SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

eit Climate-KIC

Climate-KIC is supported by the EIT, a body of the European Union

Climate Change and Extreme Natural Events: Their Effects on Sustainability Transition Pathways

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Director, EIT Climate KIC Hub – Greece, ATHENA RC

Co-Chair, UN Sustainable Development Solutions Network (SDSN) - Greece

ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

THE CLIMATE EMERGENCY

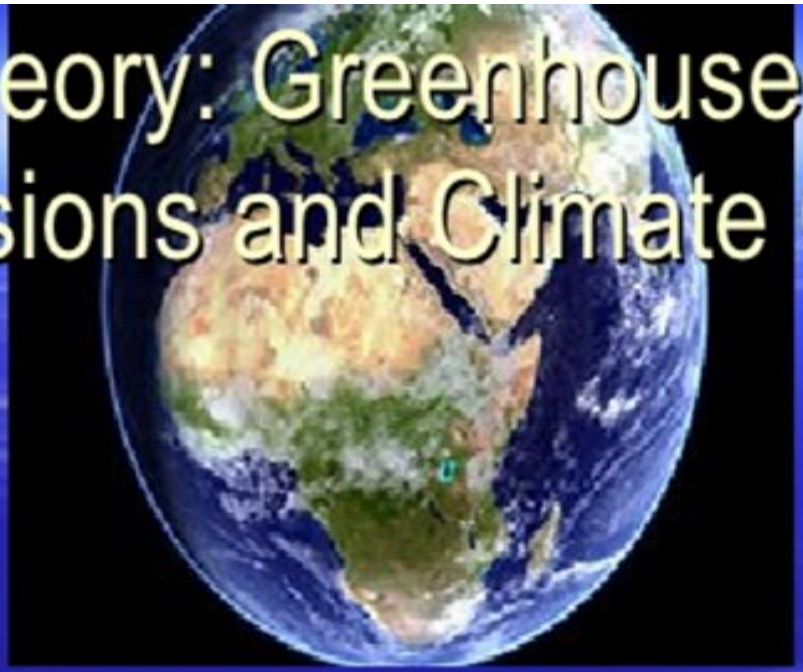
Urgency of limiting global warming to +1.5C, beyond which the risk of drought, floods, extreme heat and poverty for hundreds of millions of people, will significantly increase.

What are Natural Disasters?

NOAA 2007

Earthquakes Volcanoes Tornadoes
Hurricanes Floods Droughts
Winter Storms Wild Fires Thunderstorms

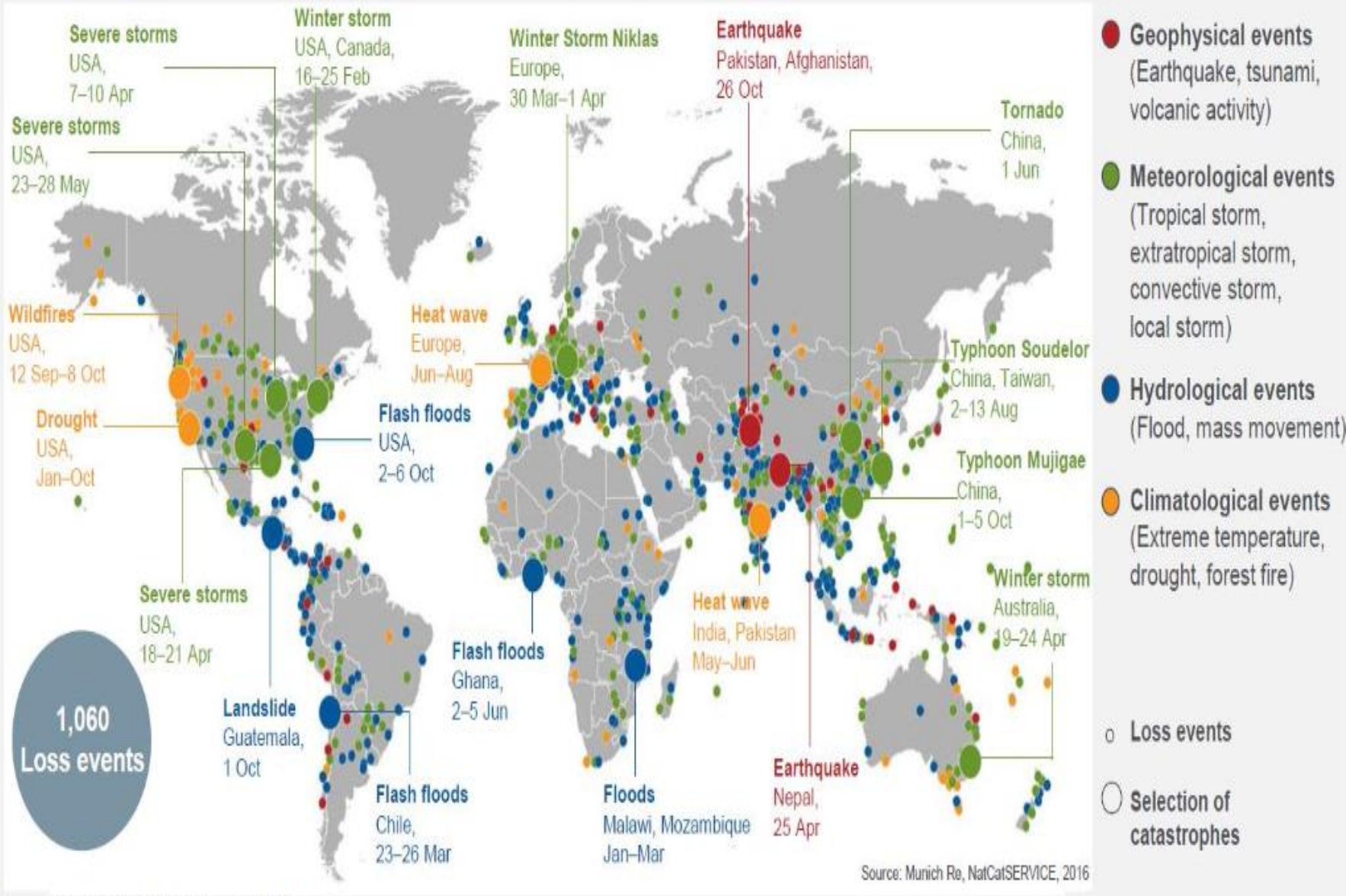
Theory: Greenhouse Gas Emissions and Climate Change



Alter the intensity and frequency of natural disasters that are regulated by atmospheric and oceanic conditions

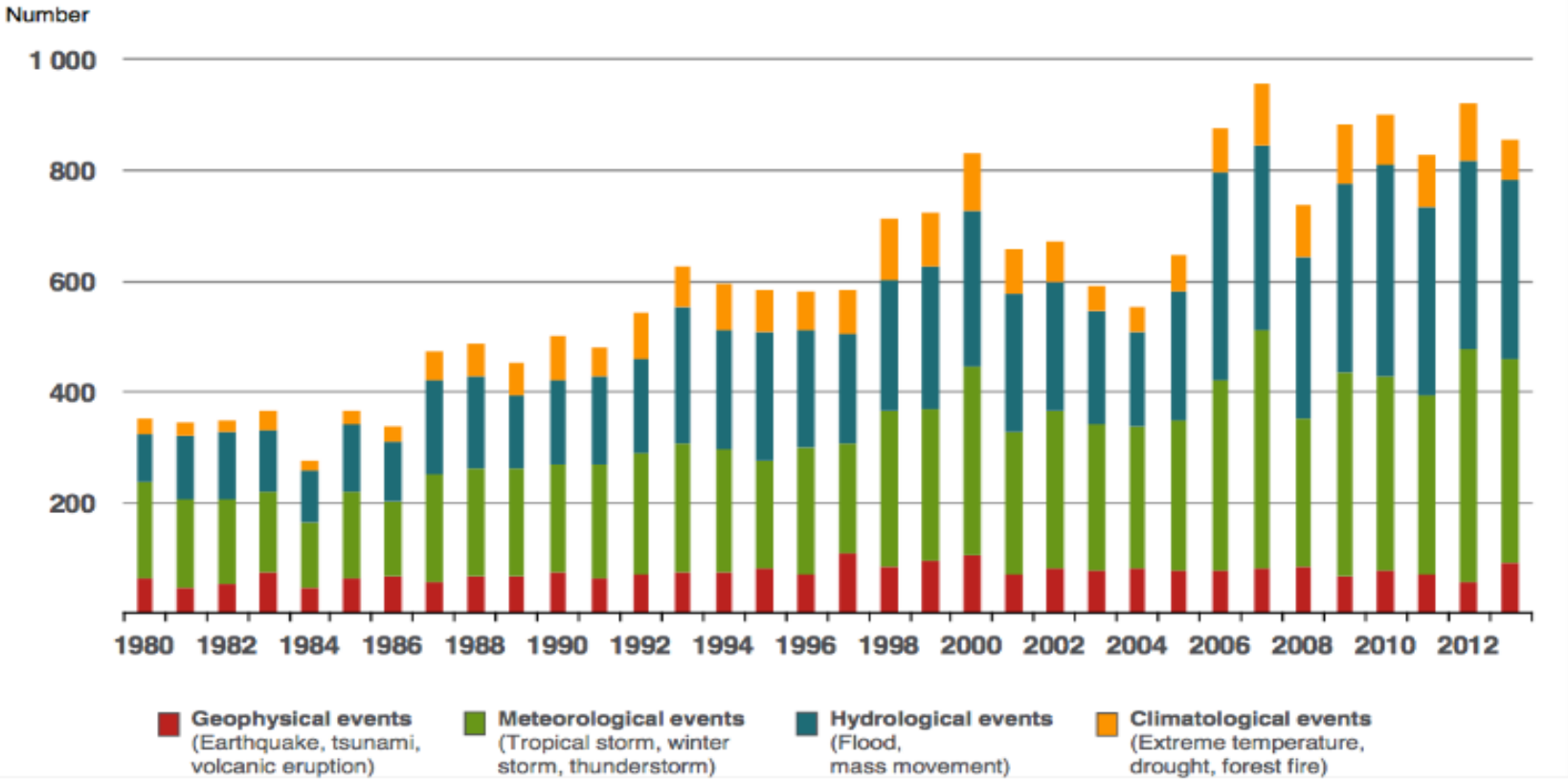
- Yes: hurricanes and cyclones, droughts, floods, thunderstorms, wild fires, winter storms
- No: volcanoes, earthquakes
- Maybe: tornadoes (no decisive verdict yet)

Natural Loss Events Worldwide 2015 – Geographical Overview



Source: Munich Re, NatCat Service 2016.

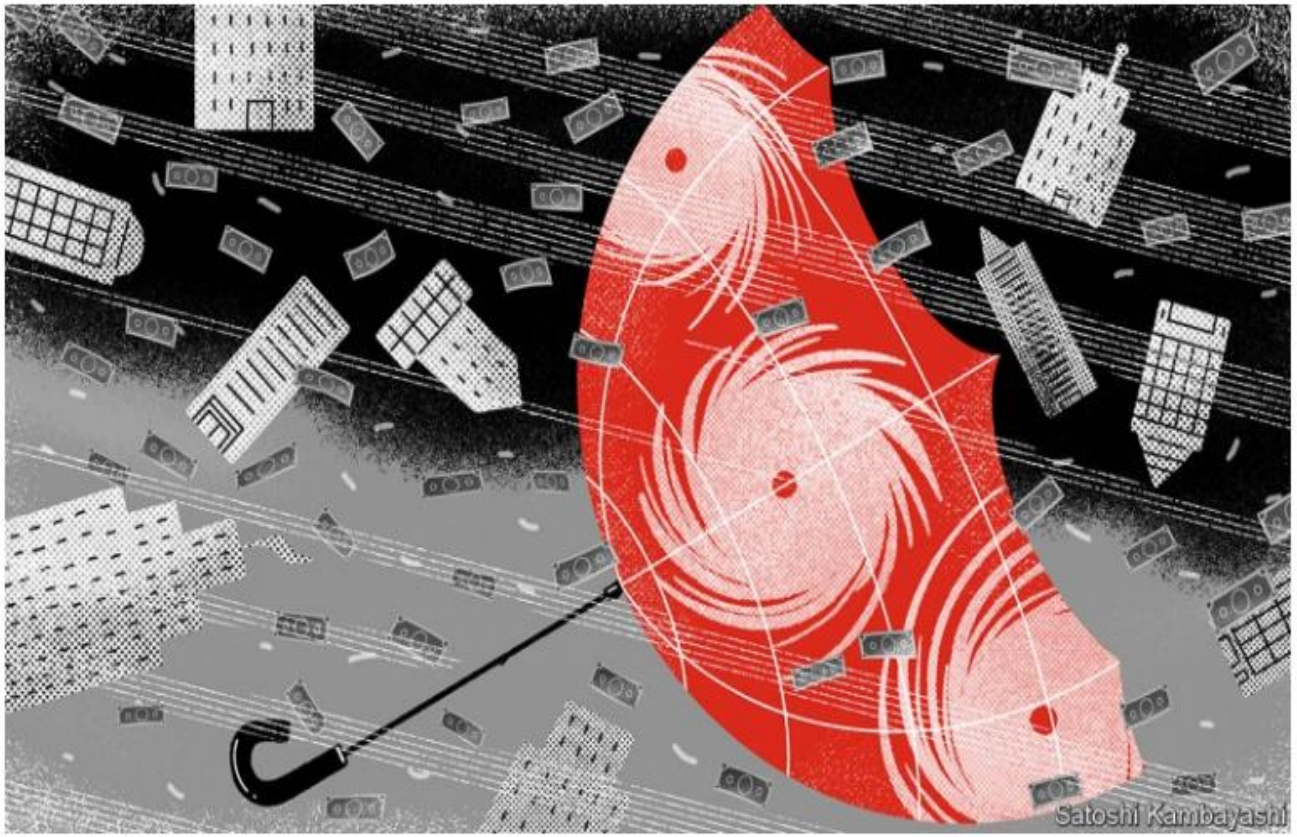
Damage costs from weather related disasters have been rising over the past 40 years and will likely continue to grow as climate change increases the intensity of storms, droughts, and floods.



Empirical Evidence on Damage Costs from Weather Related Disasters

Changing weather could put insurance firms out of business

Climate issue: The cost of comprehensive cover could become exorbitant, even as it is needed more than ever



The SDR 2019 proposes SIX MAJOR TRANSFORMATIONS

Leave No One Behind

1. Education, Gender, and Inequality

SDGs 1-5, 7-10, 12-15, 17

2 Health, Wellbeing, and Demography

SDGs 1, 2, 3, 4, 5, 8, 10

3. Energy Decarbonization and Sustainable Industry

SDGs 1-16

4. Sustainable Food, Land, Water, and Oceans

SDGs 1-3, 5, 6, 8, 10-15

5. Sustainable Cities and Communities

SDGs 1-16

6. Digital Revolution for Sustainable Development

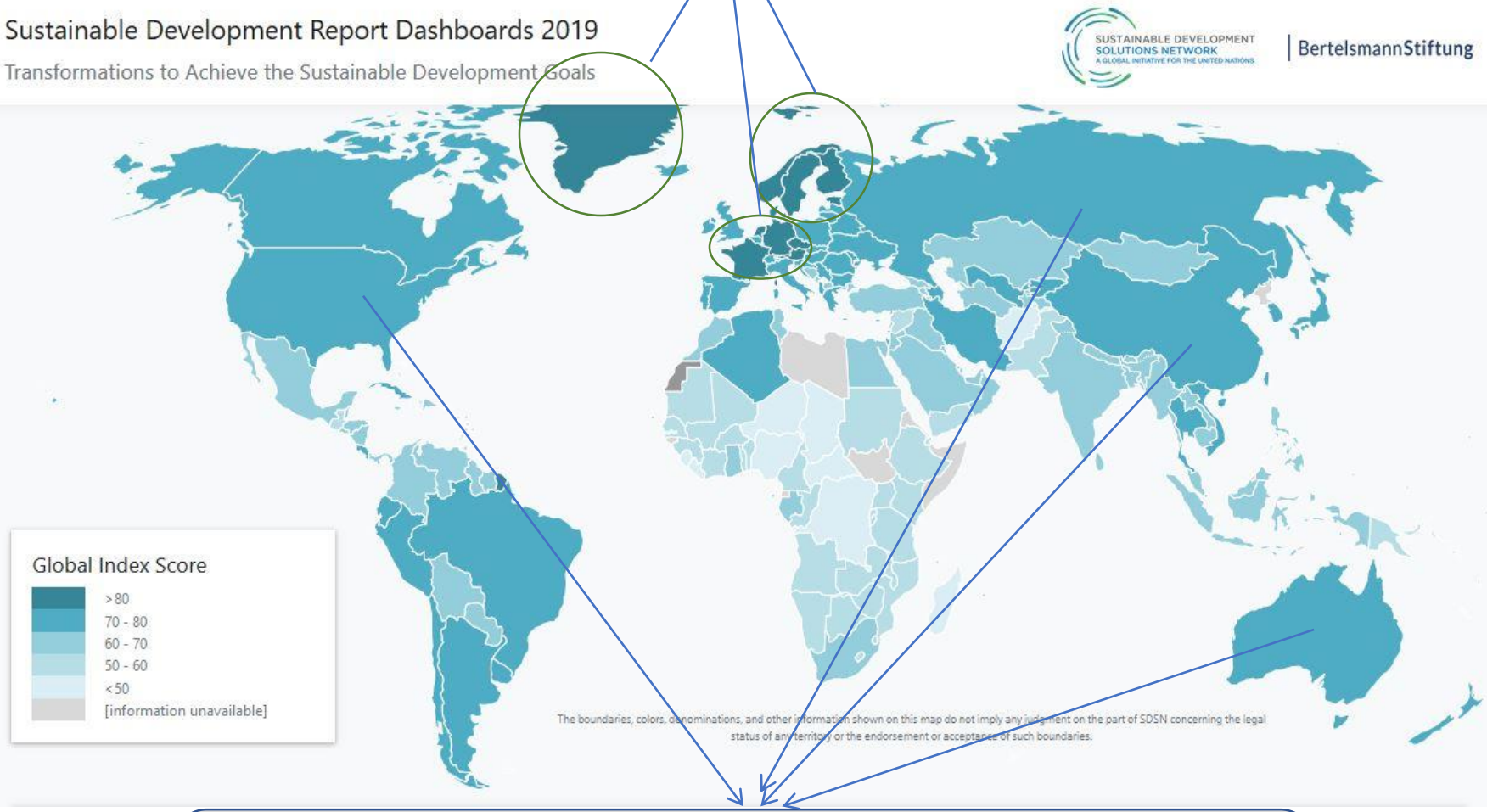
SDGs 1.4, 7-13, 17

Circularity and Decoupling

Are We on Track ?

Globally, Sustainability Transition has started!
BUT…

Right on track:
Minority



Making Progress but not Fast Enough

2013-2018 collectively, the warmest years in modern record

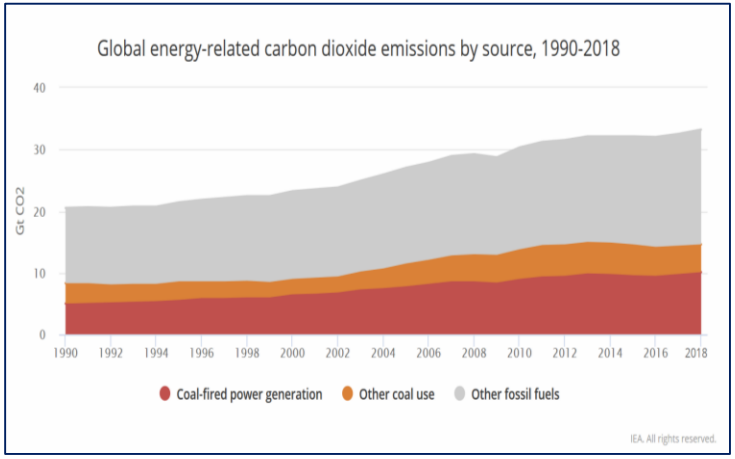
Europe Leading the way to climate-neutrality by 2050

European Commission president promised to commit to carbon neutrality by 2050 as part of a “green deal” for Europe.

- 2020: The EU is to submit its long-term strategy to the United Nations Framework Convention on Climate Change (UNFCCC).

- European countries can lead by example and show how tackling climate change can be a condition for Europe’s prosperity and stability.

Aggressive de-carbonization will be needed beyond 2030 to keep temperature increases below 1.5 C



Now-2050: Global power demand will grow by 62%, equating to 1.5-2% per year.

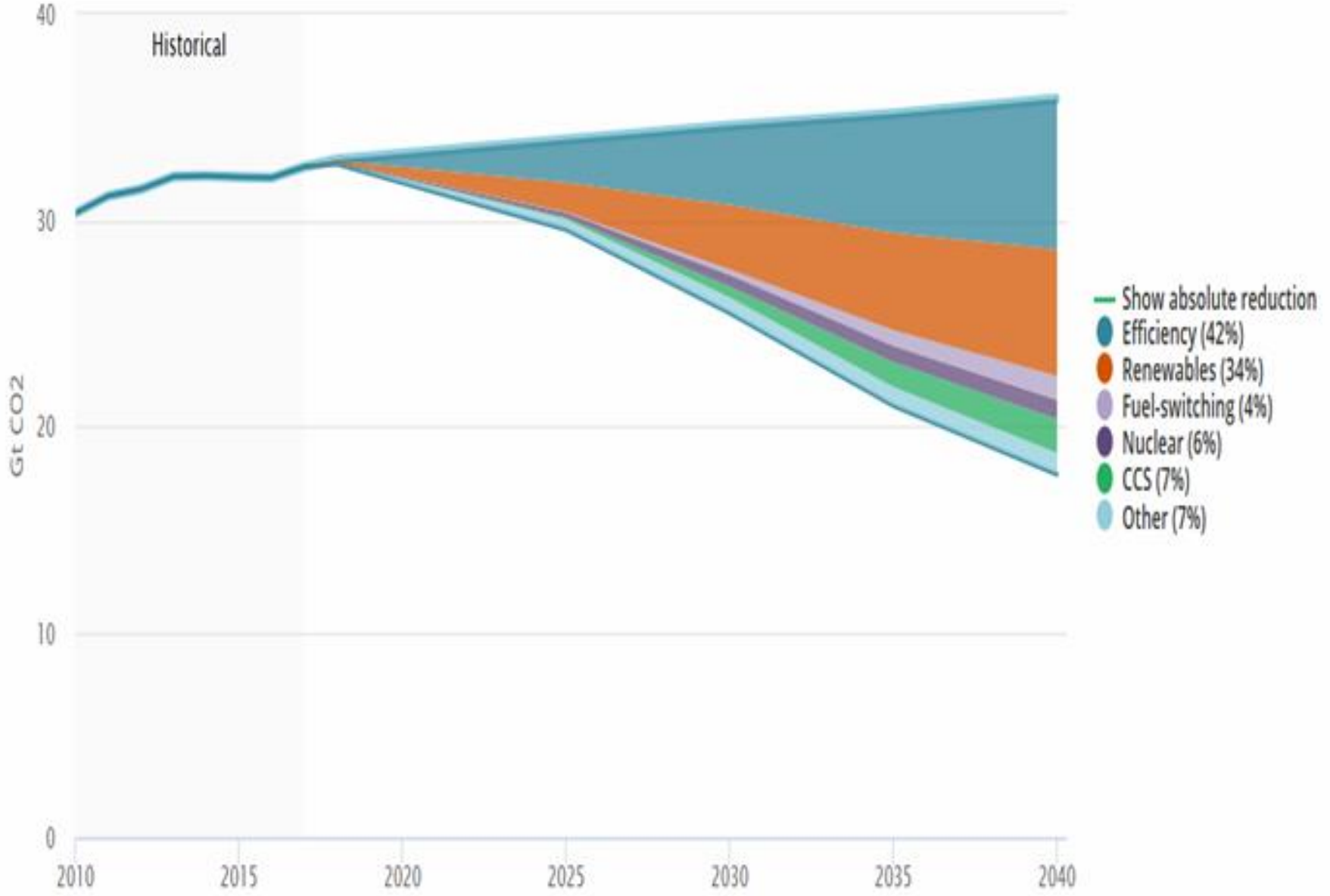
- Renewables Consistently Cheaper than Fossil Fuels by 2020
- Energy storage installations increasing exponentially
- Strong energy efficiency improvements
- Large-scale carbon capture
- Transition to Circular Economy

- By 2030 Coal is set to collapse everywhere in the world, **except Asia**
- By 2040, renewables make up 90% of the electricity mix in **Europe**
- …

DEMAND

SUPPLY

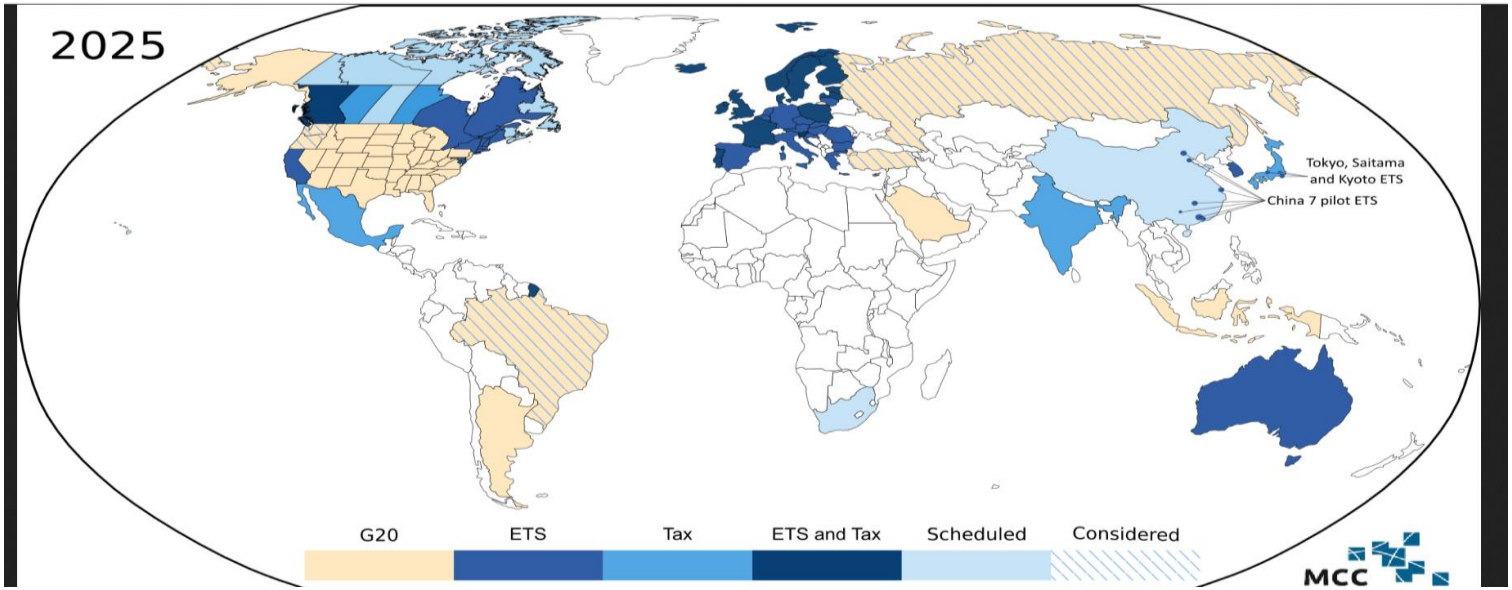
Additional CO2 emissions reductions in the SDS vs. NPS



Demand Management

Information-Awareness-Education

Economic Instruments: CO2 taxes, ETS, REDD, Insurance, etc.



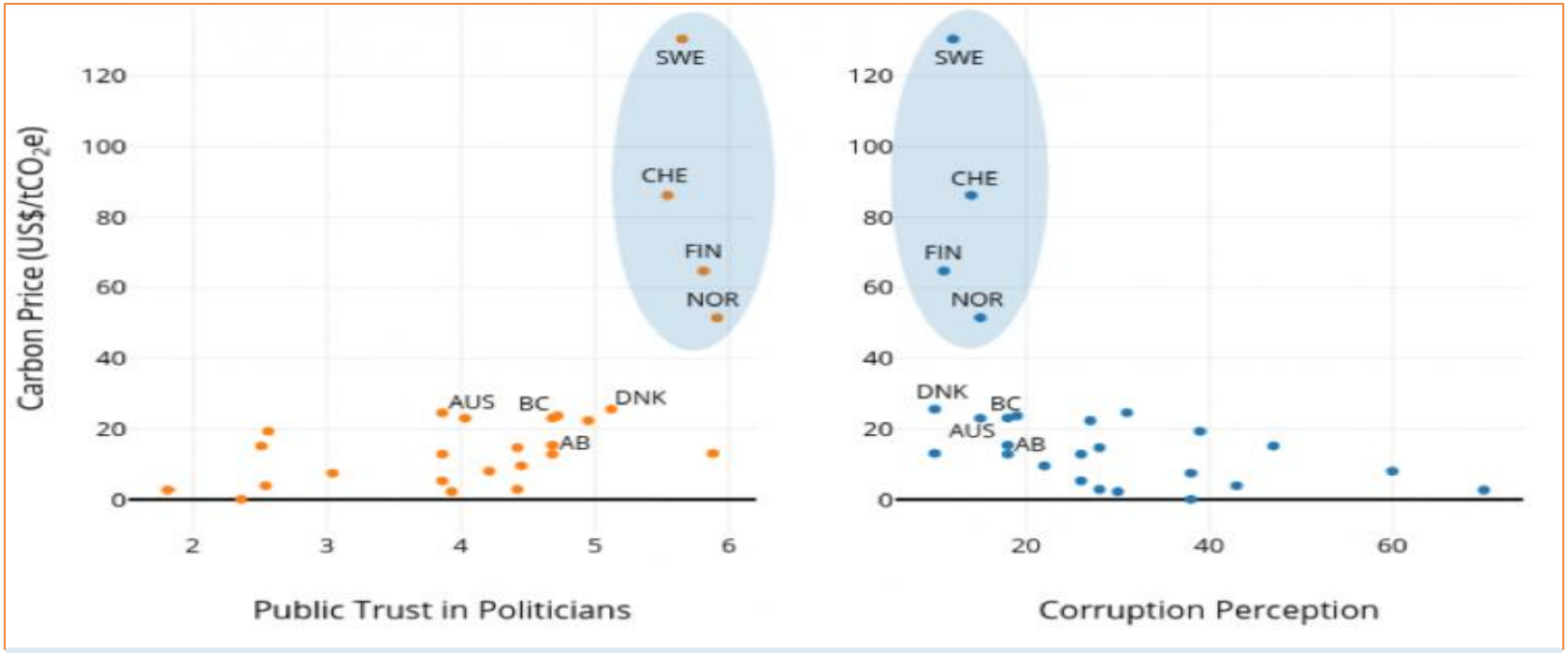
Over the last decade:

51 carbon pricing schemes have been implemented or are scheduled for implementation

25 of the 51 are in the form of ETS, predominantly introduced at the subnational level

26 of the 51 in the form of carbon taxes, mostly implemented at the national level.

Among the countries that have already submitted their Nationally Determined Contributions to the Paris Agreement, 88 countries have stated their intent to implement carbon pricing as part of their national climate policies



- High-Level Commission on Carbon Prices (2017) - achieving the goals of the Paris Agreement requires a carbon price of: $40-$80/tCO$_2$ by 2020

  $50-$100/tCO$_2$ by 2030
- Currently, less than 20% of current global greenhouse gas emissions are covered by a carbon price and most prices are below the $40-80/tCO$_2$ range.
- Ambitious carbon pricing often correlated with **high political trust** and **low corruption levels.** Finland, Norway, Sweden and Switzerland, are currently the only countries that have carbon prices above 40$/tCO$_2$.
- If trust is low, revenue should be recycled using a transparent, trust-boosting strategy to enhance its acceptability.

- Designing revenue recycling mechanisms with an eye on **behavioral insights** and in accordance with **political context**.
- Carbon pricing necessary for decarbonization, not sufficient.
- Spill-over effects in R&D need to be addressed with targeted instruments.
- Public interventions necessary to transform existing infrastructure, for example electricity and transport sectors.

ALL EYES ON CHINA AS NATIONAL CARBON MARKET PLAN EMERGES FROM THE HAZE

Sustainable Finance
Socially Responsible Investing
Social Impact Investment

- Financial services integrating environmental, social and governance (ESG) criteria into the business or investment decisions for the lasting benefit of both clients and society at large.

- Contributes to sustainable development and value creation in economic, environmental and social terms.

3 main objectives

- reorient capital flows towards sustainable investment
- manage financial risks stemming from climate change, environmental degradation and social issues
- foster transparency and long-termism in financial and economic activity

Examples

Retail Finance	Corporate Finance
▪ Green Mortgage ▪ Green Home Equity Loan ▪ Green Commercial Building Loan ▪ Green Car Loan ▪ Green Credit Card	▪ Green Project Finance ▪ Green Securitization ▪ Green Venture Capital & Private Equity ▪ Green Technology Leasing ▪ Carbon Finance
Asset Management	**Insurance**
▪ Fiscal Fund (Treasury Fund) ▪ Eco Fund ▪ Carbon Fund ▪ Natural Disaster Bond ▪ Green Bond	▪ Auto Insurance ▪ Carbon Insurance ▪ Catastrophe Insurance ▪ Green Insurance ▪ Strengthening Environmental Risk Assessment in Financing (Avoiding Default, Maintaining Collateral Value, Maintaining Good Reputation, Complying with Legal Issues on Environment, Creating Value, …)

18

Launches ambitious new climate strategy and Energy Lending Policy

European Investment Bank

- The EIB will end financing for fossil fuel energy projects from the end of 2021
- Future financing will accelerate clean energy innovation, energy efficiency and renewables
- EIB Group financing will unlock EUR 1 trillion of climate action and environmentally sustainable investment in the decade to 2030
- EIB Group will align all financing activities with the goals of the Paris Agreement from the end of 2020.

17 October 2019: IMF Event on CC

BUSINESS

Can central banks fight climate change?

In a discussion at the IMF's annual meeting the fund's new managing director and other experts discussed what central banks and other large-scale investors can do to tackle global warming – and where the limitations lie.

Disaster-risk management, climate change and sustainable development targets will need to be aligned.

- There should be a coordinated assessment of the state of knowledge in disaster risk and its utility for supporting the UN Sustainable Development Goals and the UN Framework Convention on Climate Change.

- In order to stem the increased potential for losses, build-in resilience, and promote economic growth, companies and investors, will need to proactively address climate risks, create new tools to mitigate damages from climate change, and find ways to adapt to a warmer world.

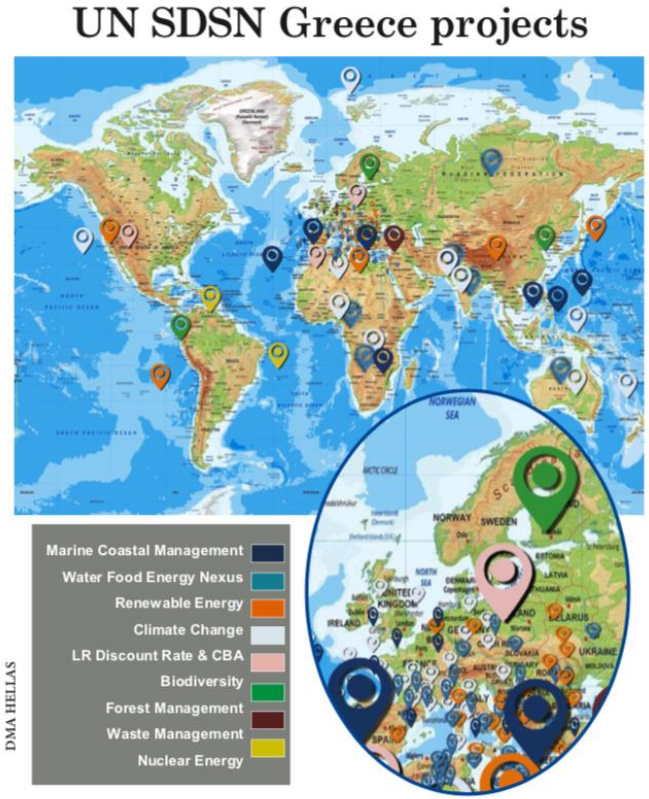
- A green bond for building climate-resilience. They are increasing in popularity with investors at an exponential rate. Green bond issuance in 2017 was $155 billion. One year later, that number is expected to clear over $250 billion.

- Public Private Partnerships for Regional catastrophe risk–financing.

Cluster of Institutions

Mobilizing Sustainability Transition, the Greek Chapter

UN SDSN - ETI Climate KIC – ReSEES@AUEB



BRIGAID

OpenAIRE

simra
Social Innovation in Marginalised Rural Areas

AMAre

COASTAL
Collaborative Land-Sea Integration Platform

eit Climate-KIC

SMIRES
Science and Management of Intermittent Rivers and Ephemeral Streams

Interreg
Balkan-Mediterranean
RECONNECT

BlueBRIDGE

MERMAID

GENESIS
groundwater and dependent ecosystems

TROPOS

GLOBAQUA

THESEUS

DAFNE

H2Ocean

Euro-limpacs

CIGESMED

AquaStress

Systems innovation approach!

Climate change is wickedly complicated.

It is interconnected with other massive global problems such as food security, water scarcity, biodiversity depletion and environmental degradation.

This means that it is impossible to solve climate change with traditional approaches to innovation which tend to focus on a single, or just a few aspects of the problem.

Instead, analysis of challenges and creation of solutions need to address the entire systems!

Integrated and Interdisciplinary Methodology

Aim: Max Social Welfare by allocation of scarce resources across people, over time & space,

while EnvS, EconS, Social Equity achieved.

FRAMEWORK CHARACTERIZATION

- Natural Resources,
- Socio-Economic-Institutional
- All relevant Stakeholders

MODELS ON INTERACTION

Dynamic, Spatial, Uncertainty

- Nature
- Society
- Economy

EMPIRICAL APPLICATION of MODELS

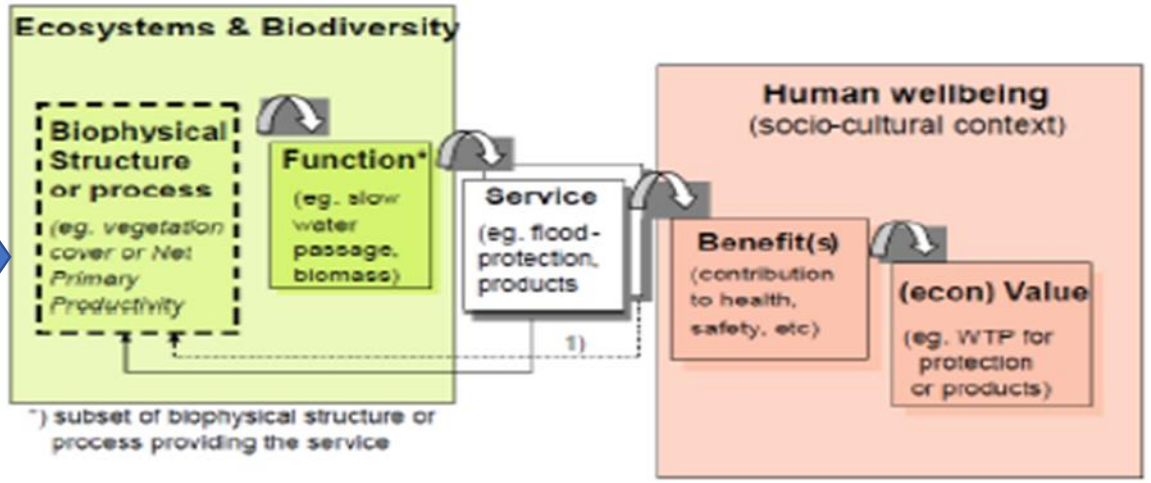
Estimation of Economic Value

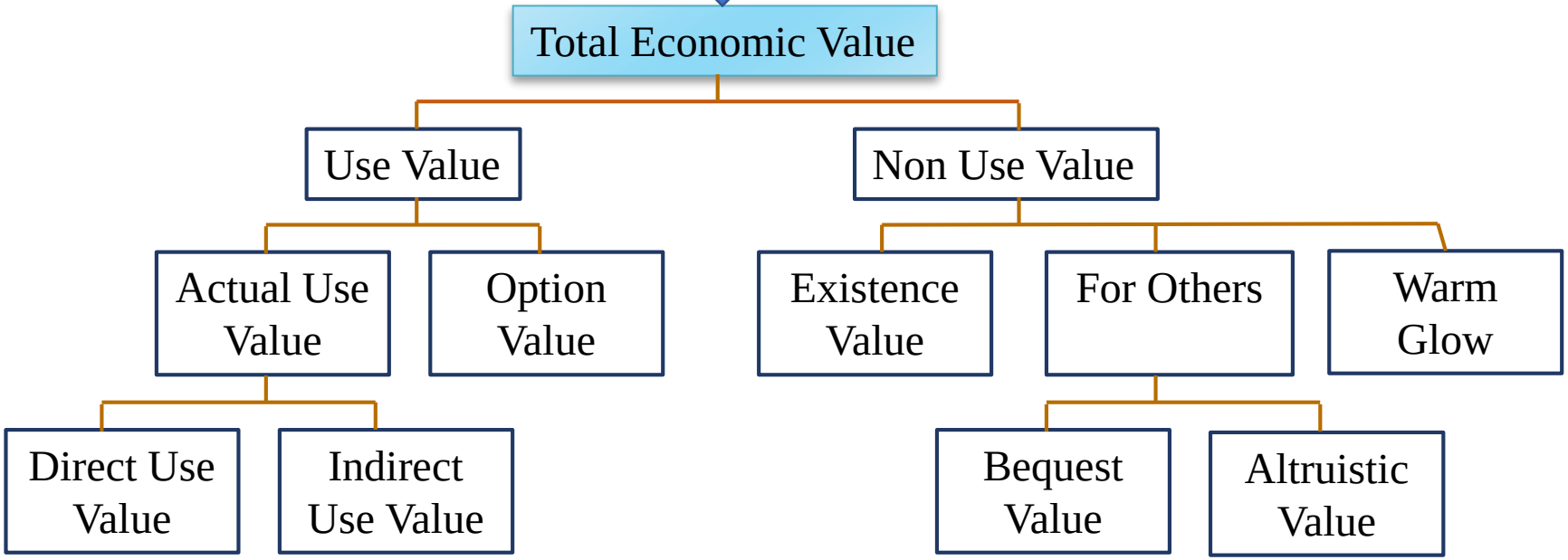
OPTIMAL ALLOCATION based on Value

How?

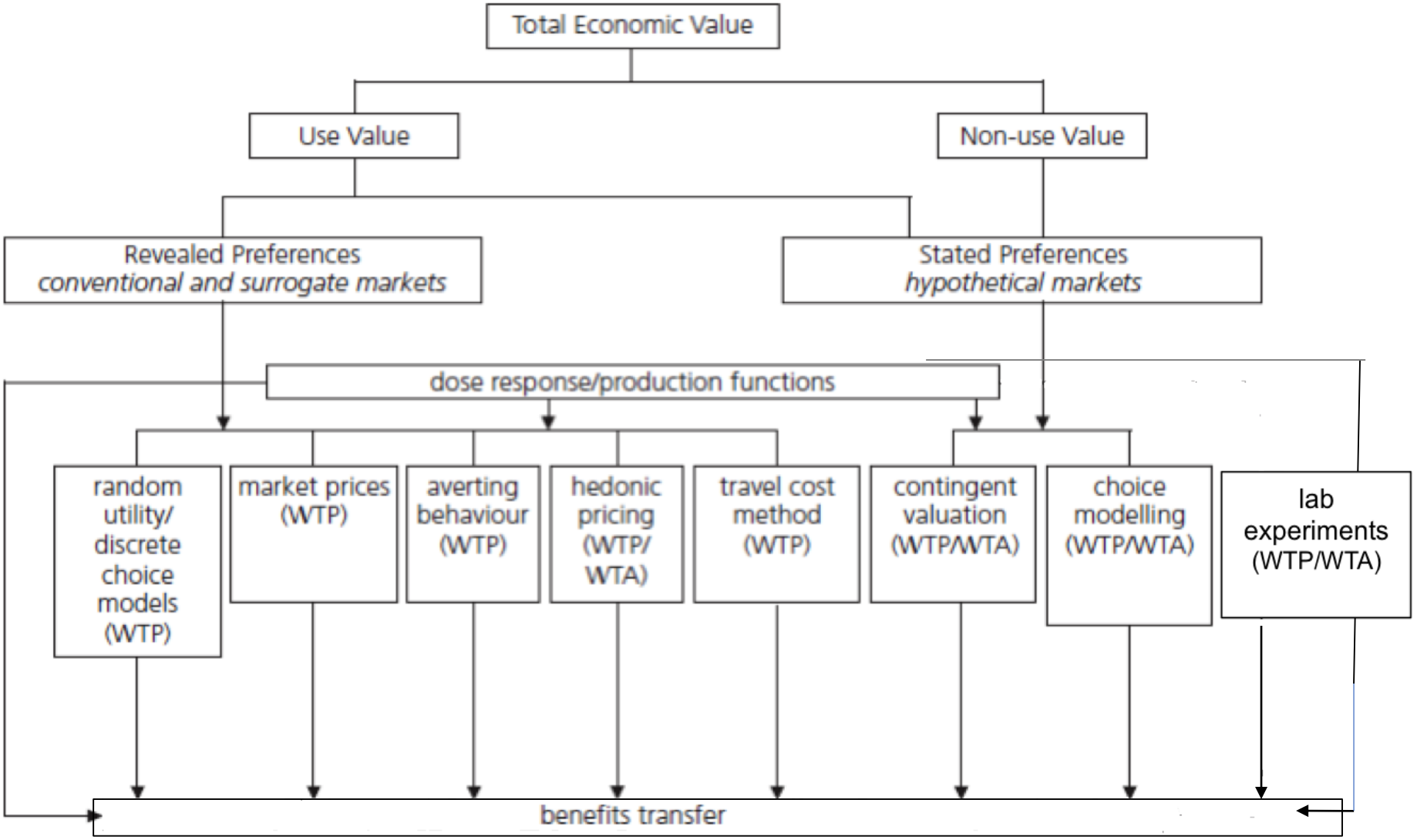
- Sustainable Finance: Taxes, ETS, Green Bonds, Insurance
- Legal Instruments
- Technological Innovations
- Social and Institutional Innovations
- Nature Based Solutions
- Infrastructural Solutions

STRATEGIC MANAGEMENT PLANS & POLICY RECOMMENDATIONS:
Stakeholders engaged & convinced throughout the process





The global economic benefit of a low-carbon future is estimated at US$26 trillion by 2030 compared with staying on the current high-carbon pathway.
https://exponentialroadmap.org/



- TEV: systematic tool for considering full range of impacts on human welfare.
- TEV: reflects the preferences of individuals, which can be statistically estimated
- TEV: essential for resource allocation and policy making.

Uncertainty affects Decisions from which we infer Total Economic Value

- Global climate change illustrates particularly well the importance of considering uncertainty when making a decision.

- Do we face RISK?
- Do we face DEEP UNCERTAINTY?
- Decision making under uncertainty?

- IPCC (2007) wrote:

*"In most instances, **objective probabilities are difficult to estimate**. Furthermore, a number of climate change impacts involve health, biodiversity, and future generations, and the **value of changes in these assets is difficult to capture fully** in estimates of economic costs and benefits….. The literature on how to account for **ambiguity in the total economic value** is growing, even if there is no agreed standard."*

The Value of Distant Benefits & Uncertainty and its Importance in Cost Benefit Analysis [series of papers Koundouri et al.]

In an Uncertain Environment:
- Persistent shocks on the growth rate of consumption
- Persistent shocks on short-term interest rates
- Persistent shocks on growth expectations, translate into persistent shocks on interest rates

Determine the shape of the term structure of the socially efficient discount rate & imply DDR.

Estimate Theory Consistent DDR trajectory
- *Using Historical Data*
- *Without a Structural Model*
- *Using univariate time series regime switching models:*
  - *describe stochastic dynamics of the real IR*
  - *future properties of the IR are determined by its own past behaviour*

Information accumulation may transmit patterns of preferences towards risk & influence time preferences & attitudes towards science-based policy.
As science becomes more important and current generations care more about the future:
DDR for PV of LR effects!

Mobilizing Sustainability Transition in Greece and Europe: Our Projects

Research

BANK OF GREECE

Climate Change Committee

Deep Demonstration

Climate KIC Programmes

Climate KIC Projects

Education

Sustainability Education ages 4-17, **GNHM**

Sustainability Education, **Greek Universities**

MSc Energy Law and Economics, **AUEB**

Summer School on Aristotelian Values in SDGs – **Aikaterini Laskaridis Foundation**

Training Courses for entrepreneurs, innovators and policy makers


Climate-KIC
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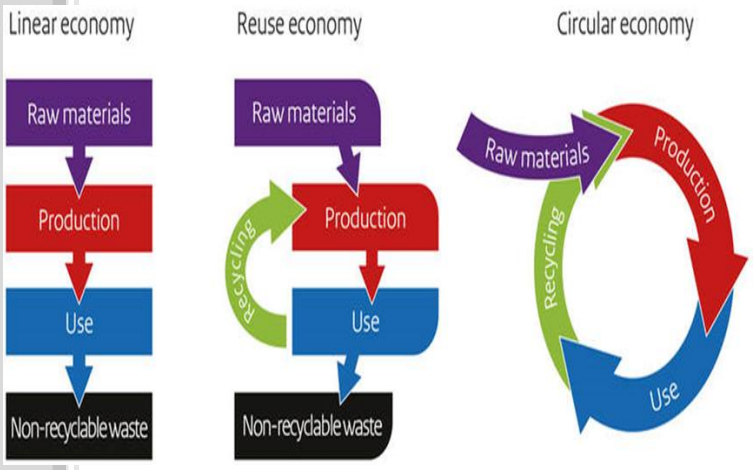
EIT Climate – KIC Hub Greece
Deep Demonstration Projects
Transformation Pathways to
zero-net CO2 emissions via
Systems Innovation and Circular Economy

Europe's Main Climate Innovation Initiative

C-KIC – DEEP DEMONSTRATION PROJECTS

Circular Economy Transition in Smart Specialization Strategy

- Contribute to the Europe 2020 objectives of smart, sustainable and inclusive growth.
- Pilot the adoption of CE in respective S3s, with the responsible authorities.
- Stimulate the timely and systemic adoption of the CE in S3s for the 2020-2027 programming period, for all EU Member States.



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Climate-KIC

Resilient Maritime Hubs

- Catalyzing Systemic Change in Maritime Sector across Europe by:

- Decarbonization Shipping Industry
- Ports Sustainable Transition Roadmap
- Fostering Sustainable Tourism
- Strengthening Fragile Ecosystems & Communities

- 13 European Ports including the Port of Piraeus.

LOOP·Ports
Circular Economy Network of Ports

eit
Climate-KIC

Climate Innovation in Southern European Waters

BL.EU CLIMATE

- Roadmap for plastic free southern European seas for the next 10 years
- Building capacity for innovation alongside the local challenge owners
- Address the issue at the beginning of its life cycle, on the prevention side

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Climate-KIC

Circular Learning Hub (CL-hub)

A learning hub for the engagement and ecosystem transition towards circular thinking

- Multi-sensor and multi-virtual experiment designed to overcome short-run bias wrt climate change
- For Investors and Entrepreneurs

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Climate-KIC

Europe's Main Climate Innovation Initiative

C-KIC - PROGRAMMES

Accelerator

Climate-KIC

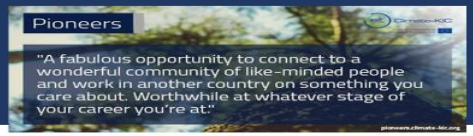
EIT Climate-KIC Accelerator is the only EU acceleration programme focused on climate impact by cleantech commercialization

Transforming ideas into climate-positive businesses

€550m+	1000+	2500+	33
capital raised in external investment by our start-ups	climate-positive companies incubated	jobs created through our start-up community	partners supporting the accelerator programme

Pioneers Into Practice

Climate-KIC



- lacement (all expenses covered).
- articipation in an educational gram (two workshops and online ning).
- raining based on innovative thodologies developed within the nate KIC.

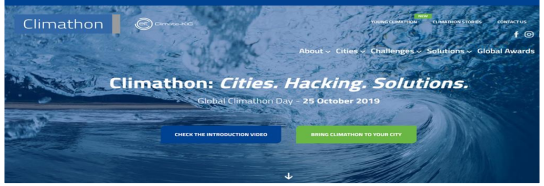
- Mentorship for improving innov ideas and skills.
- Participation in solving challen in the real environment.
- Participate in international workshops.
- Develop international profession network.

Climathon

Climate-KIC

Climathon Cities 2018

113	46	6	+5000
Cities	Countries	Continents	Participants



Accelerator

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Transforming ideas into climate-positive businesses

€550m+
capital raised in external investment by our start-ups

1000+
climate-positive companies incubated

2500+
jobs created through our start-up community

33
partners supporting the accelerator programme

- **Cyrus:** A Demokritos spin-off working on **hydrogen technologies** and designing non-mechanical high-pressure H_2 compressors using metal hydrides

- **Citipost:** Innovative waste and data management platform focusing on **smart cities** and sustainability through **recycling**

- **Cargoshare:** An automated **freight brokerage services platform** which results in a more transparent market, leading to less communication friction, while resulting to reduced emissions by freight ships traveling empty

- **Parity:** A two-sided Financing Platform, that makes **Greentech investing** accessible to retail investors and small funds

- **Trustporter: System for shipping & transportation needs** - designed to match requests to transfer goods or transport people, with other people that happen to travel along the requested routes anyway

- **Enaleia:** Educate, motivate, organize and track the fishermen, so as to be able to **collect plastic from the sea through their bi-catch**.

- **Shallows: Zero-footprint architecture** based on natural raw materials, using biological mechanisms

EIT Climate-KIC Greece ongoing H2020 EU funded projects

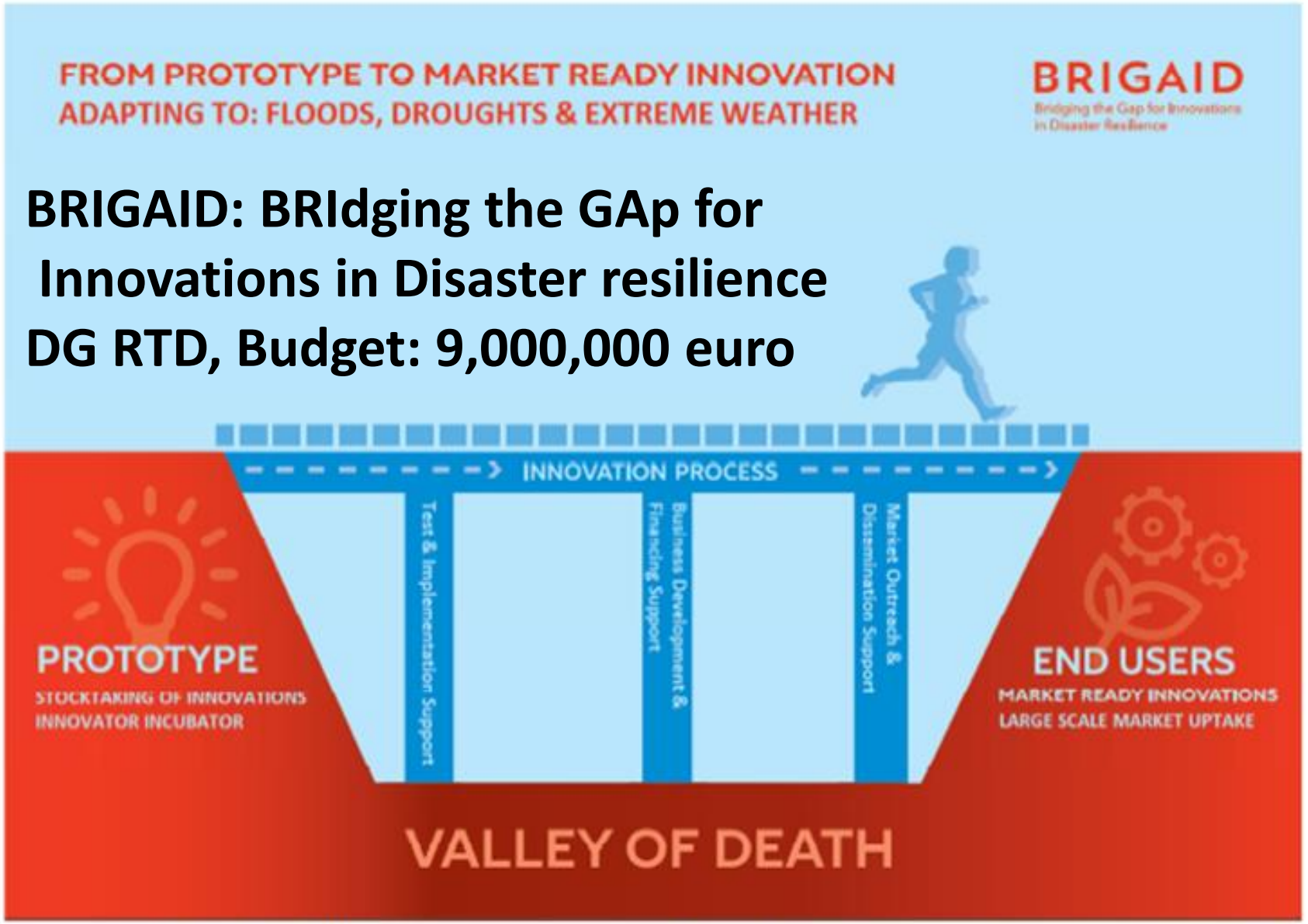
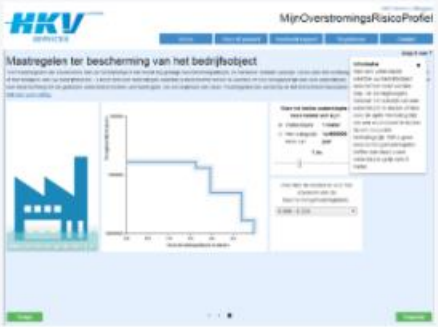


Figure 1.1: BRIGAID's conceptual approach with three types support for innovations

Show Innovations | All Hazards All Topics | View by Most Recent



Disasters and ICT | Water Safety

MyFloodRisk (for business)

TRL 5

Disasters and ICT | Urban Areas

3C for Cities

TRL 6

Agriculture | Disasters and ICT

ARIEL, soil moisture retrieval by microwave remote sensing

TRL 5

http://www.theseusproject.eu/

2019 Prize Winner as the European Commission Project with Greatest Impact

Innovative technologies for safer European coasts in a changing climate

European Commission

FP7, THEME 6 - Environment, including climate

Budget: (6,530,000 €)

Pioneers Into Practice

Climate-KIC

- Professional Mobility via Placement
- Participation in an educational programme.
- Training based on innovative methodologies developed within the Climate KIC.
- Develop international professional network.

- Mentorship for improving innovative ideas and skills.
- Participation in solving challenges in the real environment.
- Participate in international workshops.


Climathon
Climate-KIC
Climathon Cities 2018
113
Cities
46
Countries
6
Continents
+5000
Participants
Climathon
Climate-KIC
NEW
YOUNG CLIMATHON
CLIMATHON STORIES
CONTACT US
About
Cities
Challenges
Solutions
Global Awards
Climathon: Cities. Hacking. Solutions.
Global Climathon Day - 25 October 2019
CHECK THE INTRODUCTION VIDEO
BRING CLIMATHON TO YOUR CITY

New UN SDSN Global Initiatives

in association to UN getting to Zero Coalition

Global Roundtable for Sustainable Shipping

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

IPCC warned of unprecedented changes if we exceed 1.5 degrees of warming. Maritime transport emits around 940 million tonnes of CO_2 annually and is responsible for about 2.5% of global greenhouse gas (GHG) emissions (3rd IMO GHG study). These emissions are projected to increase significantly if mitigation measures are not put in place swiftly. According to the 3rd IMO GHG study, shipping emissions could under a business-as-usual scenario increase between 50% and 250% by 2050, undermining the objectives of the Paris Agreement. The **Global Roundtable for Sustainable Shipping** aims at bringing together shipowners, shipbuilders, technology developers and researchers, ports and policy makers, on innovation related to zero emissions shipping, from across the globe, to target net-zero emissions by 2050. It will be launched at a specific session on the zero-carbon ocean shipping at the two-day **COP 25 in Santiago, Chile** hosted by SDSN on December 9th & 10th 2019.

The UN SDSN 4-Seas Initiative

The UN SDSN 4-Seas is a Euro-Asian Initiative that aims to mobilizing science driven sustainable blue growth in the **Mediterranean Sea**, the **Black Sea**, the **Caspian Sea** and the **Aral Sea**, in order to protect the future state of global seas and oceans by providing a Blue Sustainability Transition Plan "from rivers to the oceans".

The initiative is led by **SDSN Greece** and **SDSN Black Sea**, established leaders on research for the implementation of SDGs in rivers and wetlands, coastal zones, seas and oceans, shipping, marine transport, offshore energy production, fishing, aquaculture, marine litter, and relevant education and training.