Topics in Sustainable Finance: *ESG and SDGs*

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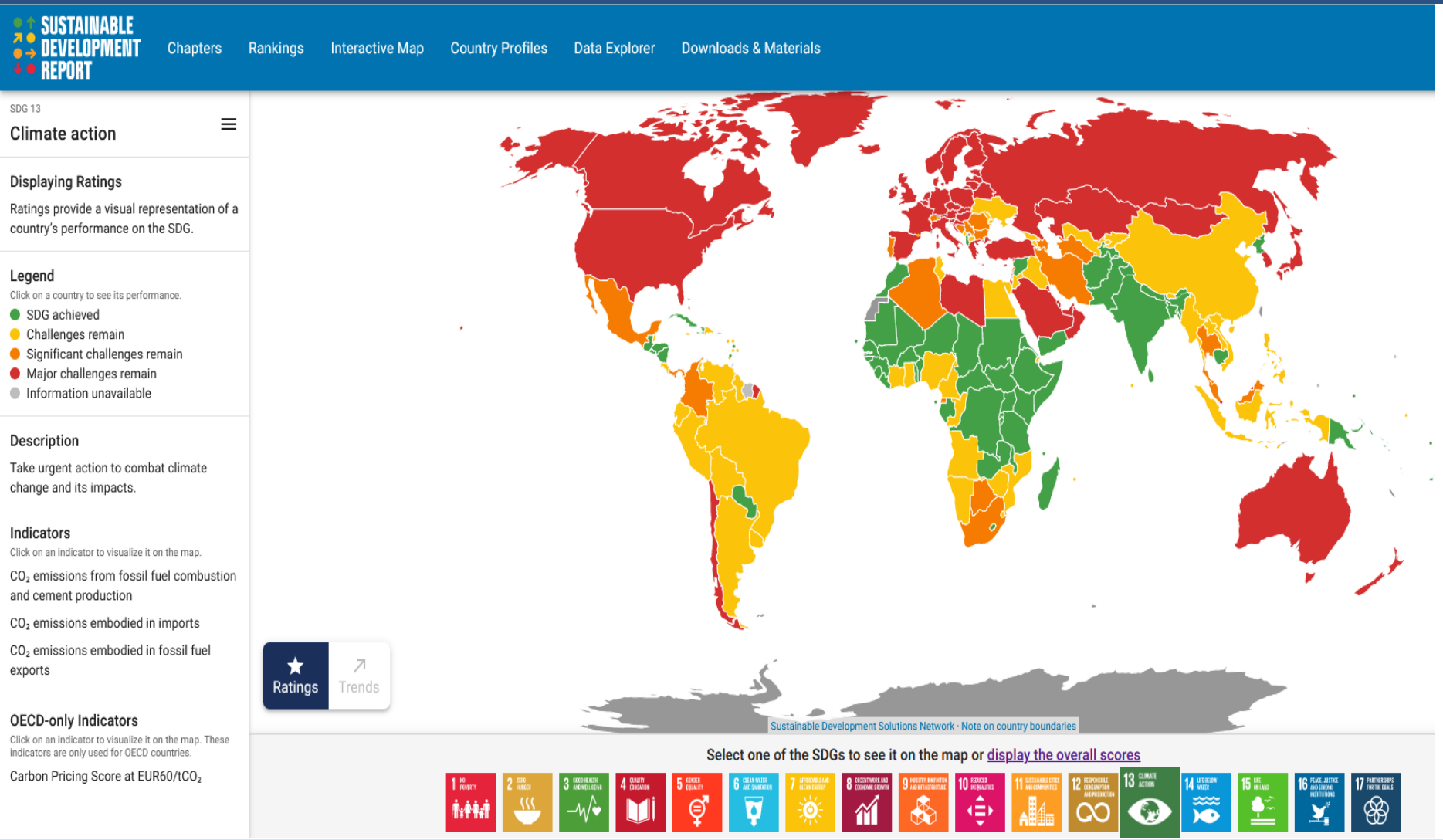
Sustainable Development Reports



- 245 KPIs and their Targets for Implementation to 2030/2050.
- Aggregated in 17 Goals.
- Methodology Audited by EC - Joint Research Center (**JRC)**

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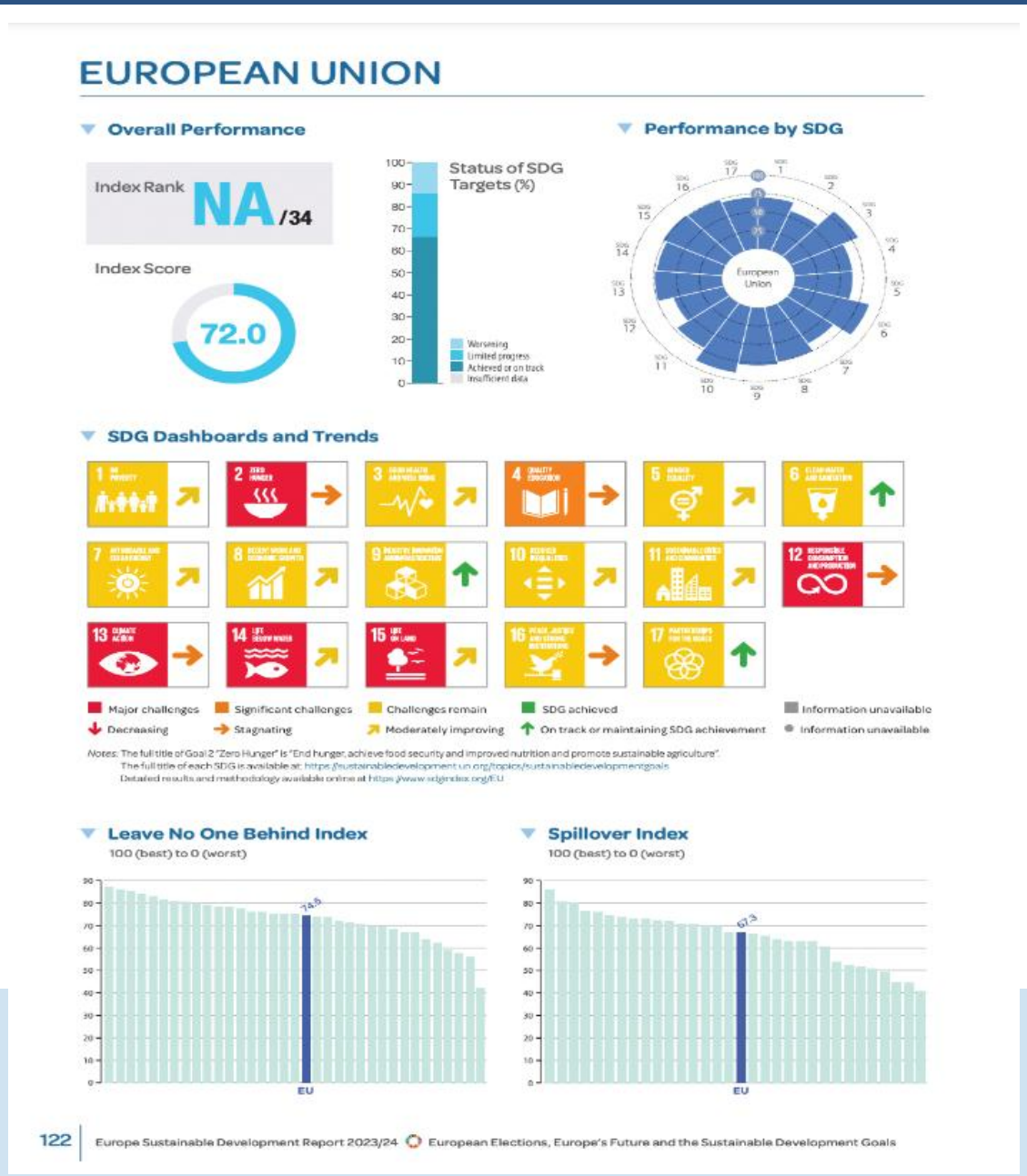
SDG Dashboards (Global/Regional/National)



EUROPEAN UNION

Overall Performance

Index Rank **NA**/34

Index Score **72.0**

Performance by SDG

SDG Dashboards and Trends

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

Decreasing · Stagnating · Moderately improving · On track or maintaining SDG achievement · Information unavailable

Notes: The full title of Goal 2 "Zero Hunger" is "End hunger, achieve food security and improved nutrition and promote sustainable agriculture".
The full title of each SDG is available at: https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals
Detailed results and methodology available online at https://www.sdgindex.org/EU

Leave No One Behind Index

100 (best) to 0 (worst)

Spillover Index

100 (best) to 0 (worst)

SUSTAINABLE DEVELOPMENT REPORT

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

Greece

OECD member

OVERVIEW · INDICATORS · POLICY EFFORTS

SDG Index Rank	SDG Index Score	Spillover Score
32/163	76.8	72.8

SDG Dashboards and Trends

Click on a goal to view more information.

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

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

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

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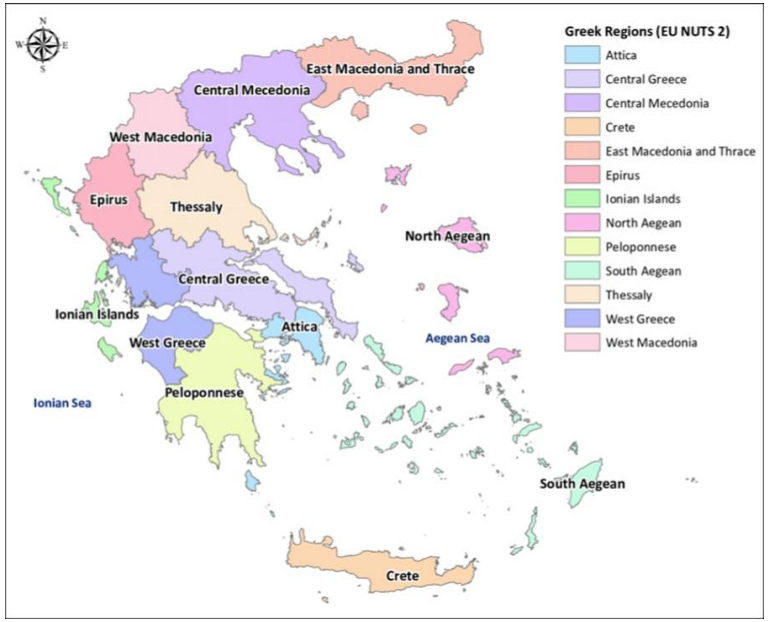
Progress at **Subnational** -NUTS2 **Level** - ***Greece***

Table 3 The SDGs heat map for the Greek regions

	Eastern Macedonia and Thrace (EL51)	Attica (EL30)	Northern Aegean (EL41)	Western Greece (EL63)	Western Macedonia (EL53)	Epirus (EL54)	Thessaly (EL61)	Ionian Islands (EL62)	Central Macedonia (EL52)	Crete (EL43)	Southern Aegean (EL42)	Peloponnese (EL65)	Central Greece (EL64)
SDG1													
SDG2													
SDG3													
SDG4													
SDG5													
SDG6													
SDG7													
SDG8													
SDG9													
SDG10													
SDG11													
SDG13			N/A					N/A			N/A	N/A	
SDG14													
SDG15													
SDG16													

Target achieved
Significant challenges
Minor challenges
Major challenges

- SDG Indicators at **Subnational** Level
- 13 Greek Administrating Distincts



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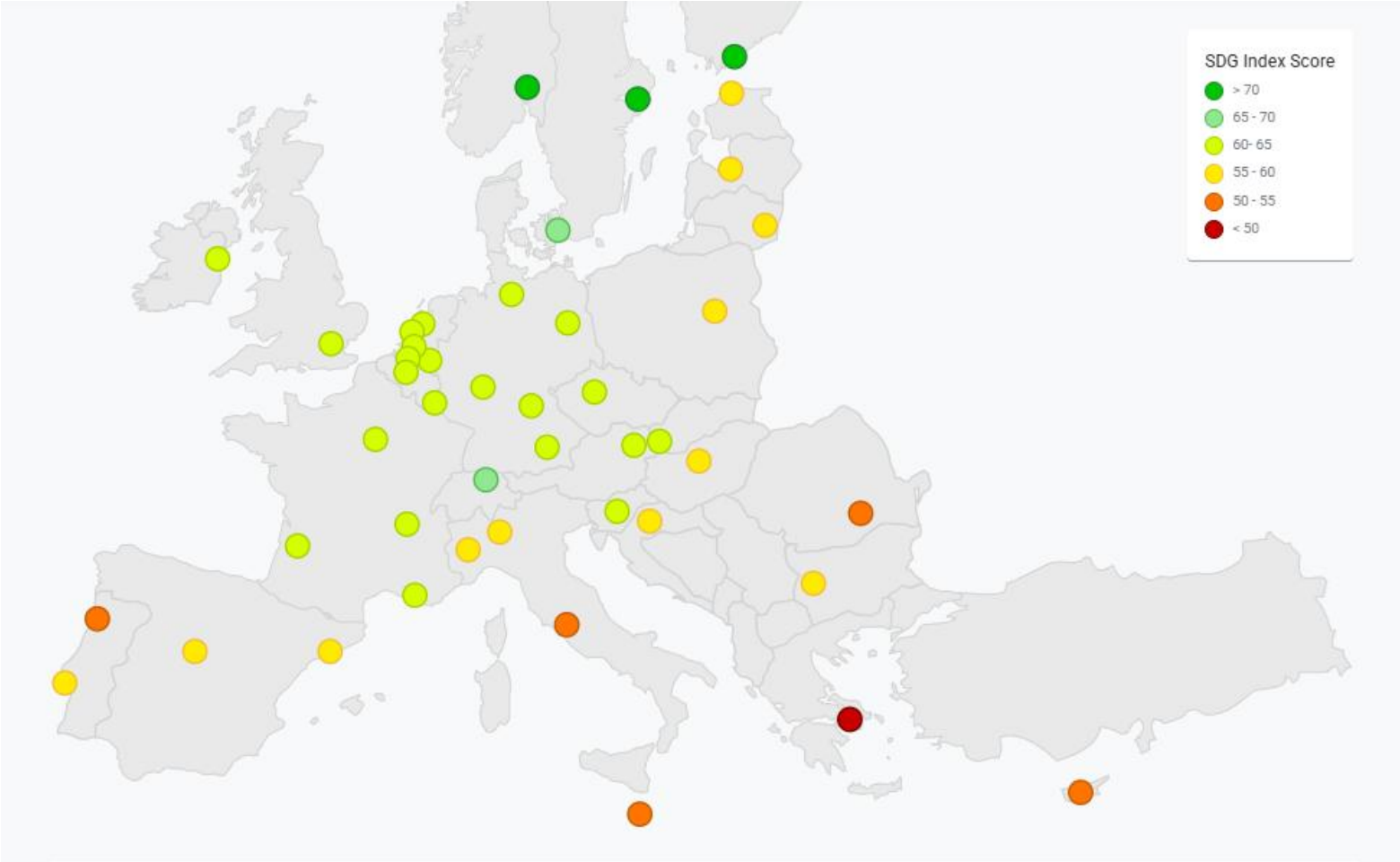
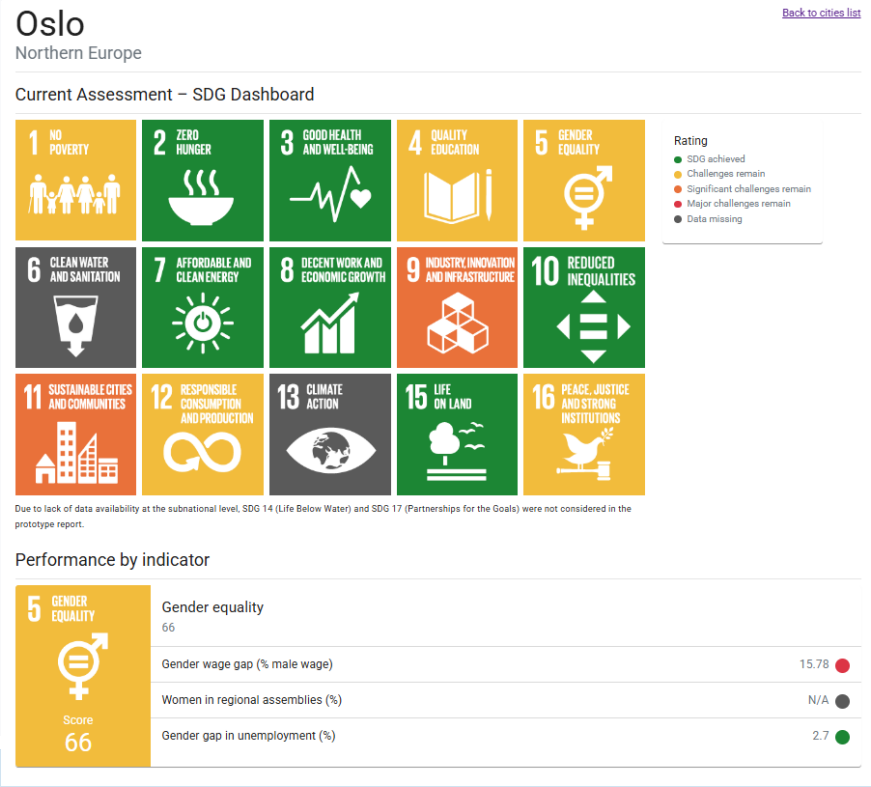
Progress at **Subnational** –Functional Urban Areas – ***EU Cities***



- SDG Indicators at **FUA** Level
- **47** EU Cities



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Progress at **Institution/University** Level

Research on the SDGs
Interdisciplinary and transdisciplinary research
Innovations and solutions
National & local implementation
Capacity building for research

Education for sustainable development
Jobs for implementing the SDGs
Capacity building
Mobilising young people

Public engagement
Cross-sectoral dialogue and action
Policy development and advocacy
Advocacy for sector role
Demonstrate sector commitment

Governance and operations aligned with SDGs
Incorporate into university reporting

- ***Athens University of Economics and Business***

Machine Learning Approaches to ***Map***

- Research output
- Course Outlines
- ESGs (Governance Criteria)
- Outreach (Events and News)

Identify Gaps in the implementation of the SDGs at the University Level.

ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

Research laboratory on Socio-Economic and Environmental Sustainability
ReSEES

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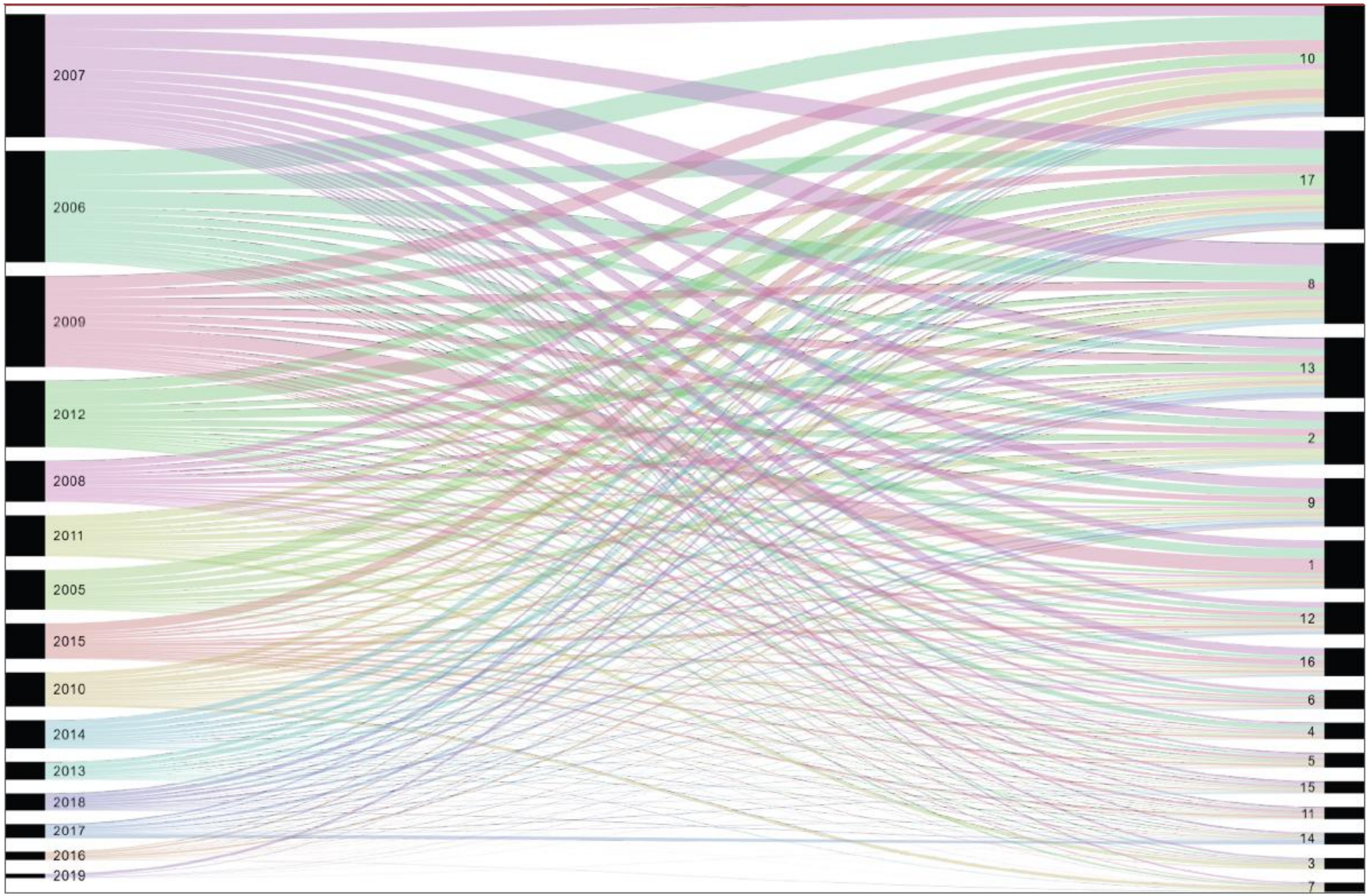
Research

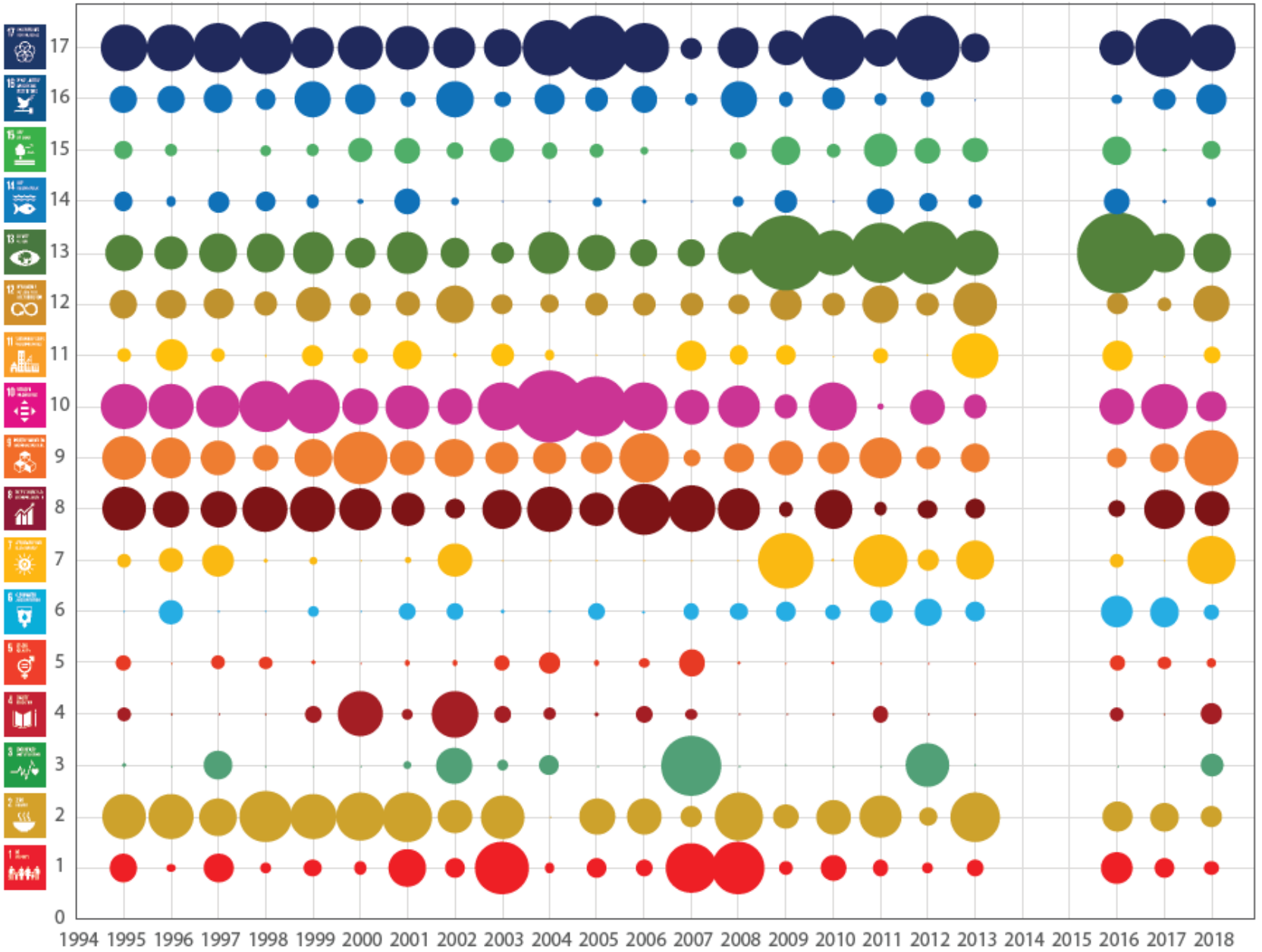


- Publications (abstract, introduction, conclusions) (google scholar, research gate, MODIP, scopus, pixida)
  a) Published Papers/working papers
  b) Conference presentation / Conference proceedings
  c) Journal article (maybe to add weights for some journals)
  d) Report
  e) Book

- By Year, to quantify progress

- Weight denotes relevant importance – ***Machine / Deep Learning Techniques*** to map research material to SDGs

Education



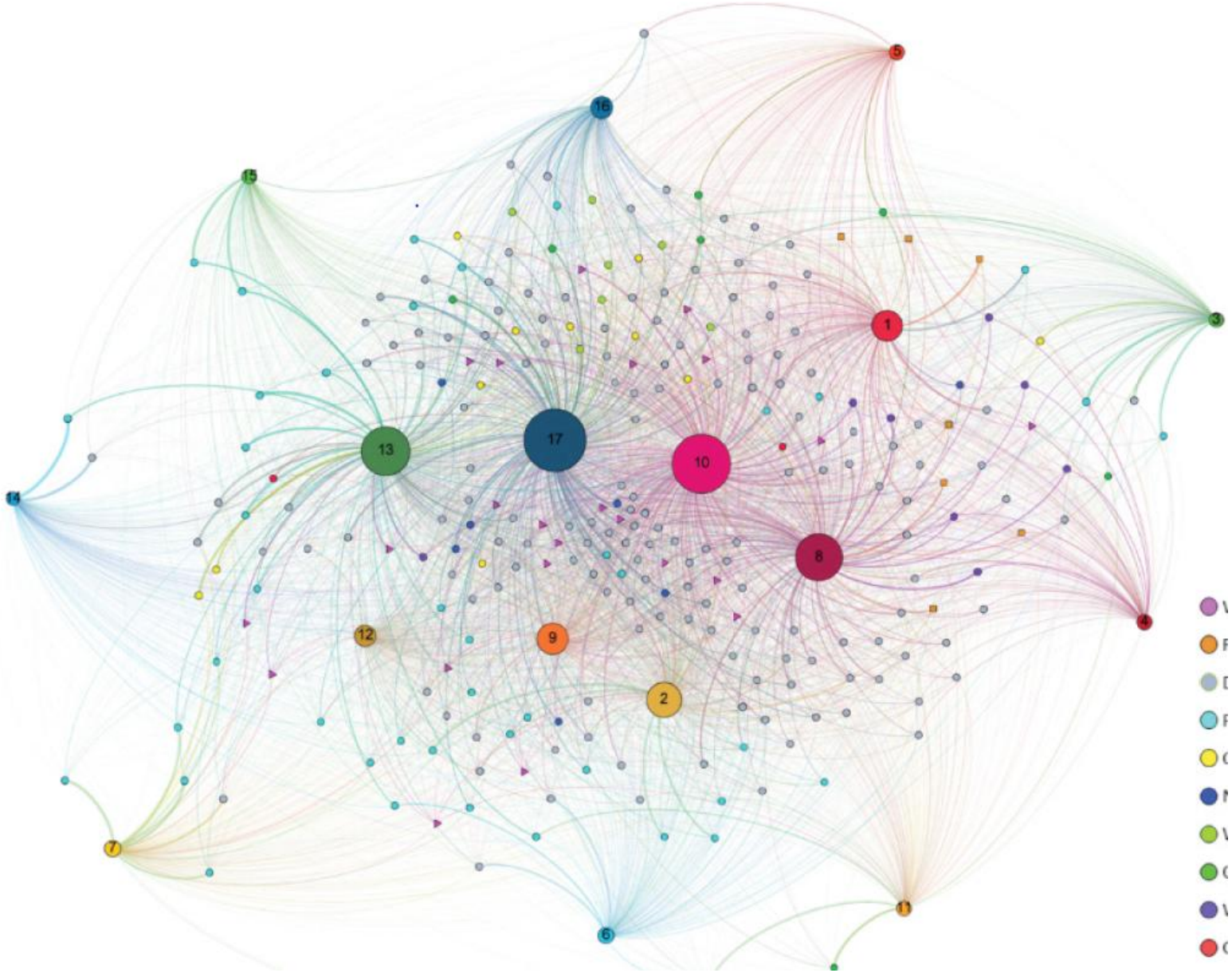
- SDG Reporting by Uni Department
- Based on Mappings with Course Outlines, Seminars , SDG Capacity Building Activities.
- Weight denotes relevant importance – ***Machine / Deep Learning Techniques*** to map Education material to SDGs

Operations & Governance

- **KPIs to** Rank Operations and Activities by SDG as in the provided ***pool of actions*** in UNSDSN guide

- Report by University organisational **units.**

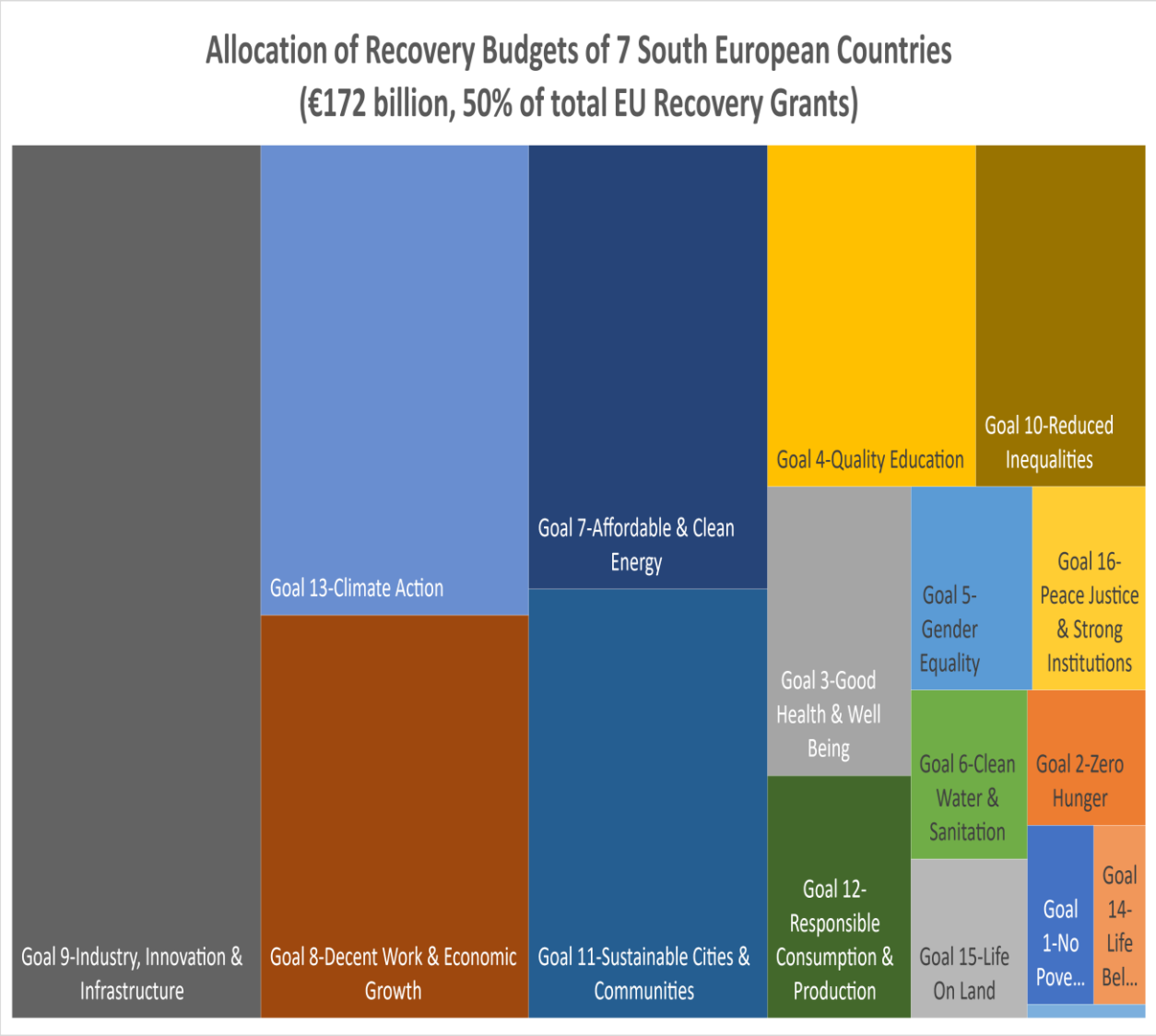
External Leadership / Outreach



- Map **News/ Announcements / Activities to SDGs.**
- Distance Measures relative importance
- Map University Networks

SDGs Budgets & Investment Plans

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.

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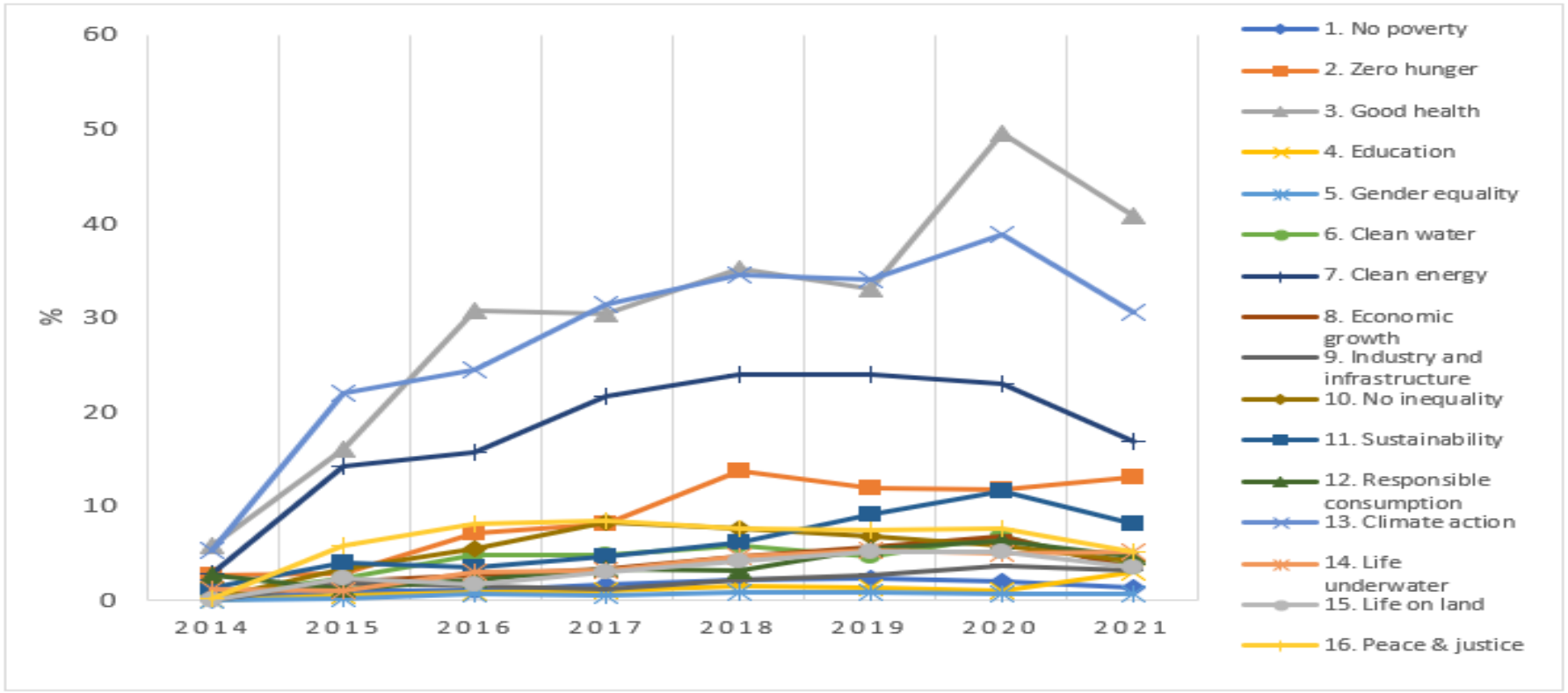
EU Financing – H2020

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.

Effectiveness of EU Funds Allocated in H2020

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



- ***Impact of European research financing to the production of Scientific Research on SDGs***
- Map the outputs of H2020 (Deliverables, Publications, Papers, Patents etc.) to SDGs
- These Metrics can be used to measure Impact/ Effectiveness VS Rio Markers (Based on the Intention)

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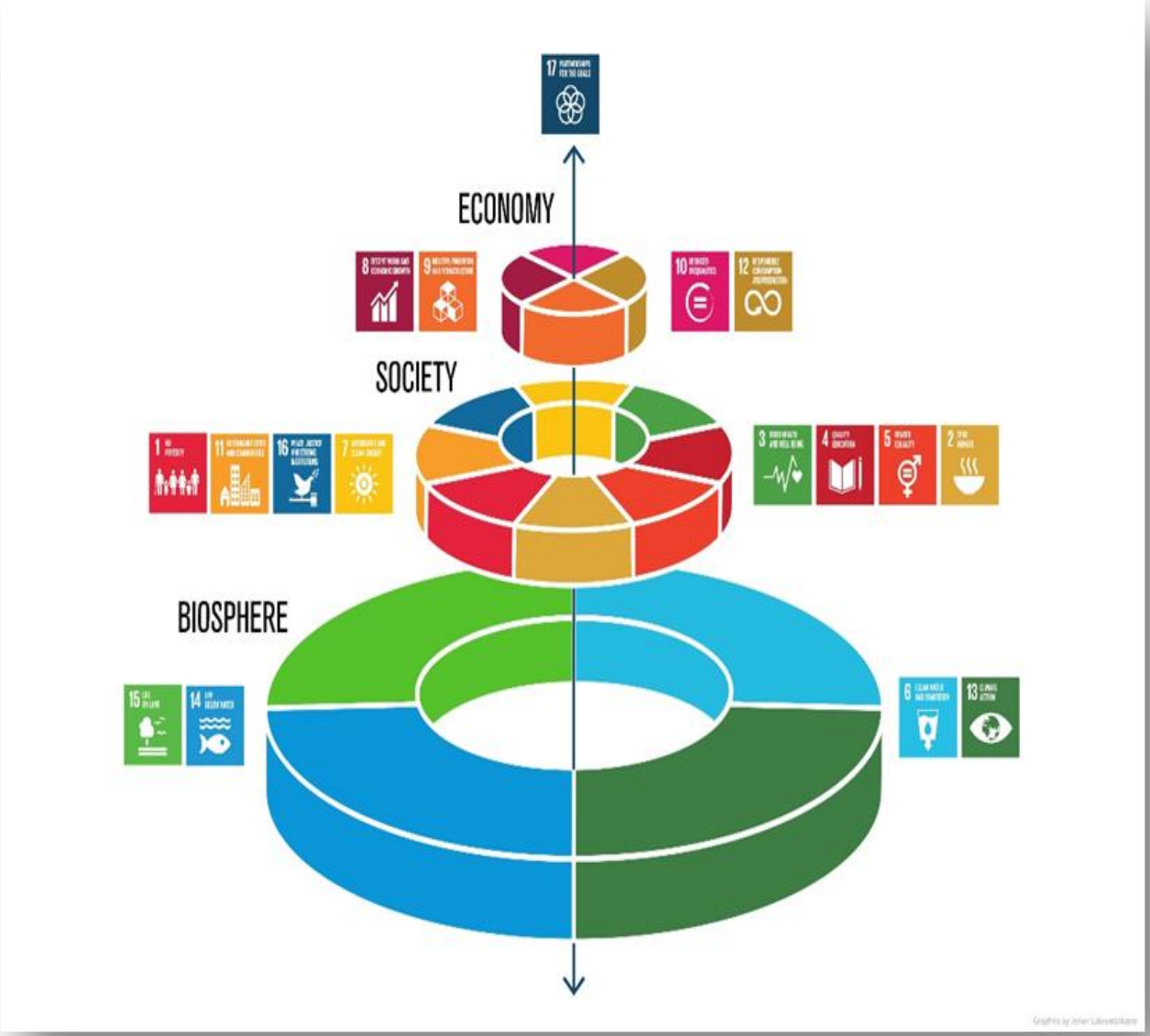
ESG/ SDG Footprint - Companies



AE4RIA Metrix

- Integrate SDGs into the Corporate Sustainability Reporting (CSR)
- Decision Making Tools and Models to Accelerate the Transition

Environment

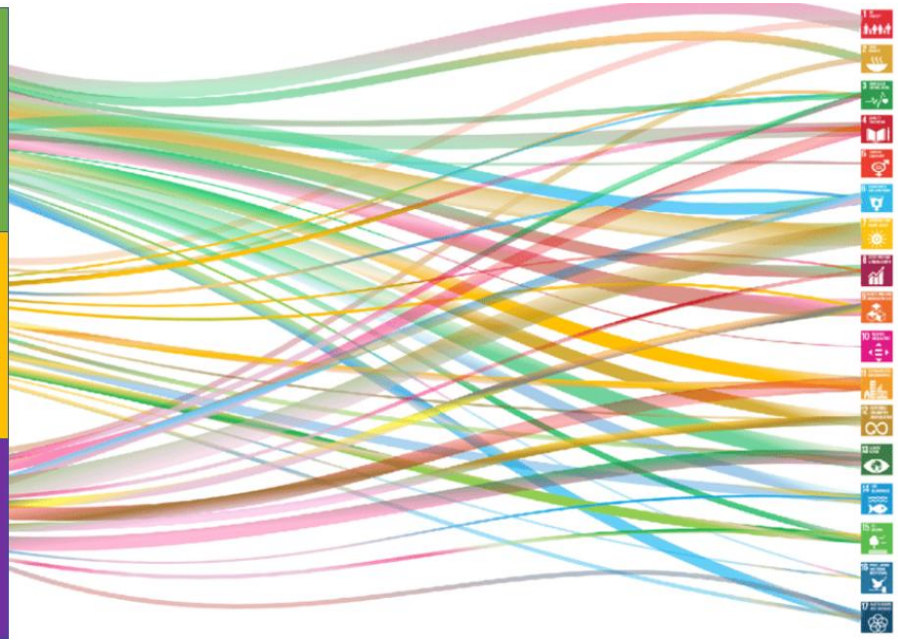
Company's impact (at supply chain level) on the natural environment and its response to the challenge of climate change (greenhouse gas emissions, energy consumption, generation and use of renewable energy, biodiversity and habitat, impact on water resources and deforestation, pollution, efficient use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



Connection between ESG 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]

[1] Professor and Director of ReSEES Research Laboratory, Athens University of Economics and Business; Director of Sustainable Development Unit and EIT Climate-KIC Hub Greece, Athena RC; Fellow World Academy of Art and Science; President-Elect of the European Association of Environmental and Resource Economists; Co-chair UN SDSN Europe; pkoundouri@aueb.gr

[2] Professor in Financial Econometrics at the Department of Banking and Financial Management of the University of Piraeus; npittis@unipi.gr

[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 good ESG performance generally implies a good financial performance as well;

Further, we noticed that in general:

- A good ESG performance is associated with a lower Beta (lower systemic risk);
- Better ESG performers demonstrate improved profit margins, but this of course depends on the business sector;
- High ESG performance is positively correlated with Profitability (both in terms of 'Return-on-Assets (RoA)' and Return-on-Equity (RoE))

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Definition of ESG

ESG

is a **generic term** used by investors to refer to **the factors** that can affect a company's ability to create long-term value. It also refers to **intangible assets**.

~ PRI Academy

E

Environmental

- Pollution
- Biodiversity Loss
- Climate Change
- Deforestation
- Resource Depletion
- Waste Management

S

Social

- Human Rights
- Child Labour
- Product Safety
- Product Mis-selling
- Labour Standards
- Employee Relations

G

Corporate Governance

- Accounting
- Board Composition
- Bribery & Corruption
- Executive Pay
- Tax Avoidance
- Shareholders' Rights

ESGs

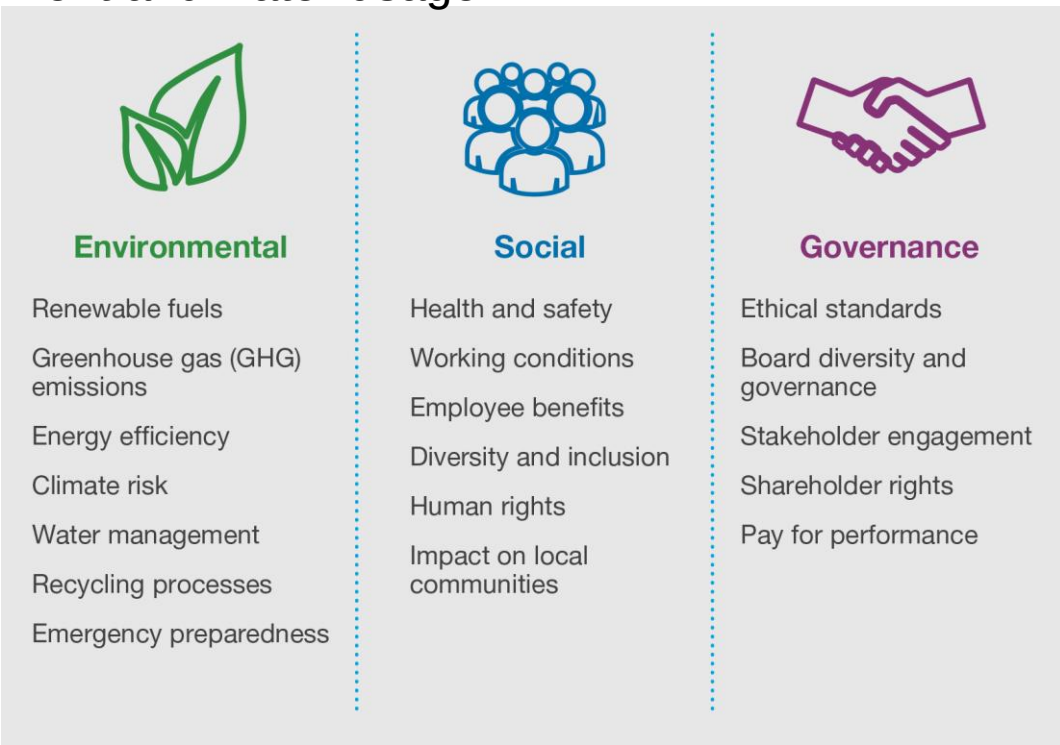
- ESG grew out of investment philosophies clustered around sustainability and, thereafter, **socially responsible investing**.

- Early efforts focused on **“screening out”** (that is, excluding) companies from portfolios largely due to environmental, social or governance concerns, while more recently ESG has favourably distinguished companies that are making **positive contributions** to the elements of ESG, premised on treating environmental and social issues as core elements of strategic positioning.

- The **“E”** captures energy efficiencies, carbon footprints, greenhouse gas emissions, deforestation, biodiversity, climate change and pollution mitigation, waste management and water usage.

- The **“S”** covers labour standards, wages and benefits, workplace and board diversity, racial justice, pay equity, human rights, talent management, community relations, privacy and data protection, health and safety, supply-chain management and other human capital and social justice issues.

- The **“G”** covers the governing of the “E” and the “S” categories—corporate board composition and structure, strategic sustainability oversight and compliance, executive compensation, political contributions and lobbying, and bribery and corruption.



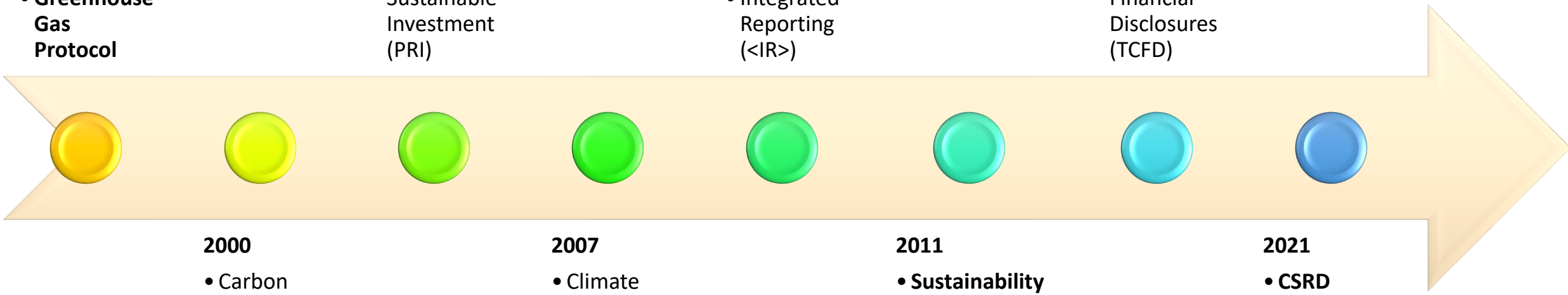
ESGs

- ***ESG metrics*** have evolved in recent years to measure **risk** as well as **opportunity**.

Physical Risks	In 2017, 73 companies on the S&P 500 publicly disclosed a material effect on earnings from weather events, and over 90% of these companies disclosed the effect on earnings was negative.
Supply Chain Risks	Supply-chain disruptions due to climate risk have increased 29% from 2012 to 2019.
Reputational Risks	Forty-seven percent of consumers walk away from a brand that doesn't align with their beliefs.
Regulatory Risks	The number of climate change regulations has grown to 1,500 globally, up from 72 in 1997.
Litigation Risks	More than 1000 cases have been filed in the U.S. on climate change impacts as of May 2019.
Transition Risks	Electric vehicles (EVs) are on track to account for over half of new car sales by 2040.
Human Capital Risks	Eighty-six percent of millennials would consider taking a pay cut to work at a company whose mission aligns with their values and the cost of replacing one employee is between 10-30% of an employee's annual salary.

- In the absence of international consensus regarding ESG disclosures, a large number of **frameworks** and indices have emerged to guide company disclosures and inform investors.

Timeline of Sustainability Reporting Standards (ESG Metrics)



1997

- **GRI (Global Reporting Initiative)**
- **Greenhouse Gas Protocol**

2000

- Carbon Disclosure Project (CDP)

2005

- Principles for Sustainable Investment (PRI)

2007

- Climate Disclosure Standards Board (CDSB)

2010

- Integrated Reporting (<IR>)

2011

- **Sustainability Accounting Standards Board (SASB)**

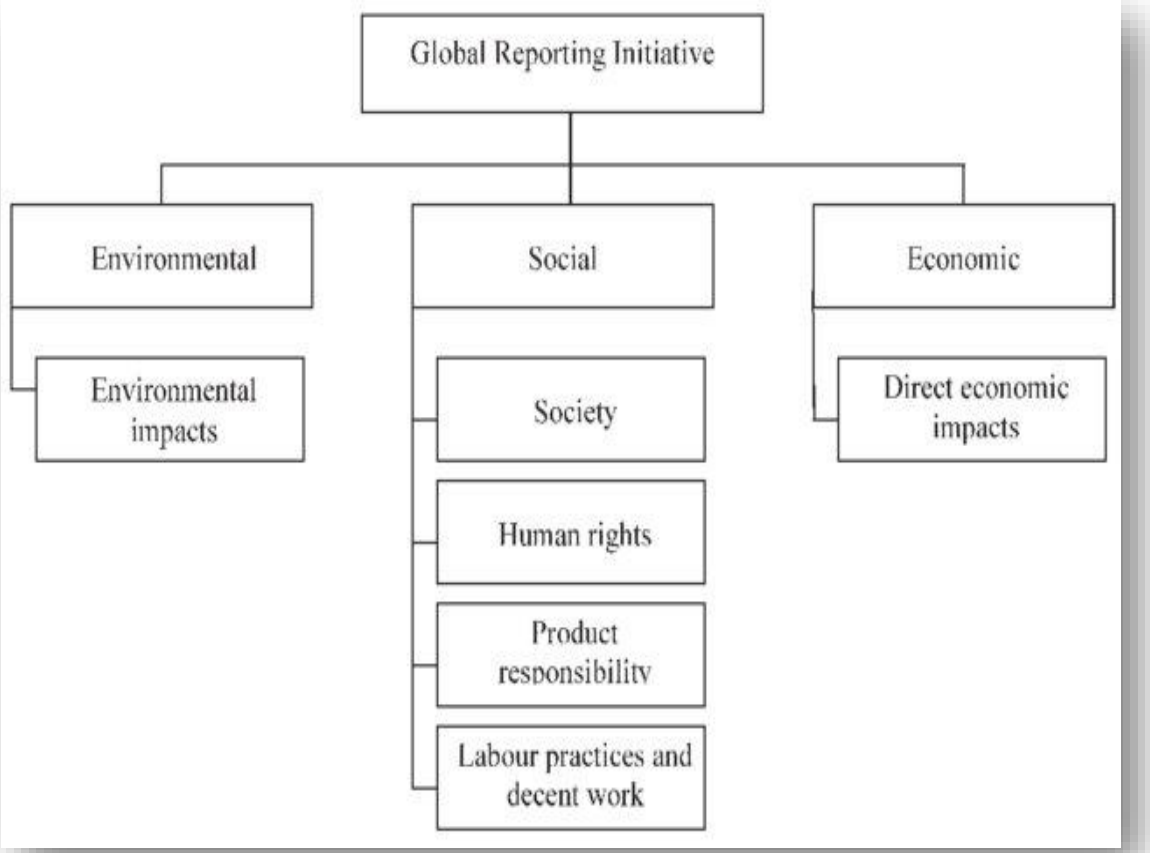
2015

- Task force on Climate-Related Financial Disclosures (TCFD)

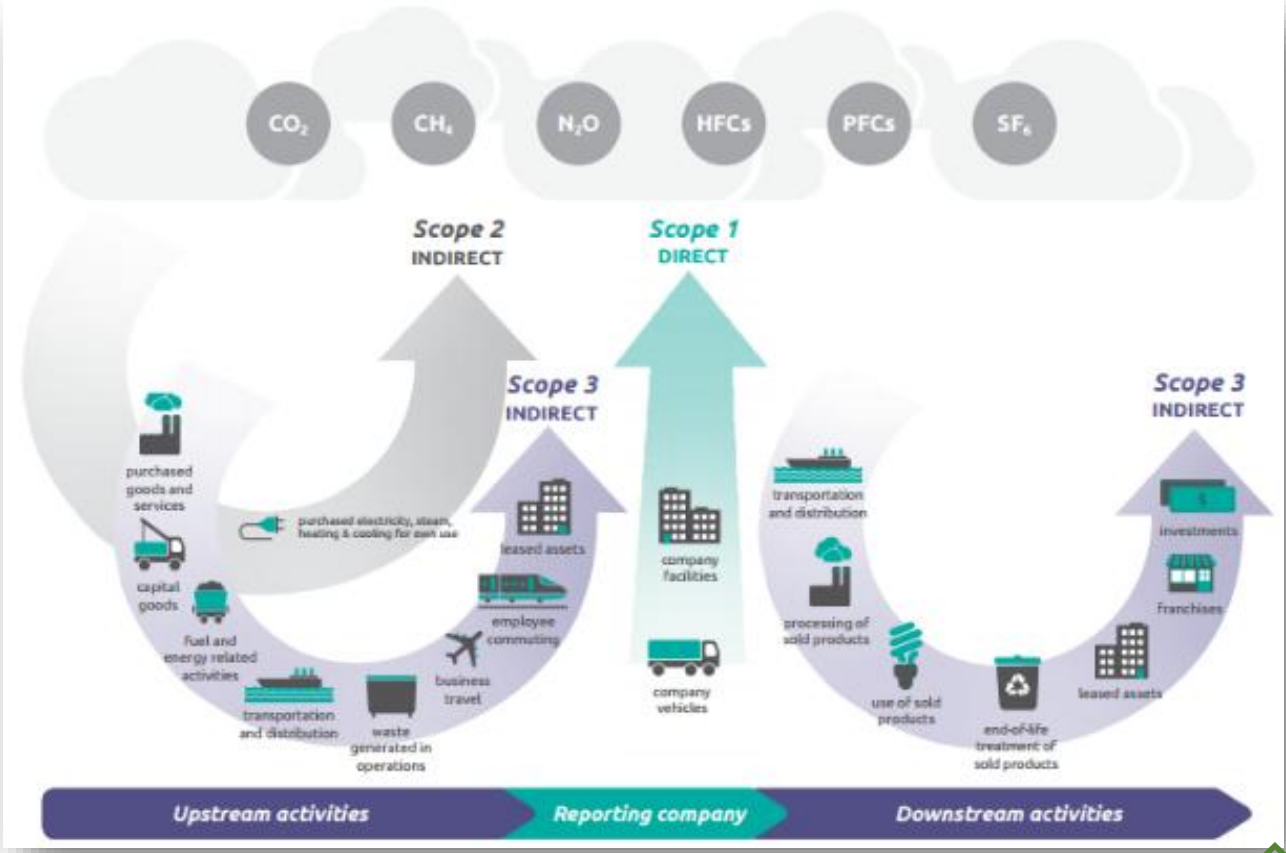
2021

- **CSRD (Corporate Sustainability Reporting Directive)**

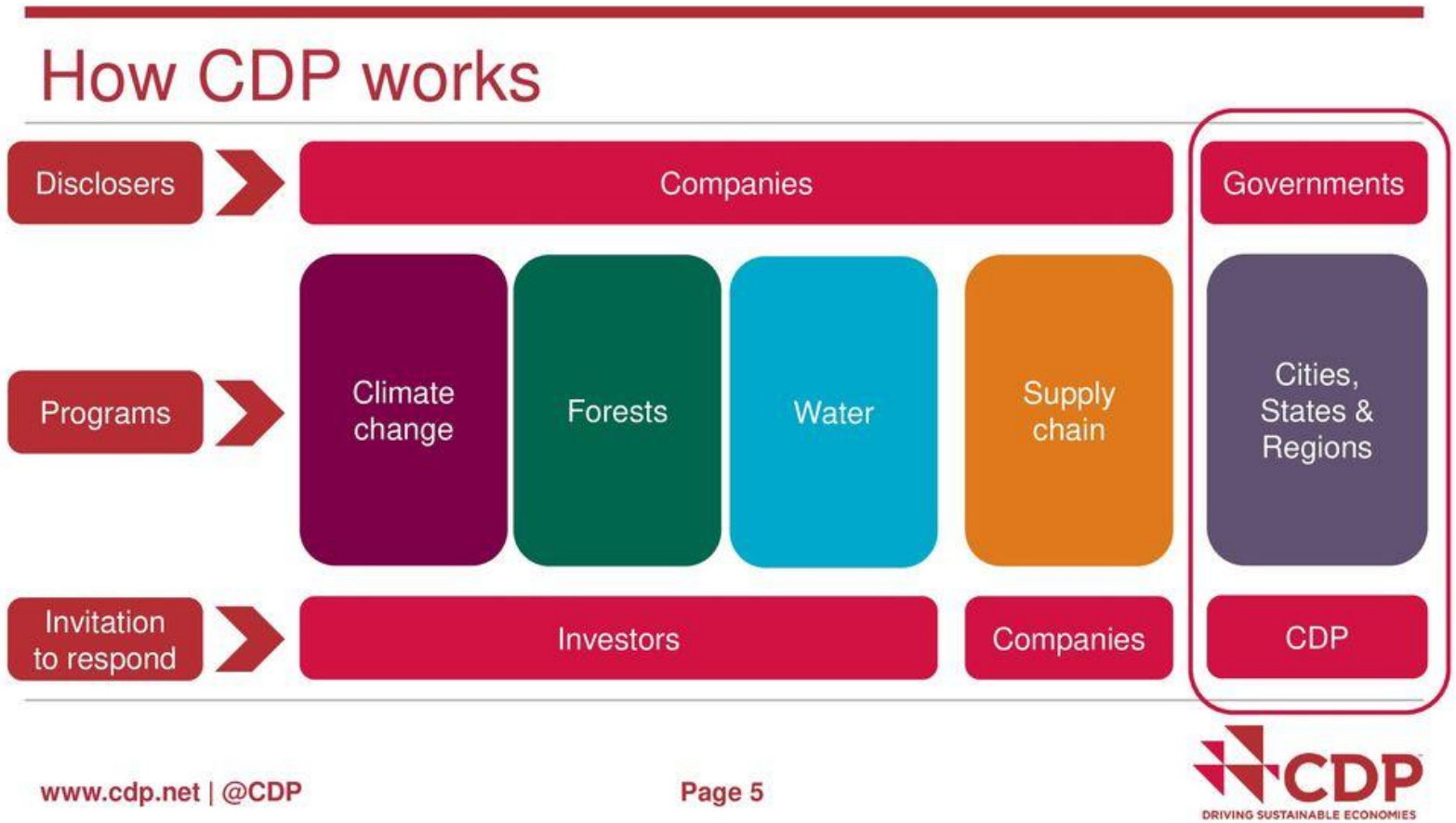
The Global Reporting Initiative (GRI) is a network-based organization that **aims to mainstream a firm's disclosure on environmental, social and governance performance**.



- An extensive standardized framework supporting companies to measure and manage their GHG emissions
- It sets a common understanding of corporate carbon footprint and scopes of emissions



Carbon Disclosure Project (CDP) is an international nonprofit organization based in the United Kingdom, Germany, and the United States that helps companies and cities disclose their environmental impact.



PRI Principles for Responsible Investment

The UN Principles for Responsible Investment (PRI) is an international organization that works to promote the incorporation of environmental, social, and corporate governance factors (ESG) into investment decision-making.

ENVIRONMENTAL

- climate change
- resource depletion
- waste
- pollution
- deforestation

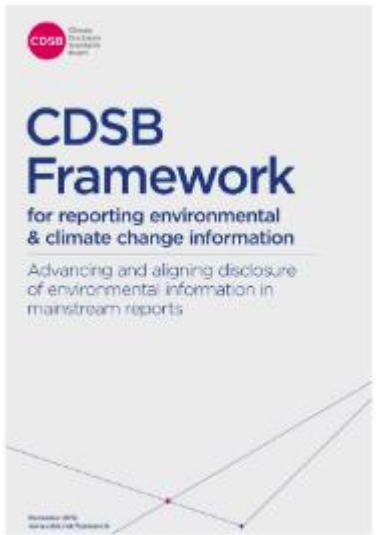
SOCIAL

- human rights
- modern slavery
- child labour
- working conditions
- employee relations

GOVERNANCE

- bribery and corruption
- executive pay
- board diversity and struc
- political lobbying and donations
- tax strategy

Climate Disclosure Standards Board



- The CDSB Framework for reporting environmental and climate change information is designed to help organizations prepare and present environmental information in mainstream reports for the benefit of investors.
- It allows investors to assess the relationship between specific environmental matters and the organization's strategy, performance and prospects.

INTEGRATED REPORTING <IR>

- **Integrated reporting** (IR) is a "process that results in communication, most visibly a periodic “integrated report”, about value creation over time.
- An integrated report is a concise communication about how an organization's strategy, governance, performance and prospects lead to the creation of value over the short, medium and long term."

IFRS Foundation announces ISSB and consolidation with CDSB and VRF

IFRS

CDSB Climate Disclosure Standards Board

VALUE REPORTING FOUNDATION

UN CLIMATE CHANGE CONFERENCE UK 2021

IN PARTNERSHIP WITH ITALY

The Sustainability Accounting Standards Board (SASB) is **an ESG guidance framework that sets standards for the disclosure of financially material sustainability information by companies to their investors.**

How ISSB fits in with reporting and ESG disclosure frameworks

IFRS Foundation

IASB — The International Accounting Standards Board sets financial reporting rules that most of the world requires companies to use.

ISSB — The International Sustainability Standards Board would give companies a unified framework for reporting climate and other sustainability risks that financial reporting may not capture.

There are many sustainability reporting frameworks and standards including:

- Global Reporting Initiative
- Taskforce on Climate-Related Financial Disclosures
- Value Reporting Foundation
- Climate Disclosure Standards Board
- CDP (formerly the Carbon Disclosure Project)

"[The ISSB] should be a body that looks at sustainability more generally, really focusing on those factors — which could have a material effect on the value of a company and on its future cash flows."
— **IASB Vice Chair Sue Lloyd**

Credit: Arleigh Andes
Sources: S&P Global Sustainable1; S&P Global Market Intelligence

TCFD | TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

The Financial Stability Board created the Task Force on Climate-related Financial Disclosures (TCFD) to improve and increase reporting of climate-related financial information.

Core Elements of Recommended Climate-Related Financial Disclosures

Governance
The organization's governance around climate-related risks and opportunities

Strategy
The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning

Risk Management
The processes used by the organization to identify, assess, and manage climate-related risks

Metrics and Targets
The metrics and targets used to assess and manage relevant climate-related risks and opportunities

Corporate Sustainability Reporting Directive (CSRD)

- Amends NFRD Non-Financial Reporting Directive (2014/95/EU).

Corporate Sustainability Reporting Directive (CSRD)

European Commission

	Non-financial Reporting Directive (NFRD) EU Directive 2014/95/EU	Corporate Sustainability Reporting Directive (CSRD)
Which companies are concerned?	**Large "public interest entities" with >500 employees:** • Listed companies • Banks & Insurance companies	**All large companies meeting at least 2 out 3 criteria:** > 250 employees and/or > €40M Turnover and/or > €20M Total Assets **Listed companies on EU regulated markets (SMEs get 3+ years to comply)** → except listed micro-companies (less than 10 employees or below €20M in turnover).

Corporate Sustainability Reporting Directive (CSRD)

European Commission

Timeline

In application since **2018**

Application on **1 January 2024 for the 2023 financial year**.

- Concerned companies will have to submit their report in compliance with the CSRD by 2023.
- For SMEs, more detailed reporting requirements and delayed timelines are available.

Different phases will develop the reporting:

- **FY 2023**: the first set of Sustainability Reporting Standards (draft standards open mid-2022)
- **FY 2024**: the second set of Sustainability Reporting Standards

Adoption of the EU-Directive in member states legislation: December 1, 2022.

Corporate Sustainability Reporting Directive (CSRD)

European Commission

Number of companies concerned by the regulation	**11,600**	**49,000** → covering **75% of total EU's companies turnover.**
Scope of reporting requirements	**Companies are to report on the following five dimensions:** • Environmental protection • Social responsibility and treatment of employees • Respect for human rights • Anti-corruption and bribery • Diversity on company boards (age, gender, educational and professional background) **Companies need to report the following items on each of the four dimensions:** • Policy • Outcomes of policy • Risks • KPIs	**Additional requirements on:** • **Double materiality concept:** → Sustainability risk (including climate change) affecting the company. → Companies' impact on society and environment. • Process to select material topics for stakeholders • More forward looking information, including targets and progress thereon • Disclose information relating to intangibles (social, human and intellectual capital) • Reporting in line with Sustainable Finance Disclosure Regulation (SFDR) and the EU Taxonomy Regulation

Corporate Sustainability Reporting Directive (CSRD)

European Commission

	Non-mandatory	Mandatory (planned end of 2022)
Reliability of reporting (Third party assurance) 		Reporting must include: • Integration in auditor's report • Involvement of key audit partner • Scope to include EU Taxonomy and process to identify key relevant information.
Where to report? 	Included in the **Annual report**. The sustainability report can be disclosed separately with a clear reference to the financial report and management report.	Included in the **Management report** A single report in "digital machine-readable format".

2025 OMNIBUS Package

- **Omnibus Simplification Packages:**
  - Aim to simplify the complex policy landscape for EU companies.
  - Reduces administrative burdens for businesses.

- **Key Features of the Omnibus Packages:**
  - Streamlining sustainability reporting for large enterprises.
  - Ensuring smaller businesses are not overly burdened.
  - Incorporating changes to CBAM Regulation and InvestEU Program.
  - Strengthening transparency and investment efficiency.

- **EU Commission's Goals:**
  - Reduce administrative burden by 25% by 2029.
  - Foster a favorable business environment and support sustainable growth

CSRD-consistent Holistic Approach for Businesses
Create value and move beyond compliance-based codes

Mapping

- Map Entire Value Chain of Company - Products and Services
- Map Stakeholders
- Materiality Assessment By Stakeholder

Measurement

- ESG KPIs in accordance with Sustainability Reporting Standards (2023, 2024)
- Map ESG KPIs across the Value Chain
- Map ESG KPI's to SDGs Indicators
- Set Targets

Assessment & Monitoring

- ESG/SDG Dashboards – Level of Implementation of SDGs and trends to 2030/2050
- Monetization of externalities/ intangible assets
- Design Hybrid Metrics to Optimize for Value
- Restructure Business Plan

AE4RIA Metrix

Spin Off

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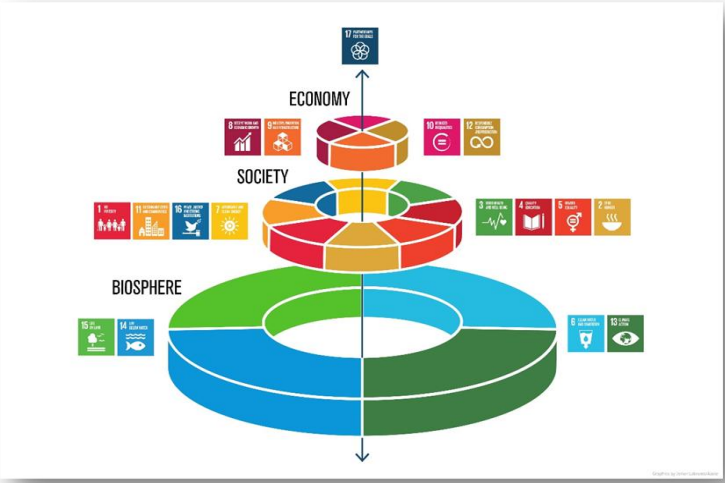
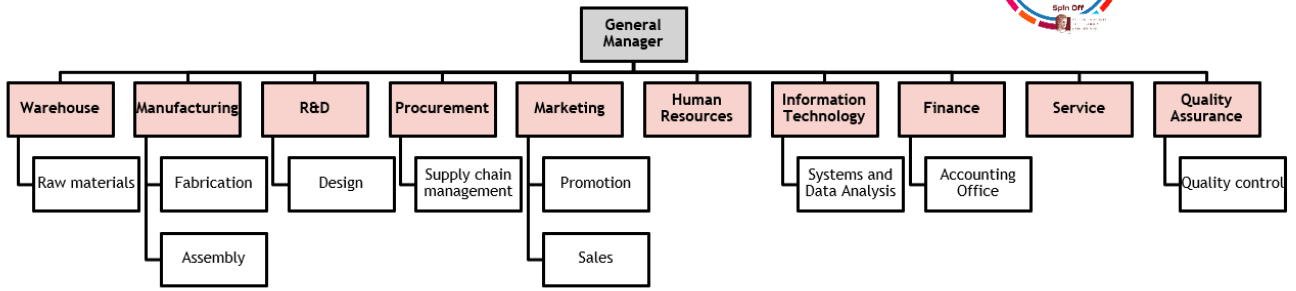
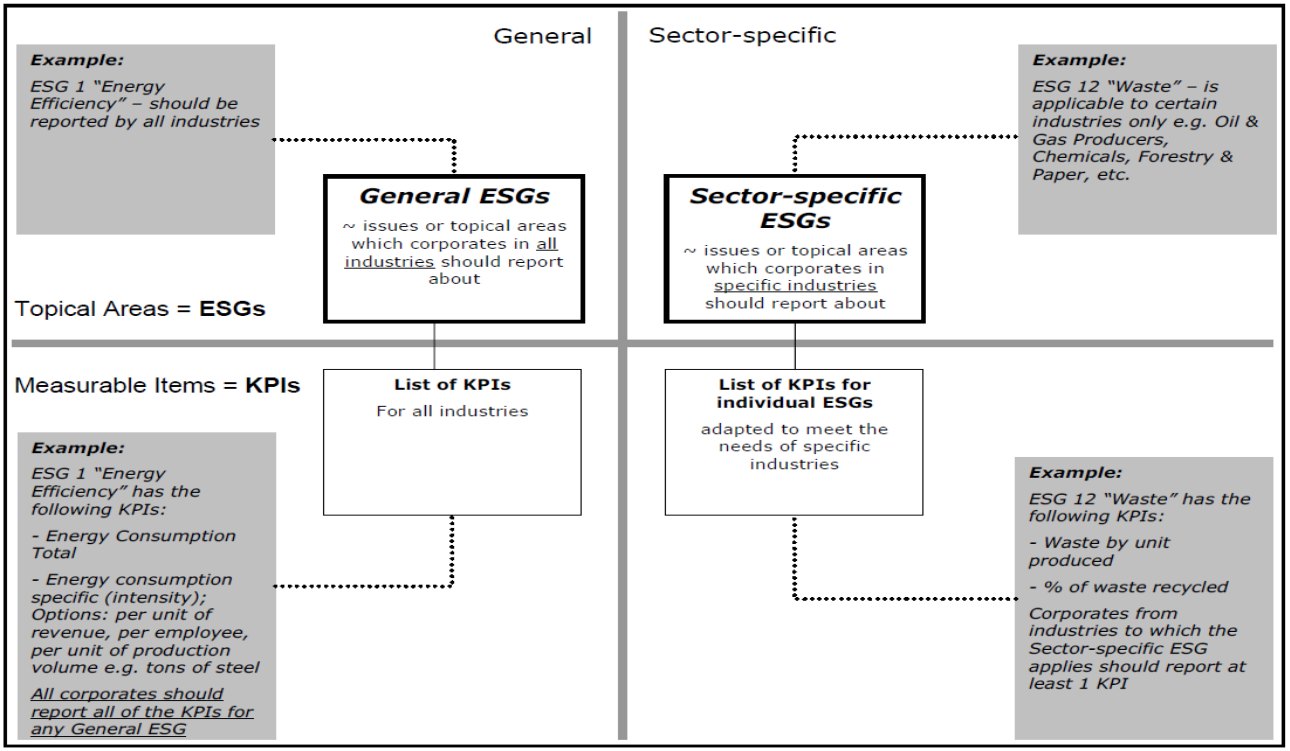


ESG/SDG Footprint - Companies

- Mapping the **value chain** of the company
- ESG **Materiality Assessment** By Stakeholder Type
- Mapping of Relevant **KPIs** across value chain
  (**Multiple Layers** – Generic – Sector Specific – Unit Specific)
- KPIs in Line with **ESRS, CSRD, EU Taxonomy**





Environmental

1 Recycling & waste
2 Water stewardship
3 Carbon emissions

Social

4 Employee development
5 Employee diversity, equity & inclusion
6 Occupational health & safety
7 Employee engagement
8 Community engagement

Governance

9 Business ethics & integrity
10 Transparency & disclosure
11 Data protection & cyber security

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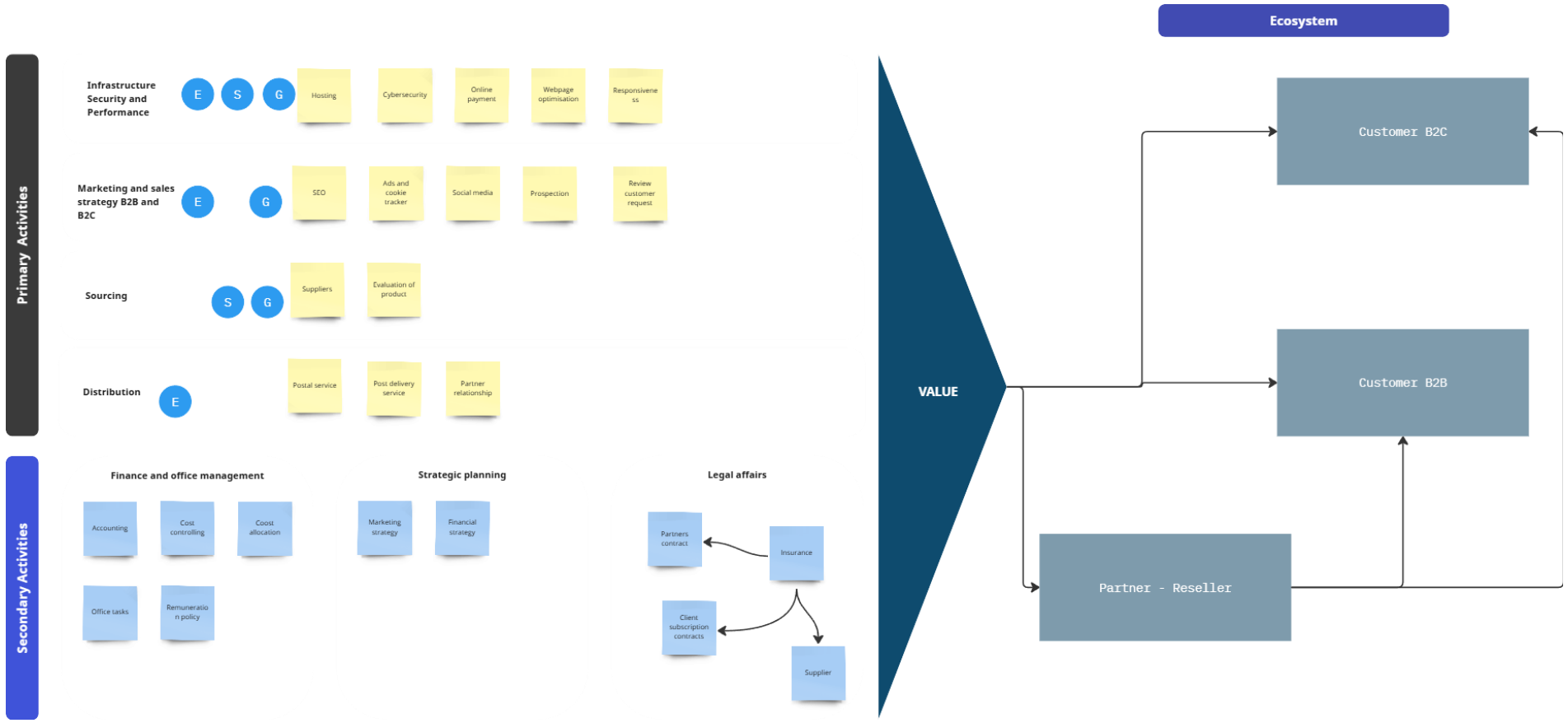
ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

ReSEES Research laboratory on Socio-Economic and Environmental Sustainability

Mapping the value chain of the company



- Typical organization chart based on core business functions/activities.
- 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/ products/services.

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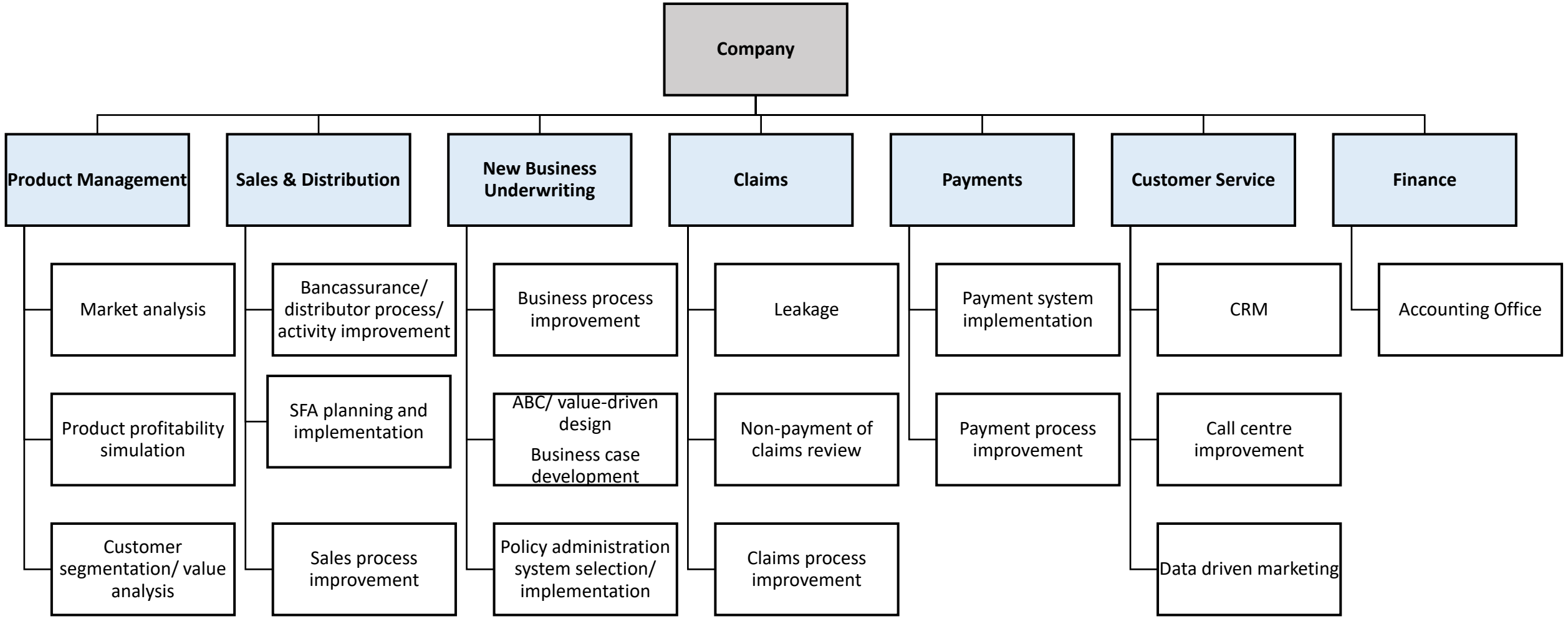
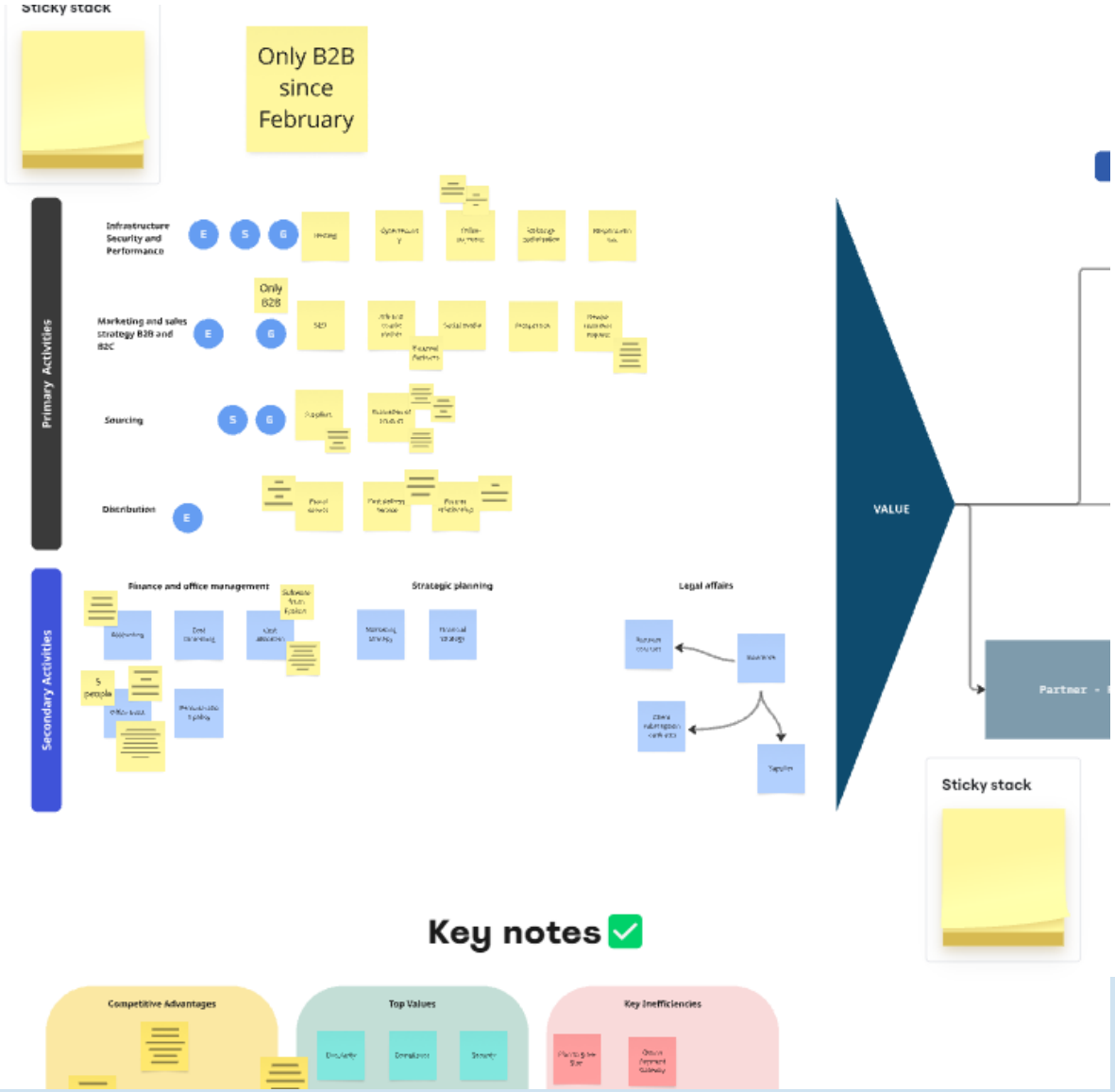
Insurance Sector -Example



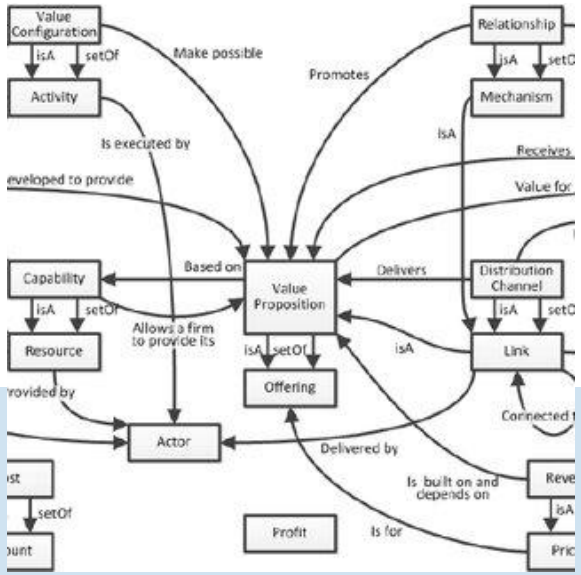
Value Chain Mapping- Workshops



- Company also to identify:

- Competitive Advantages
- Top Values
- Key Inefficiencies

- Visualizing and assessing the business model can greatly enhance a company's understanding of how sustainability considerations affect core operations, value propositions, and revenue streams.



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Company Stakeholders Mapping

- Shareholders/ Investors : - Evidence-based reporting on how risk factors are expected to affect financial performance.
  - Sustainability and viability of the organization in the future.

- Value Chain Partners : - expect a resilient ecosystem with minimal risks of adverse events ranging from financial downturns to data breaches to negative social reputations.

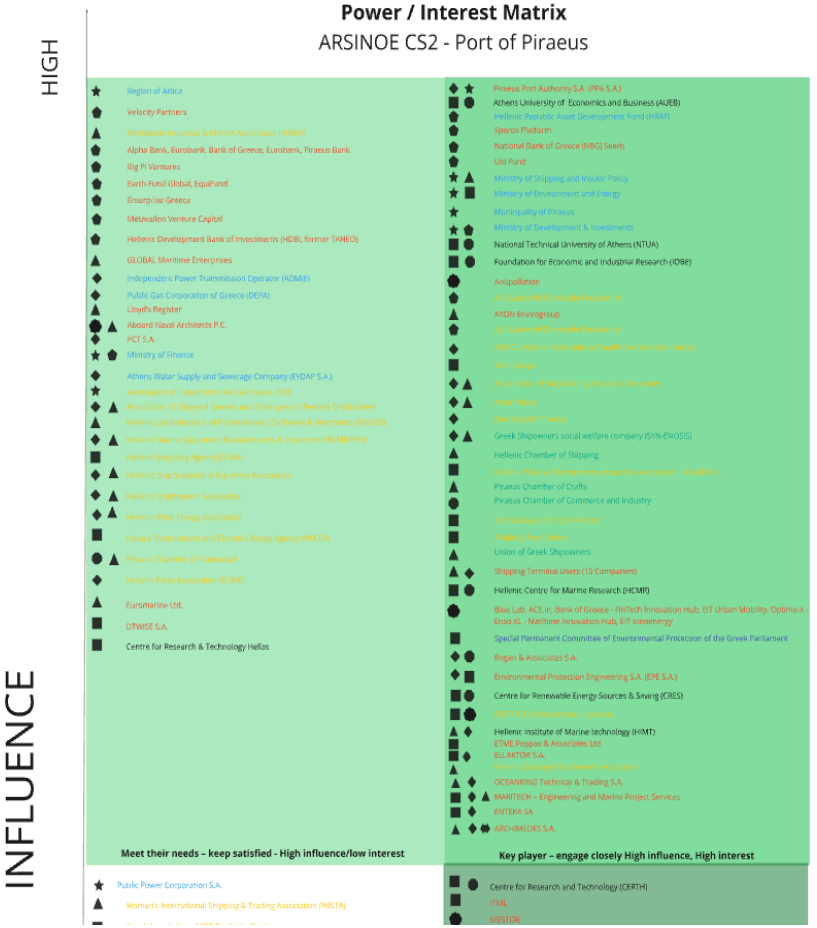
- Employees : - Holding their organizations to higher standards beyond just financial oversight.
  - Want to work for relevant organizations and understand environmental and social concerns.

- (End-)Consumers : - Innovative, agile companies that provide products and services that meet their needs
  - Responsive to changing demands and social constructs.

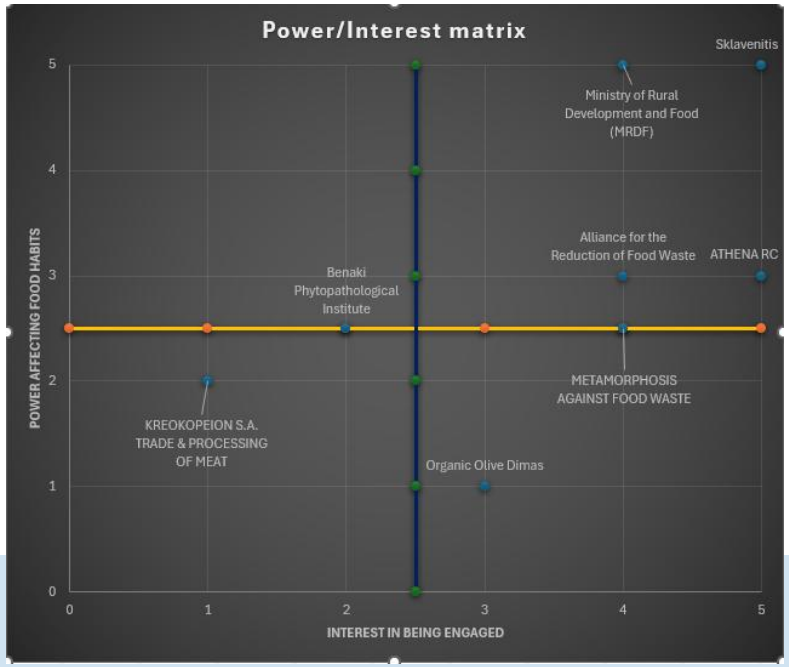
- Regulators : - expecting organizations to be responsible and prudent in all facets of business from financial reporting to the impact on the environment.

- Governments and local communities

Stakeholders Mapping- Assessments and Workshops



- Rank your stakeholders across your value chain and/or on Different criteria
- Identify those who most significantly influence—or are influenced by—your company's activities
- Insights into their priorities / Interests
- Align with Regulatory & Social Expectations



Stakeholder Attributes			Role in affecting Food Habits (Check Roles Guide)	Interest (Check Power Interest Guide)	Power (Check Power Interest Guide)
Stakeholder Name	**Value Chain categorization (Check Value Chain Guide)**	**Helix categorization**	**Main Role**	**0-5 Increasing**	**0-5 Increasing**
ATHENA RC	Land Use	Academia/ Research	1. Research and Innovation	5	3
Sklavenitis	Retailing	Industry/ Business	3. Marketing and Sales	5	5
METAMORPHOSIS AGAINST FOOD WASTE	Waste	NGOs	1. Advocacy and Awareness	4	2,5
Alliance for the Reduction of Food Waste	Waste	Civil Society	4. Alternative Food Networks	4	3
Ministry of Rural Development and Food (MRDF)	Production	Public/ Governance	1. Policy Development and Regulation	4	5
Organic Olive Dimas	Consumption	Industry/ Business	3. Marketing and Sales	3	1
KREOKOPEION S.A. TRADE & PROCESSING OF MEAT	Retailing	Industry/ Business	3. Marketing and Sales	1	2
Benaki Phytopathological Institute	Land Use	Public/ Governance	3. Infrastructure and Support	2	2,5

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ESG Materiality Assessment By Stakeholder Type

Environmental

1 Recycling & waste

2 Water stewardship

3 Carbon emissions

Social

4 Employee development

5 Employee diversity, equity & inclusion

6 Occupational health & safety

7 Employee engagement

8 Community engagement

Governance

9 Business ethics & integrity

10 Transparency & disclosure

11 Data protection & cyber security

- Identify and understand the relative importance of specific **ESG** and **Sustainability** topics relative to its Stakeholders.
- Materiality Matrix by **Stakeholder** Type.

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Identify Risk and Opportunities

Transition risks

Policy & legal risk: Compliance costs; stranded assets; asset impairment; restrictions & limitations on carbon intensive assets; and asset depreciation.

Market & economic risk: Company or securities valuations; asset impairment; viability of certain business models; and credit rating implications.

Technology risk: Write-offs for investments in disrupted technologies; required investment in new technologies; and process change costs to accommodate new technologies.

Reputation risk: Damage to brand value or reputation resulting in lost revenue and additional expenditures e.g. corporate affairs, litigation etc.

Physical risks

Acute physical risk: Short lived extreme weather impacts, e.g. flood, wildfire, cyclones, heatwaves, drought

Chronic physical risk: Impacts due to slow insidious change, e.g. rising mean temperatures, long-term water stress

Opportunities

Resource efficiency: Use of more efficient modes of transport; efficient buildings; reduced water usage; use of recycling.

Energy source: Use of lower-emission sources of energy; use of supportive policy incentives; use of new technologies; participation in carbon market.

Products & services: Development of low emission goods and services; climate adaptation and risk solutions; R&D and innovation.

Market opportunity: Exploring new markets or types of assets in order to diversify activities.

- Across the Value Chain (upstream, downstream, and among different stakeholder groups)
- Scenarios for the company's financial performance, position, or value (Rank Impact and Probability)
- Scenarios for the company's externalities—positive or negative—on people, communities, and natural ecosystems (Rank Impact and Probability)

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Frame Externalities

- **Financial Capital** is the pool of funds available for an organisation to use in the production of goods or the provision of services. Additional funds may be obtained through financing.
- **Manufactured Capital** consists of manufactured physical objects that are available to an organisation for use in the production of goods or the provision of services[4].
- **Intellectual Capital** consists of organisational, knowledge-based intangibles, including intellectual property and "organisational capital".
- **Human Capital** consists of people's competencies, capabilities and experience, as well as their motivations to innovate, often within the realm of the organisation's activities.
- **Social Capital** refers to individual and collective wellbeing because of institutions and the relationships within and between communities, groups of stakeholders and other networks.
- **Natural Capital** consists of all renewable and non-renewable environmental resources and processes that provide goods or services that support the past, current or future prosperity of an organisation.

Impact Pathways

Identify outcomes from different angles and across value chain

Event
(risk and opportunity driver)

Outcome

Physical risks:

- Acute
- Chronic

Transition risks:

- Policy & Legal
- Market & Economic
- Technology
- Reputation

Identify how each driver could affect different aspects of the business

People
- Employees and contractors
- Local communities

Value chain
- Research and development
- Supply chain
- Operations
- Customers and products
- End of life

Physical assets
- Land
- Buildings
- Machinery and equipment

Intangibles
- Reputation
- Brand
- Legal
- Financial standing and credit worthiness

Market and competition
- New markets
- New competition
- Different business models
- Differentiated impacts on competitors

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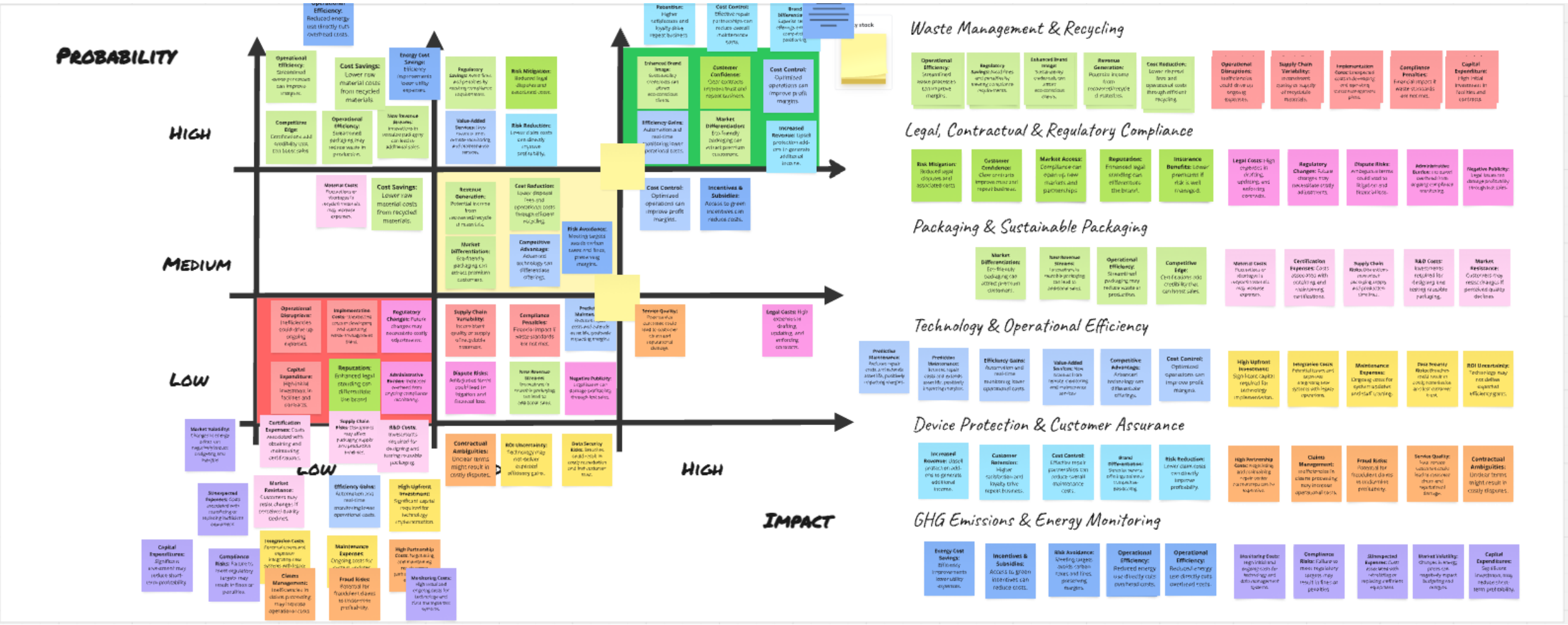
Identify Risk and Opportunities – Double Materiality Assessment



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Food Sector Case Study – Materiality Assessment

ESG Categories	Material Issues
Environmental	GHG Emissions
	Energy Management
	Water Consumption
	Waste Management & Circular Economy
	Food Waste
	Sustainable Packaging
	Animal Welfare
Social	Product Quality & Safety
	High Nutritional Value
	Employee Health & Safety
	Diversity, Equality & Inclusion
	Human Rights
	Community Support & Social Contribution

- Identify and understand the relative importance of specific ESG and Sustainability topics relative.
- A materiality assessment helps companies pinpoint the most significant environmental, social, and governance (ESG) issues (alongside traditional financial considerations) that can affect the organization's success.
- These "material" issues typically require active management to both minimize risks (e.g., reputational damage, regulatory non-compliance) and maximize profit (e.g., through innovation, efficiency gains, and stronger stakeholder relationships).
- Relative weights among Material Issues are calculated on several dimensions (Financial / Externalities etc.)

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Mapping of Relevant KPIs across value chain

General

Sector-specific

Example:

ESG 1 "Energy Efficiency" – should be reported by all industries

Example:

ESG 12 "Waste" – is applicable to certain industries only e.g. Oil & Gas Producers, Chemicals, Forestry & Paper, etc.

General ESGs

~ issues or topical areas which corporates in all industries should report about

Sector-specific ESGs

~ issues or topical areas which corporates in specific industries should report about

Topical Areas = **ESGs**

List of KPIs for individual ESGs

adapted to meet the needs of specific industries

Example:

ESG 12 "Waste" has the following KPIs:

- Waste by unit produced

- % of waste recycled

Corporates from industries to which the Sector-specific ESG applies should report at least 1 KPI

KPIs in Line with ESRS and CSRD

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 - Banks

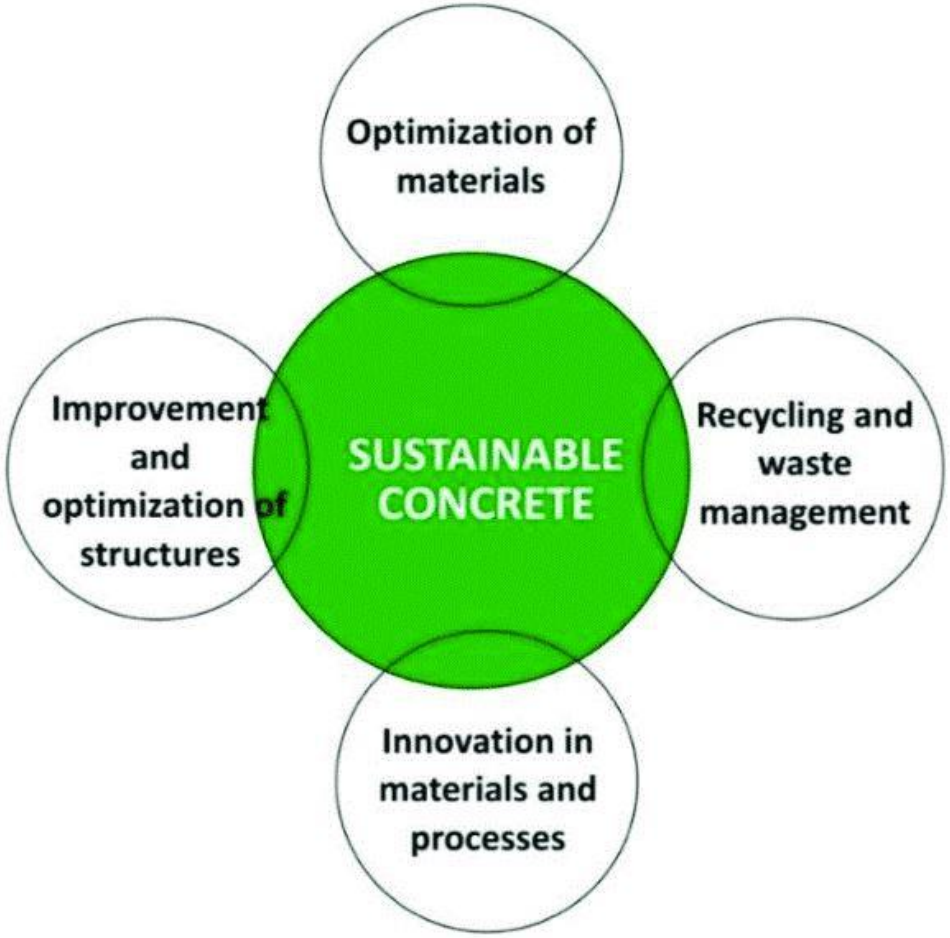
ESG	KPI
ESG 10 Deployment of renewable energy	ESG 10-1 % of energy in kwh from renewable energy sources as of total energy consumed
	ESG 10-2 % of energy in kwh from combined heat and power generation as of total energy consumed
ESG 12 Waste	ESG 12-1 Waste by unit produced
	ESG 12-2 % of waste recycled
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

Cement Industry Examples

Focus Area	Key Performance Indicator
Health and Safety	• Employee fatalities (N°)
	• Employee Lost Time Injuries Frequency Rate
Customer Centricity	• Net Promoter Score (NPS)
Climate Action	• Reduction of net CO_2 emissions per ton of cementitious product vs. 1990(%)[1]
	• Clinker Factor (cementitious) (%)
	• Alternative fuelts rate (%)
	• Clean electricity consumption in cement (%)
Sustainable Construction	• Annual sales of cement and concrete products with outstanding sustainable attributes (%)[6]

Cement Industry Examples

Circular Economy	• Total waste-derived sources managed (million tons)
Air Emissions	• Reduction of dust emissions per ton of clinker vs. 2005 (%)
	• Reduction of NO_x emissions per ton of clinker vs. 2005 (%)
	• Reduction of SO_x emissions per ton of clinker vs. 2005 (%)
Biodiversity	• Quarry rehabilitation plans, Biodiversity Action Plans, and third-party certification (%)
	• Third-party certification on critical sites (%)[2]
Water	• Implementation of Water Action Plans in sites located in water-scarce areas (%)
	• Reduction in specific freshwater withdrawal in Cementitious (%)[4]
	• Reduction in specific freshwater withdrawal in Aggregates (%)[4]
	• Reduction in specific freshwater withdrawal in Concrete (%)[4]
Employee Experience	• Employee Net Promoter Score (eNPS)[6]
	• Voluntary Turnover (%)[6]
Communities	• Community engagement plans with formal stakeholder dialogues and committees in all priority sites (%)
	• Community partners (million people)[5]
Suppliers	• Sustainability assessment of critical suppliers by an independent third-party (% spend)
Ethics and Compliance	• Implementation of Ethics and Compliance Continuous Improvement Program (%)



Insurance Industry Examples

Sector Nonlife Insurance [8530]

A. Overview of sector-specific ESGs

E **Environmental**	**S** **Social**	**G** **Governance**	**V** **Longterm Viability**
ESG 10 Deployment of renewable energy	ESG 15 Diversity 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 23 Dimension of pending legal proceedings ESG 24 Contributions to political parties	ESG 27 Investments in research on new risk ESG 28 Customer retention ESG 29 Customer satisfaction

Insurance Industry 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 15 Diversity	ESG 15-1 Percentage of female employees as of total
	ESG 15-2 Percentage of female managers as of total
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 23 Dimensions of pending legal proceedings	ESG 23-1 Amount in $, € in controversy, dispute from legal proceedings
	ESG 23-2 Amount in $, € in controversy, dispute from legal proceedings as a percentage from total revenues
ESG 24 Contributions to political parties	ESG 24-1 Contributions to political parties as percentage of revenues
ESG 27 Investments in research on new risk	ESG 27-1 Total investments in research on new risk in $, €
	ESG 27-2 Total investments in research on new risk in mandays
	ESG 27-3 Total investments in research on new risk in $, € as a percentage of revenues

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 all standards - e.g. SASB (Sustainability Accounting Standards Board), GRI (Global Reporting Initiative), Thompson Reuters, Bloomberg and other **standards**.

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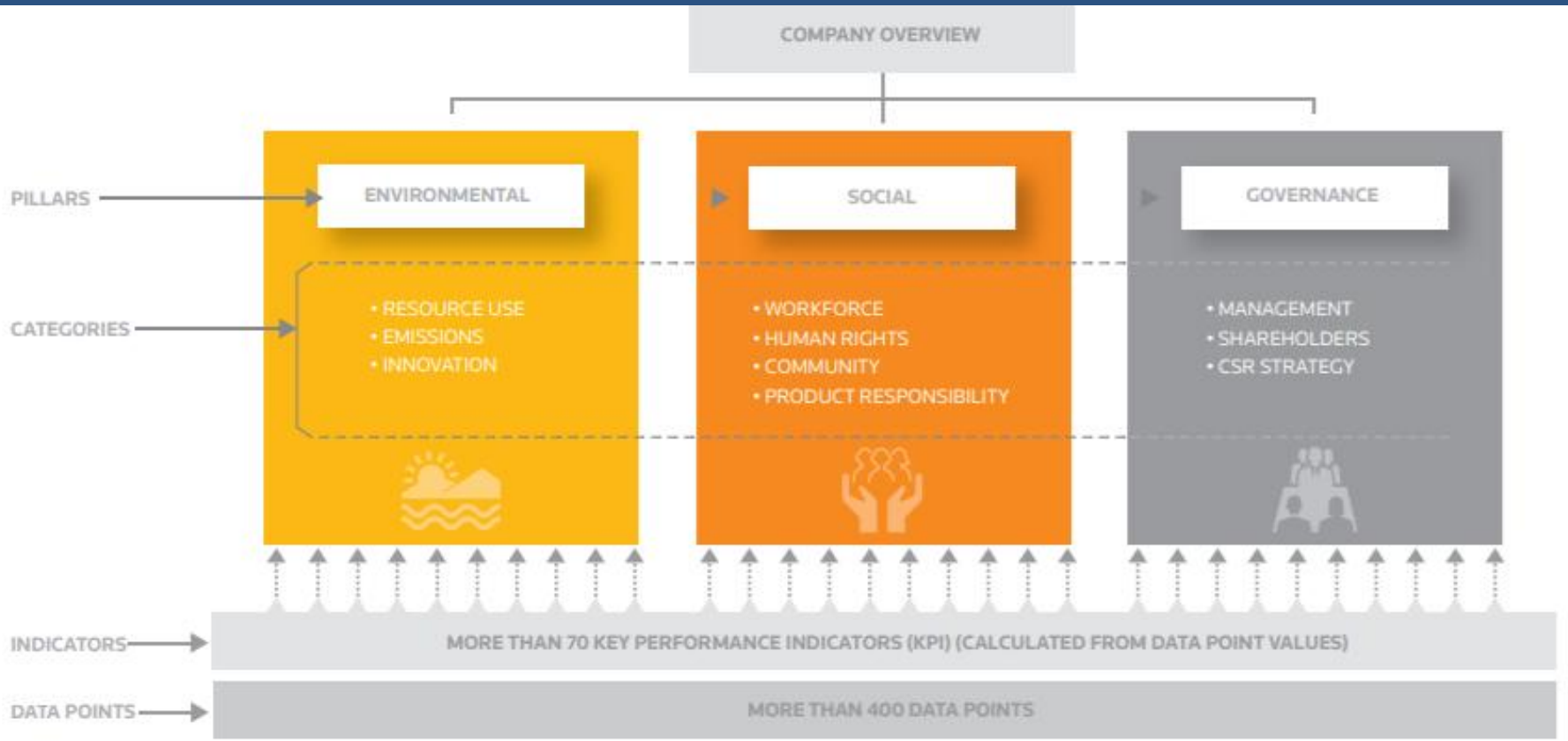
ESG Reporting Scheme



- The Set of the KPI's are co-identified and validated by the Company, representing all important units across its value chain, and representative of its **Materiality Assessment**.

- Establish an ESG Reporting Scheme : Data Collection / Calculate relevant KPI's.

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Ports Case Study – Material Issues and KPIs

Table 1 – Ports KPIs - Material Issues/ Categories

ESG Categories	Material Issues / Categories	# KPIs
Environmental	Climate Change and Environment	6
	Water and Wastewater Management	6
	Energy, Emissions and Energy Efficient Buildings	18
	Biodiversity	6
	Waste, Material and Hazardous Material Management	11
	Environment - Ports Specific	17
Social	Employees	27
	Suppliers	5
	Community	11
	Social - Ports Specific	14
Governance	Highest Governance Body and Committees	12
	Remuneration	5
	Policies	14

Water and Wastewater Management:

Total annual water consumption
Use of wastewater treatment plant
Measures of recycling/reusing water
Employee training programmes on water conservation
Change in local water balance

Environment – Port Specific:

Development of clean energy vessels initiatives
Flood risk management plan
Carbon capture (CO_2e) and storage initiatives
Electricity use reduction measures
Total amount of reduced energy (in kWh)
Monitoring of dB inside the Port and the surrounding area
Amount of dB in the port (annual average)
Amount of dB in the surrounding area (annual average)

KPIs Definition, Measurement and Scope

General Categories Identified in CT Strategy	KPI	Explicit KPI	Unit of Measurement	Definition	Methodology	Source	Taxonomy Objective
GHG Emissions	Scope 1 Emissions	**Scope 1 Emissions**	metric tonnes of CO2eq	Direct GHG emissions from sources that are owned or controlled by the undertaking.	calculate or measure GHG emissions from stationary combustion, mobile combustion, process emissions and fugitive emissions; and use suitable activity data that include the non-renewable fuel consumption; The disclosure on gross Scope 1 GHG emissions required by paragraph 44 (a) shall include: (a)the gross Scope 1 GHG emissions in metric tonnes of CO2eq; and (b)the percentage of Scope 1 GHG emissions from regulated emission trading schemes	ESRS	Climate Change Mitigation
	Scope 2 Emissions	**Scope 2 Emissions**	metric tonnes of CO2eq	Indirect emissions from the generation of purchased or acquired electricity, steam, heat or cooling consumed by the undertaking. Purchased or acquired electricity, heat, steam, or cooling When the undertaking has received its electricity, heat, steam, or cooling from a third party. The term "acquired" reflects circumstances where a company may not directly purchase electricity (e.g., a tenant in a building), but where the energy is brought into the undertaking's facility for use	Location-based method quantifies Scope 2 GHG emissions based on average energy generation emission factors for defined locations, including local, subnational, or national boundaries (GHG Protocol, "Scope 2 Guidance", Glossary, 2015). Market-based method quantifies Scope 2 GHG emissions based on GHG emissions emitted by the generators from which the reporting entity contractually purchases electricity bundled with instruments, or unbundled instruments on their own (GHG Protocol, "Scope 2 Guidance", Glossary, 2015); in this case, the undertaking may disclose the share of market-based scope 2 GHG emissions linked to purchased electricity bundled with instruments such as Guarantee of Origins or Renewable Energy Certificates.	ESRS	Climate Change Mitigation
	Scope 3 Emissions	**Scope 3 Emissions**	metric tonnes of CO2eq	All indirect GHG emissions (not included in scope 2 GHG emissions) that occur in the value chain of the reporting undertaking, including both upstream and downstream emissions. Scope 3 GHG emissions can be broken down into scope 3 categories.	The disclosure of gross Scope 3 GHG emissions required by paragraph 44 (c) shall include GHG emissions in metric tonnes of CO2eq from each significant Scope 3 category (i.e. each Scope 3 category that is a priority for the undertaking) .	ESRS	Climate Change Mitigation
	Emission (GHG) Intensity	**total GHG emissions per net revenue**	tonnes of CO2eq per Euro of Revenue	GHG emissions intensity is measured as the total GHG emissions in metric tonnes of CO2eq per net revenue	Calculate the GHG intensity ratio by using the formula: GHG Intensity=Total GHG emissions (in metric tonnes of CO2eq)/Net revenue Express the total GHG emissions in metric tonnes of CO2eq and the net revenue in monetary units. Include the total GHG emissions in the numerator and overall net revenue in the denominator .	ESRS	Climate Change Mitigation

- The Definition and the methodology are affected by various factors (capacity to gather/measure, need for compliance, comparability)

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KPIs Definition, Measurement and Scope

The GHG protocol differentiates between three scopes of emission:

Scope 1

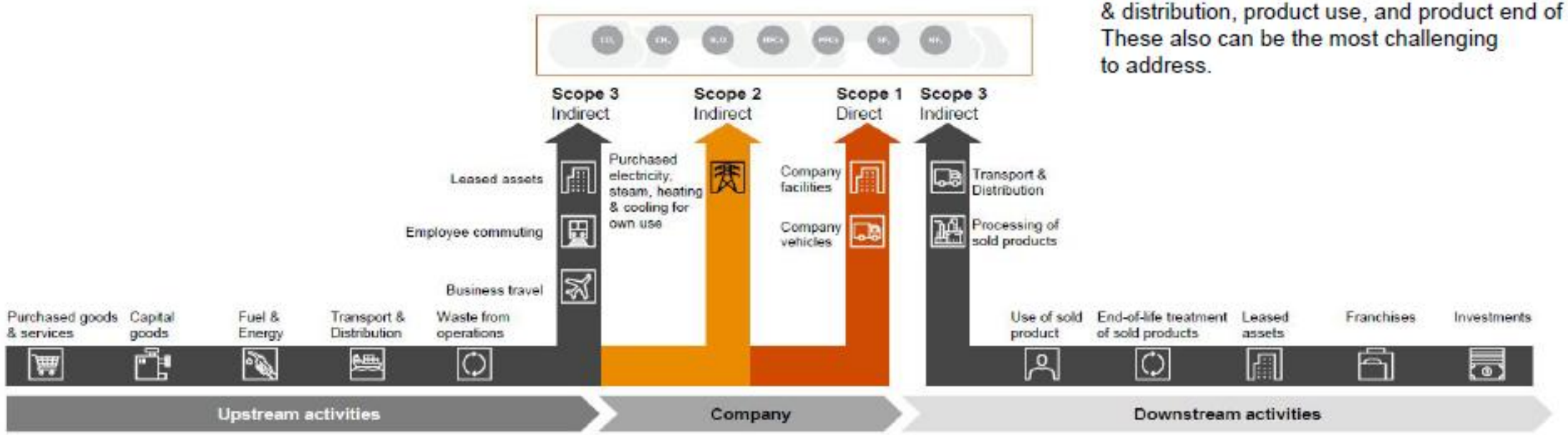
All direct emissions from the activities of an organization or under their control. Including fuel combustion on site such as gas boilers, fleet vehicles, and air-conditioning leaks.

Scope 2

Indirect emissions from electricity purchased and used by the organization. Emissions are created during the production of the energy and eventually used by the organization.

Scope 3

All other indirect emissions from activities of an organization, occurring from sources that they do not own or control. These are usually the **greatest share of the carbon footprint**, covering emissions associated with procurement, transport & distribution, product use, and product end of life. These also can be the most challenging to address.



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KPIs Definition and Measurement

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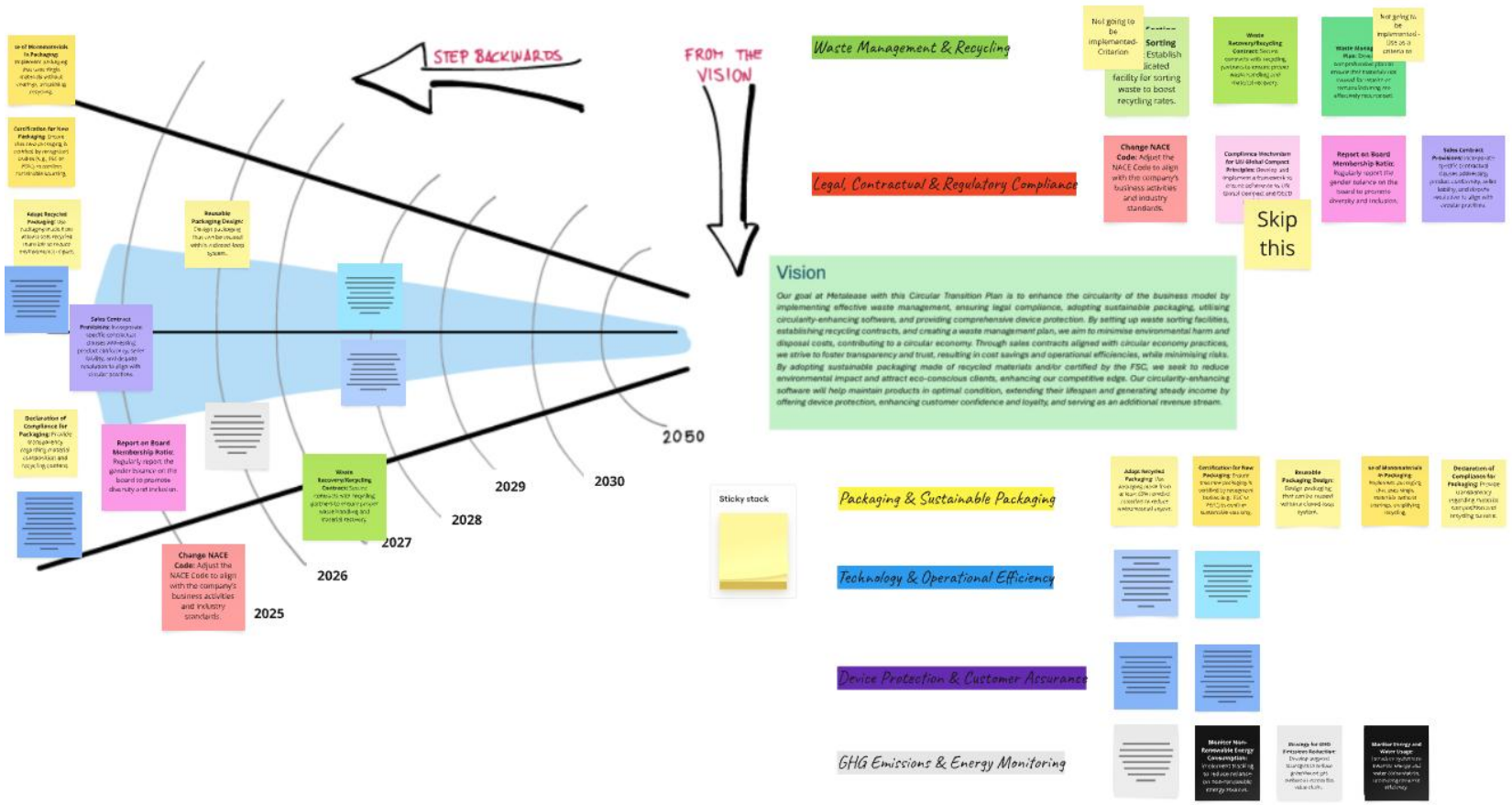
KPIs – Set Targets



- **Policy-based targets** (derived from government regulations, industry rules, or internal corporate policies. *Example:* A company adopting greenhouse gas emission limits aligned with national or international laws)
- **Scientific-Based (or Science-Based) Targets** (grounded in scientific research and data, typically validated by authoritative bodies. Often used in the context of climate change other environmental/sustainability metrics. *Example:* Setting emissions reductions in line with the IPCC's)
- **Benchmarking-based targets** (set by comparing performance to peers, industry averages, or best-in-class leaders. *Example:* A company aims to reduce water usage or improve energy efficiency to match or surpass the industry's top quartile).
- **Financial targets** (e.g., cost savings through energy efficiency)

- Targets are defined on various horizons (Short/Medium/Long) to form an Action Plan for the company towards it's Vision (Discussed in the SIA sessions)

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Hybrid Metrics

- Hybrid Metrics
  - Linking Financial Performance to ESG's
- Water Use Efficiency Ratio per company

$$\frac{Water\ Use}{Revenues - Turnover}$$

- Company to minimize this Ratio relative to other companies in sector
- Target: The average ratio of the top sustainability performers in the Sector

ESG Performance Model / Management Module

- **Hybrid** Metrics to account for **Profitability** and Size
- **Dashboards** and **Pathways** for the implementation of Targets
- ESG scores and rating – Econometric Statistical Model
- Aggregate performance, **ESG scores,** and **Ratings** By Pillar
- Model Incorporates **Benchmarking** against **Sector Peers**
- Test **Scenarios** to calculate expected ESG performance

Pillar	Material Issue	KPI Name	L0 - KPI Score	L0 - KPI Rating
1. Environment			61,27	3
			67,02	3
			0,00	1
			0,00	1
			0,00	1
			22,80	2
			100,00	4
			100,00	4
			75,94	4
			28,03	2
2. Social			100,00	4
			74,02	3
			71,71	3
			100,00	4
3. Governance			100,00	4

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Food Sector Case Study – KPIs Targets and Justification

- For each KPI long term target is set (UB) based either on Policy or Benchmarking
- Statistical Distance from the targets: $$score_k = 100 \frac{(x - LB)}{(UB - LB)}$$

- For each KPI, the Yellow/Orange Limit (YOL) is defined as the average between the lower and the upper bounds (Target is the upper bound. Lower bound is set as the Lower 2.5 Percentile). Red and Green Limits are calculated as:

$$\text{Yellow/Orange Limit (YOL)} \pm \frac{|Target - \text{ Yellow/Orange Limit (YOL)}|}{2}$$

- For the targets for which Benchmarking approach is applied (e.g. all Hybrid metrics included in the analysis), the green and red thresholds were determined as YOL $\pm$ one standard deviation of the cross-sectional distribution of the metric for all companies included in the Benchmarking.

$$\text{Yellow} - \text{Orange Limit (YOL)} \pm STD(x_k)$$

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Aggregate ESG Scores

- For each KPI, k=1,…, K=188

$$score_k = 100 \frac{(x_k - LB)}{(UB - LB)}$$

- For each material Category , m=1,…, M=14

$$Score_m = \sum_{k=1}^{Mn} \frac{score_k}{Mn}$$

Mn = # KPIs in Material Category

- For each Pillar, j=1,…, J=3 (E, S and G)

$$Score_{\mathrm{j}} = \sum_{\mathrm{j}=1}^{\mathrm{Jn}} \frac{score_k}{\mathrm{Jn}}$$

Jn = # KPIs in Pillar

- Agrregate ESG Score

$$Score_{ESG} = \sum_{j=1}^{3} score_j W_j$$

$$W_j = \frac{Jn}{K}$$

Ports Case Study – Benchmarking

FULL NAME	*Environment Pillar Score*	*Water Use To Revenues USD in millions*	*Total Waste To Revenues USD in millions*	*GEO*
ADANI PORTS AND SPECIAL ECONOMIC ZONE	85.01	2285.18	3.51	Asia Pacific
CARNIVAL	81.79	3003.30	64.15	Europe
SINOPEC KANTONS HOLDINGS	80.65	906.74	1.97	Asia Pacific
CHINA MERCHANTS PORT GROUP	76.58	2622.97	6.24	Asia Pacific
SANTOS BRASIL PARTICIPACOES ON	76.45	236.79	15.79	Latin America
HMM	75.18	3.75	1.58	Asia Pacific
NIPPON YUSEN KK	74.84	15.60	0.30	Asia Pacific
COSCO SHIPPING PORTS	74.60	821.32	6.63	Asia Pacific
A P MOLLER MAERSK	74.28	30.71	5.64	Europe

- Sector Identification 4191 to 4199 for Ports
- Top 10% performers are identified based on the “Environmental Pillar Score”. For all calculations we use data from Thompson Reuters REFINITIVE.

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Table 3 - Top 10% Performers 1

FULL NAME	*Environment Pillar Score*	*Water Use To Revenues USD in millions*	*Total Waste To Revenues USD in millions*	*GEO*
ADANI PORTS AND SPECIAL ECONOMIC ZONE	85.01	2285.18	3.51	Asia Pacific
CARNIVAL	81.79	3003.30	64.15	Europe
SINOPEC KANTONS HOLDINGS	80.65	906.74	1.97	Asia Pacific
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- Sector Identification 4191 to 4199 for Ports
- Top 10% performers are identified based on the “Environmental Pillar Score”. For all calculations we use data from Thompson Reuters REFINITIVE.

Corporate Sustainability Assessment Framework

- **Integrate** SDGs in **CSR** Framework
- **Machine Learning Algorithms (Cosine Similarity)** to
- Map **ESG** KPIs vs 232 SDG Indicators

$$\text{similarity} = \cos(\theta) = \frac{\mathbf{A} \cdot \mathbf{B}}{\|\mathbf{A}\|\|\mathbf{B}\|} = \frac{\sum_{i=1}^{n} A_i B_i}{\sqrt{\sum_{i=1}^{n} A_i^2}\sqrt{\sum_{i=1}^{n} B_i^2}}$$

$$W_{i,k}^{SDG} = \frac{\sum SDG\ Indicators\ mapped\ to\ KPI_k\ under\ SDG_i}{\sum Indicators\ under\ SDG_i}$$

- Model to Evaluate **SDG performance** at the **Company Level** and **Across the Value Chain**

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.

Value Chain Level 1	Value Chain Level 2	1	2	3	4	5	6	7	8	9	10	12	13	15	16	17
[redacted]		4	4	4	2	3		4	3	2	4	2	4		4	4
		4	4	4	2	3		4	3	2	4	2	4		4	4
		4	4	4	2	3		4	3	2	4	2	4		4	4
		4	4	4	4	3	2	3	4	3	4	4	3	3	4	4
		4	4	4	2	1			3	2	2	2	4		4	4
		4	4	4	2	1			3	2	2	2	4		4	4
		4	4	4	3			4	3	2	2	2	4		4	4
		4	4	4	3			4	3	2	2	2	4		4	4

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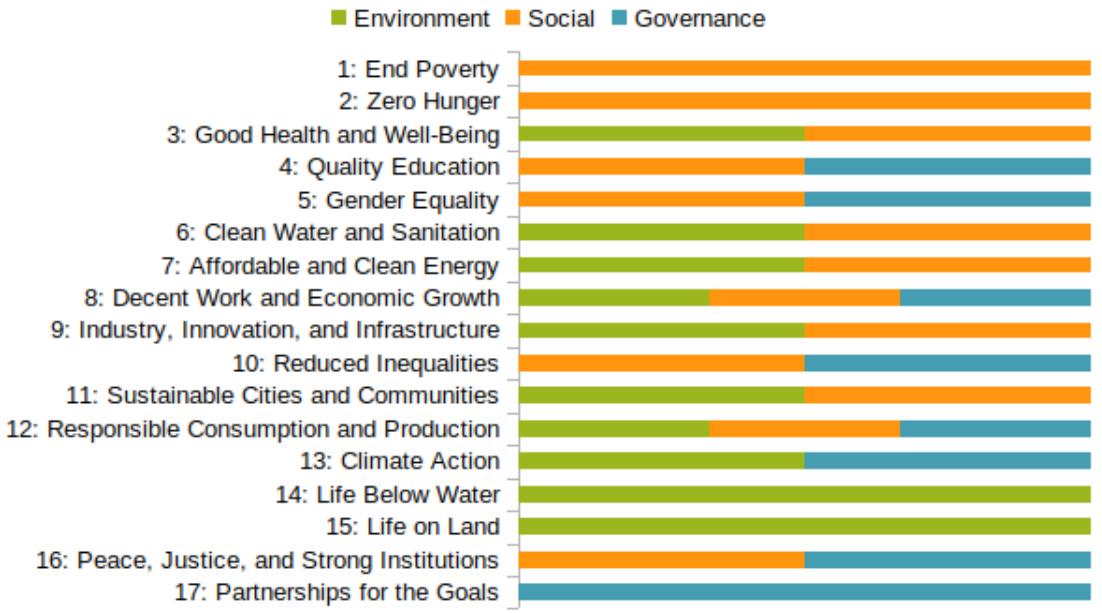
Mapping ESG KPIs to SDG Indicators

- ***ESG KPI***s are mapped to SDG indicators with Multiple Methodologies.
- Machine/Deep Learning

$$\text{similarity} = \cos(\theta) = \frac{\mathbf{A}\cdot\mathbf{B}}{\|\mathbf{A}\|\|\mathbf{B}\|} = \frac{\sum_{i=1}^{n} A_i B_i}{\sqrt{\sum_{i=1}^{n} A_i^2}\sqrt{\sum_{i=1}^{n} B_i^2}}$$

- ***Sensitivities*** based on Multifactor Econometric Models

$$KPI_{p,t} = \beta_0 + \sum_{i=1}^{267} \beta_i \left(SDG\_KPI_{i,t}\right) + \varepsilon_t$$



Circular Economy KPIs Example – Econometric Model – Sensitivities (2000-2023)

CE Categories	CE Indicators	SDG1	SDG2	SDG3	SDG4	SDG5	SDG6	SDG7	SDG8	SDG9	SDG10	SDG11	SDG12	SDG13	SDG14	SDG15	SDG16	SDG17
1. Production and Consumption	1.1.Resource productivity	0,73	0,79	0,95	0,91	0,94	0,97	0,95	0,74	0,96	0,77	0,96	0,94	0,90	0,96	0,85	0,81	0,52
	1.2 Generation of municipal waste per capita	0,32	0,21	0,37	0,12	0,35	0,29	0,24	0,38	0,32	0,41	0,29	0,42	0,28	0,29	0,24	0,14	0,61
	1.3 Generation of packaging waste per capita	0,07	0,22	0,26	0,61	0,19	0,45	0,48	0,12	0,33	0,18	0,42	0,14	0,16	0,37	0,61	0,42	0,40
	1.4 Generation of plastic packaging waste per capita	0,10	0,25	0,29	0,64	0,23	0,47	0,51	0,14	0,36	0,20	0,44	0,16	0,19	0,40	0,63	0,45	0,39
2. Waste Management	2.1 Recycling rate of municipal waste	0,16	0,34	0,30	0,57	0,30	0,42	0,46	0,13	0,37	0,12	0,41	0,22	0,33	0,40	0,43	0,46	0,30
	2.2 Recycling rate of packaging waste by type of packaging	0,01	0,19	0,24	0,62	0,17	0,45	0,48	0,06	0,32	0,15	0,41	0,12	0,18	0,36	0,62	0,41	0,42
	2.3 Recycling rate of waste of electrical and electronic equipment	0,27	0,62	0,55	0,83	0,58	0,66	0,68	0,24	0,64	0,23	0,67	0,51	0,66	0,73	0,57	0,72	0,18
3. Secondary Raw Materials	3.1 Circular material use rate	0,20	0,25	0,45	0,70	0,37	0,61	0,60	0,27	0,50	0,34	0,56	0,34	0,31	0,53	0,75	0,49	0,14
	3.2 Trade in recyclable raw materials	0,76	0,94	0,89	0,85	0,92	0,84	0,85	0,74	0,90	0,62	0,88	0,83	0,81	0,94	0,68	0,91	0,42
4. Competitiveness and Innovation	4.1 Private investment and gross added value related to circular economy sectors	0,35	0,66	0,59	0,83	0,62	0,68	0,71	0,31	0,67	0,28	0,70	0,54	0,67	0,74	0,58	0,77	0,14
	4.2 Persons employed in circular economy sectors	0,31	0,64	0,57	0,84	0,60	0,67	0,70	0,27	0,66	0,25	0,69	0,53	0,67	0,74	0,58	0,74	0,16
	4.3 Patents related to recycling and secondary raw materials	0,06	0,43	0,38	0,69	0,35	0,54	0,53	0,03	0,46	0,07	0,50	0,28	0,49	0,55	0,50	0,59	0,32
1 Global Sustainability and Resilience	5.1 Greenhouse gases emissions from production activities	0,26	0,31	0,47	0,72	0,41	0,67	0,69	0,24	0,53	0,37	0,60	0,42	0,51	0,52	0,72	0,50	0,10
	5.2 Material import dependency	0,38	0,61	0,64	0,79	0,61	0,70	0,66	0,40	0,67	0,32	0,67	0,53	0,49	0,76	0,62	0,73	0,02
	5.3 Consumption footprint	0,54	0,78	0,73	0,85	0,77	0,77	0,78	0,49	0,79	0,43	0,78	0,68	0,74	0,85	0,63	0,73	0,13

Corporate Sustainability Assessment Framework

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.

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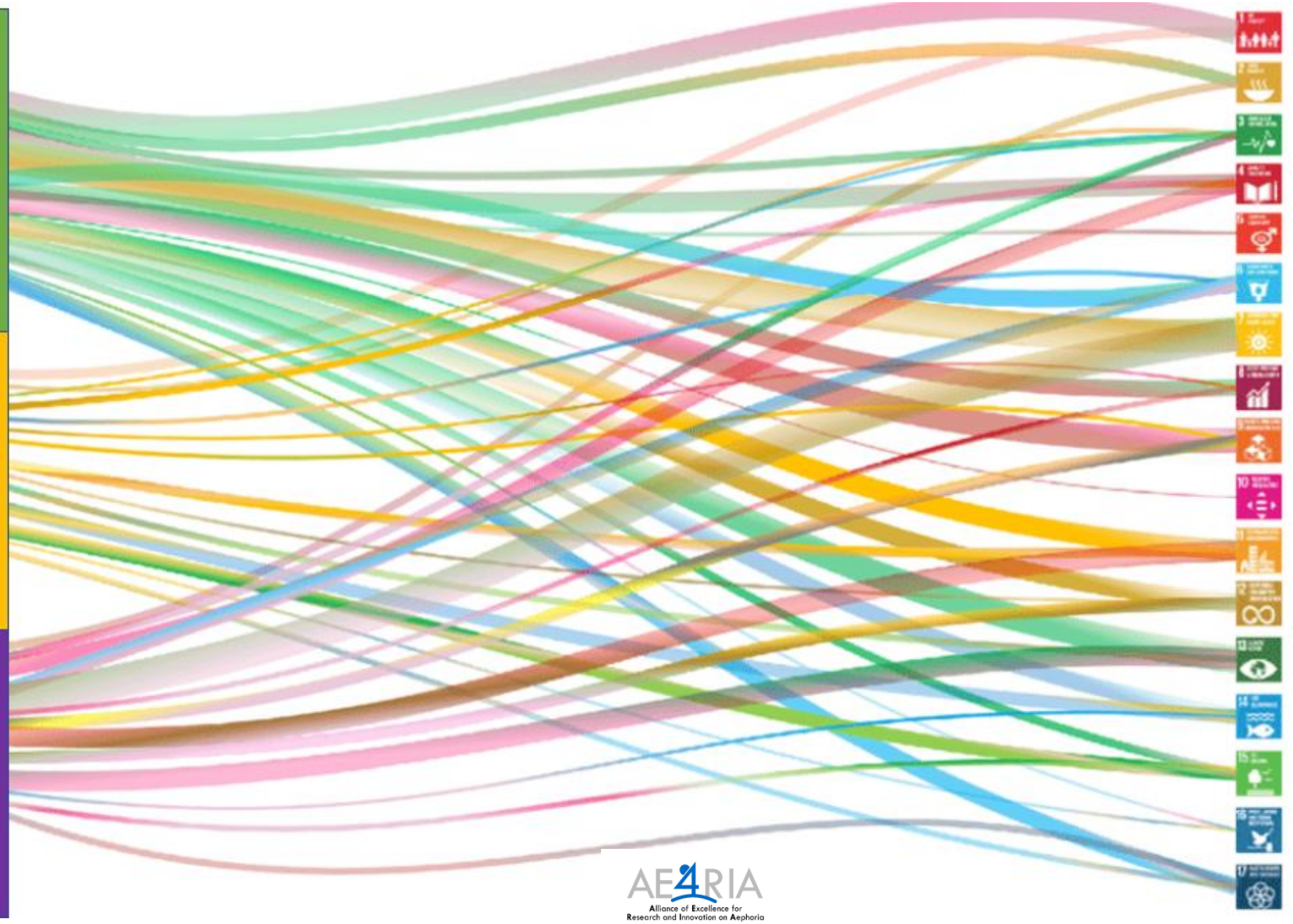
The ethical conduct of the Company's business including its corporate governance framework, business ethics, policies, code of conduct and the transparency of non-financial reporting.



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SDG Scores And Ratings

- For each SDG, i=1,…, 17

$$Score_i^{SDG} = \sum_{k=1}^{K} \widetilde{W_{i,k}^{SDG}}\, Score_k$$

$$\widetilde{W_{i,k}^{SDG}} = \frac{W_{i,k}^{SDG}}{\sum_{k=1}^{K} W_{i,k}^{SDG}}$$

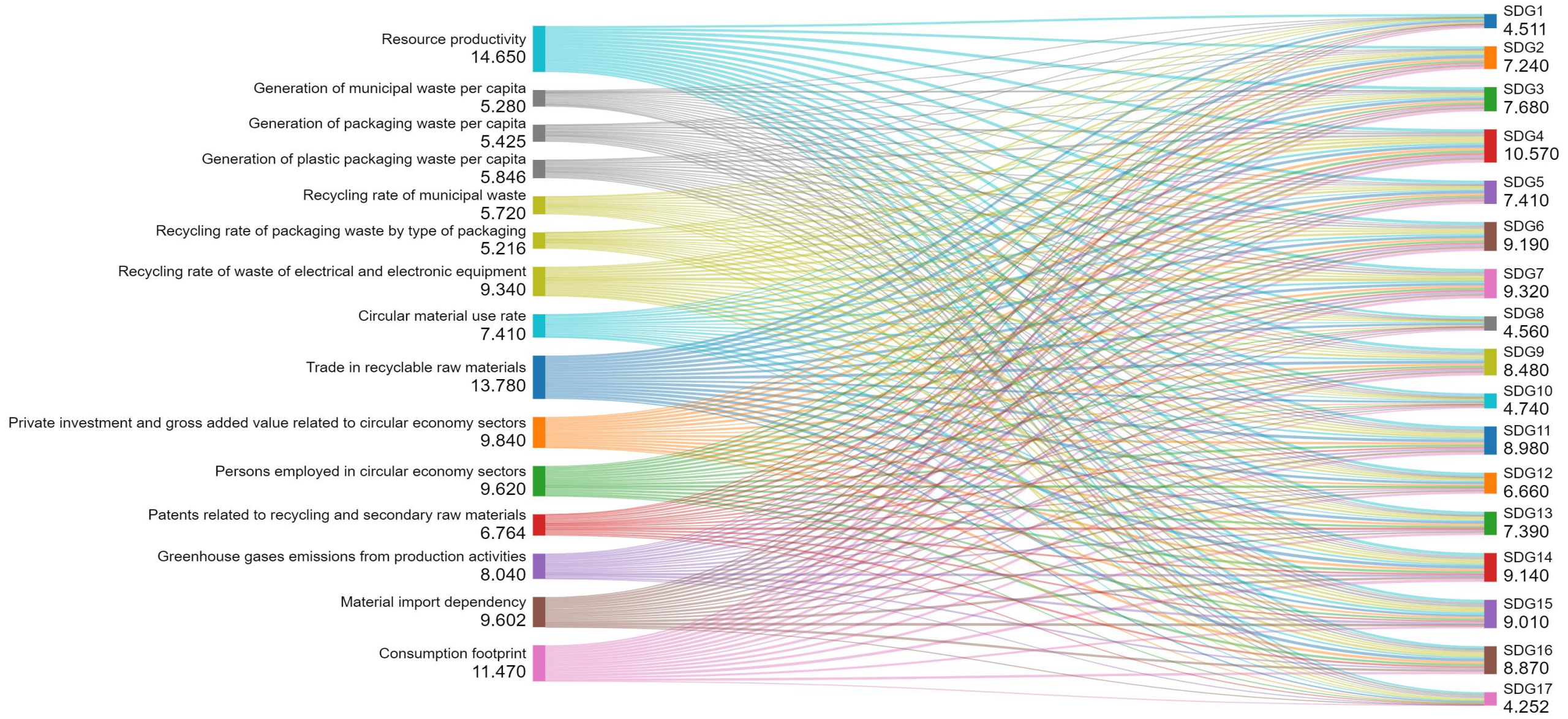
$$W_{i,k}^{SDG} = \frac{\sum SDG\ Indicators\ mapped\ to\ KPI_k\ under\ SDG_i}{\sum Indicators\ \ under\ SDG_i}$$

- For each SDG, i=1,…, 17, The limits are calculated as:

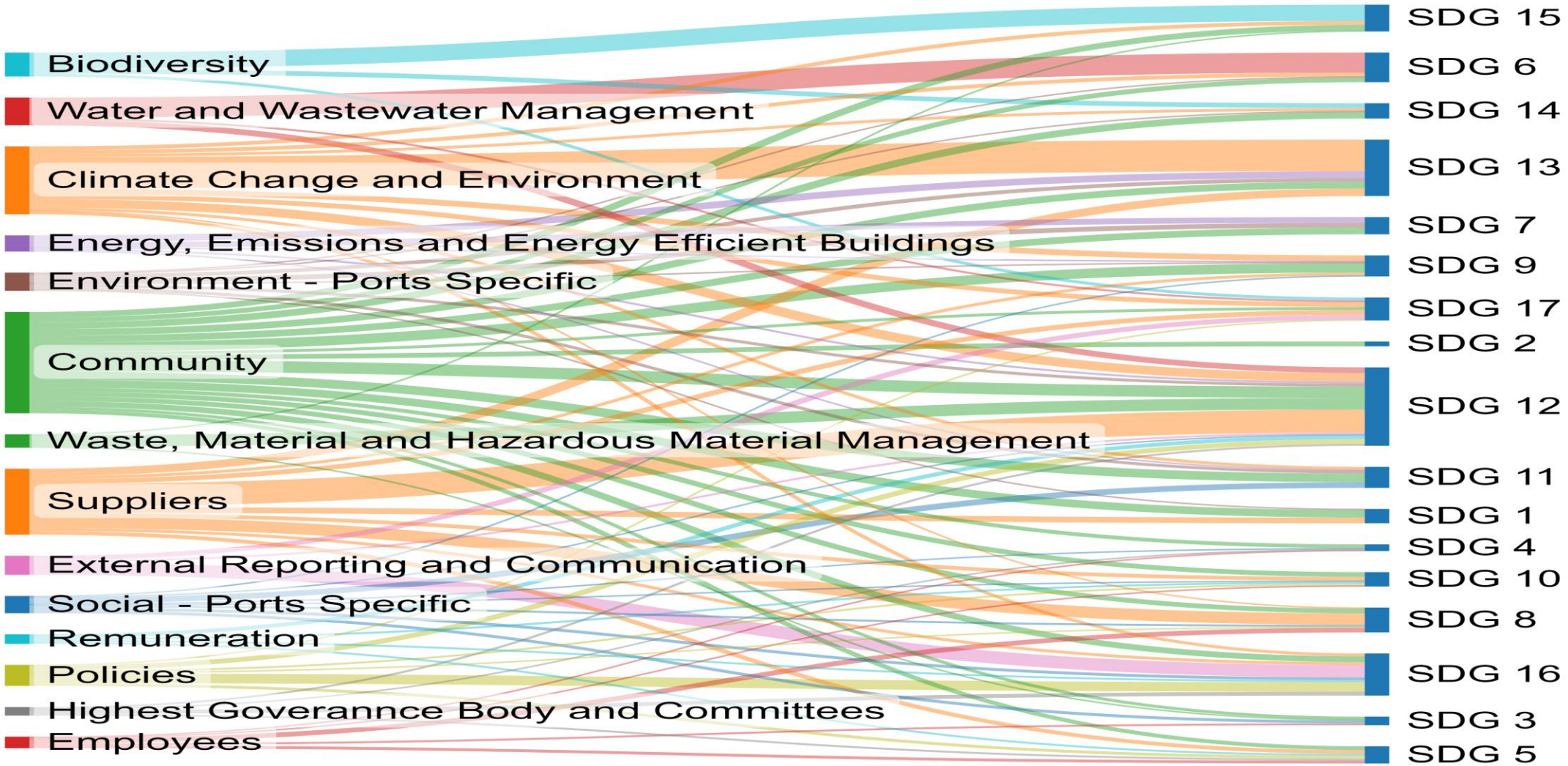
$$\text{Yellow} - \text{orange Limit}_i = \sum_{k=1}^{K} \widetilde{W_{i,k}^{SDG}}\, \frac{(Target_k - LB_k)}{2}$$

$$\text{Red}/Green\ \text{Limit}_i = \sum_{k=1}^{K} \widetilde{W_{i,k}^{SDG}}\ \text{Rating Yellow/Orange Limit (YOL)}_k$$

Circular Economy KPIs Example



Ports Case Study – ESG & SDG Mapping



$$W_{i,k}^{SDG} = \frac{\sum SDG\ Indicators\ mapped\ to\ KPI_k\ under\ SDG_i}{\sum Indicators\ under\ SDG_i}$$

$$\widetilde{W_{i,k}^{SDG}} = \frac{W_{i,k}^{SDG}}{\sum_{k=1}^{K} W_{i,k}^{SDG}}$$

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Dashboard –Scores & Ratings

Pillar	Material Issue	KPI Name	L0 - KPI Score	L0 - KPI Rating
1. Environment			61,27	3
			67,02	3
			0,00	1
			0,00	1
			0,00	1
			22,80	2
			100,00	4
			100,00	4
			75,94	4
			28,03	2
2. Social			100,00	4
			74,02	3
			71,71	3
			100,00	4
3. Governance			100,00	4

Value Chain Level 1	Value Chain Level 2	SDG 1	2	3	4	5	6	7	8	9	10	12	13	15	16	17
		4	4	4	2	3		4	3	2	4	2	4		4	4
		4	4	4	2	3		4	3	2	4	2	4		4	4
		4	4	4	2	3		4	3	2	4	2	4		4	4
		4	4	4	4	3	2	3	4	3	4	4	3	3	4	4
		4	4	4	2	1			3	2	2	2	4		4	4
		4	4	4	2	1			3	2	2	2	4		4	4
		4	4	4	3			4	3	2	2	2	4		4	4
		4	4	4	3			4	3	2	2	2	4		4	4

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