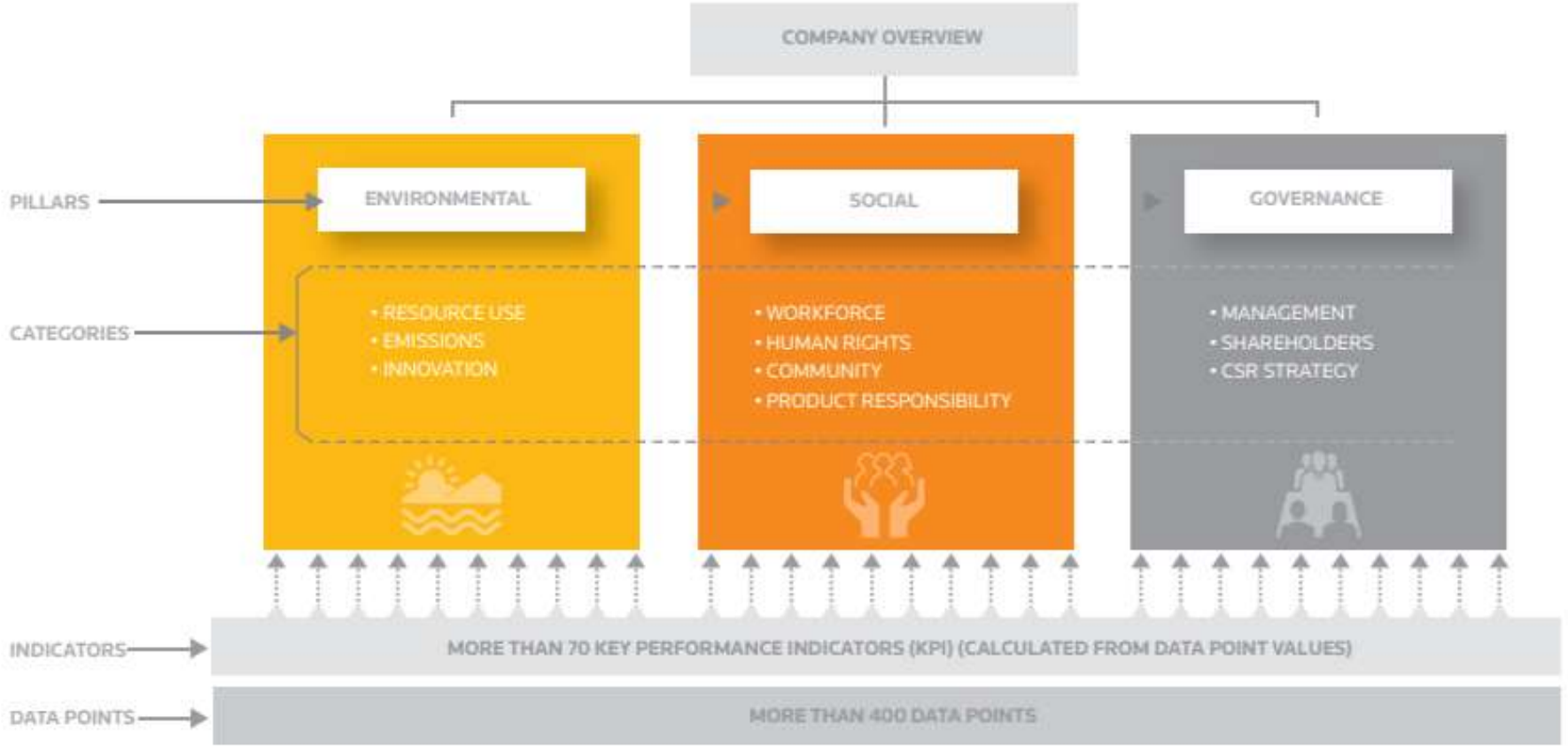
Sector/Unit Specific KPIs Examples

ESG	KPI
ESG 10 Deployment of renewable energy	ESG 10-1 % of energy in kwh from renewable energy sources as of total energy consumed
	ESG 10-2 % of energy in kwh from combined heat and power generation as of total energy consumed
ESG 12 Waste	ESG 12-1 Waste by unit produced
	ESG 12-2 % of waste recycled
ESG 15 Diversity	ESG 15-1 Percentage of female employees as of total
	ESG 15-2 Percentage of female managers as of total
ESG 16 Percentage of credit loans, investments and prop trading activities undergone ESG screening	ESG 16-1 Percentage of credit loans undergone ESG-screening
	ESG 16-2 Percentage of prop trading activities undergone ESG screening
ESG 17 Percentage of funds managed in accordance to ESG-criteria	ESG 17-1 Percentage of funds managed in accordance to ESG-criteria
ESG 18 Financial instruments, investment property held in accordance to ESG-criteria	ESG 18-1 Percentage of financial instruments, investment property held in accordance to ESG-criteria
ESG 22 Restructuring related relocation of jobs	ESG 22-1 Total cost of relocation in $, € incl. Indemnity, pay-off, outplacement, hiring, training, consulting
ESG 24 Contributions to political parties	ESG 24-1 Contributions to political parties as percentage of revenues
ESG 28 Customer retention	ESG 28-1 Percentage of new customers as of total customers
	ESG 28-2 Average length of time of customer relationship in years
	ESG 28-3 Share-of-market by product, productline, segment, region or total
ESG 29 Customer satisfaction	ESG 29-1 Percentage of satisfied customers as of total customers
	ESG 29-2 Percentage of revenues from repeat business as of total business

Mapping of Company Relevant KPIs across value chain



ESG Reporting Scheme



- Establish an ESG Reporting Scheme : Data Collection / Calculate relevant KPI's.
- The Set of the KPI's are co-identified and validated by the company.

Linking ESGs to SDGs

Environment

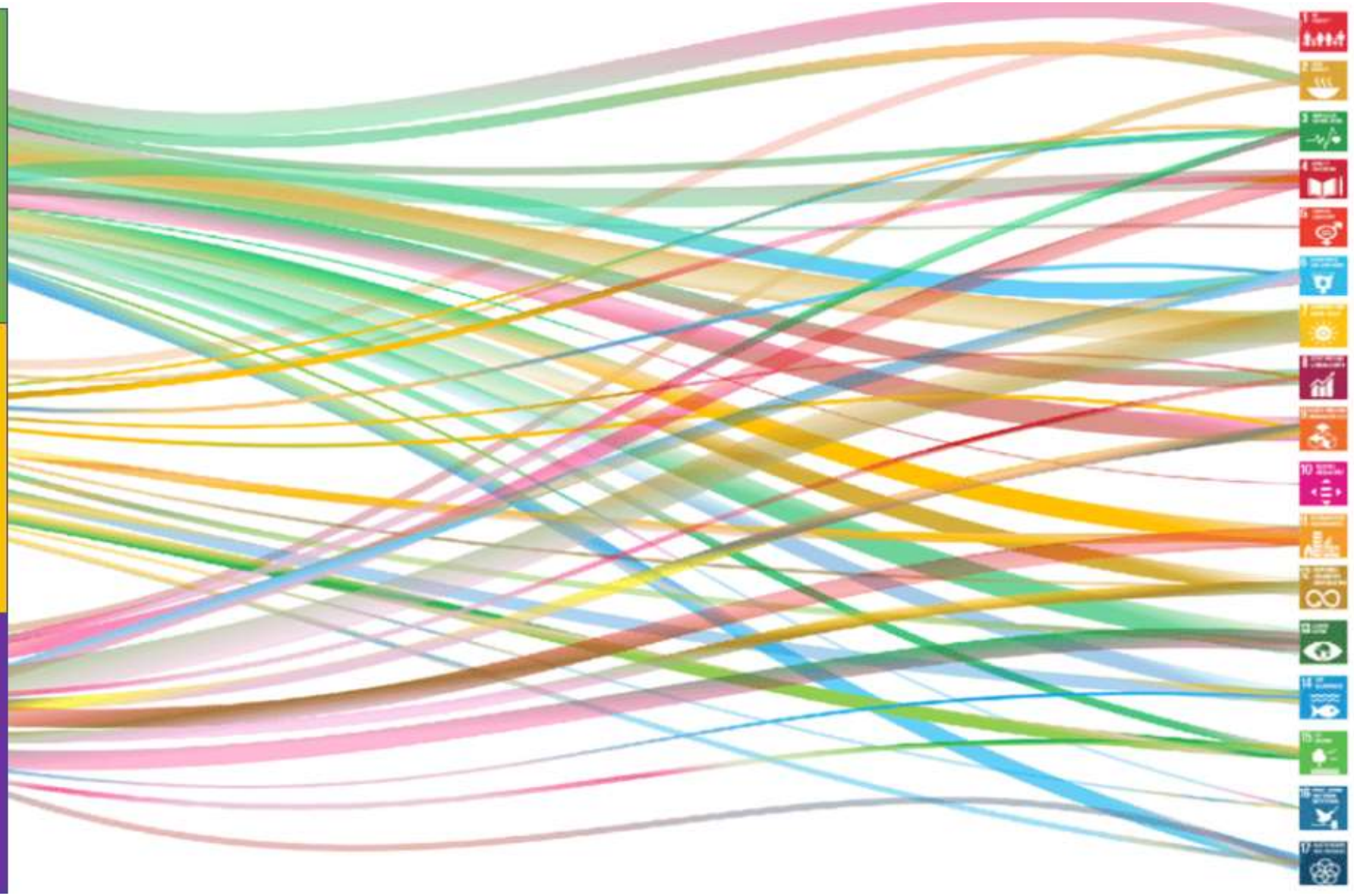
Company's impact (at supply chain level) on the natural environment and its response to the challenge of climate change (greenhouse gas emissions, energy consumption, generation and use of renewable energy, biodiversity and habitat, impact on water resources and deforestation, pollution, efficient use of resources, the reduction and management of waste)

Social

Company's interaction with workers, other stakeholders and the communities in which it operates and the role of the Company in society including: workplace policies ethical/responsible sourcing and social aspects and labour standards of the supply chain, and engagement with and contribution to the broader community through social projects and charitable donations.

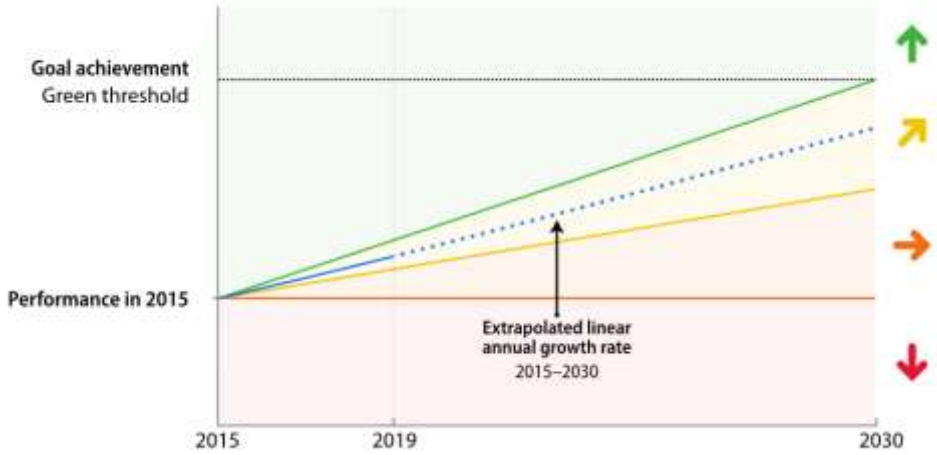
Governance:

The ethical conduct of the Company's business including its corporate governance framework, business ethics, policies, code of conduct and the transparency of non-financial reporting.

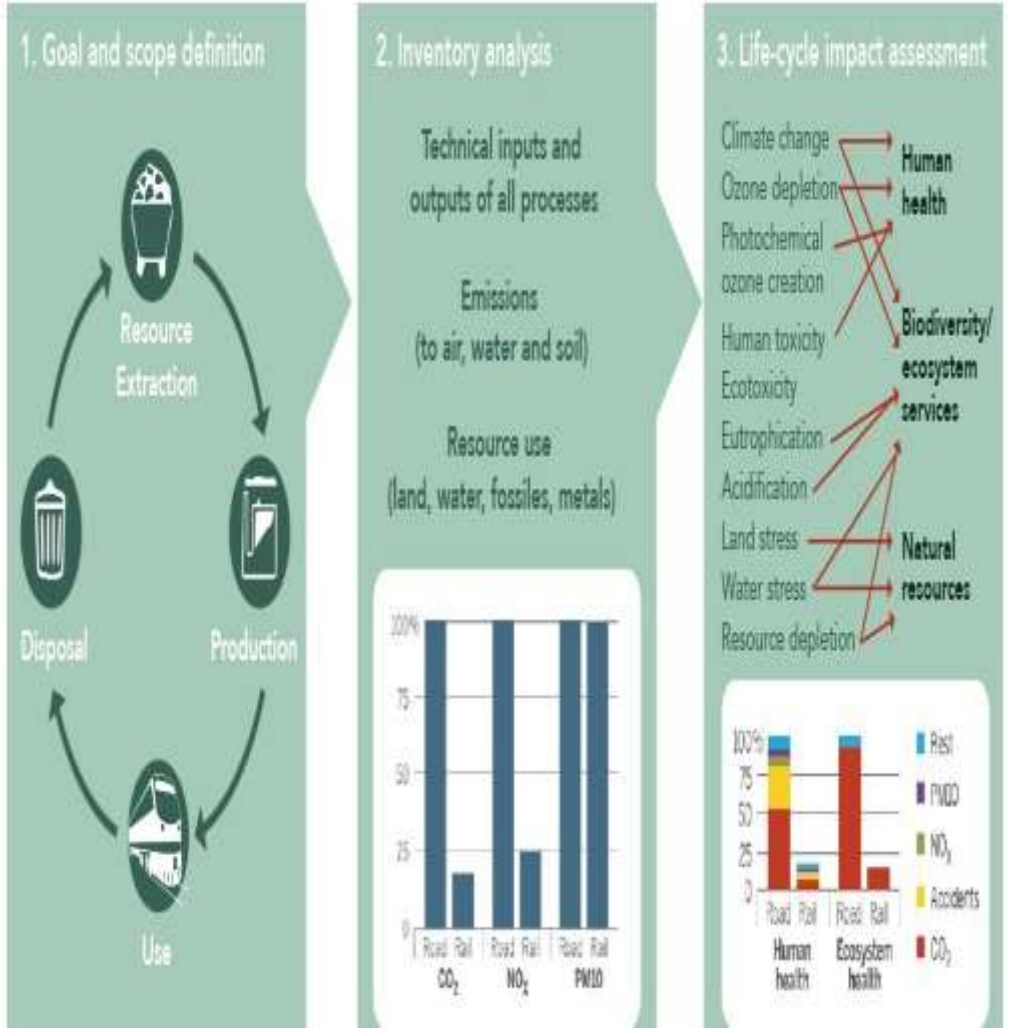


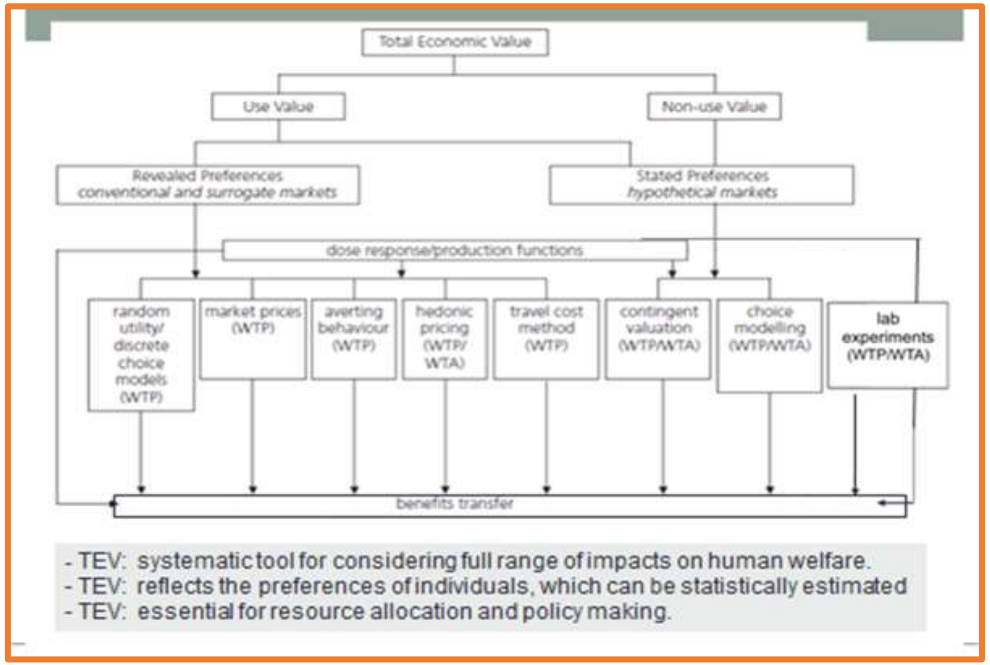
SDG Dashboard By Sector or Company

- Calculate the SDG Dashboard at a company level
- Compatible with the UN SDSN International and Regional Dashboards to evaluate progress towards the long-run SDG goals.



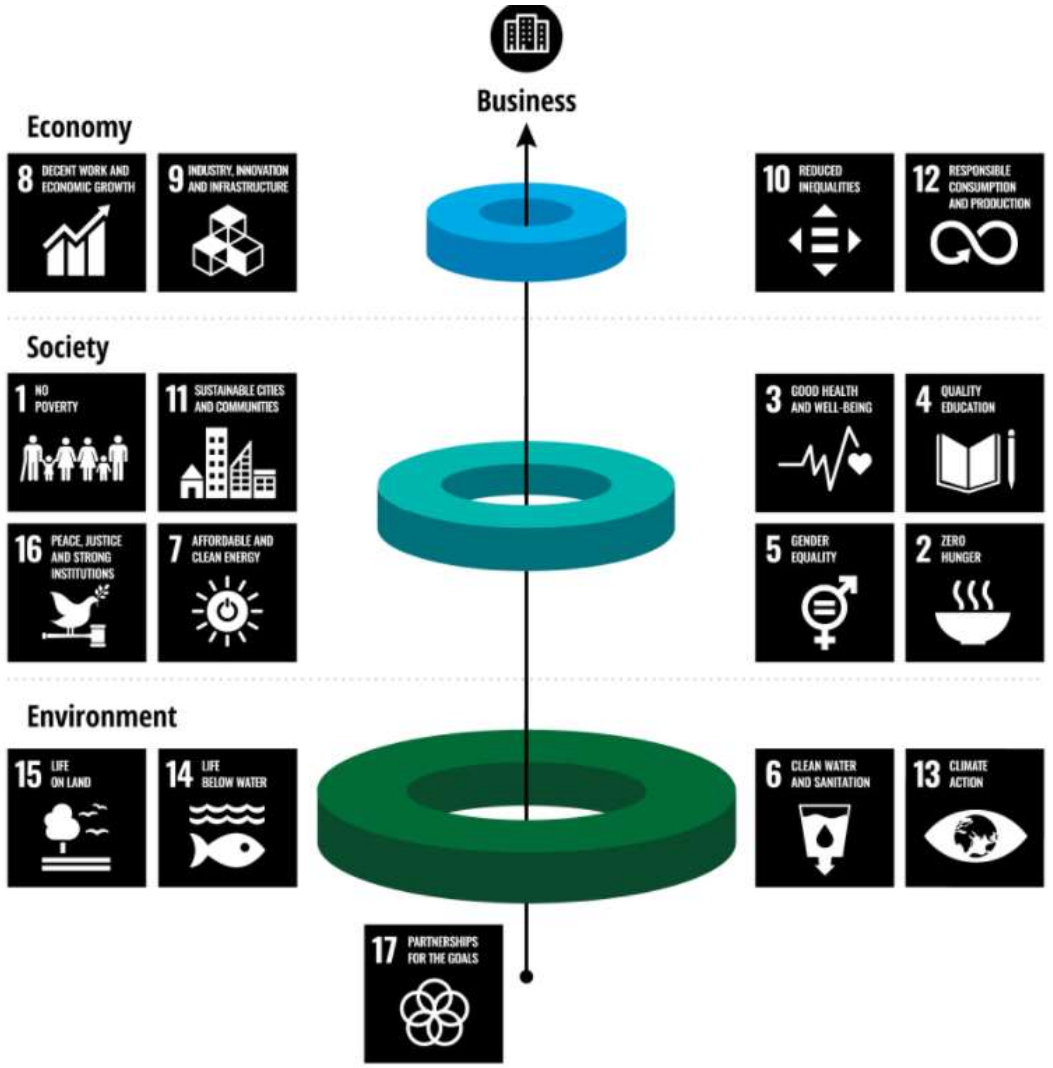
Measuring Socio-Economic Benefits of CE
Life Cycle Analysis (LCA) and Total Economic Valuation





- Estimate the Total Economic Value – Cost Benefit Analysis for the specific Ecosystem Services or Natural Resources etc.
- Tool to translate the Dashboard considerations to Economic Values and support the design of more meaningful Hybrid Metrics.

Long-term thinking, the best short-term strategy



- ✓ Businesses that need to succeed in the future, they should look ahead in the future.
- ✓ Sustainability is deeply routed in the long-term horizon, but its is strongly dependent on present.
- ✓ How decisions today are going to affect the medium and long-term horizon.

Look inside the business to accelerate transformation!

Think outside the ESG box, not just ticking it!

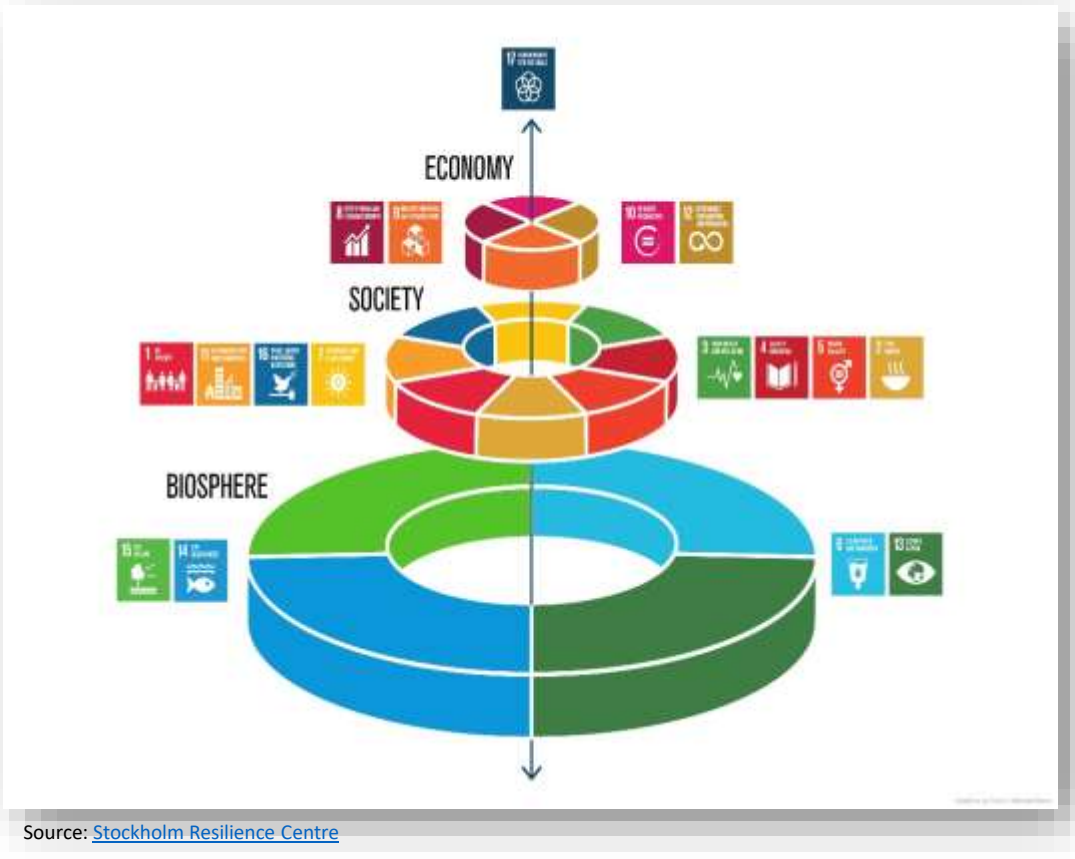
The interconnected nature of SDGs and ESG

Economy	Building on the biosphere and society, the economic goals direct attention towards: • Industry, innovation and infrastructure; • Reduced inequalities; • Responsible consumption and production; and • Decent work and economic growth that is decoupled from environmental degradation.
Society	• The goals addressing societal issues, call for the eradication of poverty, and the improvement of social justice, peace and good health. • Social development depends upon a protected biosphere. • The goals on clean energy, no poverty, zero hunger, peace and justice, sustainable cities, education, gender equality and good health are the foundation for the goals related to the economy.
Biosphere	• Protecting the biosphere is an essential precondition for social justice and economic development. • If we do not achieve the goals related to clean water and sanitation, life below water, life on land, and climate action, the world will fail to achieve the remaining goals.

Source: Pretlove, B., & Blasiak, R. (2018). *Mapping ocean governance and regulation*. Working paper for consultation for UN Global Compact Action Platform for Sustainable Ocean Business.

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

SDSN Europe
#EUGreenDeal Senior Working Group



Source: Stockholm Resilience Centre

Key findings and recommendations

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

SDSN Europe

I. **Maintain leadership in Climate Change and Biodiversity Conservation. The EU is and should continue to lead the world in mandating and regulating change.**
II. **Leverage the EGD fully to maximize the impact on the SDGs.**
III. **Reform the legal systems to require financial reporting on externalities (natural and social capital).**
IV. **Create competitive advantage for the EU through multi-stakeholder innovative solutions.**
V. **Develop SDG-based resilience plans for EU MS and EU wide metrics for relevant performance.**
VI. **Maximize the value of stimulus to climate and SDG impact requirements and metrics.**

Annexes

ANNEX I - Detailed Analysis of the National Recovery and Resilience Plans of Seven EU Member States

ANNEX II - Machine Learning Method for Policies classification under the SDGs

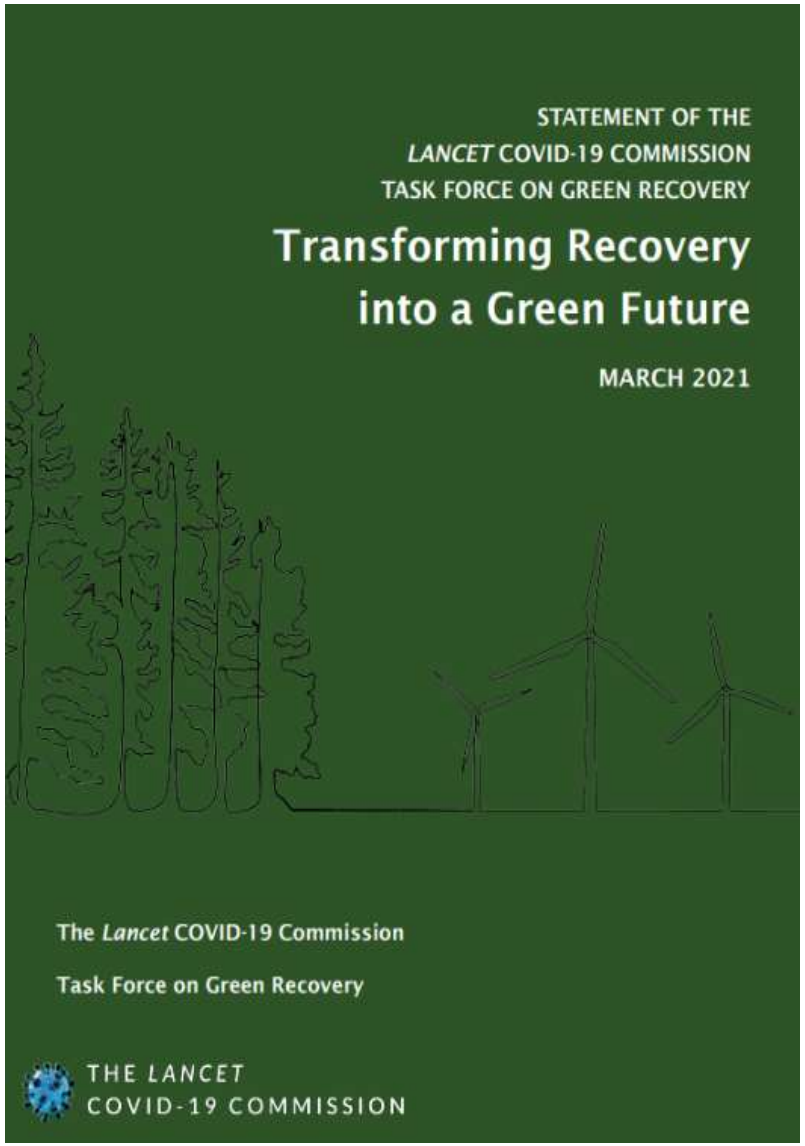
ANNEX III – Integrating Ecosystem Valuation to Decision Making - Studies used for Meta-regression analysis function transfer

ANNEX IV - Financing the Anthropocene - The European Green Deal (EGD) and Future Shocks

New forms of financial engineering to hedge, fund, coordinate and manage unchecked risks and unmet opportunities

By Stefan Brunnhuber Trustee WAAS

The Lancet Commission for COVID 19



Recovery packages across the world should finance the transformations needed for a green, digital and fair future.
Financial resources devoted to, and commitments made for post COVID-19 recovery are largely insufficient for a green recovery, including in most G20 countries.
1/3 of global Assets Under Management are now ESG-based; recovery should build on this momentum.

G7 and G20 should take major steps for development financing of a green, digital, and inclusive recovery from the pandemic and to achieve the SDGs must be taken:

- Increasing lending to the MDBs to provide LIDCs funding
- Increasing support of UN members states for existing green funds
- Enacting global tax reforms on mega-wealth and carbon emissions for climate financing.

Science-Driven Sustainability Transition

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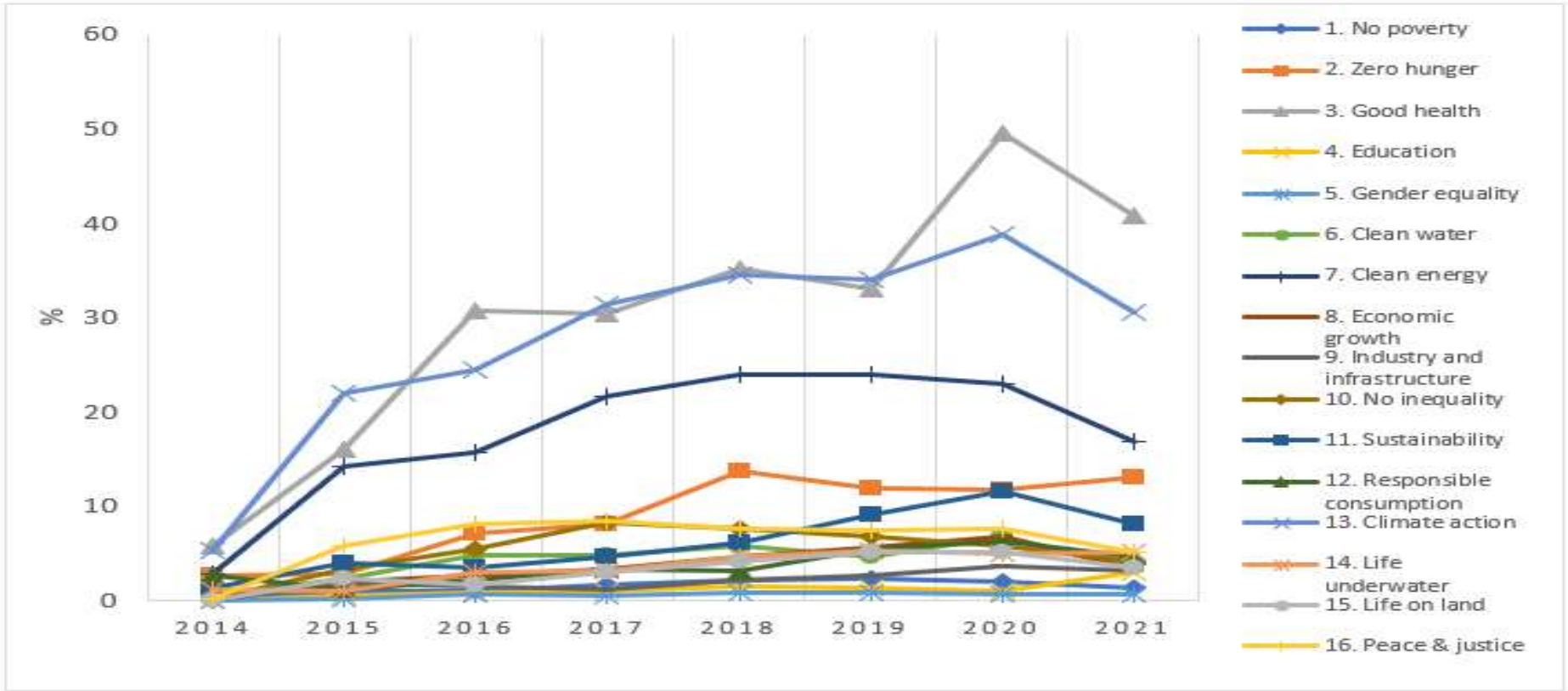
SDSN.GlobalClimateHub@unsdsn.org

Does European Research Funding support the SDGs?

Impact of European research financing to the production of Scientific Research on SDGs

- Field Weighted Citation Impact (FWCI) ratio of the actual number of citations received by an output to date and the `expected' number for an output with similar characteristics.
- Results are Stronger in the Post Interim H2020 period (2018-2021) vs 2014-2017

FIGURE 7.11. SDCCB SDG FLAGGED KPIS - % FWCI WEIGHTED EU CONTRIBUTION PER SDG



RIO MARKERS is the OECD system to classify projects on Sustainable Development, Climate Change and Biodiversity

- RIO MARKERS Classification System refers to a discrete 0%-40%-100% score assigned by EC officials at the Project and Topic Level: *(0%) not targeted, (40%) a significant objective, (100%) a principal objective of the action.*

- The values are attributed according to the extent to which the themes are explicitly addressed at the level of problem analysis (context); objectives and results; and activities.

- Fixed percentages of the overall budget are considered to be relevant for the respective themes. The EU has decided to use 0%, 40% and 100%, respectively.

Alliance of Excellence for Research and Innovation on Aephoria (AE4RIA)

www.ae4ria.org

Professor Dr. Phoebe Koundouri

Founder & Scientific Chair AE4RIA

President, European Association of Environmental and Resource Economist

AE4RIA Alliance of Excellence for Research and Innovation on Aephoria

Research Institutions

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

ATHENA Research & Innovation Information Technologies
Sustainable Development Unit

ICRE8
International Centre for Research on the Environment & the Economy

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

DTU
DTU Management
Department of Technology, Management and Economics

Accelerators

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS
Global Climate Hub
ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS
ATHENA Research & Innovation Information Technologies

eit Climate-KIC Hub GREECE
Funded by the European Union

ClimAccelerator MARITIME
eit Climate-KIC Co-funded by the European Union

BRIGAID CONNECT
Innovation for Resilience

Academies,Networks, Associations

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

Academia Europaea ~19 88~

SDSN Europe

SDSN Greece

World Academy of Art and Science

EAERE
European Association of Environmental and Resource Economists

Water Europe
Technology & Innovation

Nexus Cluster

iap SCIENCE HEALTH POLICY
the interacademy partnership

AE4RIA

Alliance of Excellence for
Research and Innovation on Aephoria

Thematic Priorities

Climate Change

Adaptation

Mitigation

Marine Ecosystems

Blue Economy

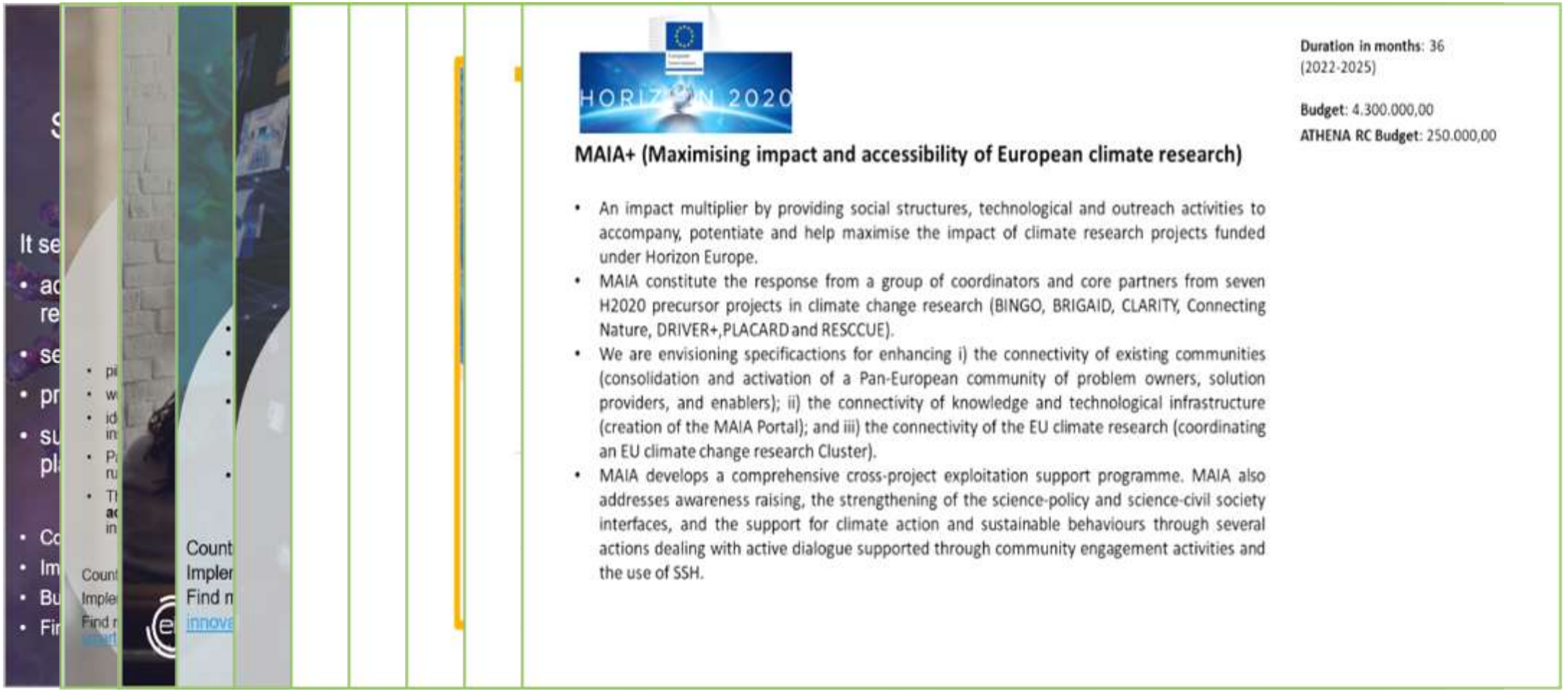
WEFB Nexus

Innovation Acceleration

Transformations: Energy Decarbonization and Sustainable Industry / Health and Wellbeing/ Sustainable Cities and Communities/ Digital Revolution

Thematic Areas:

Climate Change Mitigation and Adaptation, Green-Digital-Just Recovery Pathways, Renewables, Digitalization, Circular Economy, Nature-Based Solutions, Systems Innovation Approach



MAIA+ (Maximising impact and accessibility of European climate research)

Duration in months: 36 (2022-2025)

Budget: 4.300.000,00

ATHENA RC Budget: 250.000,00

- An impact multiplier by providing social structures, technological and outreach activities to accompany, potentiate and help maximise the impact of climate research projects funded under Horizon Europe.
- MAIA constitute the response from a group of coordinators and core partners from seven H2020 precursor projects in climate change research (BINGO, BRIGAID, CLARITY, Connecting Nature, DRIVER+,PLACARD and RESCCUE).
- We are envisioning specificactions for enhancing i) the connectivity of existing communities (consolidation and activation of a Pan-European community of problem owners, solution providers, and enablers); ii) the connectivity of knowledge and technological infrastructure (creation of the MAIA Portal); and iii) the connectivity of the EU climate research (coordinating an EU climate change research Cluster).
- MAIA develops a comprehensive cross-project exploitation support programme. MAIA also addresses awareness raising, the strengthening of the science-policy and science-civil society interfaces, and the support for climate action and sustainable behaviours through several actions dealing with active dialogue supported through community engagement activities and the use of SSH.

Transformation: Sustainable Seas and Oceans

Transformation on Sustainable Land-Use and Water

Water-Food-Energy-Biodiversity Nexus
Smart Agriculture & Smart Urban Water Systems

EIT Climate KIC **HUB Greece**

Deep Demonstration - Research Commercialization - Innovation Acceleration
Up-Skilling and Re-Skilling

ClimAccelerator

MARITIME

YOUR IDEA FITS MARITIME

Our Start-ups 2021

Climate-KIC

Funded by the European Union

http://maritime-accelerator.org

ClimAccelerator start-ups in 2021

MARITIME

AC Biode

Redrose Developments

NavHome

Marine Hound

Cargoshare

Thermonorth

Sea the change

Robospector

Green Blue Port Solutions

Ag Catalytic Solutions

Vessel-Check

Ponera Group

Inbleck Ltd

ENEXAN

CO2Sea6

Signol

Notilo Plus

HelioRec

EI Solutions

Clean Ocean Coatings GmbH

Virya Paramita Energy

TOWT - Transport à la voile

Lelieur BV

Cargo Kite

Action Tracker

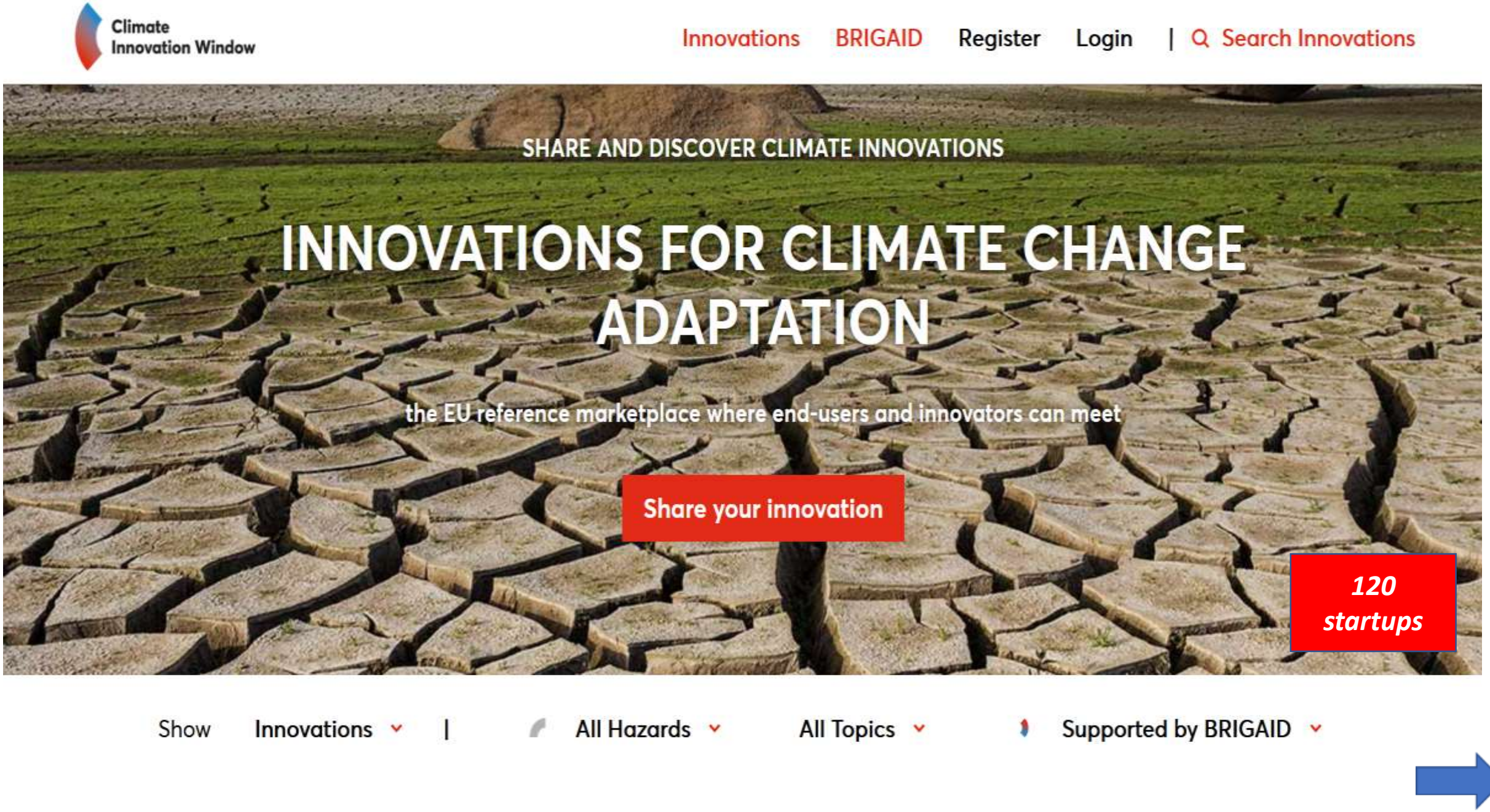
Shore B.V.

Navlandis

Qaptis

AIRead Machine Learning Technologies

Deveklia


Climate
Innovation Window
Innovations
BRIGAID
Register
Login
Search Innovations
SHARE AND DISCOVER CLIMATE INNOVATIONS
INNOVATIONS FOR CLIMATE CHANGE ADAPTATION
the EU reference marketplace where end-users and innovators can meet
Share your innovation
120 startups
Show
Innovations
All Hazards
All Topics
Supported by BRIGAID

Nature Based Solutions | Water Availability

PAS-WATER

TRL 6

Agriculture | Water Availability

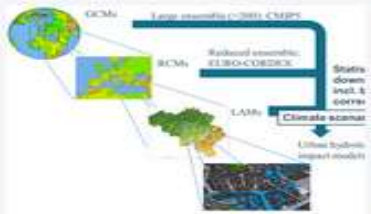
AUDIMOD

TRL 4

Disasters and ICT

I-REACT

TRL 6



Disasters and ICT | Urban Areas | Water Safety

Urban flood hazard analysis

TRL 9

Disasters and ICT

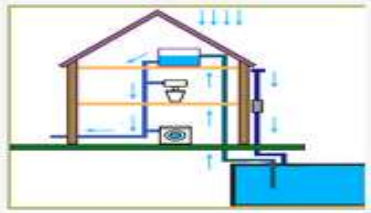
Maptionnaire in Albania

TRL 4

Agriculture | Urban Areas | Water Availability

Danube Living Labs Pilot application Potelu Living Labs Romania

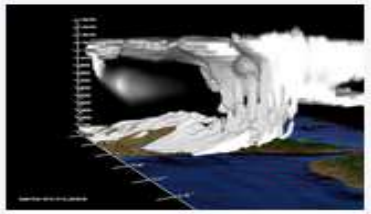
TRL 4



Urban Areas

Rainwater in kindergarten

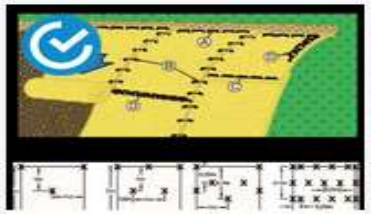
TRL 5



Disasters and ICT | Urban Areas | Water Safety

A LAM model for regions with complex orography

TRL 6



Forests | Nature Based Solutions | Urban Areas

GREENFIX f³ Fire Free Fibres Blankets

TRL 7

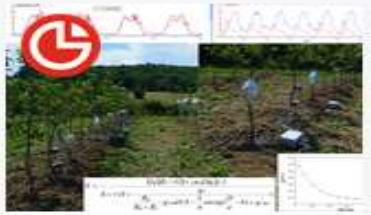
More Innovations

Climate Innovation Window
Innovations BRIGAID Register Login | Search Innovations

Nature Based Solutions | Urban Areas | Water

Alma raingarden

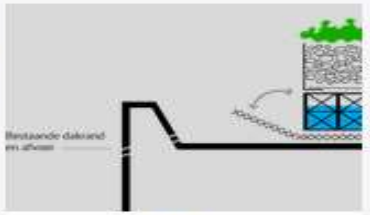
TRL 6



Agriculture | Disasters and ICT | Water

ArboDroughtStress

TRL 4



Urban Areas | Water Availability | Water

Polder Roof (Polderdak)

TRL 7

Disasters and ICT | Urban Areas

MyClimateServices.eu

TRL 4

Nature Based Solutions | Water Safety

3D Printing of coastal protection Reefs

TRL 4

Nature Based Solutions | Water Availability

Flood planting at Erzeni river

TRL 6

Disasters and ICT | Forests

Unified Fire Protection Units and System-UFPUS

TRL 5

Urban Areas

SAEx-L (Signal of Atmosphere Extreme Locally)

TRL 5

Disasters and ICT | Urban Areas

QoAir: A blockchain-based system for heatwave management in urban areas

TRL 4

More Innovations

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

Global Climate Hub

ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

ATHENA Research & Innovation Information Technologies

https://unsdsn.globalclimatehub.org

MISSION

Recognizing the global climate crisis and the need for governments worldwide to take immediate decisive action to reduce the impact of climate change, the **SDSN Global Climate Hub** will provide ***science-based advice*** for combating the aggravating climate crisis and prevent further deterioration.

SDSN Global Climate Hub will use all extensive data, knowledge and technologies provided by experts in various fields to implement country-specific action ***plans/transformations*** to be adopted and reinforced by society.

SDG 13

Climate action

Displaying Ratings

Ratings provide a visual representation of a country's performance on the SDG.

Legend

Click on a country to see its performance.

- SDG achieved
- Challenges remain
- Significant challenges remain
- Major challenges remain
- Information unavailable

Description

Take urgent action to combat climate change and its impacts.

Indicators

Click on an indicator to visualize it on the map.

CO_2 emissions from fossil fuel combustion and cement production

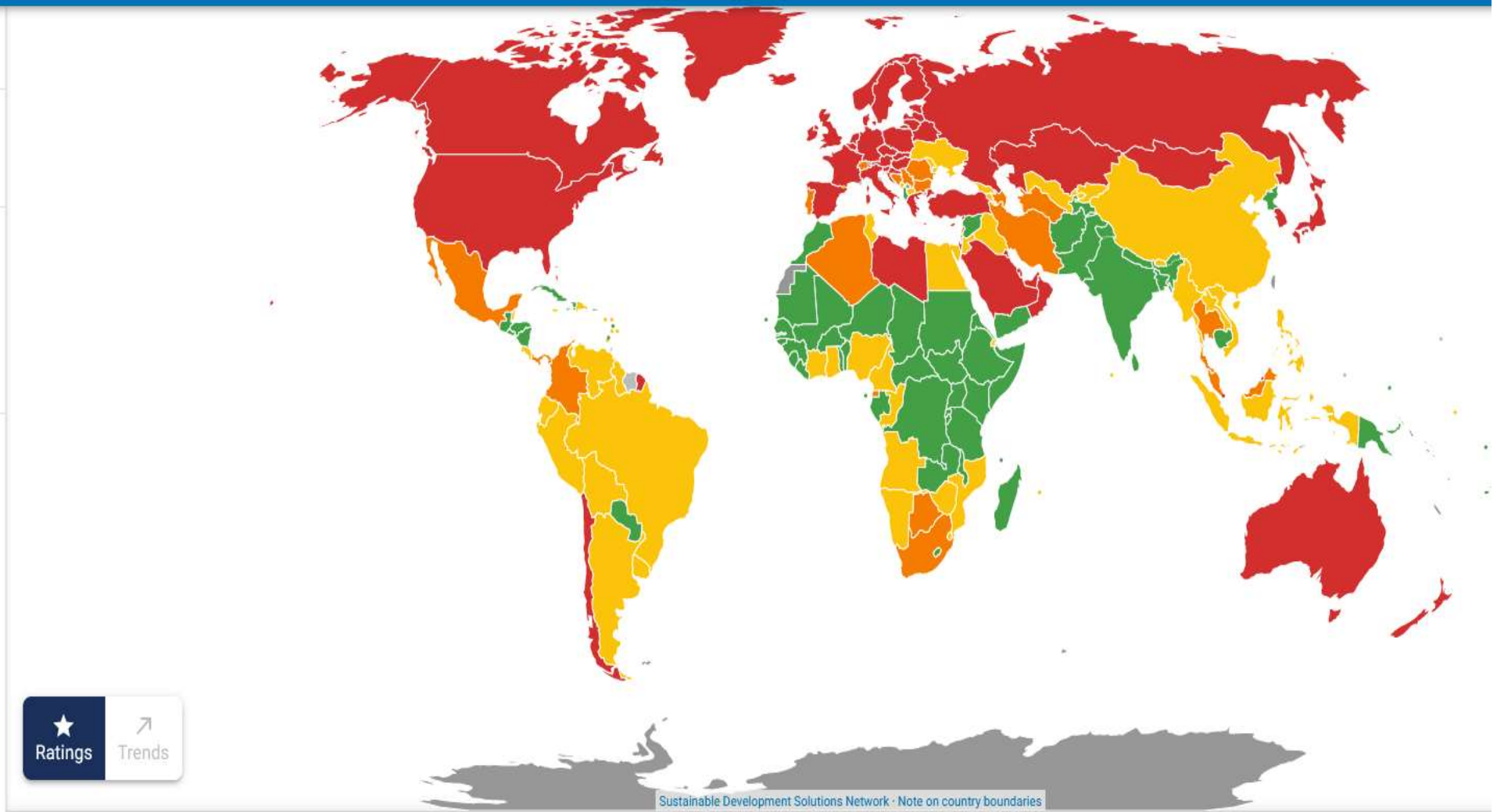
CO_2 emissions embodied in imports

CO_2 emissions embodied in fossil fuel exports

OECD-only Indicators

Click on an indicator to visualize it on the map. These indicators are only used for OECD countries.

Carbon Pricing Score at EUR60/tCO_2



Select one of the SDGs to see it on the map or display the overall scores

SDG 13

Climate action

Displaying Trends

Trends indicate whether a country is on track to achieve the SDG by 2030.

Legend

Click on a country to see its performance.

- On track or maintaining SDG achievement
- Moderately improving
- Stagnating
- Decreasing
- Trend information unavailable

Description

Take urgent action to combat climate change and its impacts.

Indicators

Click on an indicator to visualize it on the map.

CO_2 emissions from fossil fuel combustion and cement production

CO_2 emissions embodied in imports

CO_2 emissions embodied in fossil fuel exports

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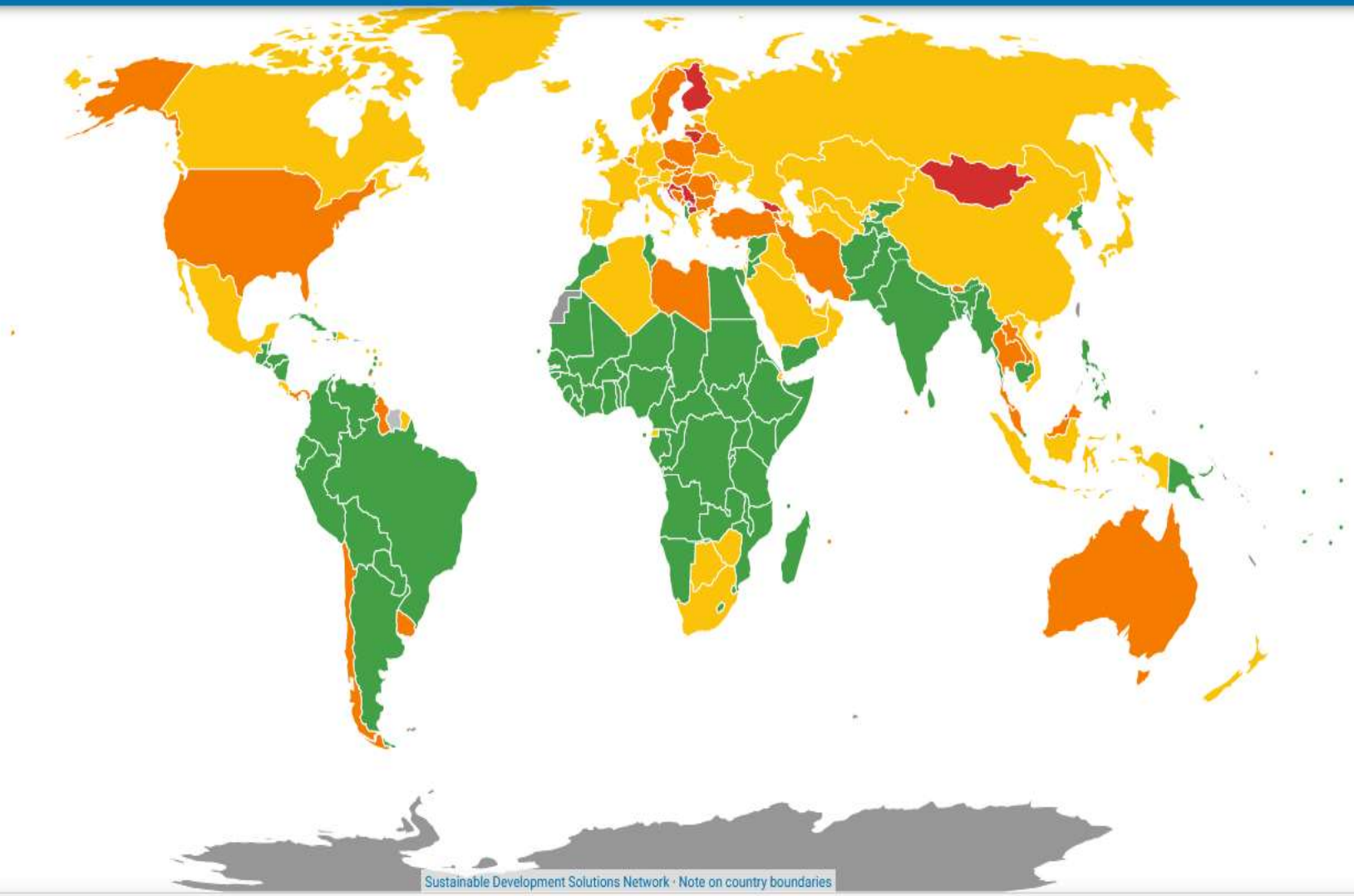


Select one of the SDGs to see it on the map or display the overall scores

Race to Net Zero: Carbon Neutral Goals after COP26

Figure 1: Net zero targets – 126 countries have set goals to decarbonize their economies

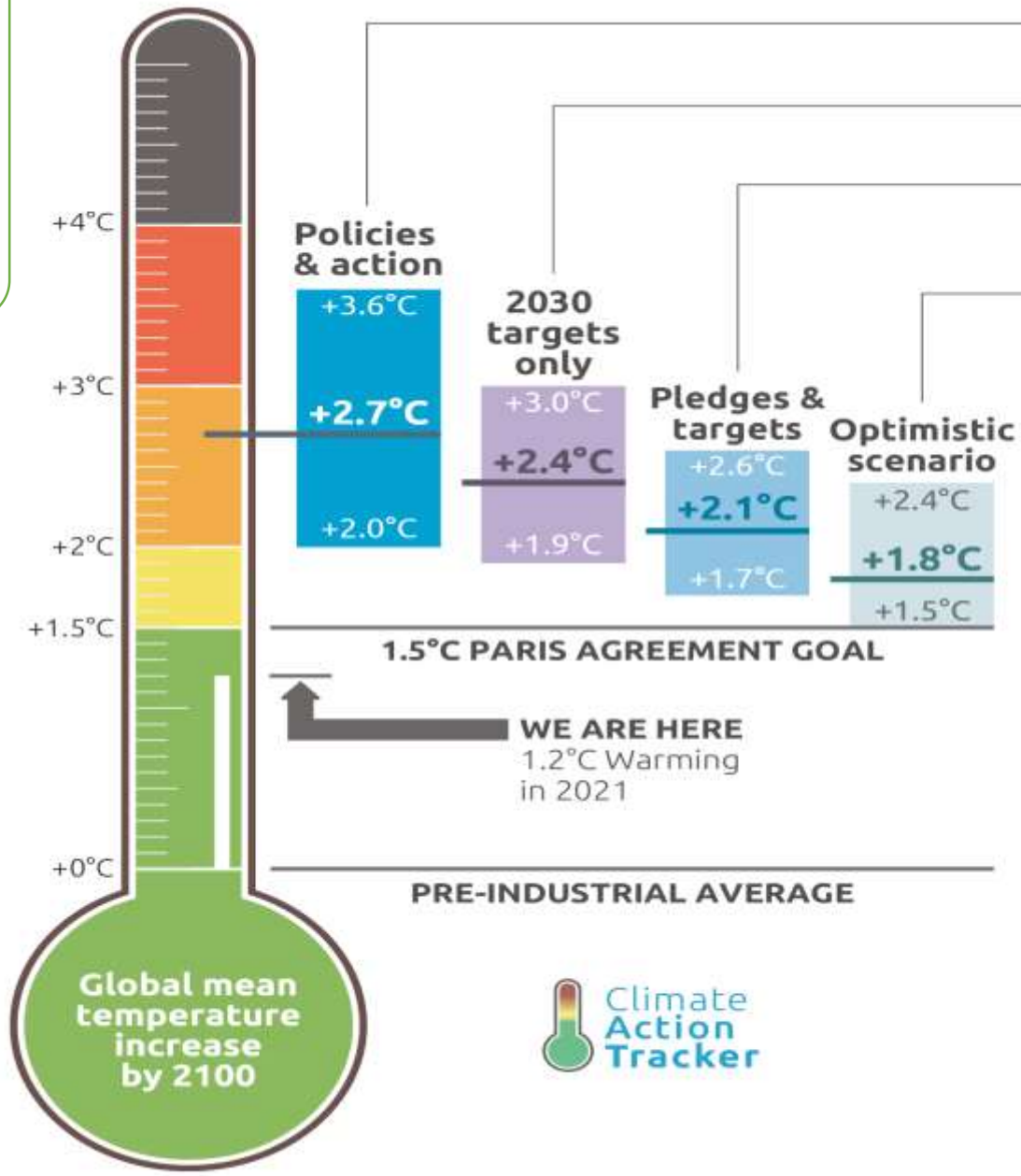
Source: BNEF (Bloomberg New Energy Finance), Climate Action Tracker, Climate Change News, and PIMCO as of October 2020

- Stronger commitments to reduce emissions and to keep global temperature rise to 1.5°C.

40 countries 2050/China 2060/India 2070

US and China to continue Climate Negotiations

- From the projected 4 °C faced before Paris, and the 2.7 degrees before Glasgow, we have now edged towards 2-1.8°C
- 450 Business and Financial Institutions coalition worth $130 trillion vows to put climate at heart of finance
- Global standards body takes aim at company 'greenwashing' claims
- 100 countries make new pledges to cut methane and 133 save forests
- Ensuring carbon market integrity
- Developed countries confirm commitment $100 billion goal a year for Climate Mitigation and Adaptation in developing countries



Policies & action
Real world action based on current policies

2030 targets only
Full implementation of 2030 NDC targets*

Pledges & targets
Full implementation of submitted and binding long-term targets and 2030 NDC targets*

Optimistic scenario
Best case scenario and assumes full implementation of all **announced** targets including net zero targets, LTSs and NDCs*

* If 2030 NDC targets are weaker than projected emissions levels under policies & action, we use levels from policy & action

Climate Action Tracker

CAT warming projections
Global temperature increase by 2100

November 2021 Update

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS
Global Climate Hub

ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

ATHENA Research & Innovation Information Technologies

In collaboration with national governments and respective SDSN National Hubs, we will ***co-design*** *national and sub-national pathways for the transition to a climate neutral and a climate resilient world*

and showcase results in terms of the ***6 transformations*** *for the transition to "The Future we Want".*

1750+ institutions all over the world

COP Olympics

Changing the Narrative: COP as home for Global Changemakers for Climate Change.

UN SDSN Global Climate Hub, together with Climate Investment Fund (CIF), Inter-Parliamentary Union (IPU), Real Madrid Football Club, AIESEC, the SDG Youth Orchestra, the World Health Innovation Summit (WHIS) are committed to combining their knowledge and experience to empower changemakers at the annual COP. Creating an event that celebrates those who are focused on accelerating positive change by including all stakeholders to create the opportunities for everyone to contribute by simply changing the narrative: in regions, countries, continents and on a global stage to ensure the targets set are met and delivered by 2030.

Collaborating party: UNGSII FOUNDATION

Climate Data Platforms and Digital Applications

Mission

The Mission of the Unit is to aggregate, connect and visualize data relative to objectives of Climate Hub on:

- **Inputs** – funding research (public/private)
- **Outputs** – who is producing what
- **Outcomes** – scientific knowledge/trends, data, technology (tools & services), policies
- **Effects** – interdisciplinarity, networks
- **Impacts** – links to SDGs, usage by non-academia

The Unit's goal is to Better understand **the STI landscape for climate** by:

- Monitor relevant **research activities related** at global scale
- Assess their **impact** on R&I ecosystem, economy and society
- Build a **directory of who's who** (people, organisations) relating with outcomes
- Monitor and enhance policies **practices** & **uptake**

Benefits:

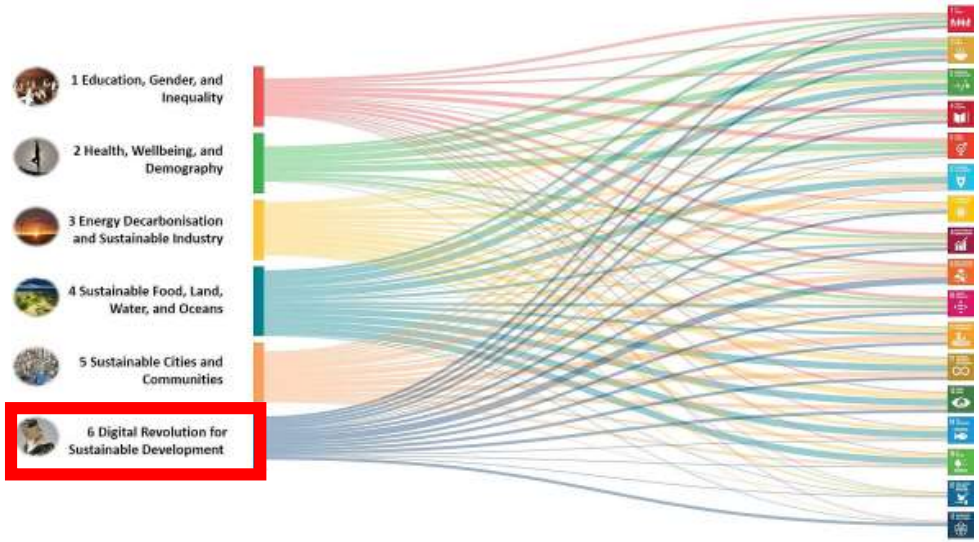
- Identify efforts to build synergies
- See what works and what not
- Reveal hidden potential
- Promote good practices

Challenges:

- Relate Gaps from end-user to solutions from developers and innovators using available connectivity hubs and networks

Topics:

- Good Practises related to Technology to support Cooperation and Synergies, and to facilitate the implementation of all SDGs.



Atmospheric Physics and Climatology

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 Contributor

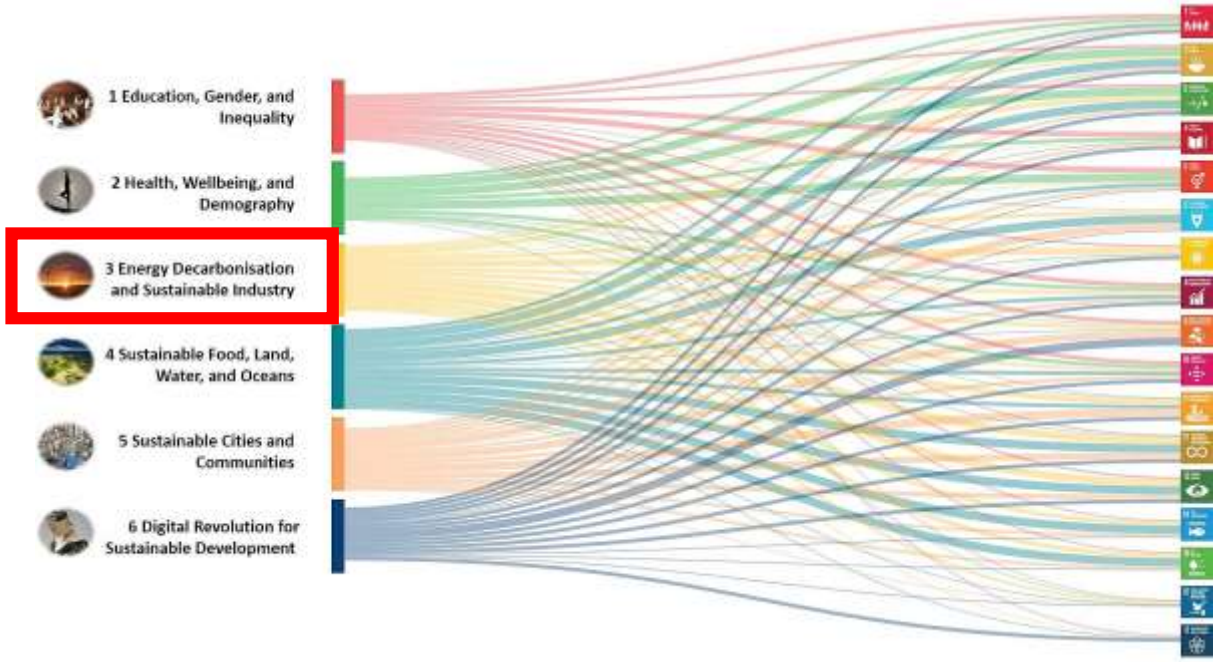
- The Study of climate fluctuations in any period
- The systemic study of the observations related to the upper layers of the atmosphere
- The collation and processing of observations related to air pollution

Topics:

- Air Pollution, Climate Data Libraries

Challenges:

- Identify Local Climate Data Sources and Libraries.



Climate & Energy Systems Modeling

Mission

The Climate Hub Unit focusing on Climate and Energy Systems modelling will use system dynamics and stochastic modelling techniques to develop decarbonization pathways of the energy system at the national level.

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

• Energy demand and use of different sectors such as transport, households, buildings and industry will be recorded along with their associated greenhouse gas (GHG) emissions.

• Various climate solutions, such as carbon pricing will be tested and their effect on GHG emissions and overall temperature will be calculated.

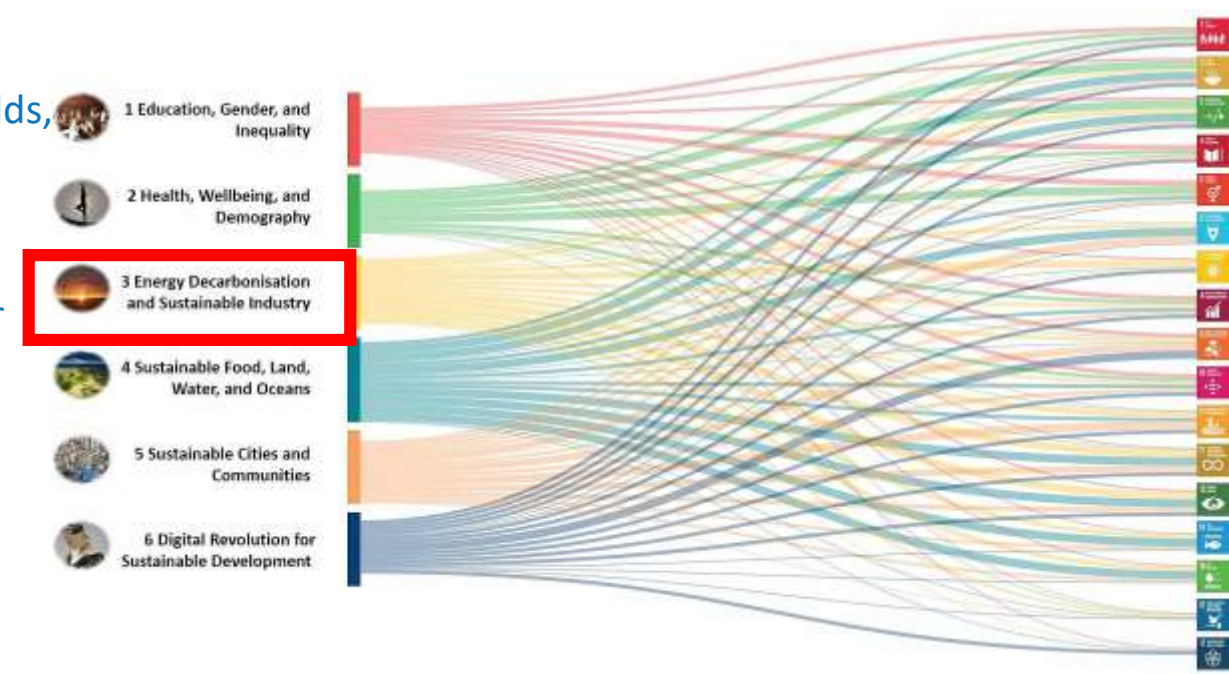
• Simulation of the scenarios providing detailed values for all relevant variables, along with the resulting temperature increase.

Topics:

- Companies or Universities working on Innovative Climate Modelling related to Energy

Challenges:

- Competing University teams using EN-ROADS or Balmorel models to achieve sustainability targets
- Start-ups or SMEs with outstanding potential/work



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

Mission

Being aware of the interconnectedness and mutual causality of the climate system and land surface processes, and the overall relevance for the Water-Food-Energy Nexus, the Climate Hub Unit will consider in high detail the relevance of land use dynamics and changes in land use and water management on various scales, i.e., ranging from continental to the river basin scale.

This Unit will combine knowledge of this complex and interdisciplinary system of systems with relevant technological, policy, and human behavioral modeling and datasets.

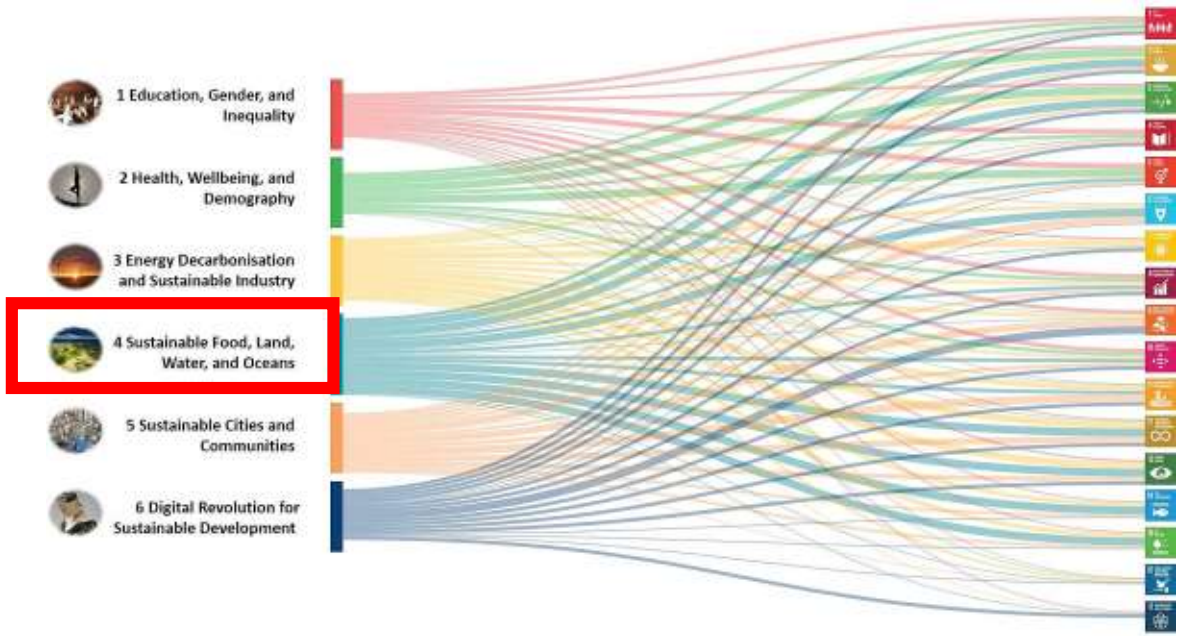
- **System Dynamics Modelling** is used to map detailed and extensive sector-specific data from major databases and scenario models for national level analysis of interlinkages and for the identification of Nexus hotspots, where resource interdependencies create vulnerabilities and threaten resource security.
- **Trade-off analysis** is conducted to identify best possible options. Economic sectors such as agriculture, industry, services, and households are modeled, and calculations include GDP, government, governance, finance and investments taking into account state of the art economic modeling. Environmental sectors include land, soil, water, energy, consumption and production patterns, waste and biodiversity, while GHG emissions are calculated from all sectors.

Topics:

- Companies/ Institutions working on Innovative tools on Water Land (Agriculture) and Energy Nexus.

Challenges:

- Compete on resource security initiatives



Climate & Health

Mission

Despite international attempts to mitigate its effects, human-caused climate change is already having far-reaching, potentially catastrophic consequences for the natural world and the lives of billions of people around the globe, including physical and mental health. Climate change is hurting the people and ecosystems that are weakest and most at risk.

Health and morbidity are affected in a wide variety of ways by climate change and other natural and man-made environmental stresses. It's expected that certain health risks will worsen, while new ones will appear. Some people are more vulnerable than others based on critical factors such as age, financial ability, and geographic location.

The goal of the SDSN Climate HUB will be to help scientists learn new things that will help reduce the negative effects of climate change on health. Indicatively, this can be achieved through:

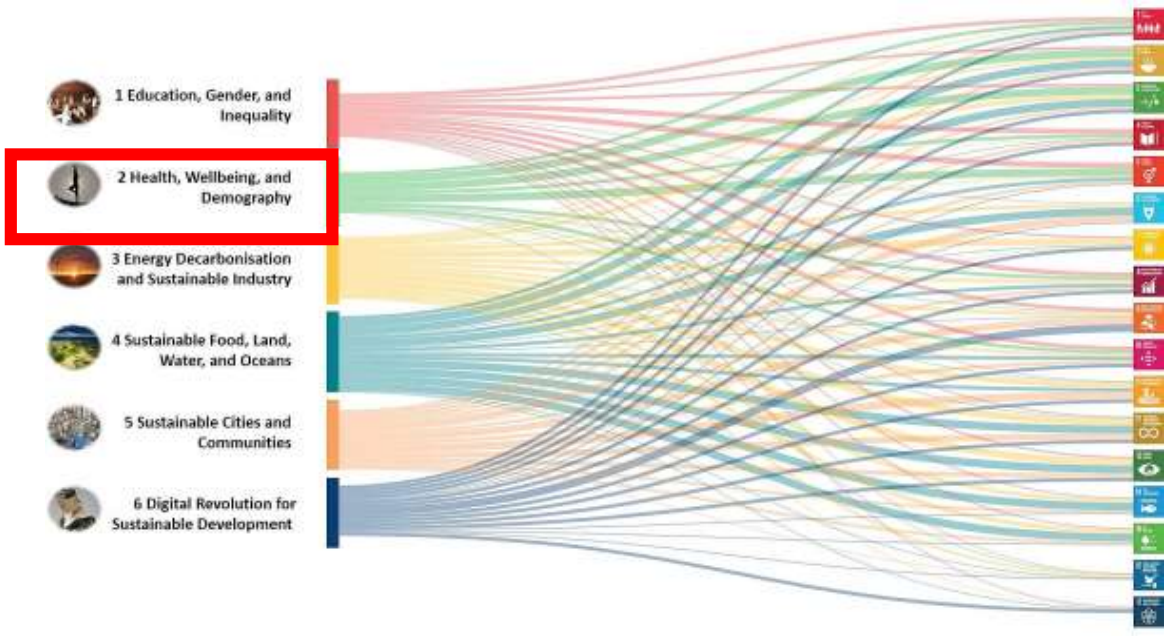
- Investigating the cost-effective public health co-benefits of climate change mitigation;
- Addressing GHG mitigation strategies across the economy, including industry, transportation, construction, the food industry, agriculture, privat consumption, and so on;
- Creating comparative modeling assessments based on mitigation scenarios under various sources of uncertainty.

Topics:

- Companies or Institutions promoting innovative Work or initiatives related to Health, End hunger, achieve food security and improved nutrition

Challenges:

- Start-ups or SMEs with outstanding potential/work



Innovation Acceleration for Climate Neutrality and Resilience

Mission

To meet the EU's 2050 climate neutrality objective, transforming industries requires supporting the mass deployment of sustainable technologies. Not only should prioritize sustainable technology deployment, but it should also prioritize certain key industries where the biggest impact on climate change can be achieved. Not only incremental innovation will be required, but also disruptive or breakthrough technologies will be needed to accelerate the transition to a green economy and society.

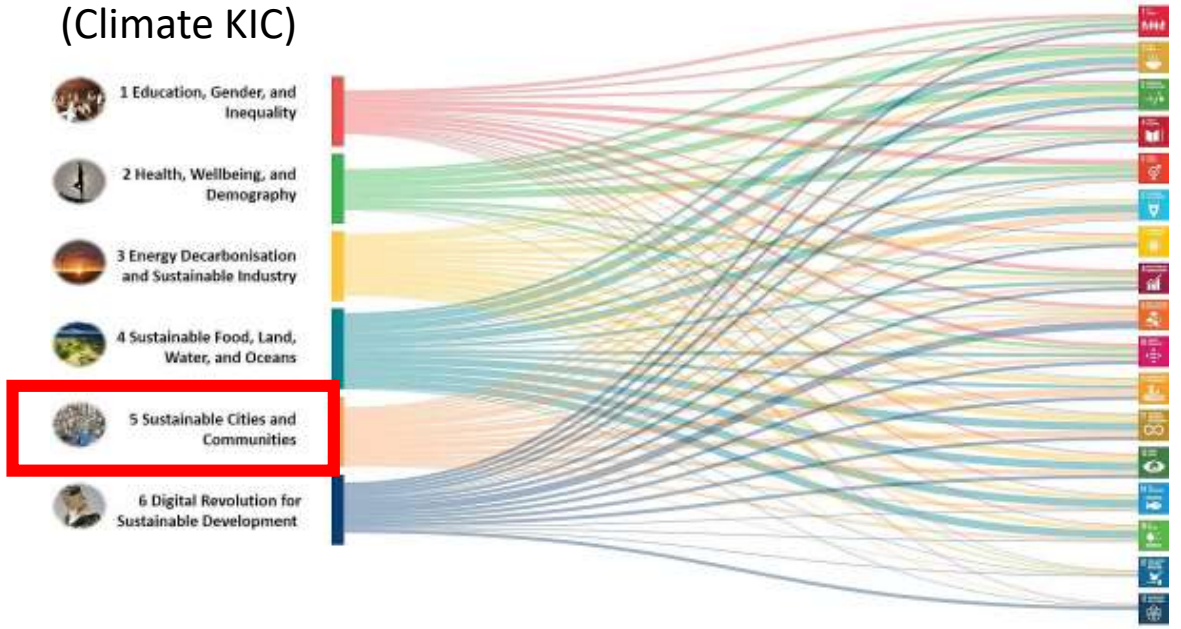
For this reason, the Global Climate Hub (GCH) hosts the EIT-Climate KIC Hub in Greece, which acts as a knowledge and innovation community, working towards accelerating the transition to a zero-carbon, climate-resilient society. With the support of the European Institute of Innovation and Technology (EIT), the EIT Climate-KIC Hub brings 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.

Topics:

- Innovations, accelerators, sustainable cities and islands decarbonization of shipping/ transportation sector, sustainable oceans

Challenges:

- Identify pressing needs from the part of end-users as well as innovators to conceptualize the importance of accelerators
- Focus on success stories of the existing accelerators (Climate KIC)



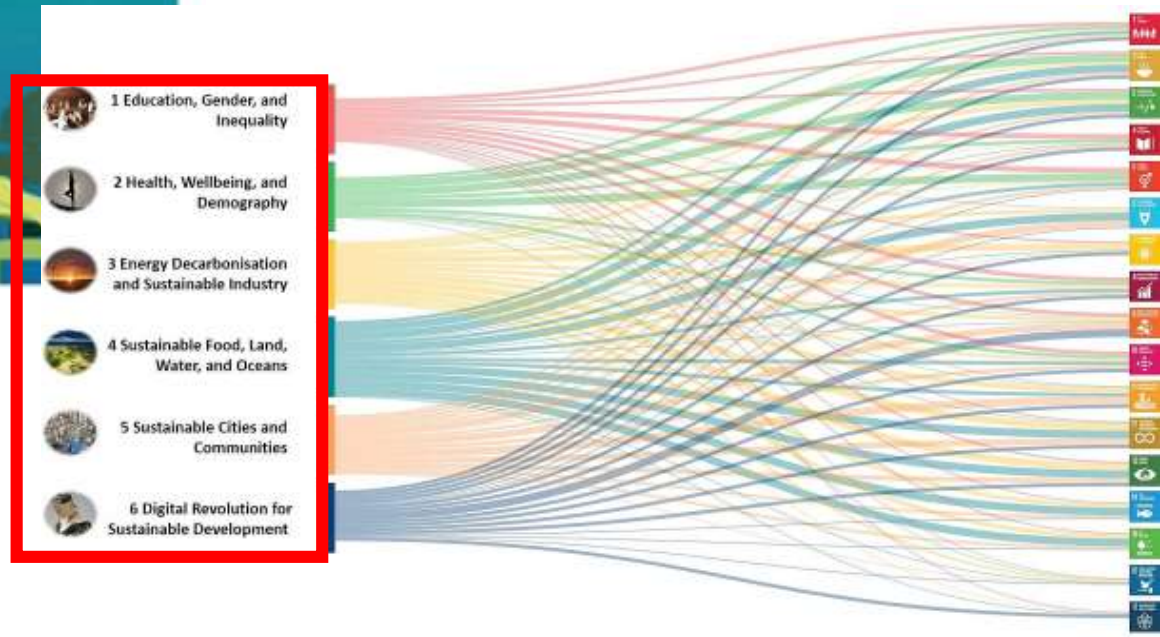
Just Transition: Policies, Finance, Labor Market

Challenges:

- Trade-offs between Energy resilience and climate mitigation/adaptation in the context of the geopolitical landscape

Topics:

- Cutting-edge financial, technological and policy pathways related to the transition to a climate neutral and resilient world.



Transformative Participatory Approaches: National Living Labs and Systems Innovation

Mission

At the heart of all Global Climate Hub (GCH) and its work lies people; those impacted by climate change as well as those charged with making crucial decisions in order to adapt to and mitigate against these impacts. With the GCH providing a focal point for the global community of climate actors, the Transformative and Participatory Approaches (TAPA) Unit bridges the gap between the models that drive the scientific outputs of the GCH and the national policy-shapers and decision-makers.

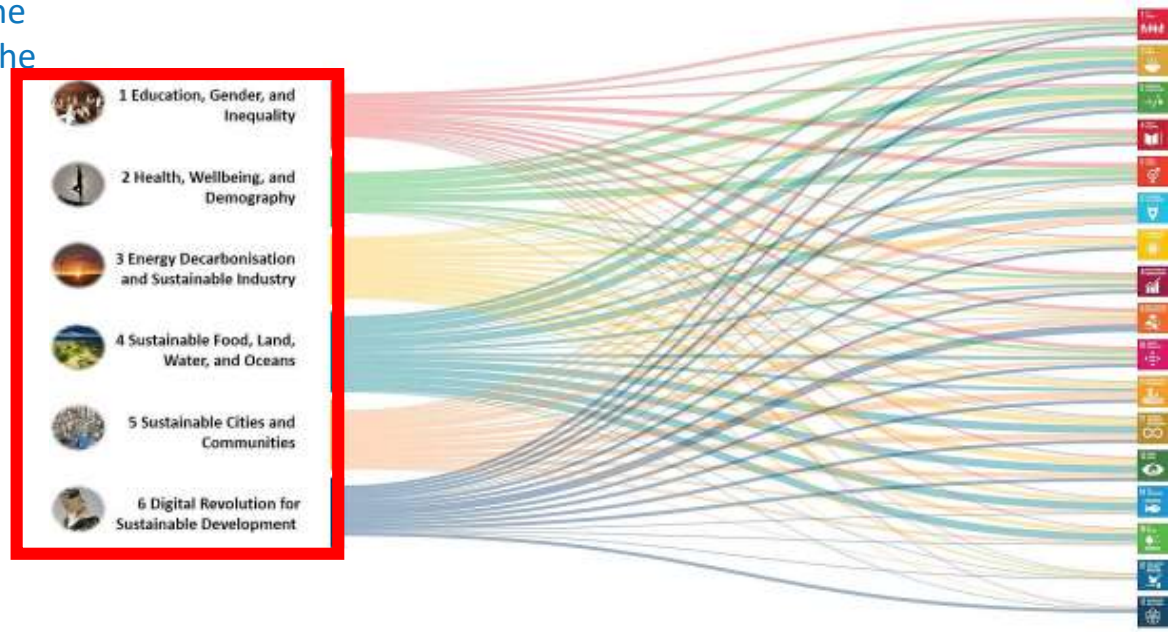
The TAPA unit works closely with stakeholders to ensure that the model outputs are not only representative of the local realities but that the proposed solutions and innovations (technological, social, financial and policy) are appropriate and fit for purpose within the local context. The systems dynamics approach adopted by the modelling activities of the GCH is mirrored in the participatory approaches of the TAPA unit which are based on System Innovation.

Topics:

- Innovative participatory approaches
- Initiatives Products for Stakeholder engagement

Challenges:

- ***Citizen Science Applications***
- Behavioural Science methodologies to assess people's attitudes vis-à-vis awareness and willingness to move towards SGD implementation



Education, Training, Upskilling and Reskilling

Mission

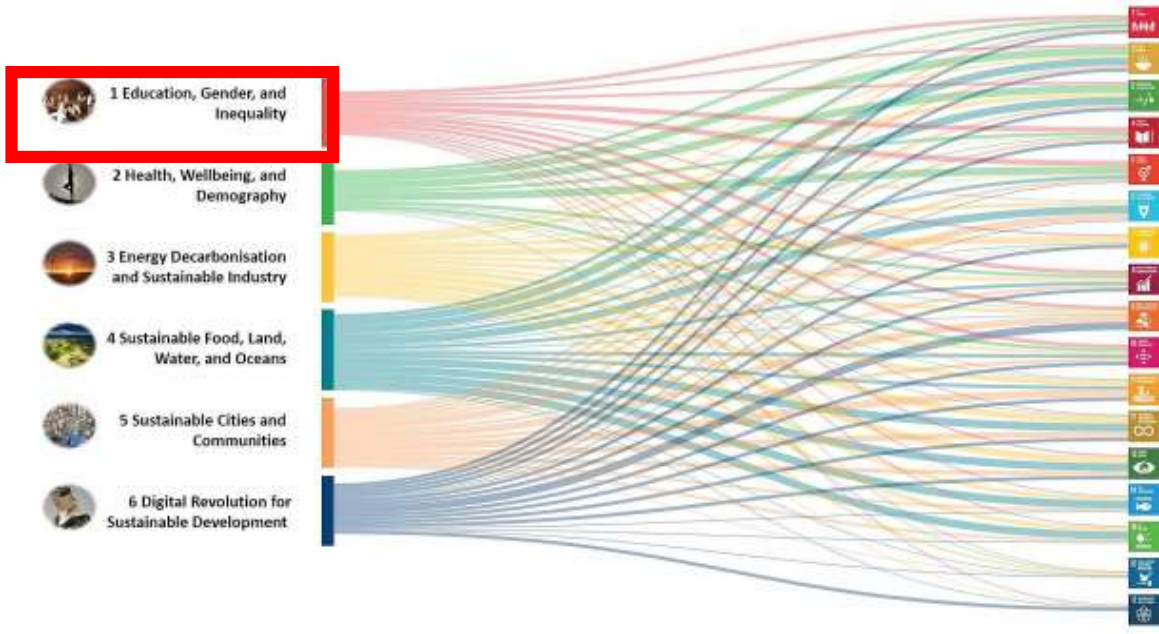
The mission of the Unit “Education, Training, Upskilling and Re-skilling” of the Global Climate Hub (GCH) will be to support the green transition by educating and training people, building skills ecosystems, which will also be aligned with national, regional, local and sectoral green strategies. The educational programs will be delivered under six themes corresponding to the Six SDG Transformations

Topics:

- Awards on Innovative programs promoting and facilitating the implementation of SDGs
- Outstanding Work in promoting Education, Gender, and Inequality

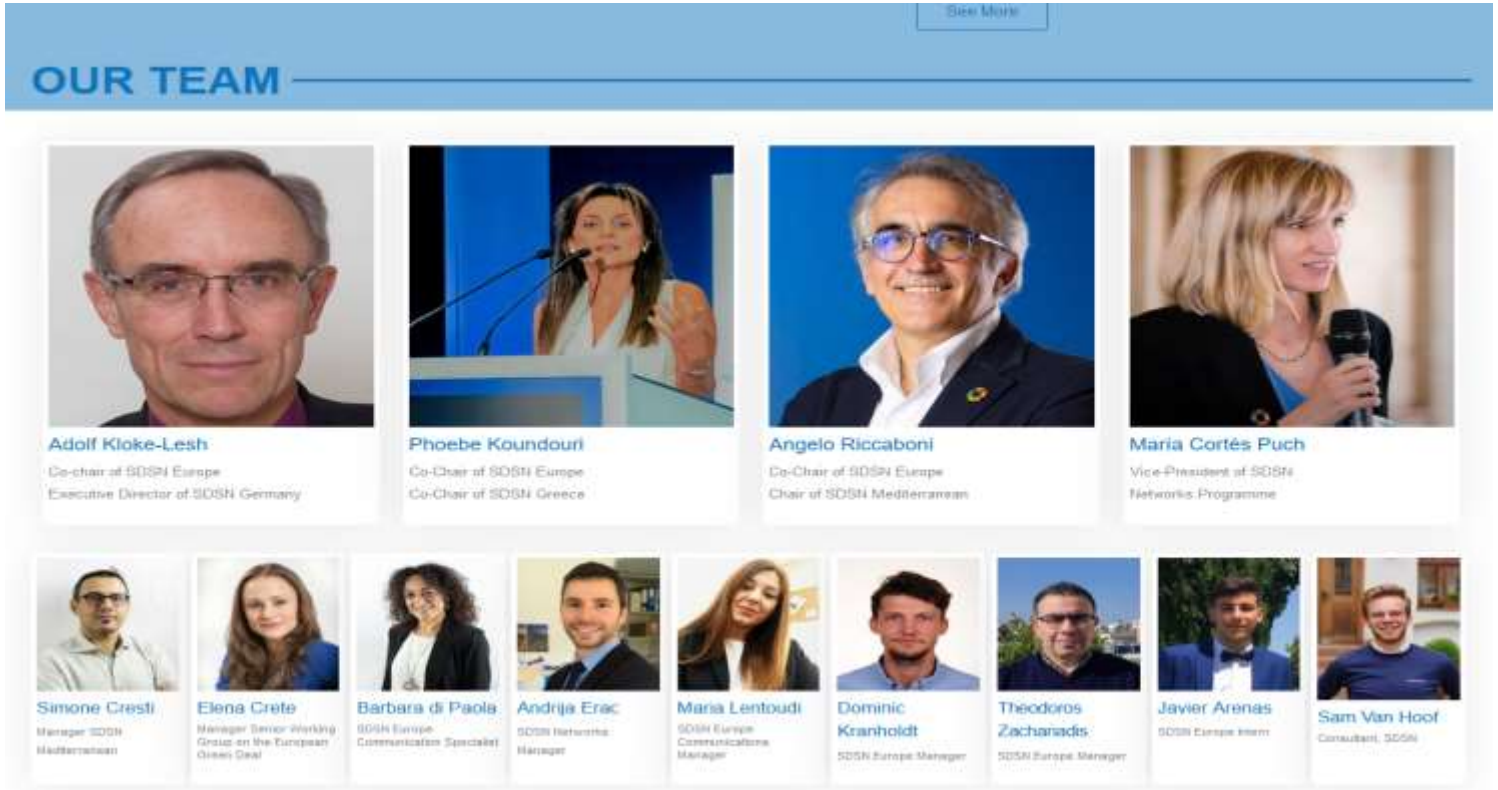
Challenges:

- Monitoring SDG compliance in public institutions, large companies, SMEs and organizations



Mission: *"In Europe, over 400 members and 13 national and regional networks of SDSN are part of SDSN Europe that aims to align the European recovery with the Agenda 2030.*

Leveraging on the research within the networks as well as on the SDSN's work on the Six Transformations and other publications, SDSN Europe will play an active role in the shaping of a sustainable and resilient Europe. "




Sustainable Agrifood Systems and Land Use
SDSN Europe Thematic Group


European Green Deal Senior Working Group
Transformations for the Joint Implementation of Agenda 2030 for Sustainable Development and the European Green Deal


SDSN SEAs Initiative
Thematic Group on Sustainable Euro-Asian Seas


EUROPE SUSTAINABLE DEVELOPMENT REPORT 2020
Meeting the Sustainable Development Goals in the face of the COVID-19 pandemic
Includes the SDG Index and Dashboards for the European Union, its Member States, and partner countries

SDG Index Rank	Country	SDG Index Score
1	Finland	80.8
2	Sweden	80.6
3	Denmark	79.3
4	Austria	78.0
5	Norway	76.7
6	Germany	75.3
7	Switzerland	74.0
8	Estonia	73.7
9	Slovenia	73.5
10	France	72.7
11	Czech Republic	72.6
12	Belgium	72.5
13	Netherlands	72.1
14	Iceland	72.1
15	Poland	71.0
16	Ireland	70.6
17	United Kingdom	70.2
18	Slovak Republic	70.0
19	Latvia	69.3
20	Portugal	69.1
21	Hungary	68.5
22	Spain	68.5
23	Italy	68.5
24	Croatia	68.0
25	Lithuania	66.1
26	Luxembourg	65.8
27	Greece	64.8
28	Malta	63.6
29	Romania	61.6
30	North Macedonia	59.9
31	Serbia	59.3
32	Cyprus	58.6
33	Bulgaria	57.6
34	Turkey	55.7

European Union	**71.4**
Northern Europe	80.6
EFTA Countries	75.1
Western Europe	74.0
Baltic States	69.3
Southern Europe	68.3
Central and Eastern Europe	68.0
Candidate Countries	55.3
Albania	NA
Bosnia and Herzegovina	NA
Liechtenstein	NA
Montenegro	NA


SUSTAINABLE DEVELOPMENT
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A GLOBAL INITIATIVE FOR THE UNITED NATIONS


SDG Index & Monitoring
Tracking progress on the Sustainable Development Goals


CLIMATE &
ENERGY


SDG FINANCING
INITIATIVE


Nature Map


GOOD GOVERNANCE OF
EXTRACTIVE & LAND RESOURCES


TReNDS
THEMATIC RESEARCH NETWORK
ON DATA AND STATISTICS


SUSTAINABLE CITIES: INCLUSIVE, RESILIENT
AND CONNECTED


The Lancet COVID-19 Commission
Promoting solutions to improve global public health and support an equitable, transformative, green, and digital recovery


The World Happiness Report 2021 focuses on the effects of COVID-19 and how people all over the world have fared.
Read the Report
Overview: Life under COVID-19
Happiness, trust, and deaths under COVID-19
COVID-19 Prevalence and Well-Being: Lessons from East Asia


Mission 4.7 brings together leaders from government, academia, civil society, and business to accelerate the implementation of Education for Sustainable Development around the world.


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SDGacademy
Free educational resources from the world's leading experts on sustainable development

CLIMATE & ENERGY

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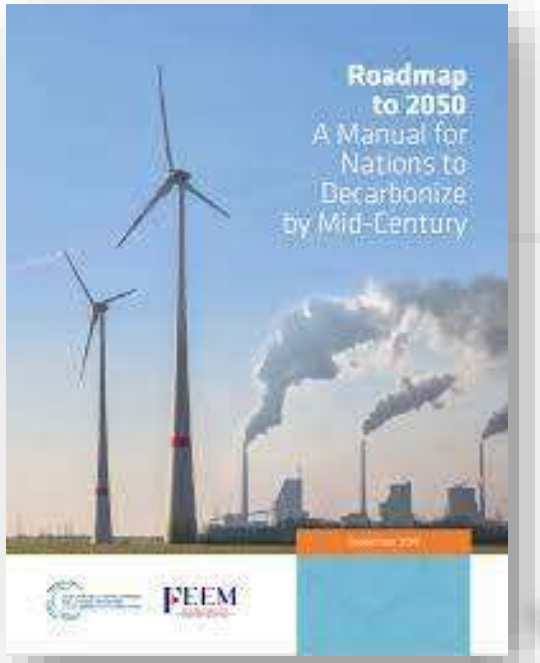

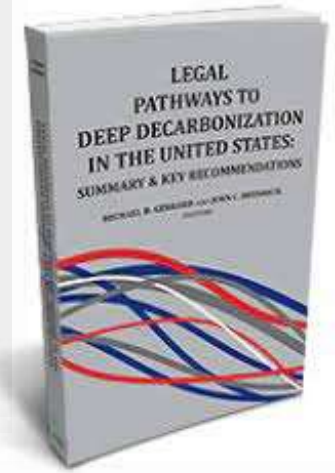

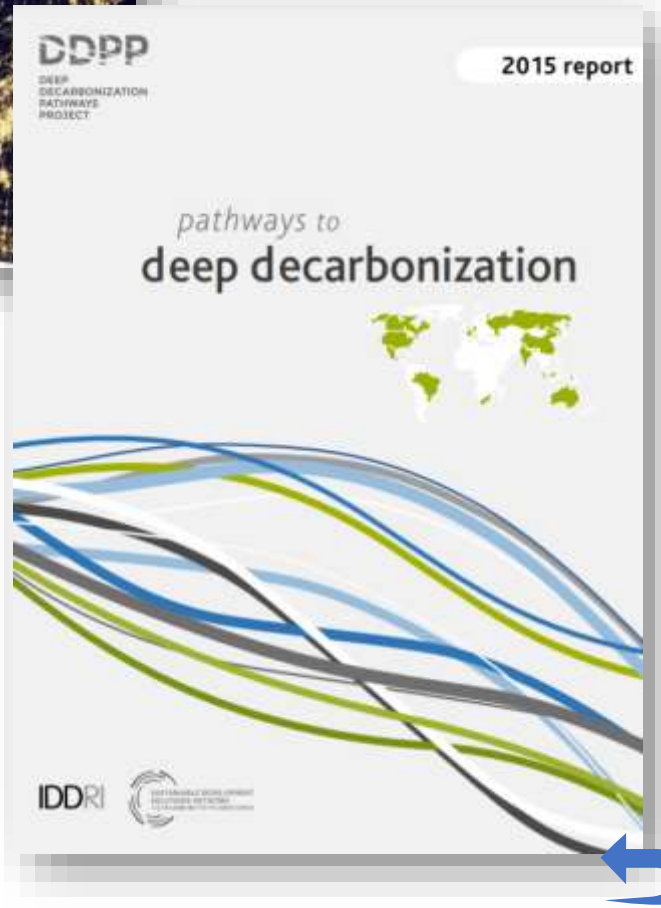

SDG Index and Dashboards: global, regional and subnational editions (2016-2021)

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
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Global Climate Hub

ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

ATHENA
Research & Innovation Information Technologies

MISSION

Recognizing the global climate crisis and the need for governments worldwide to take immediate decisive action to reduce the impact of climate change, the **SDSN Global Climate Hub** will provide ***science-based advice*** for combating the aggravating climate crisis and prevent further deterioration.

SDSN Global Climate Hub will use all extensive data, knowledge and technologies provided by experts in various fields to implement country-specific action plans to be adopted and reinforced by society.

SDG 13

Climate action

Displaying Ratings

Ratings provide a visual representation of a country's performance on the SDG.

Legend

Click on a country to see its performance.

- SDG achieved
- Challenges remain
- Significant challenges remain
- Major challenges remain
- Information unavailable

Description

Take urgent action to combat climate change and its impacts.

Indicators

Click on an indicator to visualize it on the map.

CO_2 emissions from fossil fuel combustion and cement production

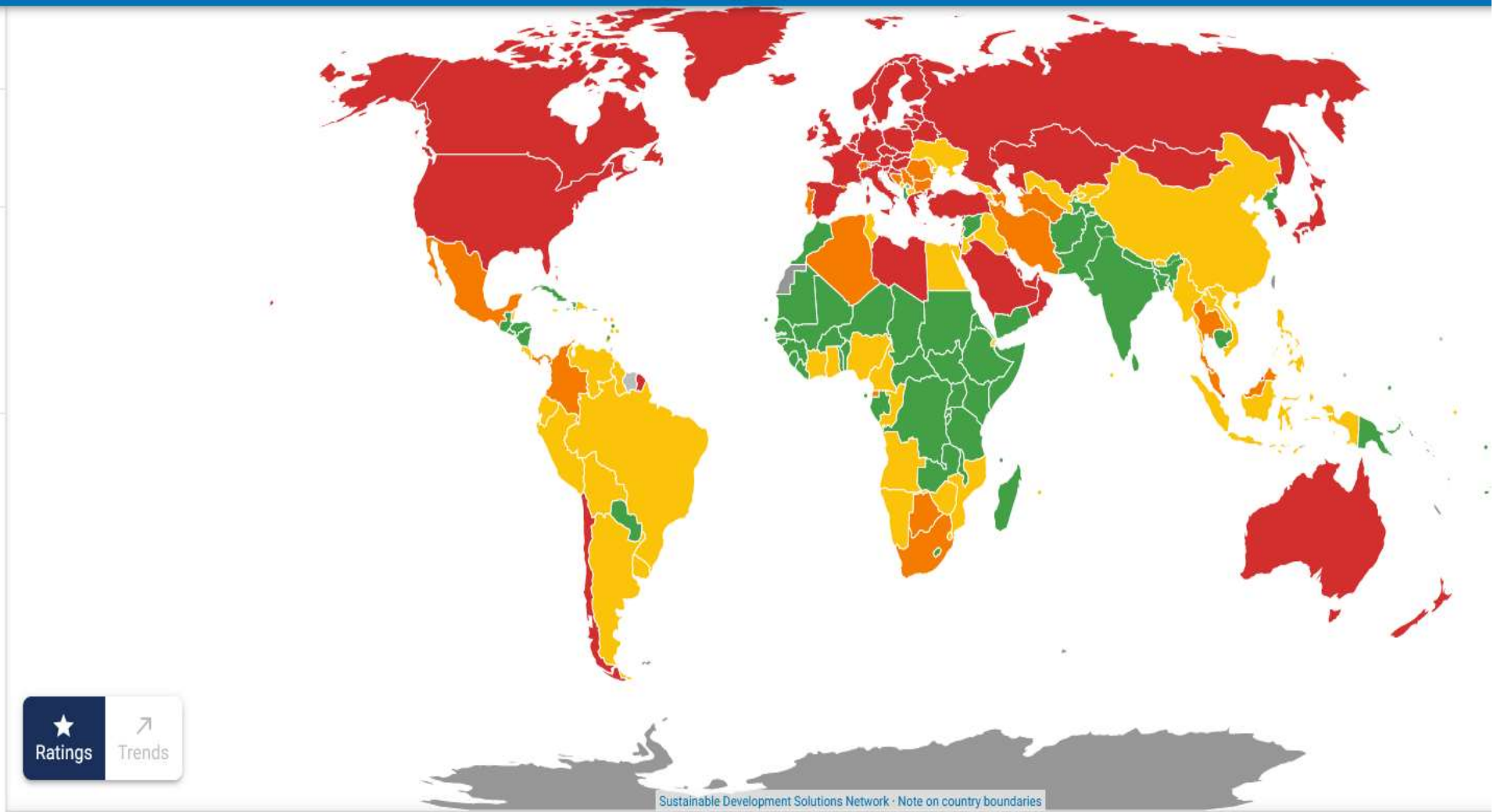
CO_2 emissions embodied in imports

CO_2 emissions embodied in fossil fuel exports

OECD-only Indicators

Click on an indicator to visualize it on the map. These indicators are only used for OECD countries.

Carbon Pricing Score at EUR60/tCO_2



Select one of the SDGs to see it on the map or display the overall scores

SDG 13

Climate action

Displaying Trends

Trends indicate whether a country is on track to achieve the SDG by 2030.

Legend

Click on a country to see its performance.

- On track or maintaining SDG achievement
- Moderately improving
- Stagnating
- Decreasing
- Trend information unavailable

Description

Take urgent action to combat climate change and its impacts.

Indicators

Click on an indicator to visualize it on the map.

CO_2 emissions from fossil fuel combustion and cement production

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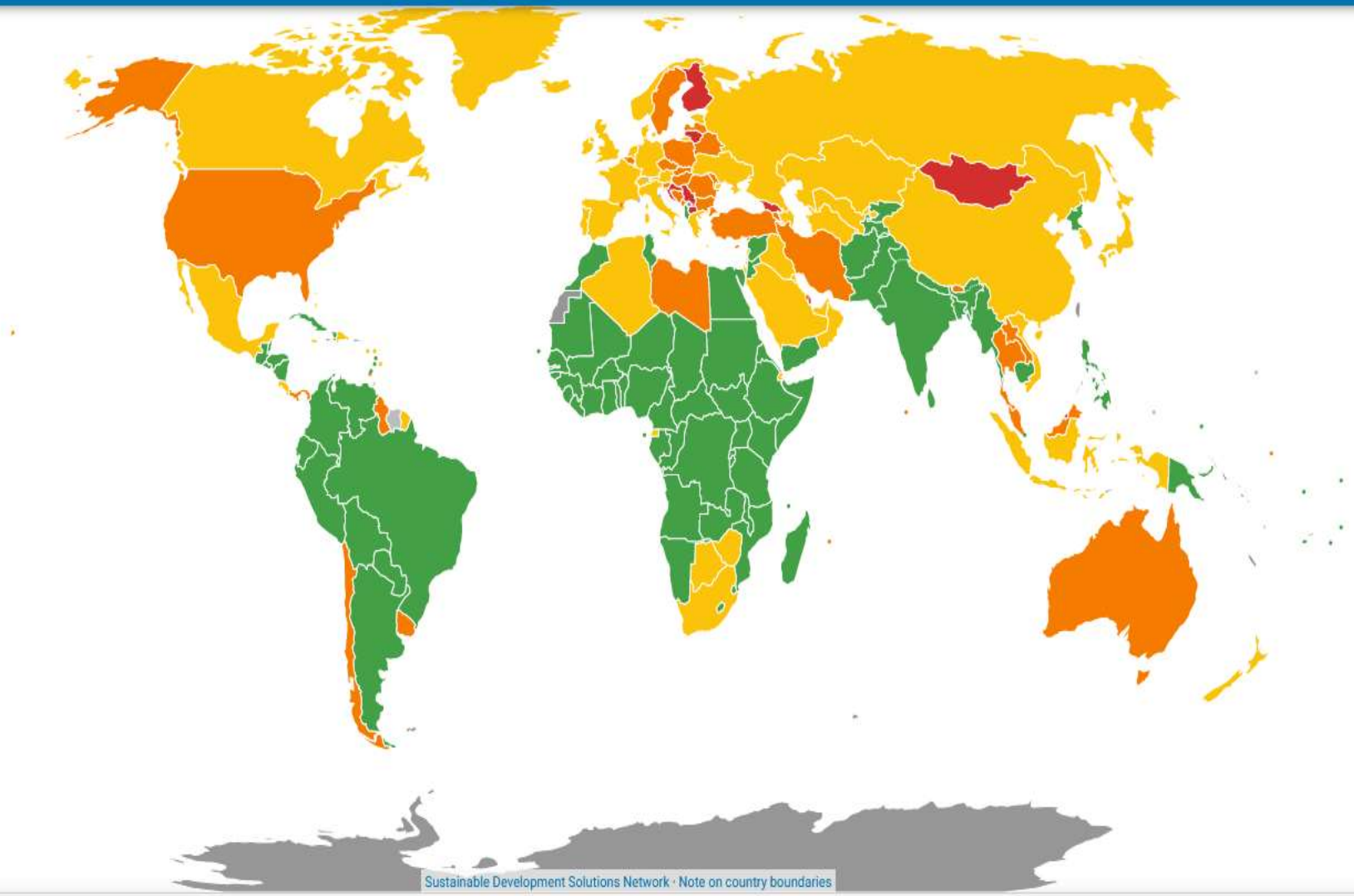


Select one of the SDGs to see it on the map or display the overall scores

Race to Net Zero: Carbon Neutral Goals after COP26

Figure 1: Net zero targets – 126 countries have set goals to decarbonize their economies

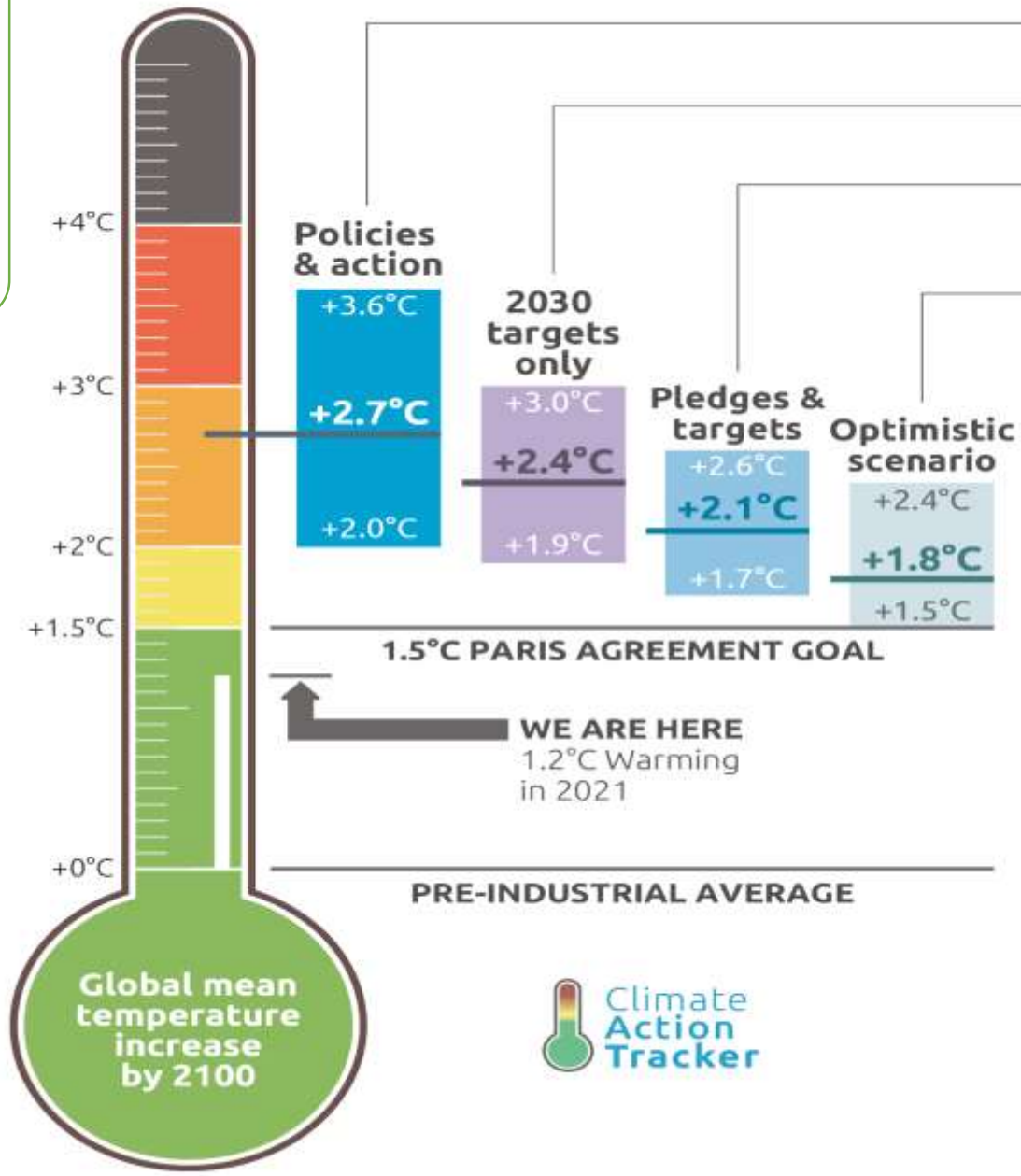
Source: BNEF (Bloomberg New Energy Finance), Climate Action Tracker, Climate Change News, and PIMCO as of October 2020

- Stronger commitments to reduce emissions and to keep global temperature rise to 1.5°C.

40 countries 2050/China 2060/India 2070

US and China to continue Climate Negotiations

- From the projected 4 °C faced before Paris, and the 2.7 degrees before Glasgow, we have now edged towards 2-1.8°C
- 450 Business and Financial Institutions coalition worth $130 trillion vows to put climate at heart of finance
- Global standards body takes aim at company 'greenwashing' claims
- 100 countries make new pledges to cut methane and 133 save forests
- Ensuring carbon market integrity
- Developed countries confirm commitment $100 billion goal a year for Climate Mitigation and Adaptation in developing countries



Policies & action
Real world action based on current policies

2030 targets only
Full implementation of 2030 NDC targets*

Pledges & targets
Full implementation of submitted and binding long-term targets and 2030 NDC targets*

Optimistic scenario
Best case scenario and assumes full implementation of all **announced** targets including net zero targets, LTSs and NDCs*

* If 2030 NDC targets are weaker than projected emissions levels under policies & action, we use levels from policy & action

Climate Action Tracker

CAT warming projections
Global temperature increase by 2100

November 2021 Update

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS
Global Climate Hub

ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

ATHENA Research & Innovation Information Technologies

In collaboration with national governments and respective SDSN National Hubs, we will ***co-design*** *national and sub-national pathways for the transition to a climate neutral and a climate resilient world and showcase results in terms of the* ***6 transformations*** *for the transition to "The Future we Want"..*

- **Downscale** Global Models to *National*
- **Expand** System Dynamics Modelling Modules and **Technological** Advances at a sectoral Level
- **Integrate Natural and Social Capital** to existing modules

OBJECTIVES

1. Infrastructure for modelling decarbonization for governments to design local pathways, along with dedicated support and capacity building programs

- Compile existing decarbonization models (EN-ROADS, MIT Climate Interactive) and develop additional ones
- Develop ICT tools to visualize and easily manage climate change data (ACM - Association for Computing Machinery)
- Identify necessary technological benchmarks to ensure we meet the Paris Agreement and design investment pathways to achieve them (SDSN Council of Engineers)
- Develop tools to assist governments in the use of all of the above (World Council for ERE)

2. Collaborate Food, Environment, Land and Development Action Tracker, Climate Action Tracker, SDSN SWG on EGD, and others to:
    - Mapping policy efforts
    - Climate change policy instruments

3. Define innovative strategies for financing mitigation and adaptation pathways

25 years of experience has taught us that achieving the systemic change we need requires a different order of innovation.

Incremental	System innovation	Transformational
Project finance model		Portfolio finance model
Single projects and incremental change		Portfolio of connected innovation projects that learn from each other
Siloed and fragmented activities, often focused on technological improvements		Wide appreciation of change levers

• e 37

The transition to Decarbonization and Climate Resilience should be conceived on a systems approach, simultaneously addressing multiple objectives and promoting the right mixture of policy instruments and technological solutions, that can be used across the various sectors of the economy and reinforced by society.

Climate Science based, Systemic and Holistic Pathways

- Technological
- Financial
- Policy

for sustainable interaction between society, economy and nature

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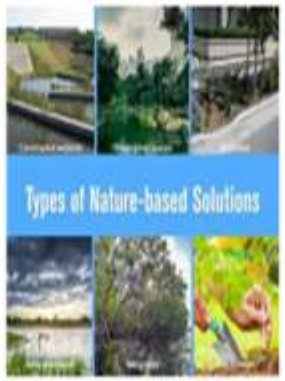
Technological and Investment Pathways

Technological pathways: Roadmap to 2050, A Manual for Nations to Decarbonize by 2050



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https://unsdsn.globalclimatehub.org

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SDSN Global Climate Hub will use all extensive data, knowledge and technologies provided by experts in various fields to implement country-specific action plans to be adopted and reinforced by society.

SDSN Global Climate Hub - https://unsdsn.globalclimatehub.org

Climate Data Platforms and Digital Applications

Atmospheric Physics and Climatology

Climate & Energy Modeling

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

Climate and Health

Innovation Acceleration for Climate Neutrality and Resilience

Just Transition: Policies, Finance, Labor Market

Transformative Participatory Approaches: National Living Labs and Systems Innovation

> There are times which are not ordinary, and in such times, it is not enough to follow the road. It is necessary to know where it leads, and, if it leads nowhere to follow another. The current momentum of climate neutrality pledges from all around the world, shows that governments have come to realise that we need to develop a new pathway that enables the transition to climate neutrality and climate resilience, within the Framework of UN Agenda 2030 and the Paris Climate Agreement. The SDSN Global Climate Hub has made it its mission to provide science-based recommendations for combating the climate crisis and preventing further deterioration. In collaboration with national governments, it will use extensive data, knowledge, and technologies provided by experts in various fields to develop and help implement, detailed country-specific action plans, to be implemented and reinforced by society.
>
> Phoebe Koundouri, chair SDSN Global Climate Hub

Education, Training, Upskilling and Reskilling

Thank you for your patience!!!

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www.ae4ria.org

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