

Alignment of the European Green Deal, the Sustainable Development Goals and the European Semester Process: Method and Application

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Abstract

The Agenda 2030 with its 17 Sustainable Development Goals (SDGs) along with the European Green Deal and its 9 Policy Areas, are the key strategic frameworks for the transformation of Europe into a climate-neutral continent in the future decades. Thus, the mandates derived from these contexts must be taken into consideration by the European countries. This report aims to suggest a methodology for the co-integration of the Sustainable Development Goals (SDGs) and the European Green Deal (EGD), with the Country-specific recommendations (CSRs) made by the European Commission as part of the Semester process. At the same time, all these should be aligned with the EU Recovery Plan, to supply applicable strategies to the European policymakers and strengthen the national recovery Plans of the Member States, which are driven by the above-mentioned EU-driven packs, in line with the superior UN Agenda for the Sustainable Development. For the alignment of CSRs, the SDGs, and the EGD a 3D-mapping approach is proposed. After the Introduction in Section 1, the framework of the applicable Policies is presented in Section 2 and our Methodology is described in Section 3. In Section 4 our results are demonstrated for the EU and in Section 5 the main conclusions are listed along with a discussion for future directions. Our analysis shows that overall, the EU has sufficiently incorporated the SDGs in its strategic priorities, although there is still room for improvement. Several issues identified by SDSN's Sustainable Development Report 2020 either as major or significant challenges have not been captured by the CSRs. The role of these Coun-

try-specific results and their mapping, as provided in the Supplementary Material, is to support the EU Commission and the Member States to reinforce the alignment of their policy priorities with the ambitions of the major Sustainability Agenda.

Keywords

Sustainable Development Goals (SDG's), European Green Deal (EGD), European Semester Process, Country Specific Recommendations (CSR's), 3-D Mapping

1. Introduction

During the UN Sustainable Development summit in New York on 25 September 2015, the global community adopted the (UNSDN, 2015) 2030 Agenda for Sustainable Development (UNSDSN, 2015). This Agenda included the 17 Sustainable Development Goals (SDGs) and 169 targets. It has illustrated a comprehensive framework for the implementation of inequalities reduction, poverty eradication, and sustainable development which have to 1) deploy activities, investments, and initiatives, 2) mobilize economy-wide, social, and environmental capital, and 3) ensure that no one is left behind. These goals have to perform countable results by 2030.

The resulting Paris Agreement (UNFCCC, 2015) was the successful result of the 21st Conference of Parties (COP21) belonging to the United Nations Framework Convention on Climate Change (UNFCCC). They agreed to struggle for the reversal of climate change and the acceleration of a new, low carbon era. This has been represented by putting the target of a global temperature increase below 2°C, compared to pre-industrial levels. That temperature increased could be further lowered to the target of 1.5°C (compared to the same pre-industrial levels) by driving the efforts serving emissions reduction and implementing the corresponding environmental standards.

3 years later, the Intergovernmental Panel on Climate Change (IPCC) illustrated the impacts of global warming and the relevance of global greenhouse gas emission pathways, presented by the Special Report of Global Warming of 1.5°C (IPCC, 2018). This report highlighted the environmental social and economic costs of unabated warming and alarmed the urgent actions, suitable to reverse the climate change effects and to reinforce the resilience of the global community, ensured by a sustainable development program.

Governments of all countries that have signed and adopted the Sustainable Development Goals (SDGs) and the Paris Agreement have also undertaken the obligation to move on deep transformations and engage the civil society, scientists, and entrepreneur community in these. The above-mentioned stakeholders have to support the SDGs implementation and national administrations have to monitor

the progress of the SDGs framework. The SDGs have become the world's shared framework for sustainable development, but countries need more clarity on how to operationalize and track progress towards the 17 goals. Similarly, "businesses, science, and civil society must support SDG achievement" (Sachs et al., 2019).

The UN Sustainable Development Solutions Network (SDSN) introduced 26 August 2019 the Six Transformations to achieve the SDGs (6T) (Sachs et al., 2019). These proposed transformations define the setting of regulatory reforms, to function the SDG intermediate outputs and track the upcoming results. The 6Ts covered the fields of:

- 1) Education, Gender and Inequality;
- 2) Health, Wellbeing, and Demography;
- 3) Energy Decarbonisation and Sustainable Industry;
- 4) Sustainable Food, Land, Water, and Oceans;
- 5) Sustainable Cities and Communities;
- 6) Digital Revolution for Sustainable Development.

The European Green Deal (EGD), introduced by EU Commission on 1 December 2019 (European Commission, 2019), was based on the Paris Agreement and the SDGs framework and settled the fields where the targets of climate neutrality by 2050 should be reached. The EGD settled the framework of actions to be taken by national administrations and implemented by corporations, citizens, and organizations, taking into consideration the challenges and targets for emissions reductions and carbon neutrality as far as 2 major milestones are concerned: 2030 and 2050. **Figure 1** refers to the greenhouse gas emission targets, trends, and Member States (MS) Monitoring Mechanism Regulation (MMR) projections in the EU, 1990-2050. According to the figure, the EU 2020 target is -20%, however, currently we cannot obtain the actual reduction, as the relevant data has not been officially updated yet.

In that way, Sustainable Development Agenda shall be prioritized within European and MSs policies. As far as SDSN's Six Transformations are concerned, this could operate as a useful tool for integrating the EGD policies.

The COVID-19 pandemic became the most dramatic turning point, since February 2020. It has cost millions of human lives up to April of 2021, despite the accelerated progress of vaccinations. Apart from this tremendous health crisis, the impact in social, business and macro-economic effects was significant, since measures were taken to ensure social distancing and to avoid the spreading of virus infections. That caused a macroeconomic recession and shocks to all supply chains (UNSDSN, 2020). The combination of Health and climate crisis, that are 2 conditions associated with a cause-effect link, led to the Agreement of the European Council on 21 July 2020 for the allocation of the total amount of €1.8 trillion (European Council, 2020a), summing the enhanced 2021-2027 long-term EU budget and the facilitation of Next Generation EU Recovery.

The implementation of the European Green Deal (EGD) and the involvement of the national Stakeholders and the regional expertized key drivers, can be

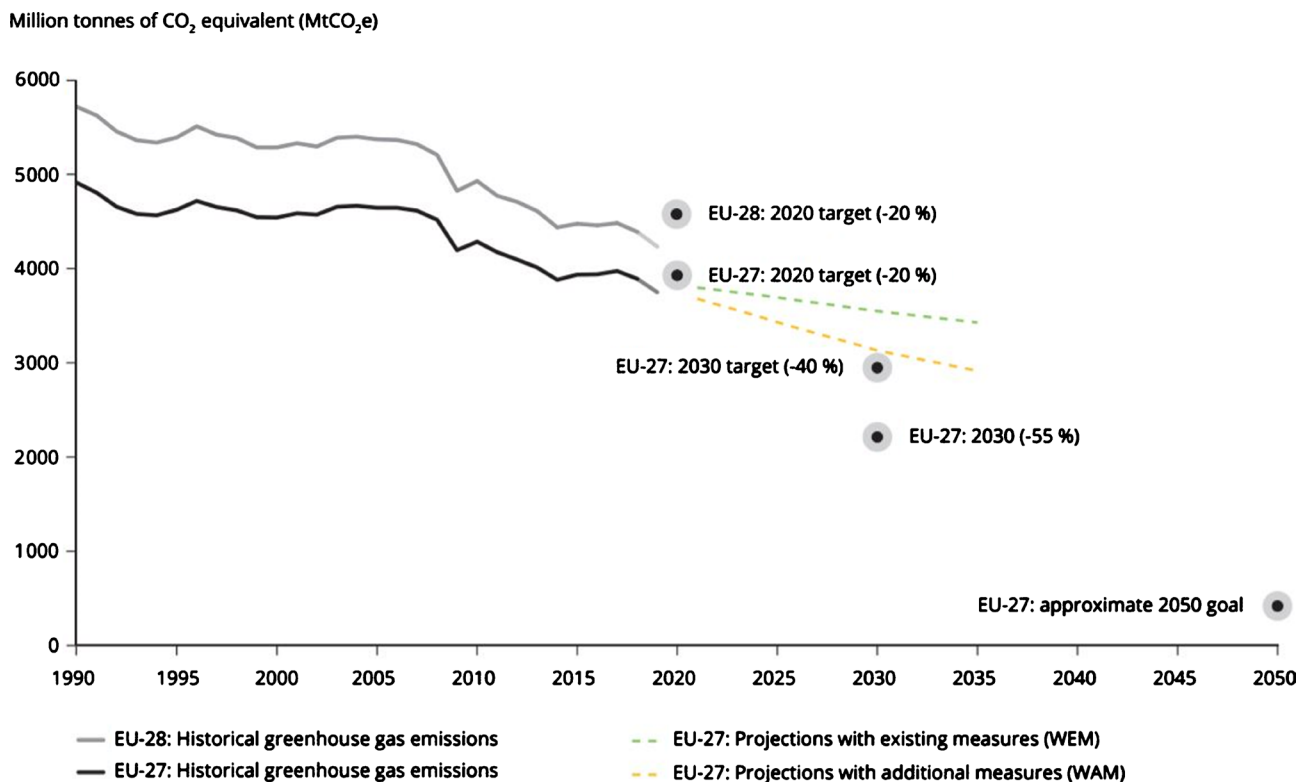


Figure 1. Greenhouse gas emission targets, trends, and Member States MMR projections in the EU, 1990-2050. Source: EEA Report No 13/2020 (EEA, 2020).

facilitated through SDSN's European networks. These networks introduced the EU Green Deal Senior Working Group for the Energy Transition in April 2020, as a consultancy tool for EU Commission. The report produced by the Group (UNSDSN, 2021) contested to design the mixture of different policies, the necessary synergies, and the alternative investment pathways, as graded at the European level.

The report introduced:

- Technological and Policy Pathways targeting for the decarbonization (mitigation) and climate change adaptation within and across the EU Member States, addressing the EGD and the SDGs topics. Financial support will be derived from a) the European Green Deal, b) the EU Multiannual Financial Framework, c) the EU Recovery Plan.
- Strategic recommendations and proposals capable to mobilise the expertized rethinking policies for clean energy supply, climate adaptation projects, across the green economy, and industry, the Circular Economy, the large-scale infrastructure, the urban mobility and transportation, the sustainable food and agriculture, health, education, the digitalization, the Building Sector the investments and the relevant taxonomy, the income (re)distribution, the partnerships between Public and Private Sector (PPP) and the social benefits, according to the European Green Deal guidelines.
- Consultancy material for politicians and policymakers, to classify the proper

sustainable and resilient investments and rationalize the allocation of the EU Next Generation funds. This could justify the action plans both for Member States level, as well for multi-national interactions, resulting in a regional sustainable recovery.

- Pathways for the mobilization of stakeholders to associate with the SDSN European networks and promote the local engagement and support of the relevant policies.

2. Statement of the Overall Policy Framework

2.1. Sustainable Development Goals (SDG)

The 17 Sustainable Development Goals and 169 targets were included in the UN 2030 Agenda for Sustainable Development (United Nations, 2015). The SDGs and targets became a network of interconnected commitments and ambitions, capable to be measured and monitored, setting the framework for global handling of universal and regional challenges in three segments-social, environmental, and economic and taking into consideration individual peculiarities, local specific capacities or backlogs. The UN principle “leave no one behind” brings the commitment to all countries for the achievement through national initiatives and multinational collaboration and interactions.

Sustainable Development Reports, starting from 1995 till the last one (SDSN & IEEP, 2020) provide the Index and Dashboard data that is necessary for the accountable monitoring of SDGs and their target implementations (see Table 1).

2.2. The European Green Deal (EGD)

The European Green Deal (EGD) was adopted by the EU Commission in December 2019 to offer to the Member States (MS) the strategy for a Just, wealthy, resource-resilient, and green economy that is accessible to the society oriented to smooth the inequalities.

Four horizontal aspects were prioritized:

- 1) Enabling Europe to become a climate-neutral continent;
- 2) Pollution reduction, enhancing the protection of human life, animals, and plants;
- 3) Support of European business community to pioneer in green technologies;
- 4) Determination of the Just and Inclusive segments of Green and Digital transition.

These four main ambitions need to be implemented using nine main policy areas:

- **Biodiversity:** Benefits for humans and nature should be recovered by 2030, according to the new EU Biodiversity Strategy for 2030 (EU Commission, 2020a). The Strategy provides a comprehensively described long-term plan, to ensure ecosystem regeneration.
- **From Farm to Fork:** There is a need for a sustainable food system, that is

Table 1. The Ambitions of the SDG. Source: Prepared by the authors.

<i>Goal No</i>	The ambitions of the Goals
<i>Goal 1 - No Poverty</i>	End poverty in all its forms everywhere
<i>Goal 2 - Zero Hunger</i>	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
<i>Goal 3 - Good Health & Well Being</i>	Ensure healthy lives and promote well-being for all at all ages
<i>Goal 4 - Quality Education</i>	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
<i>Goal 5 - Gender Equality</i>	Achieve gender equality and empower all women and girls
<i>Goal 6 - Clean Water & Sanitation</i>	Ensure availability and sustainable management of water and sanitation for all
<i>Goal 7 - Affordable & Clean Energy</i>	Ensure access to affordable, reliable, sustainable, and modern energy for all
<i>Goal 8 - Decent Work & Economic Growth</i>	Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all
<i>Goal 9 - Industry, Innovation & Infrastructure</i>	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation
<i>Goal 10 - Reduced Inequalities</i>	Reduce inequality within and among countries
<i>Goal 11 - Sustainable Cities & Communities</i>	Make cities and human settlements inclusive, safe, resilient, and sustainable
<i>Goal 12 - Responsible Consumption & Production</i>	Ensure sustainable consumption and production patterns
<i>Goal 13 - Climate Action</i>	Take urgent action to combat climate change and its impacts
<i>Goal 14 - Life Below Water</i>	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development
<i>Goal 15 - Life On Land</i>	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
<i>Goal 16 - Peace Justice & Strong Institutions</i>	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels
<i>Goal 17 - Partnerships for the Goals</i>	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

appropriate for public health, anticipating climate change, just for all, according to the food and nutrition security standards and enhancing the competitiveness of European production and supply chain. This sustainable food system can be ensured by the Farm to Fork Strategy (EU Commission, 2020b).

- **Sustainable Agriculture:** A European sustainable agriculture system can be derived if the combination of economic, environmental, and social aspects of the Common Agricultural Policy (CAP) (EU Commission, 2020c) is delivered.
- **Clean Energy:** The smart integration of renewables, energy efficiency, and other sustainable solutions across sectors will help to achieve Deep decarbonization and zero-net emissions targets by 2050 will be supported and implemented by Green technology solutions, such as the efficient integration of renewables (supported by energy storage, digitalization and power transformation of electricity to other sustainable energy carriers). The EU Hydrogen Strategy (EU Commission, 2020d) supports the transition to this direction.

- **Sustainable Industry:** The transition of the industrial sector to a new Green, Digital, and Circular Economy-oriented era will add economic value, competitiveness, and combined welfare for business, society, and the environment. This important mission can be served by the EU Industrial Strategy (EU Commission, 2020e).
- **Building and Renovating:** The updated energy efficiency performed by the revamping of public and private buildings will reduce energy poverty will reinforce the struggle against energy poverty and, at the same time, will establish a new responsible energy consumption model.
- **Sustainable Mobility:** Green fuels or sources that are renewably produced, i.e., by electrification, can support sustainable mobility and transportation, as far as roads, highways, railways, maritime and aviation are concerned. What is necessary to be planned, apart from the support of green transport manufacturing, is a resilient network, by a reliable electric grid or a robust green fueling supply chain, providing the necessary neutral points of refueling and recharging and the alternative options of demand response services, promoting the role of “prosumer”, i.e., Vehicle to Grid-V2G services, etc.
- **Eliminating Pollution:** The Commission will adopt in 2021 a zero-pollution action plan for air, water, and soil to create a toxic-free environment.
- **Climate Action:** Climate neutrality by 2050 is a top priority target for the EU. In addition, the plan to further cut emissions by at least 55% by 2030 is a pathway enhancing the 2050 final milestone.

2.2.1. European Climate Law

The proposed (first) European Climate Law (EU Commission, 2020f) was also proposed by the EU Commission, to define the terms providing permanent conditions of the sustainable and inclusive transition, capable to inspire eco-friendly entrepreneurship, aligned to EGD principles.

The objectives were also to set the long-term directions to carbon neutrality to 2050, to create a tracking system for the evaluation of actual progress.

This Climate Law addresses the necessary steps and milestones for the achievement of the 2050 targets:

- 1) The new EU 2030 target should be included in the Law, as proposed by Commission.
- 2) By June 2021, the Commission will upgrade the necessary policy instruments for the additional emissions reductions to be achieved by 2030.
- 3) By September 2023, and every five years thereafter, the Commission will assess the consistency of EU and national measures with the climate-neutrality objective and the 2030-2050 trajectory. This assessment will be repeated every five years.
- 4) Member States will also be required to develop and implement adaptation strategies to strengthen resilience and reduce vulnerability to the effects of climate change.

The proposed ambitious requirements of additional emission reductions by

2030 (September 2020), reinforced Climate Law perspectives and introduced a more effective milestone, to enable the feasibility of 2050 climate neutrality. **Figure 2** illustrates the investment paths that should be implemented by 2030, for the achievement of a 55% emission reduction target.

In response to this proposal, the European Parliament voted on 6 October 2020 GHG emissions cut by 60% in 2030 (EU Commission, 2020f), compared to 1990 levels. In other words, the EP elevated the climate targets.

As a sequence, the European Council (held on 10th and 11th December 2020), agreed on the EU emissions reduction target by 55% compared to 1990 levels until 2030, and “call the co-legislators to reflect this new target in the European Climate Law proposal” (European Council, 2020b). Public health recovery against COVID-19 and competitive conditions within EU economies can be enhanced by this target.

The GHG reduction target of 55% is synonymous with an additional investment annual budget of €350 billion, compared to the period 2011-2020. It is estimated that to achieve the target of 55% GHG reduction, the annual investment in the total European energy system will need to elevate at the amount of EUR 350 billion higher in the current decade (2021-2030) if compared to the previous decade (2011-2020) spending. The main reasons for this increasing expenditure level are: a) the new capacities and interconnections needed for the energy infrastructure, b) the upgrades in power and industrial plants, which have to become

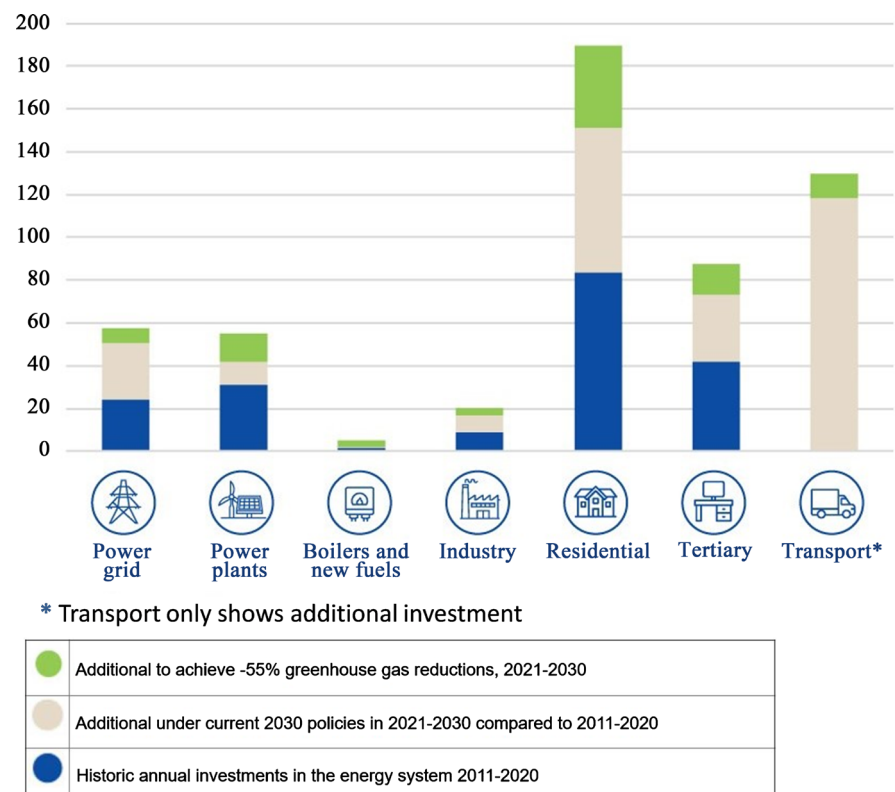


Figure 2. EU 2030 Climate Target Plan. Source: European Commission.

resilient, flexible, and capable to cover the energy requirements, in a more effective, sustainable and uninterrupted module, implementing an updated life cycle, c) building renovations with energy efficiency value and materials that can be re-used in the future (implementing the Circularity-oriented ambitions), and d) the transportation plus sustainable mobility perspectives.

This is the level of expenditures that can inject the necessary stimulus to the European economy, as a long-term targeting for the post-COVID-19 recovery era. The appropriate allocation of the corresponding funding is very crucial and essential for the EU Economy and Society, to support the most effective way of sustainable growth (Figure 2).

European experts provided comments to improve the implementation of the proposed Climate Law. As an example, Greek experts on the Law's provisions (as their European colleagues did in other initiatives, such as European Climate Pact) provided annotation and feedback set (Climate Change Committee of the Greek Ministry of Energy and Environment, 2020) in response to the proposed European Climate Law.

According to the Climate Change Committee of the Greek Ministry of Energy and Environment, GHG reductions should be considered irreversible and the goals should correspond to the limitation of 1.5 C planet temperature rise. International aviation and shipping should be included in the climate neutrality targets with a clear reference, mentioning the need for financial support transfer of emission rights between the Member States should be clarified, as permissible. Pathways to climate neutrality should be determined on a scientific basis and rationale. Implementation of actions and priorities and the assessment of the actual target achievements should be linked via an appropriately designed Timeline.

As far as the adaptation to climate change is concerned, the impacts of change should be evaluated in terms of 1) Damages that already happened to the Member States, 2) Potential natural hazards, 3) Measures to be taken for all sectors of the economy, and 4) the estimation of financial resources required to support the more vulnerable areas.

The assessment of European measures should be aligned also with 2030 targets and not only with those of 2050.

The assessment of the individual national measures should be based on their National Energy and Climate Plans (NECPs). In addition, the assessment of the progress of Member States after 2030 should be based on the Long-Term Strategy for 2050.

European Climate Pact initiative—16 December 2020 (European Commission, 2020g) allowed all European citizens to co-design climate actions, exchange information, commence bottom-up initiatives and introduce innovative solutions, as the guidelines for other human collective entities.

2.2.2. Green Deal Initiatives around the World

Apart from the EU, many countries committed to carbon neutrality by the idle

of 21st century. In 2020, South Korea (South Korean Government, 2020), Canada (MacArthur et al., 2020), China (McGrath, 2020) became the major examples. By the end of 2020 countries covering 2/3 of the global GDP had committed to join climate neutrality efforts. In response to this, the new administration of the USA fulfilled his commitment to re-join the Paris Agreement. On Day One after taking the power. Days later, President Biden mobilized the mechanisms for tackling the climate crisis, both for the US and globally. Taking into account the ambition of green job creations and reinforcement of the Economy within a sustainable frame. On April 23rd of 2021, the US administration held a historic climate summit inviting 40 leaders of the most emerging economies around the world (The White House, 2021).

According to President Biden, the United States targets emissions reduction at the level of 50-52 % by 2030, compared to 2005 levels. Apart from the US 2030 target commitment, more than one-half of the global economies are now committed to succeeding in limiting the planet's temperature increase to 1.5-degree C.

Brazil's President Bolsonaro sets more ambitious environmental targets, promising carbon neutrality by 2050 instead of 2060 (according to the previously declared target).

President Xi Jinping promised that China will gradually reduce its coal use from 2025 to 2030.

Prime Minister Trudeau, elevated Canada's goals to a cut of 40%-45% by 2030 below 2005 levels, (there was a 30% reduction goal before) (Volcovic & Mason, 2021).

2.3. The European Semester

The European Semester was introduced in 2010 to enable MS's coordination of their economic and social policies throughout an annular life cycle.

National economic effort should integrate the targets of the UN Agenda and Sustainable Development Goals (SDGs).

In 2020 an Annual Sustainable Growth Strategy (ASGS) 2021 (European Commission, 2021a) was published, to emphasize sustainability and social inclusion targets within the foreground of European economic policy, reflecting the priorities set by the European Green Deal.

In 2021 ASGS, the Commission has defined the strategies for the implementation of the Recovery and Resilience Facility that will provide €672.5 billion of loans and grants in upfront recovery support. As a sequence of ASGS 2020, the four dimensions of environmental sustainability, productivity, fairness, and macroeconomic stability remain the guiding principles for Member States' recovery and resilience plans.

Member States' recovery and resilience facility plans should address the challenges mentioned during the recent Country Specific Recommendations (CSR's), enabling Member States to proceed into the green and digital transitions, the social cohesion and economic growth with labor protection.

For these reasons, Commission strongly encouraged the Member States to implement investments within the following flagship areas:

1) Power Up: ASGS 2021 defines that 40% of the 500 GW of renewable power generation needed by 2030 should support the building and industrial sector, the installation of 6 GW electrolyzer capacity, and the production and transportation of 1 million tons of renewable hydrogen across the EU (by 2025).

2) Renovate: Energy efficiency and raw material efficiency and recirculation have to be doubled in terms of facilitation for residential and administration buildings by 2025 in Europe.

3) Recharge and Refuel: Sustainable charging and refueling for private and public transport should be promoted. 3 million EV charging points have to be developed by 2030. By 2025 this number has to be raised to 1 million points, and 1 million tonnes of renewable hydrogen has to be facilitated across Europe by 2025. By the same time, 500 hydrogen-fuelled stations must be erected and set up into operation.

4) Connect: rapid broadband services to all regions and households, including 5G networks should be accelerated. Since the current residential connectivity in the EU is about 2/5 of households, EU countries have to develop the network of 5G, fiber optic, and quantum encryption (VPN capability and peer to peer transaction), covering all areas not efficiently served by the current market.

5) Modernize: The digitalization of public administration and services, including judicial and healthcare systems. European Digital Identity, digital signs, and other encrypted users—friendly services should be provided by 2025.

6) Scale-Up: The increase in European industrial data cloud capacities and the development of the most powerful, cutting edge, and sustainable processors. Semi-conductors should be doubled by 2025 and micro-processors should be multiplied by ten times by the same time. This is necessary for the rapid promotion and development of digital connections between cars and installation (promotional for demand response services in EV charging, for instance) and to double the connection of enterprises to cloud services and big data from 1/6 up-scaled to 1/3 of the European companies.

7) Reskill and Upskill: The adaptation of education systems to support digital skills. By 2025, digital skills should be developed at least for 70% of EU adults with emphasis to anticipate underperforming IT skills of young students. Professional training with advanced skills should be at an 80% level of labor potential and 60% level of active labor.

2.3.1. EU Taxonomy

The Taxonomy Regulation establishes the framework for the qualification of real environmentally sustainable activities. A qualifying activity should:

- 1) contribute substantially to the environmental objectives;
- 2) do no significant harm to any of the environmental objectives;

- 3) be implemented in compliance with minimum (social) safeguards;
- 4) comply with technical screening criteria established by the Commission through delegated acts.

Some years before, in 2018, a Technical Expert Group (TEG) on Sustainable Finance was set up, including private and public sector stakeholders. Its mission was to develop the EU taxonomy aligned with the Commission's legislative proposals of May 2018 and with the objectives of the (upcoming at that moment) European Green Deal.

The TEG recommended 2 intermediate proposals, in December 2018 and in June 2019. On 9 March 2020, the TEG published its final report (European Commission, 2021b).

The Commission published the inception impact assessment in March 2020 and asked for feedback until the end of April 2020 (due to the outbreak of COVID-19). Finally, 409 respondents commented.

The draft delegated act was firstly published for a four-week feedback period between 20 November and 18 December 2020. Then, it was discussed with the Platform on Sustainable Finance on 4 December 2020. Furthermore, the draft was further discussed with the Member States' experts and observers from the European Parliament, at several meetings of the Member States Expert Group on 10 December 2020, on 26 January 2021, 26 February 2021, and 24 March 2021.

It is mentioned that energy sector criteria were the most commented on, followed by agriculture and transport. Many comments were also related to the criteria for forestry, manufacturing, and buildings.

2.3.2. EU Taxonomy Climate Delegated Act

The EU Taxonomy Climate Delegated Act was published on 21 April 2021 (European Commission, 2021c), as a result of a political agreement among the Members of the College of Commissioners. The main goal of this Act is to support sustainable investment and to clarify which activities enhance the EU's environmental objectives, both for mitigation and adaptation to climate change.

The Regulation shall enter into force on the 21st day following that of its publication in the Official Journal of the European Union. It shall apply from 1 January 2022.

This Regulation shall be directly applicable in all Member States.

3. Development of the Methodology for Alignment between SDGs, EGD, and Country Specific Recommendation

3.1. Methodology for Country-Specific 3D Mapping of SDGs, EGD Policies and the European Semester Process Recommendations (CSR's)

This section outlines the methodological approach for integrating the SDG framework both in the European Semester's Country-Specific Recommendations (CSRs),

as foreseen in the EU's Annual Sustainable Growth Strategy (ASGS), and the policies envisaged by the European Green Deal (EGD).

This 3D mapping approach aims at assisting EU and national policymakers to identify actionable policies that are aligned with all three overarching frameworks while avoiding trade-offs between specific policies and measures that will compromise the pursuit of some goals. A similar approach has been applied by the European Commission's Joint Research Centre, exploring the connections between EU policy documents on economic recovery and the SDGs (Borchardt et al., 2020). The approach described in this report is partly different as it focuses on linking the overarching EU-wide strategy document (the European Green Deal) with country-specific assessments—the country scores on SDG progress and the country recommendations of the European Semester process. In this way:

- EU policymakers may identify areas in which the current European growth strategy and economic policy coordination effort are consistent with the SDG framework, both EU-wide and on a country-by-country basis.
- National policymakers may obtain insights on the extent to which major sustainability challenges of their country are linked with national priorities promoted by the EU sustainable growth strategy, to improve the alignment of sustainability objectives with national policies and measures that are consistent with the broader EU policy framework.

Figure 3 provides an overview of the methodology. Steps 1-7 involve the 3D mapping, which identifies horizontal priorities across the entire economy. Step 8 onwards, focuses on sectoral domains to identify investment gaps and needed reforms, to be assessed and ranked by all relevant stakeholders. The engagement of all stakeholders, (politicians, policymakers, businesses, civil society, the NGOs, technology developers, research, and innovation) is crucial for an inclusive,

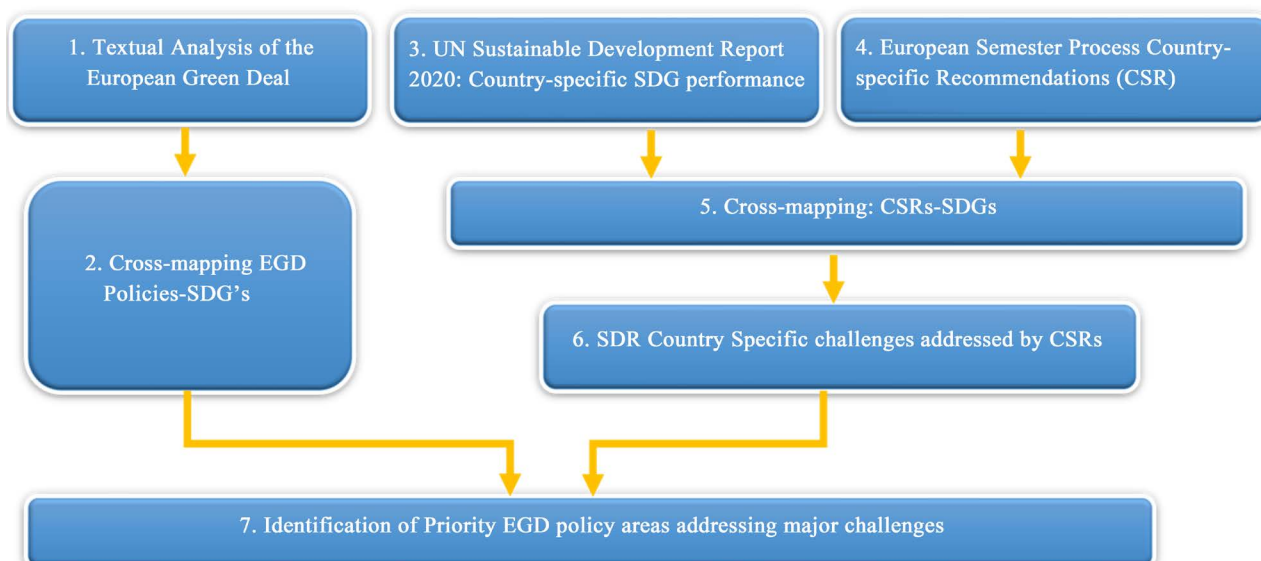


Figure 3. Methodology flowchart steps. Source: prepared by the authors.

fair, and effective co-design of the transition to sustainability, that will enable the timely joint achievement of EGD and the SDGs and provide a least-cost pathway to a sustainable EU.

3.2. Methodological Steps for 3-D Mapping

Step 1. Textual Analysis of the European Green Deal

The European Green Deal, as previously stated, is a policy document that lays out a vision for a prosperous, just, equitable, and environmentally neutral European continent focused on nine major axes: Biodiversity conservation, “From Farm to Fork” production, sustainable agriculture, clean energy, sustainable industry, building and renovation, sustainable mobility, and pollution reduction are all priorities. It is characteristic that the document of the European Green Deal is dominated by words like “Climate”, “Energy”, “Green”, “Sustainable” and “Environmental”, which conceptually leads to Step 2 where the linkage of EGD Policies to SDGs takes place.

Step 2. Cross-mapping EGD Policies-SDGs

Table 1 from the previous section contains the ambition of each of the 17 SDGs identified by the UN 2030 Agenda. Since the EGD and the SDGs context have shared goals, the adoption of the EGD policy will support measures that will lead to the achievement of many of the SDGs.

To make this link, we executed a mining exercise over the text of the EGD and matched individual sections of the EGD document to SDGs that are directly related (**Table 2**). Some extracts may appear more than one time as they can be associated with more than one SDGs.

Figure 4 depicts the relationship between each SDG and relevant EGD policies. Cells in dark green indicate a clear correlation between EGD Policies and SDGs, based solely on quotations from the EGD text that are conceptually analogous to the ambition of each SDG. Light green cells represent the indirectly derived relationship between EGD Policies and the SDGs, while white cells represent a weak or no apparent relationship.

Step 3. UN Sustainable Development Report 2020: Country-specific SDG performance

The UN assesses how well a nation performs in terms of achieving a particular SDG using a series of performance metrics that are presented to country on an annual basis.

According to the “Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development” (United Nations, 2017), a total of 231 distinct performance measures have been developed, but only 115 of them are used for the related evaluation of European countries.

The information obtained by the Sustainable Development Report (SDR) of the year 2020 (Sachs et al., 2020) and for each one of the EU-27 countries is as follows:

Table 2. Matching the European Green Deal document to the 17 SDGs. Source: Table prepared by the authors.

<i>SDG</i>	Excerpts from the European Green Deal document
<i>Goal1</i>	Fairness and Justice are pervasive in the EU Green Deal as a whole and a Just Transition Mechanism for most vulnerable regions is proposed. Moreover, EGD explicitly calls: “The risk of energy poverty must be addressed for households that cannot afford key energy services to ensure a basic standard of living”
<i>Goal2</i>	The Farm to Fork Strategy will strive to stimulate sustainable food consumption and promote affordable healthy food for all
<i>Goal3</i>	Protect the health and well-being of citizens from environment-related risks and impacts The focus should also be put on renovating schools and hospitals, as the money saved through building efficiency will be money available to support education and public health Plans should lead to the use of sustainable practices, such as precision agriculture, organic farming, agroecology, agroforestry, and stricter animal welfare standards The price of transport must reflect the impact it has on the environment and health. Achieving sustainable transport means putting users first and providing them with more affordable, accessible, healthier, and cleaner alternatives to their current mobility habits
<i>Goal4</i>	Particular attention will be paid to the renovation of social housing, to help households who struggle to pay their energy bills. The focus should also be put on renovating schools and hospitals, as the money saved through building efficiency will be money available to support education and public health
<i>Goal5</i>	No EU Green Deal Policy explicitly deals with Gender Equality Affairs
<i>Goal6</i>	About half of total greenhouse gas emissions and more than 90% of biodiversity loss and water stress come from resource extraction and processing of materials, fuels, and food Digitalization also presents new opportunities for distance monitoring of air and water pollution By shifting the focus from compliance to performance, measures such as eco-schemes should reward farmers for improved environmental and climate performance, including managing and storing carbon in the soil, and improved nutrient management to improve water quality and reduce emissions To protect Europe’s citizens and ecosystems, the EU needs to better monitor, report, prevent and remedy pollution from the air, water, soil, and consumer products
<i>Goal7</i>	About half of total greenhouse gas emissions and more than 90% of biodiversity loss and water stress come from resource extraction and processing of materials, fuels, and food Digitalization also presents new opportunities for distance monitoring of air and water pollution By shifting the focus from compliance to performance, measures such as eco-schemes should reward farmers for improved environmental and climate performance, including managing and storing carbon in the soil, and improved nutrient management to improve water quality and reduce emissions To protect Europe’s citizens and ecosystems, the EU needs to better monitor, report, prevent and remedy pollution from the air, water, soil, and consumer products
<i>Goal8</i>	EGD is a growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient, and competitive economy The transition is an opportunity to expand sustainable and job-intensive economic activity The European Green Deal will support and accelerate the EU’s industry transition to a sustainable model of inclusive growth.
<i>Goal9</i>	EU industrial strategy to address the twin challenges of the green and the digital transformation Rethink policies for clean energy supply across the economy, industry, production, and consumption, large-scale infrastructure, transport, food and agriculture, construction, taxation, and social benefits The transition to climate neutrality also requires smart infrastructure Achieving a climate-neutral and circular economy requires the full mobilization of industry Energy-intensive industries, such as steel, chemicals, and cement, are indispensable to Europe’s economy, as they supply several key value chains

Continued

EU industry needs 'climate and resource frontrunners' to develop the first commercial applications of breakthrough technologies in key industrial sectors by 2030. Priority areas include clean hydrogen, fuel cells, and other alternative fuels, energy storage, and carbon capture, storage, and utilization

Digital technologies are a critical enabler for attaining the sustainability goals of the Green deal in many different sectors. The Commission will explore measures to ensure that digital technologies such as artificial intelligence, 5G, cloud and edge computing, and the internet of things can accelerate and maximize the impact of policies to deal with climate change and protect the environment

Goal 10 The growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient, and competitive economy

The common agricultural and common fisheries policies will remain key tools to support these efforts while ensuring a decent living for farmers, fishermen, and their families

Particular attention will be paid to the renovation of social housing, to help households who struggle to pay their energy bills

Goal 11 The EU has the collective ability to transform its economy and society to put it on a more sustainable path

The construction, use, and renovation of buildings require significant amounts of energy and mineral resources

The Commission will rigorously enforce the legislation related to the energy performance of buildings

To achieve climate neutrality, a 90% reduction in transport emissions is needed by 2050. Road, rail, aviation, and waterborne transport will all have to contribute to the reduction. Achieving sustainable transport means putting users first and providing them with more affordable, accessible, healthier, and cleaner alternatives to their current mobility habits

The price of transport must reflect the impact it has on the environment and health

The EU should in parallel ramp up the production and deployment of sustainable alternative transport fuels. By 2025, about 1 million public recharging and refueling stations will be needed for the 13 million zero- and low-emission vehicles expected on European roads

Transport should become drastically less polluting, especially in cities. A combination of measures should address emissions, urban congestion, and improved public transport

Goal 12 the growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient, and competitive economy

Encourage changes in consumer and business behavior, and facilitate an increase in sustainable public and private investment

The circular economy action plan will include a 'sustainable products' policy to support the circular design of all products based on a common methodology and principles

Action will focus in particular on resource-intensive sectors such as textiles, construction, electronics, and plastics

The circular economy action plan will also include measures to encourage businesses to offer, and to allow consumers to choose, reusable, durable, and repairable products

Reliable, comparable, and verifiable information also plays an important part in enabling buyers to make more sustainable decisions and reduces the risk of 'greenwashing'

A sustainable product policy also has the potential to reduce waste significantly

Access to resources is also a strategic security question for Europe's ambition to deliver the Green Deal

Goal 13 the Commission will propose a carbon border adjustment mechanism, for selected sectors, to reduce the risk of carbon leakage

European 'Climate Law' for Climate Neutrality by 2050

The Commission will adopt a new, more ambitious EU strategy on adaptation to climate change

the Commission will propose a carbon border adjustment mechanism, for selected sectors, to reduce the risk of carbon leakage

To ensure a toxic-free environment, the Commission will present a chemicals strategy for sustainability

Goal 14 Protect, conserve and enhance the EU's natural capital

Increase the value given to protecting and restoring natural ecosystems

European farmers and fishermen are the key to managing the transition. The Farm to Fork Strategy will strengthen its efforts to tackle climate change, protect the environment, and preserve biodiversity

Continued

European food is famous for being safe, nutritious, and of high quality. It should now also become the global standard for sustainability

The Commission will work with the Member States to develop the potential of sustainable seafood as a source of low-carbon food

The strategic plans will need to reflect an increased level of ambition to reduce significantly the use and risk of chemical pesticides, as well as the use of fertilizers and antibiotics

The Commission will present a Biodiversity Strategy by March 2020, to be followed up by specific action in 2021

Work will continue under the common fisheries policy to reduce the adverse impacts that fishing can have on ecosystems, especially in sensitive areas

The role of oceans in mitigating and adapting to climate change is increasingly recognized

The Commission will also take a zero-tolerance approach to illegal, unreported, and unregulated fishing

The natural functions of ground and surface water must be restored. This is essential to preserve and restore biodiversity in lakes, rivers, wetlands, and estuaries, and to prevent and limit damage from floods

Goal15 EU Biodiversity Strategy 2030

The strategic plans will need to reflect an increased level of ambition to reduce significantly the use and risk of chemical pesticides, as well as the use of fertilizers and antibiotics

Goal16 The Commission will consider revising the Aarhus Regulation to improve access to administrative and judicial review at the EU level for citizens and NGOs who have concerns about the legality of decisions with effects on the environment. The Commission will also take action to improve their access to justice before national courts in all Member States. The Commission will also promote action by the EU, its Member States, and the international community to step up efforts against environmental crime

Goal17 Increased cross-border and regional cooperation will help achieve the benefits of the clean energy transition at affordable prices

Promoting new forms of collaboration with industry and investments in strategic value chains is essential

The Commission proposes to work with stakeholders on a new initiative on renovation in 2020. This will include an open platform bringing together the buildings and construction sector, architects and engineers, and local authorities to address the barriers to renovation

The Global Goals for Sustainable Development - Agenda 2030		P1	P2	P3	P4	P5	P6	P7	P8	P9
		Biodiversity	From Farm to Fork	Sustainable agriculture	Clean energy	Sustainable industry	Building and renovating	Sustainable mobility	Eliminating pollution	Climate action
Goal 1 - No Poverty										
Goal 2 - Zero Hunger										
Goal 3 - Good Health & Well Being										
Goal 4 - Quality Education										
Goal 5 - Gender Equality										
Goal 6 - Clean Water & Sanitation										
Goal 7 - Affordable & Clean Energy										
Goal 8 - Decent Work & Economic Growth										
Goal 9 - Industry, Innovation & Infrastructure										
Goal 10 - Reduced Inequalities										
Goal 11 - Sustainable Cities & Communities										
Goal 12 - Responsible Consumption & Production										
Goal 13 - Climate Action										
Goal 14 - Life Below Water										
Goal 15 - Life On Land										
Goal 16 - Peace Justice & Strong Institutions										
Goal 17 - Partnerships for the Goals										

Figure 4. linkage between each SDG to specific EGD policies. Source: prepared by the authors. Dark green—clear correlation between EGD Policies and SDGs; light green—indirectly derived relationship between EGD Policies and the SDGs; white cells—weak or no apparent relationship.

- The country's SDG Index, which measures each country's progress toward the SDGs while giving equal weight to all 17 targets;
- For the sake of comparability, the region's score on each SDG;
- An evaluation of SDG achievement or the nature of remaining challenges;
- The individual scores for each indicator under SDGs with Major Challenge to determine the root causes of poor performance.

Step 4. European Semester Process: Country-Specific Recommendations (CSR)

The European Commission periodically assesses the success of each Member State against particular goals in the Semester Process, the coordinated mechanism for integrating economic policies around the EU, and publishes a study with its conclusions as well as specific reform proposals, known as Country Specific Recommendations (CSRs) (EU Commission, 2020h).

The short-term recommendations for 2020 are divided into four major categories:

- Employment Pandemic Recovery/Healthcare System effectiveness
- Address the Social Impact of the Crisis
- Energy/Environment/Digital Transition
- Further Improvement of Structural Characteristics

As a result, for each of the 27 EU Member States, we gathered the Commission's CSRs in each of these four categories and prepared an overview similar to the one shown in Error! Reference source not found. in Annex I. Thus, for each of the 27 EU Member States, we collected the Commission's CSRs concerning each of these four categories and prepared a summary like the one shown in **Table 3**, found in Annex I.

Step 5. Cross-mapping CSRs-SDGs

Each CSR may be linked to any of the SDG metrics used in the UN Sustainable Development Report (SDR), either directly or indirectly. As a result, we determined the significance of and of the 115 SDR performance metrics listed in Step 3 with the CSRs classified in Step 4. **Table 4** provides an example.

Step 6. SDR country-specific challenges addressed by CSRs

Following the completion of Step 5, we concentrated on those policy domains defined by the SDR as posing "Major" or "Significant" remaining challenges by country and investigated if these are resolved by the European Commission's CSRs—see **Table 5**. If at least one SDR performance indicator is correlated with a particular CSR, we consider the CSRs urge a country's attention to this topic.

According to our findings, some of the 115 SDR success metrics are not included in any CSR. This is an important finding because one would believe that all of the SDGs with Major or Significant problems would have been reported and resolved by CSRs, but this is not the case. This implies that the CSR process does not capture all sustainability issues within EU member countries with total effectiveness.

Table 3. The four categories of country-specific recommendations made by the EU commission. Example of Greece. Source: Table prepared by the authors.

CSR Category 1	CSR Category 2	CSR Category 3	CSR Category 4
<i>Address Pandemic/Health System</i>	Employment/Decent Work/Reskill	Energy/Environment/Digital Transition	Further Improvement of Structural Characteristics
<i>Effectively address the COVID-19 pandemic, sustain the economy.</i>	1) Mitigate the employment and social impacts of the COVID-19 crisis, including by implementing measures such as short-time work schemes and ensuring effective activation support.	Focus investment on the green and digital transition, in particular on safe and sustainable transport and logistics, clean and efficient production and use of energy, environmental infrastructure, and very-high-capacity digital infrastructure and skills.	Completing reforms in line with the post-program commitments
<i>Strengthen the resilience of the health system and ensure adequate and equal access to healthcare.</i>	2) Swiftly deploy measures to provide liquidity and the continued flow of credit and other financings to the economy, focusing in particular on SMEs most affected by the crisis. 3) Front-load mature public investment projects and promote private investment to foster the economic recovery.	Improve the effectiveness and digitalization of the public administration and promote the digital transformation of businesses.	

Table 4. Relevance of each one of the 115 SDR performance indicators with the CSRs. Source: Table prepared by the authors

Goal	CSR_1 Address Pandemic- Health System	CSR_2 Employment- Decent Work- Reskill	CSR_3 Energy- Environment- Digital Transition	CSR_4 Improvement Structural Characteristics	Total
Goal 1-No Poverty					0
Goal 2-Zero Hunger					0
Goal 3-Good Health & Well Being	2	2			4
Goal 4-Quality Education			5		5
Goal 5-Gender Equality					0
Goal 6-Clean Water & Sanitation					0
Goal 7-Affordable & Clean Energy	3				3
Goal 8-Decent Work & Economic Growth			1		1
Goal 9-Industry, Innovation & Infrastructure			1		1
Goal 10-Reduced Inequalities					0
Goal 11-Sustainable Cities & Communities	2				2
Goal 12-Responsible Consumption & Production	2				2
Goal 13-Climate Action	2				2
Goal 14-Life Below Water					0
Goal 15-Life On Land					0
Goal 16-Peace Justice & Strong Institutions					0
Goal 17-Partnerships for the Goals	1	1		3	5
Total Number of relevant SDG indicators	12	3	7	3	25

Table 5. Identification of national “major challenges” in SDR that are addressed by CSRs. Source: Table prepared by the authors.

Goal	CSR_1 Address Pandemic/Health System	CSR_2 Employment/ Decent Work/Reskill	CSR_3 Energy-Environment/ Digital Transition	CSR_4 Improvement to Structural Characteristics	Total	SDSN Dashboard Assessment	Addressed By CSRs
Goal 1-No Poverty					0	Achieved	NO
Goal 2-Zero Hunger					0	Significant Challenges	NO
Goal 3-Good Health & Well Being	2	2			4	Challenges Remain	YES
Goal 4-Quality Education			5		5	Challenges Remain	YES
Goal 5-Gender Equality					0	Significant Challenges	NO
Goal 6-Clean Water & Sanitation					0	Challenges Remain	NO
Goal 7-Affordable & Clean Energy	3				3	Challenges Remain	YES
Goal 8-Decent Work & Economic Growth			1		1	Challenges Remain	YES
Goal 9-Industry, Innovation & Infrastructure			1		1	Significant Challenges	YES
Goal 10-Reduced Inequalities					0	Challenges Remain	NO
Goal 11-Sustainable Cities & Communities	2				2	Challenges Remain	YES
Goal 12-Responsible Consumption & Production	2				2	Major Challenges	YES
Goal 13-Climate Action	2				2	Major Challenges	YES
Goal 14-Life Below Water					0	grey	NO
Goal 15-Life On Land					0	Significant Challenges	NO
Goal 16-Peace Justice & Strong Institutions					0	Achieved	NO
Goal 17-Partnerships for the Goals	1	1		3	5	Major Challenges	YES
Total Number of relevant SDG indicators	12	3	7	3	25		

Step 7. Identification of Priority EGD policy areas addressing major challenges

This stage integrates the mapping of SDGs to EGD Policies stated in Step 2 with the mapping of CSRs and Major/Significant Challenges performed in Step 6 for each Member State. As a result, we recommend a country-specific prioritization for EGD policy enforcement. Policies associated with Major-Challenge-SDGs are usually prioritized first, preceded by policies in realms associated with SDGs labeled as “Significant Challenges.”

4. Results

Steps 1-7 of the 3D mapping technique outlined in Section 2.1 have been extended to each EU Member state (Annex I). This section presents some of the analysis’s overall EU-wide findings.

According to the UN Sustainable Development Report, Major Problems for the majority of the EU-27 Countries can be found in the policy realms of SDGs 12, 13, and 14, while the majority of Significant Challenges (i.e., challenges of marginally lower priority) are covered by SDGs 2, 5, and 9 (Table 6). It is also important to note that 16 of the EU's 27 member states have reached SDG 1 of Zero Poverty.

The key finding from Step 6 of the study, which connects SDGs and CSRs, is that CSRs as part of the European Semester Process is very effective in solving the problems found in the UN Sustainable Development Report—but there is space for more progress so that the European Semester will lead to CSRs that are more compatible with SDGs.

As seen in Table 7, after removing 45 Goals attained by certain European countries, CSR has tackled 300 out of 414 ($17 \text{ SDGs} \times 27 \text{ countries} = 459 - 45 = 414$) evaluations of the degree of achievement of the 17 SDGs. This results in an estimated efficiency ratio of 72 percent, implying that the European Semester

Table 6. Match between the SDR challenges and the SDGs. Source: Table prepared by the authors.

<i>Goal</i>	Major Challenges	Significant Challenges	Challenges Remain	Achieved	Unavailable Info	Total
<i>Goal 1-No Poverty</i>	0	2	9	16		27
<i>Goal 2-Zero Hunger</i>	10	17	0	0		27
<i>Goal 3-Good Health & Well Being</i>	0	8	17	2		27
<i>Goal 4-Quality Education</i>	1	10	12	4		27
<i>Goal 5-Gender Equality</i>	0	16	10	1		27
<i>Goal 6-Clean Water & Sanitation</i>	0	6	18	3		27
<i>Goal 7-Affordable & Clean Energy</i>	2	8	12	5		27
<i>Goal 8-Decent Work & Economic Growth</i>	0	7	19	1		27
<i>Goal 9-Industry, Innovation & Infrastructure</i>	6	17	4	0		27
<i>Goal 10-Reduced Inequalities</i>	4	8	13	2		27
<i>Goal 11-Sustainable Cities & Communities</i>	0	9	18	0		27
<i>Goal 12-Responsible Consumption & Production</i>	17	10	0	0		27
<i>Goal 13-Climate Action</i>	24	2	1	0		27
<i>Goal 14-Life Below Water</i>	11	9	2	0	5	27
<i>Goal 15-Life On Land</i>	0	8	13	6		27
<i>Goal 16-Peace Justice & Strong Institutions</i>	0	10	13	4		27
<i>Goal 17-Partnerships for the Goals</i>	9	12	5	1		27
Total	84	159	166	45	5	459

Table 7. Efficiency ratio of EU semester process to capture challenges identified by SDR. Source: Table prepared by the authors.

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

Process can currently address more than 7 of the 10 vulnerabilities found by the Sustainable Development Report.

Table 8 summarizes the CSR-SDG Correspondence Index for each EU-27 Member State, concentrating solely on SDGs for which the SDR recognizes either Major or Significant Challenges.

Table 9 shows the prioritization for the execution of each of the European Green Deal policy domains, as extracted from our country-specific review and discussed in Step 6 of Section 2.2. The main point is that policies aligned with an environmentally friendly food system ("From farm to fork"), sustainable industry, emission reduction, and climate change are likely to have the greatest effect on most countries and therefore must be prioritized. These policies are Policies P2, P5, P8, and P9 of the European Green Deal, i.e., those associated with an environmentally friendly food system ("From farm to fork"), sustainable industry, pollution elimination, and climate action, respectively.

5. Conclusion

The primary goal of this paper is to propose a 3-D Mapping approach for identifying dependency and assessing consistency between the European Semester Process's Country Specific Recommendations (CSRs), the 17 Sustainable Development Goals (SDGs), and the European Green Deal.

Our approach demonstrated that CSRs effectively resolve the challenges found by the SDSN's Sustainable Development Report concerning SDG achievement. In other words, CSRs satisfactorily capture the problems that European countries face.

However, there is potential for progress for Recommendations to completely match the SDSN Sustainable Report Dashboard's evaluation. As a result, there would be a more precise connection with the National Plans that the Member States would produce to meet the Sustainable Development and European Green

Table 8. CSR-SDG Correspondence Index per country. Source: Table prepared by the authors.

Country	Total Significant and Major Challenges	Not addressed by CSR	Addressed by CSR	Overall Efficiency ratio
Austria	7	3	4	57%
Belgium	10	4	6	60%
Bulgaria	12	2	10	83%
Croatia	8	2	6	75%
Cyprus	7	1	6	86%
Czech Republic	9	2	7	78%
Denmark	5	3	2	40%
Estonia	8	2	6	75%
Finland	6	2	4	67%
France	9	1	8	89%
Germany	8	3	5	63%
Greece	15	3	12	80%
Hungary	10		10	100%
Ireland	8	2	6	75%
Italy	12	2	10	83%
Latvia	11	4	7	64%
Lithuania	14	3	11	79%
Luxembourg	12	5	7	58%
Malta	8	2	6	75%
Netherlands	8	3	5	63%
Poland	10	2	8	80%
Portugal	8	4	4	50%
Romania	9	3	6	67%
Slovak Republic	10	1	9	90%
Slovenia	6		6	100%
Spain	9	3	6	67%
Sweden	4	2	2	50%
Grand Total	243	64	179	74%

Deal Agenda.

According to Country-Specific Analysis, EGD Policy areas such as P2 (From farm to fork), P5 (sustainable industry), P8 (elimination of pollution), and P9 (climate action) are demonstrated with a higher priority for implementation.

With regards to each CSR category, we could conclude that:

- CSR Category 3 calls for investments in green and digital transitions that are

Table 9. Prioritization of the European Green Deal Policies per country. Source: prepared by the authors.

Prioritization of EGD Policies for each Country.	P1 Biodiversity	P2 From Farm to Fork	P3 Sustainable agriculture	P4 Clean energy	P5 Sustainable industry	P6 Building and renovating	P7 Sustainable mobility	P8 Eliminating pollution	P9 Climate action
Austria	B	B	B	A	A	A		A	A
Belgium	A	A	B	B	A	B		A	A
Bulgaria	B	A	B	B	B	A	B		B
Croatia		A		B	B	A	B	B	B
Cyprus	B	B		A	A	A	B	A	A
Czech Republic	B	B	B	A	A	A		A	A
Denmark	A	A			A	B	B	A	A
Estonia		A	B	B	A	B		A	A
Finland	B	B		B	A	B		A	A
France	B	B		B	A	B		A	A
Germany		B			A			A	A
Greece	B	B	B	B	B	B	B	A	A
Hungary		A	B	A	A	B		A	A
Ireland	B	B		A	A	A		A	A
Italy	A	A	B	A	A	B	B	A	A
Latvia	A	A	B	A	A	A	B	A	A
Lithuania	B	A	B	A	A	A	B	A	A
Luxembourg	B		B	A	A	A	B	A	A
Malta	A	A	B	A	A	A		A	A
Netherlands	A	A	B	A	A	A		A	A
Poland	A	A		A	A	A		A	A
Portugal	A	A		B	B	B		A	A
Romania	A	A	B	B	B	A	B	B	A
Slovak Republic		A		A	A	B		A	A
Slovenia	A	A		B	A	B		A	A
Spain		A						B	B
Sweden		B			A			A	A

A—High Priority; B—Next Priority; Blank—Not relevant.

compliant with the EU Commission's guidelines for the majority of Member States that can serve SDGs, strengthen Dashboard vulnerabilities, and EGD Policies all at the same time.

- CSR Category 4 does not directly represent the EGD Policies, but it will aid in their execution by increasing accountability in public and private programs. This group is consistent with SDG Dashboard's evaluation, which states that despite the success, substantial problems remain in terms of sys-

temic and structural changes to promote robust and sustained economic development for the majority of Member States. Members of the European South, in particular, have succeeded in committing concrete steps relating to labor and product prices, privatization, the operation of the judicial system, public administration, and anti-corruption processes since completing the Programs enacted during the last decade.

- CSR Category 2 will be used to address gaps in the SDGs evaluation (according to SDSN Dashboard). In the same way, as CSR4 can strengthen (indirectly) the effort for EGD Policy implementation, CSR4 can reinforce (indirectly) the effort for EGD Policy implementation.
- Last but not least, CSR Category 1 aims to fix inefficiencies caused by the unprecedented pandemic. It has the potential to exacerbate the shortcomings of SDG3 implementation in the many Member States, especially in terms of fair access to healthcare. Even if several European Member States do well in this Goal (according to the SDSN Dashboard), some challenges remain. CSR Categories 3 and 1 should work together to ensure a more successful pathway of digital facilities delivered through a new and just healthcare framework.

Future Directions

Future directions in cross-mapping the SDGs, EGD Laws, and Country Specific Recommendations which include the incorporation of additional sustainability-related policies, such as the newly introduced Climate Law, the EU Taxonomy and its Delegated Act, and the forthcoming National Plans for the use and equitable distribution of the Resilience Recovery Fund (RRF).

Using Machine Learning tools, this may be achieved automatically. Several European and global policies may thus be tested for their efficacy in reflecting particular facets of Agenda 2030 in a consistent and timely manner. Techniques such as Bag-of-words, Text similarities, Text classification, Support Vector Machines, K-nearest neighbors (KNN) algorithm, and text mining methods can detect and match sustainability information across different sustainability strategies and policy documents.

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<https://resources.unsdsn.org/transformations-for-the-joint-implementation-of-agenda-2030-the-sustainable-development-goals-and-the-european-green-deal-a-green-and-digital-job-based-and-inclusive-recovery-from-covid-19-pandemic>

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Supplementary Material (Result Tables)

Annex I-“Detailed Member States’ results on the Methodology for Country-Specific 3-D Mapping of SDGs, EGD Policies, and the European Semester Process”, is an integral part of this Report and is available for download at the link:

https://irp-cdn.multiscreensite.com/be6d1d56/files/uploaded/ANNEX%20I_Member%20States%203D%20Mapping%20detailed%20results_final.pdf